# IRE

# DIRECTORY

# 1961

- A Radio Engineer's Directory
- A Comprehensive Listing of Manufacturers and Products

The Institute of Radio Engineers


FOR YOUR SPECIAL APPLICATIONS

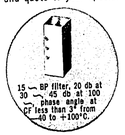
The bulk of UTC production is on special units designed to specific customers' needs. Illustrated below are some typical units and some unusual units as manufactured for special applications. We would be pleased to advise and quote to your special requirements.



FILTERS — All types for frequencies from .1 cycle to 400 MC.



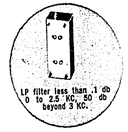
400 ~ telemetering, 3 db at ± 7.5%, 40 db at 230 and 700 ~ 9/16 x 1¼ x 2"



15 ~ BP filter, 20 db at 30 ~, 45 db at 100 ~, phase angle at CF less than 3° from -40 to +100°C.



LP filter within .1 db to .49 KC, stable to .1 db from 0 to 8.5KC, 45 db at 55 KC.



LP filter less than .1 db 0 to 2.5 KC, 50 db beyond 3 KC.

PULSE TRANSFORMERS — From miniature blocking oscillator to 10 megawatt.



Wound core unit .01 micro-second rise time.



Pulse current transformer 100 Amp.

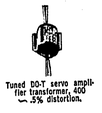


Pulse output to magnatron, bifilar filament.



Precise wave shape pulse output, 2500 V. 3 Amps.

HIGH Q COILS — Toroid, laminated, and cup structures from .1 cycle to 400 MC.



Tuned DO-T servo amplifier transformer, 400 ~ .5% distortion.



Toroid for printed circuit, Q of 90 at 15 KC.



Dual toroid, Q of 75 at 10 KC, and Q of 120 at 5 KC.



HVC tapped variable inductor for 3 KC oscillator.

SPECIALTIES — Saturable reactors, reference transformers, magnetic amplifiers, combined unit.



RF saturable inductor for sweep from .17 MC to 21 MC.



Voltage reference transformer .05% accuracy.

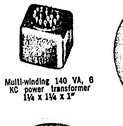


Multi-control magnetic amplifier for airborne servo.



Input, output, two tuned interstages, peaking network, and BP filter, all in one case.

POWER COMPONENTS — Standard and high temperature, hermetic, sealed, and encapsulated.



Multi-winding 140 VA, 6 KC power transformer 1¼ x 1¼ x 1"



200° C. power transformer, 400 ~, 150 VA.



400 ~ scope transformer, 20 KV output.



60 ~ current limiting filament transformer, Sec. 25 Watts, 10 KV hipot.



MORE THAN OVER 1,000 STOCK ITEMS with UTC High Reliability

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# 1961 IRE DIRECTORY

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1 East 79 Street, New York 21, N.Y.

PRINTED IN THE UNITED STATES OF AMERICA

# THE INSTITUTE OF RADIO ENGINEERS
## 1960

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# THE IRE

THE INSTITUTE OF RADIO ENGINEERS, founded through the efforts of three far-seeing engineers, Dr. A. N. Goldsmith, J. V. L. Hogan, and R. H. Marriott, has grown from its original roster of less than fifty members gained by the merger of two small professional societies in 1912, to an international membership of 82,000. It is an incorporated, nonprofit organization established for the advancement of the theory and practice of radio and electronics, including allied branches of engineering and the related arts and sciences.

The IRE publishes technical papers, reports, and general information of interest to electronics engineers. It holds meetings and discussions throughout the United States, Canada, and several countries abroad, and maintains committees for collating and standardizing the results of technical research and development. Among the fields covered are radio communication, sound broadcasting, television, marine and aerial guidance, electron devices, radio-frequency measurements, engineering education, electron optics, sound and picture electrical recording and reproduction, power and manufacturing applications of radio and electronic technique, industrial electronic control and processes, medical electrical research and applications.

The management of the Institute of Radio Engineers resides in a Board of Directors selected from the body of Fellows and Senior Members, acting through an Executive Committee and the officers of the IRE. The President and Vice-Presidents are elected annually from the body of Fellows and Senior Members.

Membership in the IRE is contingent upon experience and achievement in radio engineering and allied fields. The grade of Fellow is one of distinction, and appointment thereto by the Board of Directors is made on the basis of eminence and distinguished service. Other grades—Senior Member, Member, Associate, and Student—are filled from applicants whose age, experience, and attainments conform to the respective requirements set forth in Bylaw 203 on page 9. An application blank appears on pages 21–24.

## COMMITTEES*

The IRE has established some twenty-five technical committees covering specialized fields of radio engineering. Through the IRE, these committees (sometimes in collaboration with technical committees of other engineering societies) publish standards of accepted definitions of terms, and methods of measurements of physical quantities used in radio engineering practices.

## CONVENTIONS AND MEETINGS

Each year the IRE holds an international convention for its entire membership, during which technical papers are presented and the latest electronic equipment is displayed. Numerous additional meetings, many with exhibits, are held throughout the year by IRE Regions, Sections, and Professional Groups.

## SECTIONS†

Sections have been established throughout the United States, Canada, Egypt, Israel, Japan, Argentina, Brazil, Colombia, Italy, India, and the Benelux countries, to hold meetings under the aegis of the IRE. The Sections of the IRE are grouped into eight Regions, and each Region is represented on the Board of Directors by a Regional Director elected bi-annually from, and by, the membership of the respective Region.

## PROFESSIONAL GROUPS†

To serve many special fields of interest, Professional Groups have been formed on an Institute-wide basis in each of twenty-eight technical fields. These Groups organize meetings and conferences on subjects of special interest to their members. They issue technical publications called TRANSACTIONS to provide a means for ensuring their membership proper coverage of their fields in the publications of the IRE, and for promoting recognition of their leaders among the IRE membership at large.

## PUBLICATIONS OF THE IRE

### PROCEEDINGS OF THE IRE

Perhaps the most important single activity of the Institute is the publication of a technical journal. The first issue of the PROCEEDINGS OF THE INSTITUTE OF RADIO ENGINEERS appeared in 1913. Established first as a quarterly, since 1927 the PROCEEDINGS has been published in twelve numbers annually. In 1939, the name of the journal was shortened to PROCEEDINGS OF THE IRE.

The PROCEEDINGS OF THE IRE is the official publication of the Institute of Radio Engineers. In it appear technical papers, discussions, and communications approved by the Editorial Reviewers and Managing Editor, as well as IRE Standards prepared by the technical committees.

To date, over 7000 papers on advanced research topics have been published in PROCEEDINGS, including mathematico-physical analyses of engineering problems, current engineering developments of equipment and methods, and commercial applications of engineering methods and products, historical papers, and tutorial papers covering specific aspects of radio and electronic engineering. In addition, space is devoted to news, book reviews, new products, and abstracts of papers published in technical publications the world over. The PROCEEDINGS OF

* A list of Committees appears in the June and October issues of PROCEEDINGS OF THE IRE.

† A list of Sections and Professional Groups and their officers appears bi-monthly in PROCEEDINGS OF THE IRE.

THE IRE is mailed gratis to all members; subscription price to nonmembers is $18.00 per year, $19.00 to foreign destinations.

### IRE Transactions

Each of the twenty-eight IRE Professional Groups publishes its own technical publication, called TRANSACTIONS, covering developments of particular interest within its own specialized field. The TRANSACTIONS is sent free to all paid members of the Professional Group. Frequency of issue varies from Group to Group, and ranges from one to six issues per year.

### IRE Convention Records

The IRE annually publishes two Convention Records, one containing the papers presented at the IRE International Convention in New York, and the other for the WESCON meeting on the West Coast. They are known as the IRE INTERNATIONAL CONVENTION RECORD and the IRE WESCON CONVENTION RECORD, respectively. Each RECORD is issued in several Parts.

### Yearbooks and Directories

The first Yearbook was published in 1914, the second in 1916, and then annually between 1926 and 1932. Yearbooks were then published in 1937, 1942, and 1946. With the 1948 Yearbook, annual publication was resumed. In 1950 its name was changed to "Directory."

### Standards

Standardization reports have been issued since 1913. Early reports were confined to the definition of technical terms and standard graphical symbols. Current reports include methods of testing equipment and measuring electronics quantities, and letter symbols and mathematical notation. Starting in 1949, IRE Standards have been published in the PROCEEDINGS, rather than as separate reports, to make them available to all members at no extra charge. Also, they are available in reprint form.

## AWARDS

The IRE bestows seven awards, six annual and one nonannual, in recognition of outstanding technical and administrative achievements in the field of radio communication.

### Medal of Honor

The Medal of Honor is given annually in recognition of outstanding scientific or engineering achievements in the fields of activity of the IRE. The recipient is named by the Board of Directors upon the recommendation of the Awards Committee.

*Recipients of the Medal of Honor*

| | | | |
|---|---|---|---|
| E. H. Armstrong | 1917 | A. G. Lee | 1939 |
| E. F. W. Alexanderson | 1919 | Lloyd Espenschied | 1940 |
| Guglielmo Marconi | 1920 | A. N. Goldsmith | 1941 |
| R. A. Fessenden | 1921 | A. H. Taylor | 1942 |
| Lee deForest | 1922 | William Wilson | 1943 |
| John Stone Stone | 1923 | Haradan Pratt | 1944 |
| M. I. Pupin | 1924 | H. H. Beverage | 1945 |
| G. W. Pickard | 1926 | R. V. L. Hartley | 1946 |
| L. W. Austin | 1927 | L. C. F. Horle | 1948 |
| Jonathan Zenneck | 1928 | Ralph Brown | 1949 |
| G. W. Pierce | 1929 | F. E. Terman | 1950 |
| P. O. Pedersen | 1930 | V. K. Zworykin | 1951 |
| G. A. Ferré | 1931 | W. R. G. Baker | 1952 |
| A. E. Kennelly | 1932 | John M. Miller | 1953 |
| J. A. Fleming | 1933 | William L. Everitt | 1954 |
| S. C. Hooper | 1934 | Harald T. Friis | 1955 |
| Balth. van der Pol | 1935 | John V. L. Hogan | 1956 |
| G. A. Campbell | 1936 | Julius A. Stratton | 1957 |
| Melville Eastham | 1937 | Albert W. Hull | 1958 |
| J. H. Dellinger | 1938 | E. Leon Chaffee | 1959 |
| | | Harry Nyquist | 1960 |

### Founders' Award

The Founders' Award is bestowed on special occasions only, for outstanding leadership in planning and administration of important technical developments. Recipient is named by the Board of Directors upon the recommendation of the Awards Committee.

*Recipients of the Founders' Award*

| | |
|---|---|
| David Sarnoff | 1953 |
| Alfred N. Goldsmith | 1954 |
| Raymond A. Heising | 1957 |
| W. R. G. Baker | 1958 |
| Haraden Pratt | 1960 |

### Vladimir K. Zworykin Television Prize

The Vladimir K. Zworykin Television Prize will be awarded annually for twenty (20) times beginning in 1952 to that member who makes the most important technical contribution to electronic television during the preceding three calendar years, or the importance of whose contribution to electronic television shall have been realized during this period.

The award consists of a citation and a check for $500 drawn from a fund of $10,000 donated to the Institute by Vladimir K. Zworykin to encourage outstanding technical developments in fully electronic television. Recipient is named by the Board of Directors upon recommendation of the Awards Committee.

*Recipients of the Valdimir K. Zworykin Television Prize*

| | | | |
|---|---|---|---|
| B. D. Loughlin | 1952 | Frank J. Bingley | 1956 |
| Frank Gray | 1953 | Donald Richman | 1957 |
| Alda V. Bedford | 1954 | Charles P. Ginsburg | 1958 |
| Harold B. Law | 1955 | Paul Weiner | 1959 |

### Morris Liebmann Memorial Prize

The Morris Liebmann Memorial Prize was originally based on an endowment by E. J. Simon to preserve the memory of Colonel Morris N. Liebmann, who gave his life in the first World War. The award consists of a certificate and a monetary award. It is given annually to a member of the Institute who, in the opinion of the Board of Directors, upon the recommendation of the Awards Committee, shall have made an important contribution to the radio art.

*Recipients of the Morris Liebmann Memorial Prize*

| | | | |
|---|---|---|---|
| L. F. Fuller | 1919 | H. A. Wheeler | 1940 |
| R. A. Weagant | 1920 | P. T. Farnsworth | 1941 |
| R. A. Heising | 1921 | S. A. Schelkunoff | 1942 |
| C. S. Franklin | 1922 | W. L. Barrow | 1943 |
| H. H. Beverage | 1923 | W. H. Hansen | 1944 |
| J. R. Carson | 1924 | P. C. Goldmark | 1945 |
| Frank Conrad | 1925 | Albert Rose | 1946 |
| Ralph Bown | 1926 | J. R. Pierce | 1947 |
| A. H. Taylor | 1927 | S. W. Seely | 1948 |
| W. G. Cady | 1928 | C. E. Shannon | 1949 |
| E. V. Appleton | 1929 | O. H. Schade | 1950 |
| A. W. Hull | 1930 | R. B. Dome | 1951 |
| Stuart Ballantine | 1931 | William Shockley | 1952 |
| Edmond Bruce | 1932 | John A. Pierce | 1953 |
| Heinrich Barkhausen | 1933 | Robert R. Warnecke | 1954 |
| V. K. Zworykin | 1934 | Arthur V. Loughren | 1955 |
| F. B. Llewellyn | 1935 | Kenneth Bullington | 1956 |
| B. J. Thompson | 1936 | Oswald G. Villard, Jr. | 1957 |
| W. H. Doherty | 1937 | Edward L. Ginzton | 1948 |
| G. C. Southworth | 1938 | Nicolaas Bloembergen | 1959 |
| H. T. Friis | 1939 | Charles H. Townes | 1959 |
| | | J. A. Rajchman | 1960 |

### Browder J. Thompson Memorial Prize

The Browder J. Thompson Memorial Prize, established in 1945, is given annually to the author or joint authors under thirty years of age at date of submission of original manuscript for that paper of sound merit recently published in the technical publications of The Institute of Radio Engineers, and which, in the opinion of the Board of Directors, upon the recommendation of the Awards Committee, constitutes the best combination of technical contribution to radio and electronics, and presentation of the subject.

The award comprises the income from a fund established by voluntary contributions to preserve the memory of Browder J. Thompson, a Director of the Institute killed in action in World War II while on a special mission for the Secretary of War.

*Recipients of the Browder J. Thompson Memorial Prize*

| | | | |
|---|---|---|---|
| G. M. Lee | 1946 | Richard C. Boonton, Jr. | 1953 |
| C. L. Dolph | 1947 | R. L. Petritz | 1954 |
| W. H. Huggins | 1948 | Blanchard D. Smith, Jr. | 1955 |
| R. V. Pound | 1949 | Jack E. Bridges | 1956 |
| J. F. Hull | 1950 | Dudley A. Buck | 1957 |
| A. W. Randalls | 1950 | Arthur Karp | 1958 |
| A. B. Macnee | 1951 | Franklin H. Blecher | 1959 |
| H. W. Welch, Jr. | 1952 | J. W. Gewartowski | 1960 |

### Harry Diamond Memorial Award

The Harry Diamond Memorial Award, established in 1949, is given annually to a person or persons in Government service for outstanding contributions in the field of radio or electronics, as evidenced by publication in professional society journals such as the PROCEEDINGS OF THE IRE, or journals of similar standing. The award consists of a certificate provided for from proceeds of a fund established by friends who felt that the professional life of Harry Diamond, a Fellow of the Institute, exemplified the highest type of scientific effort in government service. Recipient of the award is named by the Board of Directors upon the recommendation of the Awards Committee.

*Recipients of the Harry Diamond Memorial Award*

| | | | |
|---|---|---|---|
| A. W. Haeff | 1950 | Barnard Salzberg | 1955 |
| M. J. E. Golay | 1951 | Wilbur S. Hinman | 1956 |
| Newbern Smith | 1952 | Georg Goubau | 1957 |
| Robert M. Page | 1953 | Edward W. Allen, Jr. | 1958 |
| Harold A. Zahl | 1954 | Jack W. Herbstreit | 1959 |
| | | K. A. Norton | 1960 |

### W. R. G. Baker Award

The W. R. G. Baker Award is given annually to the author or authors of the most outstanding paper published in the IRE TRANSACTIONS of the Professional Groups. The award consists of a certificate and a monetary award derived from the income of a fund donated to the IRE by W. R. G. Baker, Chairman of the IRE Professional Groups Committee since 1950. The recipient of the award is named by the Board of Directors upon the recommendation of the Awards Committee.

*Recipients of the W. R. G. Baker Award*

| | | | |
|---|---|---|---|
| Réymond J. Kircher | 1957 | R. L. Kyhl | 1958 |
| Robert L. Trent | 1957 | H. F. Webster | 1958 |
| D. Robert Fewer | 1957 | Richard D. Thornton | 1959 |
| | | E. J. Nalos | 1960 |

# THE INSTITUTE OF RADIO ENGINEERS

(Incorporated)

# CONSTITUTION

*(Effective April 20, 1959)*

## ARTICLE I

### NAME AND OBJECT

SEC. 1—The name of this organization shall be The Institute of Radio Engineers, Incorporated, hereinafter called the IRE.

SEC. 2—Its objects shall be scientific, literary, and educational. Its aims shall include the advancement of the theory and practice of electronics, radio, allied branches of engineering, and of the related arts and sciences, their application to human needs, and the maintenance of high professional standards among its members. Among the means to this end shall be the holding of meetings for the reading and discussion of professional papers and the publication of papers, discussions, communications, and such other matters as may be appropriate for the fulfillment of its objects.

SEC. 3—The territory in which its operations are to be conducted is the United States of America and other countries.

## ARTICLE II

### MEMBERSHIP

SEC. 1—The membership of the IRE shall consist of members qualified to hold professional membership grades, who shall be designated as voting members, and members admitted to non-professional grades, who shall be designated as non-voting members.

SEC. 2—The grades of membership and the member qualifications for each and the requirements for admission, transfer, and severance of members shall be specified in the Bylaws.

## ARTICLE III

### DEFINITIONS

SEC. 1—The term "member" when printed without an initial capital, where used in this Constitution and the Bylaws, includes all grades of membership. The term "voting member" where used in this Constitution and the Bylaws means a member entitled to vote on IRE matters.

SEC. 2—The term "allied" as used in this Constitution and the Bylaws refers to electronics, electrical communication, radio, and such other technical fields as are directly contributory to, or derived from, electrical science.

SEC. 3—The term "Bylaw" as used in this Constitution refers to any Bylaws adopted by the Board of Directors as herein set forth and amended as hereinafter provided.

## ARTICLE IV

### DUES AND FEES

SEC. 1—Dues and fees shall be specified in the Bylaws.

SEC. 2—Under exceptional circumstances, the payment of dues and fees may be deferred or waived in whole or in part by the Board of Directors.

## ARTICLE V

### ANNUAL ASSEMBLY, BOARD OF DIRECTORS, AND PRESIDENT

SEC. 1—There shall be an annual Assembly composed of Delegates elected by the voting members. The annual Assembly shall receive reports and perform such other functions as required by law or specified in the Bylaws.

SEC. 2—There shall be a Board of Directors which shall be the governing body of the IRE, shall manage its affairs, and shall consist of Directors elected by the voting members and Directors elected by the annual Assembly. These Directors shall include the President and the two most recent Past Presidents.

SEC. 3—The election by the voting members of each Delegate shall signify the election of the same individual as a Director.

SEC. 4—The President shall be elected by the voting members, by virtue of which election he shall also be a Delegate-at-large and a Director-at-large.

## ARTICLE VI

### DELEGATES, DIRECTORS, AND OFFICERS

SEC. 1—The number of Directors elected by the voting members together with the number of Directors elected by the annual Assembly shall be not less than nine nor more than fifty, but in no case below the minimum prescribed by law. The number of Directors elected by the voting members shall not be less than two-thirds of the total number.

SEC. 2—All of the Directors shall be of full age and at least one shall be a citizen of the United States and a resident of the State of New York.

SEC. 3—The term of each Delegate elected by the voting members shall run concurrently with the term of his office as Director and shall be not less than two nor more than five years, except that the term of office of the President as a Delegate-at-large and Director-at-large shall be three years, and such terms of office of such Delegates and Directors shall begin with the first annual Assembly after their election and acceptance.

The terms of office of Directors elected by the annual Assembly shall be one year.

SEC. 4—The United States and Canada and other areas, at the discretion of the Board of Directors, shall be divided into geographical districts known as Regions, which shall be specified in the Bylaws. The voting members of each Region shall elect a Delegate to the annual Assembly designated as its Regional Delegate who shall also by virtue of such election be a Director designated as its Regional Director. The election of Regional Delegates and Regional Directors under this paragraph shall be conducted as specified in the Bylaws.

The voting members of the IRE shall elect Delegates to the annual Assembly designated as Delegates-at-large who shall also by virtue of such election be Directors-at-large. The number of Directors-at-large elected by the voting members shall not be less than the number of Regional Directors.

The number and method of election of Delegates-at-large and Directors-at-large shall be specified in the Bylaws.

SEC. 5—If the Directors shall not be elected on the day designated by law or fixed in the Bylaws, the corporation shall not for that reason be dissolved; but every Director shall continue to hold his office and discharge his duties until his successor has been elected.

SEC. 6—The Corporate Officers of the IRE shall be the President, one or more Vice Presidents as specified in the Bylaws, the Secretary, the Treasurer, and the Editor.





SEC. 7—The terms of office for all Corporate Officers shall begin with the annual meeting of the Board of Directors and shall terminate at the beginning of the following annual meeting of the Board of Directors or at such time as their successors are elected and accept.

SEC. 8—The terms of office of the Vice Presidents, Secretary, Treasurer, and Editor, as Directors shall be one year.

SEC. 9—No Corporate Officer or Director shall receive, directly or indirectly, any salary, traveling expenses, compensation, or emolument from the IRE either as such Officer or Director or any other capacity, unless authorized by the Bylaws or by the concurring vote of two-thirds of all the Directors at a regularly constituted meeting.

No Director or other Officer shall be interested, directly or indirectly, in any contract relating to the operations of the IRE, nor in any contract for furnishing supplies thereto, unless authorized by the Bylaws or by the concurring vote of two-thirds of the Directors at a regularly constituted meeting.

## ARTICLE VII

### MANAGEMENT

SEC. 1—The President shall be the regular presiding officer at meetings of the Board of Directors and the annual Assembly. He shall be an ex-officio member of each committee.

A Vice President shall assume the duties of the President in the absence or incapacity of the President, as specified in the Bylaws. Duties of Vice Presidents and the order of priority regarding assumption of presidential duties shall be specified in the Bylaws.

In the event of the absence or incapacity of both the President and all of the Vice Presidents, the Board of Directors shall elect a chairman from its membership who shall perform the presidential duties during such absence or incapacity of the President and all of the Vice Presidents. The tenure of such temporary chairman shall be at the discretion of the Board of Directors provided, however, that said temporary chairman shall not serve longer than the unexpired term of the incumbent President.

SEC. 2—The Secretary shall be responsible for the preparation of all meetings of the Board of Directors, the annual Assembly, and all principal meetings of the IRE. He shall be responsible for the keeping of full records of all the meetings and activities of the IRE, the records of the membership, such other records as are required by law, and shall be responsible for the provision of such information from them as is requested by the Board of Directors.

SEC. 3—The Treasurer, under the control of the Board of Directors, shall have general supervision of the fiscal affairs of the IRE and shall be responsible for the keeping of records thereof.

SEC. 4—All funds received by the IRE shall be deposited in an account requiring the signatures of at least two of the Corporate Officers for withdrawal. The Board of Directors shall designate those Corporate Officers authorized to execute such withdrawals.

SEC. 5—The number of Directors required to constitute a quorum shall be stated in the Bylaws but shall not be less than one-third of the total number of Directors.

SEC. 6—The number of Delegates required to constitute a quorum at the annual Assembly shall be stated in the Bylaws but shall not be less than one-third of the total number of Delegates or if one-third be nine or more, not less than nine.

SEC. 7—The chairman of the Board of Directors shall have no vote on the Board unless the votes of the other Directors present are equally divided.

SEC. 8—The chairman of the annual Assembly shall have no vote on the Assembly unless the votes of the other Delegates present are equally divided.

SEC. 9—The Board of Directors may make, amend, or revoke the Bylaws made by the IRE. Proposed Bylaws changes and reasons therefore shall be mailed to all IRE Directors at least twenty days before the stipulated meeting of the Board of Directors at which the vote shall be taken. Two-thirds of all votes cast at that meeting shall be required to approve any new Bylaw, amendment, or revocation.

SEC. 10—All committees unless otherwise provided for in the Bylaws, shall be appointed by the Board of Directors in such manner as the Board of Directors may designate.

SEC. 11—The fiscal year of the IRE shall be defined in the Bylaws.

## ARTICLE VIII

### NOMINATION AND ELECTION OF OFFICERS, DIRECTORS AND DELEGATES

SEC. 1—On or before July first of each year, the Board of Directors shall submit to all voting members a list of nominees for Delegates, Directors, the President, and such Officers as may be specified in the Bylaws to be elected by the voting members for the coming term, in accordance with the Bylaws. Submission may be by publication.

SEC. 2—Nomination by petition may be made by letter to the Board of Directors setting forth the name of the proposed candidate and the office for which the candidate is desired to be nominated, provided such letter is received at the general offices of the IRE no later than 12 o'clock noon on the Friday prior to August fifteenth. Such a petition shall be signed by at least one per cent of the total number of voting members as listed in the official membership records of the IRE at the end of the previous year, but in no case shall the number be less than one hundred.

SEC. 3—On or before September first, the Board of Directors shall submit to all voting members as of August fifteenth, a ballot listing all nominees to be voted upon by the voting members, in accordance with the Bylaws.

SEC. 4—The annual Assembly of the IRE shall elect additional Directors and such of the Corporate Officers as shall also serve as Directors, as provided by the Bylaws. Other Corporate Officers as specified in the Bylaws shall be elected by the Board of Directors.

SEC. 5—The Board of Directors is authorized to fill a vacancy occurring in the Board of Directors or among the Corporate Officers for a period not to exceed the unexpired term of the office becoming vacant, provided, that if a vacancy shall occur in the office of a Regional Director, then the gegoraphical Region which elected such Director shall have the right to elect a Director to serve the remainder of such term. If such geographical Region shall fail to elect a Director within sixty days after notice of such vacancy, as provided in the Bylaws, then the same may be filled by the Board of Directors.

SEC. 6—The existence of vacancies in the Board of Directors or among the Corporate Officers shall be determined by the Board of Directors in accordance with the Bylaws.

## ARTICLE IX

### MEETINGS

SEC. 1—There shall be an annual Assembly of Delegates-at-large and Regional Delegates of the IRE during January of each year. The President of the IRE shall preside. The annual Assembly may be held elsewhere than in the State of New York.

SEC. 2—There shall be an annual meeting of the Board of Directors during January of each year following the annual Assembly. This annual meeting may be held elsewhere than in the State of New York.

SEC. 3—Additional meetings and special meetings of the Board of Directors shall be held in accordance with the Bylaws.

SEC. 4—The Board of Directors may authorize the establishment of groups of members for promoting the objectives and interests of the IRE in accordance with the Bylaws. The Board of Directors may, at its discretion, terminate the existence of any such group.

## ARTICLE X

### AMENDMENTS

SEC. 1—Amendments to this Constitution shall be made by ballot of the voting members. Amendments may be proposed by a resolution adopted by vote of at least two-thirds of those present at a regularly constituted meeting of the Board of Directors or by a petition signed by at least one per cent of the total number of voting members as listed in the official membership records of the IRE at the end of the previous year, but in no case shall the number be less than one hundred. A copy of such proposed amendment or amendments, if lawful, shall be mailed with a ballot to each voting member at least sixty days before the date designated for counting the ballots. Balloting shall be in accordance with the Bylaws.

SEC. 2—If the total ballot vote be at least twenty per cent of the total voting membership and if at least sixty-seven per cent of all ballot votes cast shall be favorable, the proposed amendment or amendments shall be adopted. Voting members shall be notified as soon as practicable after the adoption by publication.

SEC. 3—Amendments to this Constitution shall take effect thirty days after adoption, but if by amendment Officers and Officers-Elect are changed in status or the number of Directors is reduced, each Officer and each Director shall continue to serve until his term expires.

# BYLAWS

*(Effective April 22, 1960)*

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## 100. DEFINITIONS

1. The term "all the rights and privileges" refers to right to participate fully in the activities of the IRE in furtherance of its objects as defined in the Constitution.
2. The term "group of members" refers to any classification of members whether on a geographical territorial basis or on a particular technical or professional interest basis, that has been authorized by the IRE.
3. The terms "meetings of the IRE" or "meetings of IRE members" refers to meetings authorized by the IRE, with or without geographical or other limitation, held to further the objects of IRE.
4. The term "IRE Headquarters" refers to the principal office of the IRE at which the Executive Secretary and his staff are located.
5. The term "Constitution" refers to the IRE Constitution.
6. The term "Executive Committee" refers to the Executive Committee of the IRE.
7. The term "school of recognized standings" refers only to schools which award degrees for not less than four years of full-time academic study in electronics, radio, allied branches of engineering or the related arts and sciences, and are designated as such by the Executive Committee.
8. The word "junior" when used in the terms "junior past President," "junior past Regional Director," "junior past Chairman" or other titles of IRE official positions refers to the immediate past holder of the office referred to.
9. The word "senior" when used in term "senior past President" or other titles of IRE official positions refers to the holder of the office referred to next preceding the immediate past holder of the office.



## 200. MEMBERSHIP

201. *Grades*

1. The grades of IRE membership are:
   a. Fellows
   b. Senior Members
   c. Members
   d. Associates
   e. Students
   f. The designation "Life Member" is applicable to all members who have attained the age of 65 years and who have been members of the IRE for at least 35 years.
2. The designation "Group Affiliate" refers to persons entitled to participate in IRE Professional Group activities under provisions established by the Executive Committee under the Bylaws.

202. *Rights and Privileges*

1. Fellows shall be entitled to all rights and privileges of the IRE.
2. Senior Members shall be entitled to all rights and privileges of the IRE except the right to serve on the Awards and Fellow Committees.
3. Members shall be entitled to all rights and privileges of the IRE except the right to hold any corporate office and the office of Director, and to serve on the Admissions, Awards and Fellow Committees.
4. Associates shall be entitled to attend meetings of IRE members, to vote only on matters presented to groups of members, to be appointed on committees when specifically approved by the Board of Directors or the Executive Committee, but shall not have the right to hold any office.
5. All voting members shall have the right to use the IRE emblem (dark background) on letter heads and business cards to indicate their professional membership status in the IRE, provided that a sample of each letterhead or business card is first submitted for approval to the IRE Executive Secretary, who shall have the discretion to refuse such permission if the intended use of the emblem does not meet ethical and professional standards.
6. The emblem of the IRE is protected by trademark registrations and shall be reproduced only in connection with official business of the IRE or to indicate professional membership status in the IRE.
7. Emblems purchasable from IRE Headquarters may be worn by members.
8. Assertion of IRE membership by members is authorized, including the right to use the following abbreviations:
   Fellow IRE
   Sen. Mem. IRE
   Mem. IRE
   Assoc. IRE
9. Every member of the IRE shall receive the PROCEEDINGS OF THE IRE.
10. Every Student member shall receive the IRE STUDENT QUARTERLY.

203. *Qualifications*

1. Fellow: The grade of Fellow is one of unusual professional distinction and shall be conferred only by invitation of the Board of Directors upon a person of outstanding and extraordinary qualifications and experience in the fields of electronics, radio, allied branches of engineering or the related arts and sciences, who meets the requirements for Senior Member as stated in these Bylaws and who has been a member in any grade for a period of five years preceding the year of nomination, except that the five-year provision in any individual case may be waived for cause by the Board of Directors.
2. Senior Member is the highest professional grade for which application may be made and shall require experience or attainment reflecting professional maturity. For admission or transfer to the grade of Senior Member, a candidate shall be an engineer, scientist, technical executive, or teacher, in the fields of electronics, radio, allied branches of engineering or the related arts and sciences; as such, he shall have been in the active practice of his profession for at least ten years and shall have attained distinction as measured by above-average performance over a period of at least five of these years, such performance including one or more of the following:
   a. Publication of important original engineering or scientific papers, books or inventions, or
   b. Technical direction with evidence of accomplishment of important scientific or engineering work, or
   c. Creative contributions to the welfare of the scientific or engineering profession, or
   d. Establishment or furtherance of important scientific or engineering courses in a school of recognized standing, or
   e. Contributions equivalent to those of "a" to "d" above in such areas as technical editing, patent prosecution or patent law, provided these contributions serve to advance progress substantially in the fields of electronics, radio, allied branches of engineering or the related arts and sciences.
3. Member is a professional grade limited to those who have demonstrated professional competence in the fields of electronics, radio, allied branches of engineering or the related arts and sciences. For admission or transfer to the grade of Member, a candidate shall be either:
   a. An engineer or scientist in the fields of electronics, radio, allied branches of engineering or the related arts and sciences, who shall have had at least three years of professional experience.
   b. A teacher of electronics, radio, allied branches of engineering or the related arts and sciences, for at least three years, who shall have held the rank of instructor or higher, and shall have participated in planning and conducting courses.
   c. A person regularly employed in the fields of electronics, radio, allied branches of engineering or the related arts and sciences, for at least six years who, by experience, has demonstrated competence in work of a professional character.
   d. An executive who, for at least six years, has had under his direction important technical, engineering or research work in the fields of electronics, radio, allied branches of engineering or the related arts and sciences.
4. Associate: For admission or transfer to the grade of Associate, a candidate shall be interested in the theory or practice of electronics, radio, allied branches of engineering or the related arts and sciences.
5. Under the membership grade of Student there shall shall be two classifications: Student, and Student Associate.
   a. For classification as a Student, a candidate shall be devoting a major portion of his time as a resident and registered student in a regular course of study in engineering or science in a school of recognized standing.
   b. For classification as a Student Associate, a candidate shall be devoting a major portion of his time as a resident and registered student in a regular course of study in electronics, radio, allied branches of engineering or the related arts and

sciences, in a school, other than a school of recognized standing, approved by the Executive Committee.

6. Membership in the Student grade shall not extend more than six months beyond the termination of his student status as described in these Bylaws.
7. Graduation from a course of study of at least four years duration in electronics, radio, allied branches of engineering or the related arts and sciences, in a school of recognized standing, may be accepted as equivalent to three years' professional experience in those fields.
8. Graduation from a course of study of at least two years' duration in electronics, radio, allied branches of engineering or the related arts and sciences, in a school, other than a school of recognized standing, approved by the Executive Committee, may be accepted as equivalent to one year's professional experience in those fields.
9. Full-time graduate work, or part-time graduate work with teaching or research, in the fields of electronics, radio, allied branches of engineering or the related arts and sciences, in a school of recognized standing, may be accepted as equivalent to professional experience.
10. The time requirements for admission or transfer to any grade of membership may be satisfied by applying *pro rata* the experience of the candidate under the various alternative requirements for the grade.

204. *Applications*

1. Applicants for membership shall furnish names of references as follows:
   For Senior Member—Five Fellows or Senior Members.
   For Member—Four Fellows, Senior Members or Members.
   For Associate—Three Fellows, Senior Members, Members, Associates or other responsible individuals.
   For Student—The IRE Representative at his school, if such a Representative exists; otherwise, a member of the faculty of his school.
2. When an applicant for Senior Member or Member shows that his work or location is such as to make impracticable compliance with the reference requirements of these Bylaws, the names of persons who are familiar with his professional work may be substituted. The Admissions Committee shall exercise discretion in determining suitability of substitute references.
3. Applications for admission or transfer to any grade of membership, except Fellow, shall be addressed to the Board of Directors and submitted to IRE Headquarters. Recommendation of election or transfer of an applicant to any grade, except Fellow, shall be by two-thirds affirmative vote of the Admissions Committee.
4. A re-application for admission or transfer to a particular grade may be made after the expiration of one year from the date of a rejection.
5. The Executive Committee is authorized to act for the Board of Directors in electing members, readmitting members or transferring their membership grades, except where involving Fellow grade, and may waive application and reference requirements in the transfer of members from Student to Associate or member grade.

205. *Proposals*

1. Each year, the Fellow Committee shall recommend to the Board of Directors, nominees for Fellow grade not more than seventy-five in number. A citation summarizing the accomplishments of the nominee shall be a part of each recommendation.
2. Admission or transfer to any grade except Fellow may be proposed by any member acting as sponsor by supplying to the Admissions Committee sufficient information and testimonials from the required number of references to satisfy the Admissions Committee as to qualifications. Such proposals shall be acted upon by the Admissions Committee and, if approved, transmitted to the Executive Committee. If approved by the Executive Committee, an invitation blank shall be sent to the proposed member inviting him to accept the grade of membership proposed, which membership shall become effective automatically and immediately upon his supplying the biographical and professional information required and paying the necessary dues and fees. The name of an invitee shall be placed on the mailing list for the PROCEEDINGS OF THE IRE immediately upon receipt of dues and fees.

206. *Admissions and Transfers*

1. The entrance fee for all grades shall be three dollars ($3) except that there shall be no entrance fee for the Student grade.
2. No entrance fee shall be charged any non-IRE member of a Joint Student Branch or Joint Student Associate Branch, who is a student member of another national engineering society which is a sponsor with IRE of the Joint Student Branch or Joint Student Associate Branch, and who applies for admission to membership in the IRE within six months after the termination of his student status.
3. There shall be no transfer fees. A notice of approval of a transfer shall be sent to the member. A member whose grade of membership is changed during his annual dues period shall be billed *pro rata* for the remainder of that period.
4. The name of every person newly-admitted or transferred to the grade of Senior Member, Member or Associate shall be published in the PROCEEDINGS OF THE IRE.
5. When an applicant for membership is elected, the membership period shall be dated as of the first day of the first month following receipt of application, if received on or before the nineteenth day of the month, or as of the first day of the second month following receipt of application, if received after the nineteenth day of the month.
6. The entrance fee and dues are payable on notification of election and if not received within six months from notification, the election shall be considered void.
7. A notice that he has been elected shall be sent to every newly-admitted member together with a bill for entrance fee and dues, if not previously paid, dues being computed for the annual period concurrent with the membership period. Entrance fee or dues remaining unpaid, additional bills shall be sent the newly-elected member two months and four months after notification of election, in the last instance accompanied by a warning that the election will be considered void if the entrance fee and dues are not received within six months of notification of election.

207. *Dues*

1. Every member's annual dues period and the period during which he shall receive at least one IRE publication shall run concurrently with his membership period. The annual dues shall be payable in advance at the beginning of the annual dues period.
2. For members elected prior to July 1, 1955, the annual dues for all grades shall be fifteen dollars ($15) except for Student which shall be five dollars ($5) and except for Associate which shall be ten dollars ($10) for each year which is within the first five years of membership in any grade other than Student. Beginning with the sixth such year, the annual Associate dues shall be fifteen dollars ($15).
3. For members elected July 1, 1955 or thereafter, the annual dues shall be ten dollars ($10) for the first three years of IRE membership in any grade other than Student, and fifteen dollars ($15) for each succeeding year. The annual dues for Student grade shall be five dollars ($5).
4. Dues shall be waived for all IRE members who have both attained the age of sixty-five (65) years and who have been IRE members for at least thirty-five (35) years.
5. Under exceptional circumstances, such as inability of a member to remit dues due to wartime conditions, the Board of Directors may, if it waives dues, also declare that during the period of such waiver, the member has maintained continuous membership.

208. *Billing, Termination, and Reinstatement*

1. A bill covering his dues for the following year shall be mailed to every member not later than one month prior to the beginning of his annual dues period. A second bill shall be mailed after a lapse of two months to every member whose dues remain unpaid. There shall be mailed with the second bill a notice that, if the member's dues remain unpaid for four months, it shall be the duty of the Executive Secretary, in accordance with the Bylaws of the IRE, to notify the member that his membership has terminated.
2. After a member has been in arrears four months, his membership shall terminate and his name shall be removed from the roll of membership. Every such person shall be mailed a notice to the effect that, according to the Bylaws of the IRE, his membership in the IRE has in fact terminated. Accompanying the notice of termination shall be a final bill, with the suggestion that the former member pay the bill and resume his membership.
3. Membership so terminated may be resumed on payment of all dues in arrears, or on payment of a new entrance fee and current dues.
4. On resuming membership and paying dues in arrears, a member may receive available copies of the PROCEEDINGS OF THE IRE during the period covered by the back dues. A rebate of 25 cents per copy shall be made in lieu of copies not available.
5. The mailing of bills or statements to the last known address of a member shall be considered a valid notice of indebtedness.

209. *Resignations*

1. A member in good standing may resign by submitting a written resignation to the Secretary.
2. Subject to the approval of the Executive Committee, a resigned member may resume his membership upon payment of current dues.

210. *Severances*

1. To initiate action toward expulsion of a member, a written complaint must be submitted to the Board of Directors which, if it deems the reason sufficient, shall notify the accused by letter of the charges against him and of the place and date of a hearing to consider such charges which shall be held not less than thirty days after mailing of the notice. The accused may present his defense in person, in writing, or by an authorized representative. There shall be a majority of the members of the Board present at the hearing and the votes cast must be unanimous in order to expel. The action of the Board of Directors shall be final and conclusive.



## 300. GROUPS OF MEMBERS

301. *Regions*

1. The United States shall be divided into seven geographical Regions which shall be given consecutive numbers for identification. There shall be an additional Region which shall consist of all of Canada.
2. When new Regions are established, or when changes are made in Regional boundaries, the changes shall be made effective so that no Regional Delegate-Regional Director shall have his term shortened by such changes.
3. Each Region shall have a Regional Committee which shall consist of at least the Regional Director, the junior past Regional Director, the Chairman of the Regional Education Committee and two representatives of each Section in the Region, one of these to be the Chairman of the Section and the other to be appointed by the Section's Executive Committee from among a group comprised of the junior past Chairman and the present elected officers of the Section. Each member of the Regional Committee shall be, ex-officio, a member of the Executive Committee of his own Section. In case of necessity, a Section may be represented at a Regional Committee meeting by alternates appointed by the Section Executive Committee.
4. Each Region shall establish a Regional Education Committee to be responsible to the Regional Committee. It shall be concerned with the handling of all educational problems of the Region including Student Member and Student Branch operations, general supervision of student papers contests and similar activities when held on a Regional basis, and the fostering and coordination of the educational activities of the Sections. The Regional Education Committee shall be composed of all IRE Representatives in colleges and technical institutes in the Region and all Education Committee members residing in the Region, ex-officio. The Chairman of this Committee is to be appointed from the Region membership by the Regional Director; his term of office shall correspond with that of the Regional Director; he shall be a member of the Education Committee, ex-officio, and a member of the Regional Committee, ex-officio.
5. Pending installation of the first Regional Director of a Region, the Chairman of the largest Section, numerically, in the Region shall act as Chairman pro-tem of the Regional Committee, and the Chairman pro-tem shall appoint a Secretary-Treasurer pro-tem.
6. The Regional Committee may include additional voting members not exceeding in number one-fourth of the above mandatory number of members representing the Sections in the Region. The purpose for such additional members shall be determined by the Regional Committee based upon each Region's individual requirements. Such additional members shall be appointed on a year-to-year basis by the Regional

Director, subject to approval of the Regional Committee.

7. Each member of the Regional Committee shall be of Member, Senior Member or Fellow grade in the IRE. The term of office of each member other than the Regional Director and the junior past Regional Director shall be one year concurrent with the term of office of the Section officers. Vacancies, except for Regional Director, shall be filled by appointment of the Section Executive Committee in which the vacancy exists.
8. The Regional Director shall be Chairman of the Regional Committee and shall appoint one or more Vice Chairmen from among the membership of the Committee. The Chairman of the Regional Committee shall appoint a Secretary-Treasurer from among the membership of the Region for a two-year term concurrent with that of the Chairman. The duties of the Secretary-Treasurer shall include correspondence, the keeping of the minutes of the Committee meetings, mailing notices, handling of funds, the keeping of financial records, the submission of a report at the end of each year and such other duties as are assigned to him by the Chairman. The Secretary-Treasurer shall not be a voting member of the Committee unless he shall be appointed a voting member for a term of one year by the Regional Director, subject to the approval of the Regional Committee.
9. The Regional Committee shall hold at least one meeting each year, within or without the Region. A quorum for a Regional Committee meeting shall consist of at least one-third of the members of the committee or their alternates and shall include representatives from at least half of the Sections in the Region. The Regional Director or, in the event of his unavailability, a Regional Committee Vice Chairman, shall be responsible for calling the necessary number of Regional Committee meetings.
10. The duties of the Regional Committee shall include the making of at least one nomination for Regional Delegate-Regional Director from its Region during election years, participation in the development of the IRE by means of suggestions on national and international matters to the Board of Directors and on Regional and Sectional matters to the Sections comprising the Region.
11. Regions failing to maintain reasonable activity may be dissolved and the Sections therein may be absorbed into other Regions the boundaries of which are to be correspondingly altered.

302. *Sections*

1. There shall be established throughout the territory in which IRE conducts operations groups of members residing in specified geographical districts designated as Sections.
2. A petition for the formation of a Section within the IRE Regional organization shall be signed by not fewer than twenty-five members other than Students, having mailing addresses within the territorial limits proposed in the petition. The territorial limits shall be specifically delineated.
3. A petition for the formation of a Section outside of the IRE Regional organization shall be signed by not fewer than ten members, other than Students, having mailing addresses within the territorial limits proposed in the petition. The territorial limits shall be specifically delineated.
4. The Executive Committee, upon receipt of a petition for the creation of a Section, may authorize its formation. Each Section so authorized shall within not more than six months thereafter adopt and conform to a Section Constitution approved by the Executive Committee, which Section Constitution shall provide for a Chairman, Secretary-Treasurer and a Section Executive Committee. After the Section is organized and a Section Constitution has been adopted, the Executive Committee may give final approval to its establishment.
5. Each Section shall conduct its activities within the Constitution and Bylaws of the IRE and other rules which by law affect the membership and activities of the IRE.
6. Sections outside the IRE Regional organization shall be represented on the Board of Directors by the senior past President in his capacity as a Director.
7. No Section or any officer or representative thereof shall have any authority to contract debts for, pledge the credit of, or in any way bind, the IRE.
8. All Sections shall be exclusively those of the IRE. No Section joint with any other organization, society, or group shall be recognized. However, IRE Sections may cooperate with other organizations in the holding of joint meetings and may invite members of such organizations and the public to their meetings.
9. Section Secretaries shall forward to the Executive Secretary a report of each meeting held by the Section and its Subsections, if any, for the presentation or discussion of papers and at the end of each fiscal year, a financial statement for that fiscal year.
10. Failure of a Section to maintain the required activities, which shall include the holding of at least five meetings each year and also the maintenance of a minimum membership of twenty-five members, other than Students in a Section within the IRE Regional organization, and a minimum membership of ten members, other than Students, in a Section outside of the IRE Regional organization, shall place the Section on probation. All members of the Section shall be informed of the probation by the Executive Secretary who shall also call their attention to the requirements for maintaining the Section. If the delinquency continues for a second year, a second notification to the Section membership shall be made by the Executive Secretary, and the Board of Directors shall be informed of the probationary status of the Section. If the delinquency continues for a third year, the Section shall, thereupon, automatically be dissolved. The Executive Secretary shall so report to the Board of Directors and so inform the members previously constituting that Section. The Board of Directors may waive the provisions herein regarding dissolution of a Section in case such Section becomes affected by war or any other force majeure, for the period of the duration thereof and for at least six months thereafter.
11. For the maintenance of a Section the IRE shall pay to the Section for each calendar year:
    a. One dollar and ten cents ($1.10) for each member, except Students, up to a total of seven hundred members plus one dollar and twenty-five cents ($1.25) for each member, except Students, in excess of a total of seven hundred; and
    b. Fifty cents ($.50) for each Affiliate of each and every Professional Group having a mailing address within the territory of the Section as of December 31 of the calendar year for which payment is made; and
    c. Ten dollars ($10) per meeting for not more than ten meetings of the Section within the calendar year.
12. Local noncompulsory financial contributions may be accepted by Sections.
13. The Board of Directors may dissolve any Section for any reason deemed sufficient by the Board of Directors.
14. Any Section that publishes a periodical shall inform the Executive Committee of the establishment thereof and shall provide IRE Headquarters with copies thereof, as published.

303. *Subsections*

1. In conformance with the Constitution for Sections, a Section may establish Subsections which shall be geographical subdivisions of the Section, subject to the same limitations and control as the Section itself, pursuant to the following conditions:
    a. In the case of Subsections to be formed in Sections within the IRE Regional organization, a petition shall be submitted to the parent Section Executive Committee signed by twenty or more members, except Students, with mailing addresses within the proposed territory of the Subsection;
    b. In the case of Subsections to be formed in Sections outside the IRE Regional organization, a petition shall be submitted to the parent Section Executive Committee signed by eight or more members, except Students, with mailing addresses within the proposed territory of the Subsection;
    c. Approval of the petition by the parent Section Executive Committee;
    d. Notification of the Executive Secretary of actions by a Section regarding Subsections with a copy of petition or petitions;
    e. Approval by the Executive Committee.
2. For each authorized Subsection, the IRE shall pay to the Section a meeting allowance of ten dollars ($10) per meeting up to a maximum of ten meetings per year, during the time the Subsection remains in good standing according to the Section Constitution.

304. *Professional Groups*

1. There shall be established within the scope and objectives of the IRE, groups of members interested in specific technical fields or related subjects, designated as Professional Groups.
2. A petition for the formation of a Professional Group shall be signed by not fewer than twenty-five members, other than Students, shall state the proposed field of interest and shall be forwarded to the Executive Committee after review thereof by the Professional Groups Committee.
3. The Executive Committee, upon receipt of a petition to form a Professional Group, may authorize its formation. After the Group is organized and a Constitution for it is approved by the Executive Committee, the Executive Committee may give final approval to its establishment.
4. Each Professional Group authorized by the Executive Committee shall within not more than six months thereafter adopt and conform to a Professional Group Constitution which shall have been submitted to and approved by the Executive Committee. A Group Constitution may be amended by the Group subject to the approval of the Executive Committee. Such Group Constitution shall provide for a Group Chairman and a Secretary-Treasurer.
5. All Professional Groups shall consist exclusively of IRE members and such affiliates as may be recognized by the Executive Committee. No Professional Group joint with any other organization, society or group outside of the IRE shall be recognized. However, Professional Groups may co-operate with other organizations in the holding of joint meetings and may invite members of such organizations and the public to their meetings.
6. A Professional Group may not charge dues. A Professional Group may raise revenues by fees or other means approved by the Executive Committee.
7. For the maintenance of a Professional Group, the IRE shall pay a subsidy equal to one-third of the cost to the Group of printing and mailing all TRANSACTIONS, Newsletters and any other publications which are distributed to all paid members of a Group free-of-charge; and in addition, there shall be provided for each new Professional Group, matching funds of one dollar ($1) for each dollar of income derived by the Group from membership fees during the first two years.
8. All IRE members may become members of Professional Groups in conformance with the respective Group Constitutions.
9. All Professional Group meetings shall be open to all members of the IRE on an equal basis with Group members. Any IRE member or any Group Affiliate, upon payment of charges judged to be equitable by the Executive Committee, shall receive any notices of meetings of any Group.
10. A Professional Group may hold or join in holding conferences or conventions and may charge for registration; but a Group may not charge for registration at a meeting, conference or convention when it operates as part of an IRE Sectional, Regional or national meeting, conference or convention.
11. All publications of Professional Groups, other than programs, notices, and the like, shall be subject to prior authorization of the Executive Committee and shall be made available to all IRE members and Group Affiliates on equitable bases approved by the Executive Committee.
12. Each Professional Group shall forward to the Executive Secretary a copy of each meeting notice of the Group, an annual report and a financial statement for each fiscal year prepared immediately following the end thereof.
13. No Professional Group or any officer or representative thereof shall have any authority to contract debts for, pledge the credit of, or in any way bind, the IRE.
14. Each Professional Group shall conduct its activities within the Constitution, Bylaws and other rules which by law affect the membership and activities of the IRE.
15. The Board of Directors may dissolve any Professional Group for any reason deemed sufficient by the Board of Directors.
16. Group Affiliates are non-IRE members who have been admitted by a Professional Group to some of the rights and privileges of Group membership. In general, a Group Affiliate must be a person whose professional life does not justify full membership in the IRE, but which may be helped by participation in Group activities or who may contribute benefits to Group members by his participation in their activities. The qualifications for Group Affiliation and the limits in rights and privileges shall be established by the Executive Committee.

305. *Professional Group Chapters*

1. A Professional Group Chapter may be established

in a Section to function in the manner of a committee of a Section.

2. A petition to establish a Chapter must contain the following:
   a. Name of the Section.
   b. Name of the Professional Group.
   c. Name of the organizer (who becomes interim Chairman pending election of a regular Chairman at a later organization meeting).
   d. Signatures of at least ten IRE members, other than Students, who must indicate they are either members of the Professional Group involved, or are prepared to become members if the petition is granted.
3. The petition for a Chapter shall be submitted to the Section Executive Commiittee for written approval and forwarded with this written approval to the Executive Secretary. The Executive Secretary shall endeavor to obtain written approval from the Executive Committee. Upon receiving approval, the existence of the new Chapter will be recorded at IRE Headquarters and the Section Executive Committee will be informed thereof.
4. For each Chapter, the IRE shall pay ten dollars ($10) to a Section for each meeting of the Section promoted by a Chapter up to five meetings per Chapter per year, provided such meeting is attended by ten or more Section members and a report of such meeting, including a statement of the number of members attending, signed by a Chapter officer, is forwarded to IRE Headquarters through the Section Secretary-Treasurer. A meeting of the Section promoted by a Chapter may be counted among the above five, or may be counted among the ten meetings of the Section as provided in these Bylaws, but not among both as such would result in duplicate payments for the same meeting.

306. *Student Branches*

1. There shall be established throughout the territory in which IRE conducts operations, groups of Student members residing in specified geographical localities, designated as Student Branches.
2. There shall be established IRE Representatives who shall be IRE members and teachers of electronics, radio, allied branches of engineering or the related arts and sciences, at schools or technical institutes eligible for IRE Student members, and who shall be appointed and released by the Executive Committee. Each such IRE Representative is charged with promoting the welfare of the IRE at his school, particularly in matters relating to the Student membership.
3. Upon receipt of a petition signed by the IRE Representative, or in the event one has not been appointed, by a representative of the faculty of the school involved, and by fifteen or more IRE members who are students in a school of recognized standing, the Executive Committee may authorize the establishment of an IRE Student Branch in that school.
4. Upon receipt of a petition signed by the IRE Representative, or in the event one has not been appointed, by a representative of the faculty of the school involved, and by fifteen or more IRE members who are students in a school, other than a school of recognized standing, approved by the Executive Committee, the Executive Committee may authorize the establishment of an IRE Student Associate Branch in that school.
5. Each IRE Student Branch and each IRE Student Associate Branch shall adopt and conform to a Student Branch Constitution which shall have been submitted to and approved by the Executive Committee and which shall provide for a Chairman and a Corresponding Secretary.
6. The IRE, by action of the Executive Committee, may join with another national engineering or technical society to co-sponsor a Joint Student Branch in a school of recognized standing or a Joint Student Associate Branch in a school, other than a school of recognized standing, approved by the Executive Committee. The petition for the establishment of the Branch must be signed by the IRE Representative, or in the event one has not been appointed by a representative of the faculty of the school involved, and by ten or more members of either society, at least twenty-five per cent of which petitioners must be IRE members.
7. Each Joint Student Branch and each Joint Student Associate Branch shall adopt and conform to a Joint Student Branch Constitution which shall have been submitted to and approved by, both the Executive Committee and the other co-sponsoring society and which shall provide for a Chairman and a Corresponding Secretary.
8. No IRE Student Branch, IRE Student Associate Branch, Joint Student Branch or Joint Student Associate Branch, or any officer or representative thereof shall have any authority to contract debts for, pledge the credit of, or in any way bind the IRE.
9. Each IRE Student Branch, IRE Student Associate Branch, Joint Student Branch and Joint Student Associate Branch Corresponding Secretary shall forward to the Executive Secretary a report of each meeting held by the Branch for the presentation or discussion of papers, and, during June of each year, a financial statement for the preceding year.
10. An IRE Student Branch, IRE Student Associate Branch, Joint Student Branch or Joint Student Associate Branch may collect dues from its members as provided in its constitution and, in addition, may accept local non-compulsory financial contributions.
11. Failure of an IRE Student Branch or IRE Student Associate Branch to maintain a minimum of ten IRE Student members and to hold at least three meetings each year shall place the Branch on probation. All officers of the Branch and the IRE Representative, or in the event one has not been appointed, a representative of the faculty of the school or institute involved, shall be informed of the probation by the Executive Secretary who shall also call to their attention the requirements for maintaining the Branch. If the delinquency continues for a second year, the IRE sponsorship shall be withdrawn automatically. The Executive Secretary shall so report to the Executive Committee and the Board of Directors and so inform the former officers of the dissolved Branch and the IRE Representative.
12. Failure of a Joint Student Branch or Joint Student Associate Branch to maintain a minimum of ten Student members, of which at least twenty-five per cent must be IRE Student members, and to hold at least three meetings each year shall be reported by the Executive Secretary to the Executive Committee.
13. For maintenance of an IRE or Joint Student Branch upon certification by the IRE Representative or, in the event one has not been appointed, by a representative of the faculty of the school where the Branch is located, the IRE shall pay to each such Branch upon request the sum of twenty-five dollars ($25) for any one school year; and shall also pay to each such Branch the sum of one dollar ($1) for each IRE Student member of the Branch as of November fifteenth of each year and the sum of fifty cents ($.50) for each additional IRE Student member of the Branch as of the following February first.
14. For maintenance of an IRE or Joint Student Associate Branch, upon certification by the IRE Representative or, in the event one has not been appointed, by a representative of the faculty of the school where the Branch is located, the IRE shall pay to each such Branch upon request the sum of fifteen dollars ($15) for any one school year; and shall also pay to each such Branch the sum of fifty cents ($.50) for each IRE Student member of the Branch as of November fifteenth of each year and the sum of twenty-five cents ($.25) for each additional IRE Student member of the Branch as of the following February first.
15. The Executive Committee may dissolve an IRE Student Branch or IRE Student Associate Branch, or withdraw its sponsorship and support of a Joint Student Branch or Joint Student Associate Branch for any reason deemed sufficient by the Executive Committee.



## 400. ANNUAL ASSEMBLY

401. *How Constituted*

1. The annual Assembly shall consist of nine Delegates-at-large elected by the membership-at-large and eight Regional Delegates elected respectively by the members residing in the eight Regions of the IRE, making a total of seventeen.
2. The nine Delegates-at-large shall comprise the President, the senior past President, the junior past President, and six additional Delegates-at-large. The six additional Delegates-at-large shall serve three-year terms. Two of the six shall be elected each year so that the terms of two of the six additional Delegates-at-large shall expire each year.
3. The Delegates elected by Regions shall be members of and reside in the Regions electing them and shall have terms of office of two years, the Delegates from even-numbered Regions being chosen and elected in even-numbered and those from odd-numbered Regions in odd-numbered years. A vacancy shall occur in the office of Regional Delegate at such time as the incumbent ceases to reside in the Region that elected him.
4. All Delegates, both Regional Delegates and Delegates-at-large, shall be elected Directors by virtue of their election as Delegates and shall serve terms as Directors concurrent with their terms as Delegates.
5. The presiding officer of the annual Assembly, as provided by the Constitution, shall be the newly-elected President.
6. Prior to the election of the Secretary or in the event of his absence, the Executive Secretary shall perform the secretarial functions.

402. *Meetings*

1. The annual Assembly of the IRE, required to be held during January of each year, shall be held as early in that month as feasible, at IRE Headquarters. Notice of time and place shall be mailed not less than thirty days in advance. In the case of extraordinary circumstances, a special meeting of the Assembly or the designation of a place of meeting for the annual Assembly other than IRE Headquarters may be authorized by a two-thirds vote of those present at a regularly constituted meeting of the Board of Directors held at least thirty days in advance of the date of such specially designated meeting.
2. A meeting of the Assembly may be held without notice if waivers of notice signed by all of the Delegates are filed with the Secretary with notation thereof entered in the minutes of the meeting.
3. Ten Delegates shall constitute a quorum at meetings of the Assembly.
4. Any notices of meetings or other official business required by the Constitution or these Bylaws to be mailed to Delegates shall be sent by airmail if the addresses are located at places beyond the continental United States or Canada, or at any place where ordinary mail might be unusually slow and airmail more expeditious.
5. Reimbursement of necessary travel expenses incurred by Delegates for the purpose of attending any special or extraordinary meeting of the Assembly not associated with a meeting of the Board of Directors held contiguously with it, is authorized.

403. *Functions*

1. The annual Assembly shall elect six additional Directors for the required term of office of one year. Three of these Directors shall also be elected Corporate Officers, respectively designated as the Secretary, the Treasurer and the Editor. The annual Assembly shall also elect such alternate Directors as may be necessary to insure the attaining of a total number of six Directors including the three Corporate Officers, in the event that consent to serve by any of the electees cannot be secured prior to the conclusion of that Assembly meeting.
2. The annual Assembly shall receive reports, verified by the President and Treasurer, or by the Board of Directors, showing the amount and status of real and personal property owned by the IRE, its fiscal condition, changes in membership, changes in groups of members and other vital statistics, all of which are to be as of the most recent date available from the records kept by the Officers. These reports shall be filed with the records of the IRE and abstracts thereof entered in the minutes of the proceedings of the Assembly.

## 500. MANAGEMENT

501. *Board of Directors*

1. The Board of Directors shall consist of eleven Directors-at-large elected by the membership-at-large, eight Regional Directors elected respectively by the members residing in the eight Regions of the IRE and six Directors elected by the annual Assembly, making a total of twenty-five.
2. The Directors-at-large shall comprise the President, the senior past President, the junior past President, the two Vice Presidents and six Directors elected for three year terms. Two of the six shall be elected each year so that the terms of two of the six Directors shall expire each year.
3. The Directors elected by Regions shall be members of and reside in the Regions electing them and shall have terms of office of two years, the Directors from even-numbered Regions being chosen and elected in even-numbered, and those from odd-numbered Regions in odd-numbered years. A vacancy shall occur in the office of Regional Director at such time

as the incumbent ceases to reside in the Region that elected him.

4. The annual meeting of the Board of Directors, required to be held during January of each year, shall be held immediately after the adjournment of the annual Assembly and at the same place. Notices thereof shall be mailed at the same time that notices are mailed for the annual Assembly.
5. At the annual meeting, the Board shall determine the time and place of other meetings to be held throughout the year, which normally shall be scheduled for the first Wednesday of May, the first Wednesday after the second Monday of September and the first Wednesday after the second Monday of November.
6. The time and place of any scheduled Board meeting may be altered or the meeting cancelled only by consent of a majority of all Directors secured by or transmitted to the Secretary, not less than twenty days before the original date or the new date set for the meeting, whichever is the earlier. Notice of such approved change shall be mailed to all Directors not less than ten days before the original or the new date, whichever is the earlier.
7. Special meetings of the Board of Directors may be called by any five Directors on notice to all other Directors. Notice of such special meetings giving the time and place of meeting, the purpose of the meeting and the names of the Directors calling the meeting shall be mailed to all Directors not less than twenty days before the date set for the special meeting. The place of such special meetings may be only at IRE Headquarters unless otherwise authorized by a majority vote of all Directors, such vote to be secured by or transmitted to the Secretary.
8. In the absence or incapacity of the Secretary, the Executive Secretary shall perform the secretarial functions.
9. A meeting of the Board of Directors may be held without notice if waivers of notice signed by all of the Directors are filed with the Secretary with notation thereof entered in the minutes of the meeting.
10. Notices of meetings and any other documents required to be sent to Directors pursuant to provisions of the Constitution and these Bylaws shall be sent by airmail if the destination is beyond the continental United States or Canada, or at any place where ordinary mail might be unusually slow and airmail more expeditious.
11. Twelve Directors shall constitute a quorum at meetings of the Board of Directors.
12. Reimbursement of necessary travel expenses incurred by Directors for the purpose of attending meetings of the Board of Directors, the Executive Committee and meetings taking place during the IRE International Convention and Radio Engineering Show is authorized.
13. The Board of Directors may appoint or direct the appointment of representatives of the IRE on joint committees, boards and other local, national and international bodies.

502. *Executive Committee*

1. The Board of Directors at its annual meeting shall appoint an Executive Committee composed of Officers and Directors, to exercise powers and assume duties of management as directed by the Board of Directors and as may be outlined in the Bylaws, subject to the following limitations:
   a. That the Board of Directors may at any meeting overrule any act or decision of the Executive Committee except insofar as any act has in fact been carried out, or
   b. Suspend at any meeting any power conferred upon the Executive Committee, such suspension to remain in effect pending repeal of any Bylaw conferring such power, or
   c. Direct any action or plan of the Executive Committee.
2. The Executive Committee shall consist of eight members and shall comprise the President, the Vice President residing in North America, the junior past President, the Treasurer, the Secretary, the Editor and two other Directors. The President shall be Chairman, the Vice President shall be Vice Chairman and the Secretary shall be Secretary thereof.
3. At the first meeting of a newly-appointed Executive Committee, it shall schedule other meetings throughout the year. Minutes of the meetings of the Executive Committee shall be mailed to all Directors.
4. The terms of office of members of the Executive Committee shall begin with the annual meeting of the Board of Directors and shall continue until the succeeding annual Assembly.
5. The Executive Committee may divide its duties and responsibilities among its members as it sees fit and conduct its business as it finds necessary. Such activities as the Executive Committee shall direct shall be administered by the Executive Secretary.
6. The Executive Committee shall be responsible for the management of IRE Headquarters. The Executive Committee shall prepare and present an annual budget to the Board of Directors for approval.
7. The Executive Committee shall be charged with broadly considering IRE policies and making appropriate recommendations to the Board of Directors on its own initiative.
8. The Executive Committee shall appoint, direct and coordinate the work of all Standing Administrative Committees except those appointed directly by the Board of Directors.
9. The Executive Committee shall appoint, direct and coordinate the work of all Standing Technical Committees.
10. The Executive Committee shall approve or disapprove the formation, dissolution and operation of groups of members.
11. The Executive Committee may authorize conventions, conferences and meetings of the IRE and approve their dates and locations.
12. The Executive Committee shall direct and manage IRE standardization activities, relations with other organizations, special activities, technical activities, advertising and publications.
13. The Executive Committee shall establish an office account, limited in size, the funds for which shall be made available from the funds received by IRE by authorization of at least two Corporate Officers, as provided in the Constitution. Funds shall be withdrawn from the office account only by authorized bonded employees of the IRE.

503. *Officers*

1. As provided in the Constitution, the Corporate Officers of the IRE shall be a President, two Vice Presidents, a Secretary, Treasurer and an Editor.
2. As provided in the Constitution, the President shall be elected by the voting members by virtue of which election he shall also be a Delegate-at-large and a Director-at-large. His term as President shall be one year but his term as Delegate-Director shall be three years.
3. There shall be two Vice Presidents of the IRE who shall be elected by the voting membership for terms of office of one year, by virtue of which election they shall also be Directors-at-large. One of these shall be a member residing in North America who, by reason of availability and qualifications, is able effectively to assist the President in the performance of his presidential duties, and the other shall be a member residing elsewhere than in North America. Both Vice Presidents shall serve terms as Directors concurrent with their terms as officers.
4. The Vice President residing in North America shall take precedence as regards assumption of presidential duties as provided in the Constitution.
5. The Secretary, Treasurer and Editor shall be elected by the annual Assembly by virtue of which election they shall also be Directors. The terms of the Secretary, Treasurer and Editor shall be one year and their terms as Director shall also be one year.
6. Reimbursement of necessary travel expenses of the President, incurred for the performance of his IRE duties other than his duties as Delegate or Director, is authorized. Reimbursement of necessary travel expenses of the Vice President residing in North America, incurred for the performance of his IRE duties other than his duties as Director, is authorized.
7. Incapacity of the President to perform his duties and the length of time such incapacity may continue shall be determined by the Board of Directors, or by the Executive Committee, if the incapacity occurs at a time when it is not feasible to convene a meeting of the Board and there is need for action. The President, however, may declare a condition of incapacity and the duration thereof by written communication to the Secretary, in which event the Secretary shall notify the Vice President residing in North America, to assume the presidential duties and the Secretary shall take such other action as provided in the Constitution if that Vice President is unavailable or incapacitated.
8. A vacancy among the Corporate Officers and the duration thereof shall be determined by the Board of Directors which may fill such vacancy as provided by the Constitution. If a vacancy occurs among the Corporate Officers at a time when it is not feasible to convene a meeting of the Board of Directors and there is need for action, the Executive Committee shall make such determination and fill such vacancy if the approval of a majority of all the Directors is secured by mail or telephone, such approval to be recorded by the Secretary with the names of the approving Directors.
9. The President shall determine the extent of the assistance to be rendered him by the Vice President charged with the duty of assisting the President.
10. The Secretary shall prepare an Annual Report on membership, meetings and IRE activities, to be submitted to the Board of Directors.
11. The Treasurer shall cause to be prepared an annual audit of the affairs of the IRE by certified public accountants and a report thereof submitted to the Board of Directors. The Treasurer shall also make a report to the Executive Committee semi-annually concerning the status of the IRE investments. The Treasurer, before making changes in the IRE portfolios, shall report the proposed changes to the Executive Committee and obtain its approval.



504. *Committees*

1. The IRE shall have Standing Committees each of which shall normally consist of five or more persons. These shall be classified as Standing Administrative Committees and Standing Technical Committees. Each Standing Committee shall have the right to create subcommittees of its own selection.
2. The Standing Administrative Committees shall be:

   Admissions
   Awards
   Constitution and Laws
   Editorial Board
   Education
   Fellow
   Finance
   History
   Nominations and Appointments
   Policy Study
   Professional Groups
   Tellers

   The Awards, Constitution and Laws, Fellow, Nominations and Appointments, Policy Study and Tellers Committees and the Editorial Board shall be appointed by and be advisory to the Board of Directors. The others shall be appointed by and be advisory to the Executive Committee. The appointments to these committees, except the Nominations and Appointments Committee, shall start with the first day following appointment and shall continue until the date the succeeding terms of appointments take effect.
3. The Standing Technical Committees shall be:

   Antennas and Waveguides
   Audio and Electroacoustics
   Circuits
   Electron Tubes
   Electronic Computers
   Facsimile
   Feedback Control Systems
   Industrial Electronics
   Information Theory and Modulation Systems
   Measurements and Instrumentation
   Medical Electronics
   Mobile Communication Systems
   Navigation Aids
   Nuclear Techniques
   Piezoelectric and Ferroelectric Crystals
   Radio Frequency Interference
   Radio Receivers
   Radio Transmitters
   Recording and Reproducing
   Solid State Devices
   Standards
   Symbols
   Television Systems
   Video Techniques
   Wave Propagation

   They shall be appointed by and be advisory to the Executive Committee; the appointments to them shall be made between January first and May first, and the terms of appointment shall be from May first of the year when the appointments are made through April thirtieth of the following year.
4. Additional appointments may be made to any standing committee to fill vacancies or to care for special cases as the need arises, but such appointments shall expire with the expiration of the term of the committee.
5. The functions and responsibilities of each Committee, together with rules for operation and guidance, shall be compiled by the Executive Secretary under the direction of the Executive Committee and contained in a document titled ". . . Committee Manual." Following appointment, each new member of a Committee shall be provided with a copy of the applicable Manual.

6. The Admissions Committee shall be responsible for advising the Executive Committee as to the admission and transfer of applicants to the professional grades of Senior Member and Member. It shall be concerned with determining whether the applicants meet the requirements of the Constitution and the Bylaws, functioning primarily as a jury and acting as a guardian of the membership standards of the IRE. As far as possible, its meetings shall be held just prior to the scheduled meetings of the Executive Committee in the interest of expediting the processing of applications. Members of the Admissions Committee shall be of Fellow or Senior Member grade.

   Applications for the grades of Associate and Student shall be handled by IRE Headquarters and periodic reports shall be made to the Executive Committee by the Executive Secretary.
7. The Awards Committee shall be responsible for making recommendations to the Board of Directors for the following IRE National awards:
   a. Medal of Honor
   b. Morris Liebmann Memorial Prize Award
   c. Browder J. Thompson Memorial Prize Award
   d. Harry Diamond Memorial Award
   e. Vladimir K. Zworykin Television Prize Award
   f. Founders Award
   g. W.R.G. Baker Award

   The specifications for all of these awards shall be set forth in the Awards Committee Manual.

   The Awards Committee shall also be responsible, in odd-numbered years, for making a recommendation to the Board of Directors on the Norman W. V. Hayes Memorial Award of The Institution of Radio Engineers, Australia.

   The Board of Directors may assign other matters concerning IRE awards to the Committee.

   The Awards Committee shall consist of twelve members chosen from among those of Fellow grade, eight being selected so that each of the eight Regions will have representation. When appointments are being made, retiring members of the Fellow Committee shall become nominees for consideration for such appointments. Six of the twelve members shall be appointed each year for terms of two years each. A Chairman shall be appointed from among the twelve members to serve for a term of one year.
8. The Constitution and Laws Committee shall be responsible for advising the Board of Directors and assisting the Executive Committee, on matters concerning changes and amendments to the Constitution or the Bylaws that are referred to it.
9. The Editorial Board shall be advisory to the Board of Directors concerning all matters of editorial policy, the publication of the PROCEEDINGS OF THE IRE, including policy determination of its editorial and technical content, the general publication policies for IRE publications, including the IRE DIRECTORY, the TRANSACTIONS of the Professional Groups, the IRE STUDENT QUARTERLY and the IRE INTERNATIONAL CONVENTION RECORD.

   The Editorial Board shall consist of the Editor as Chairman, a Vice Chairman, the Managing Editor if such position exists, and not less than three nor more than five other members.
10. The Education Committee shall be a policy advisory group for the IRE in the field of education and shall report to the Executive Committee at periodic intervals concerning the status of and proposals affecting that field. These reports shall be simultaneously circulated to the members of the Board of Directors.

    The Committee shall study the needs of electronic engineering education in all areas, including the high schools, the universities and the technical institutes, determine whether the general area of electronics and basic electrical engineering is adequately covered in the colleges of the nation and consider a possible policy for accreditation if deficiencies are found.

    The Committee shall consider the needs of the profession in graduate education, and shall guide IRE policy in recognizing and promoting graduate work in electronics. Means whereby the IRE may improve the educational status of its members in general shall also be suggested.

    The Committee shall closely follow the use of electronics in education and shall make recommendations concerning means of promoting electronics as a teaching and learning medium in the schools and universities. The Committee shall consider and make recommendations concerning IRE policies and activities for the Student members and Student Branches.

    The Committee shall establish appropriate standing subcommittees, such as Student Branch, Graduate Education, Accreditation and for other areas where appropriate to carry out its responsibilities more adequately.

    The Committee shall seek contributions to the formulation of policy recommendations from the Professional Group on Education, encouraging that Group to provide for exchange of information through seminars and publications and for discussion of educational philosophy, problems and methods.

    The membership of the Education Committee shall include, ex-officio, the Chairmen of the Regional Education Committees and members-at-large not to exceed the number of ex-officio members.
11. The Fellow Committee shall be responsible for making recommendations to the Board of Directors for nominees to be conferred the grade of Fellow. The Committee shall also provide a citation for each such nominee. The recommendations may not exceed a total of seventy-five in any one year, approximately five thereof to be allocated for nominees residing elsewhere than in North America. Sources from which nominations of candidates and other useful information shall be obtained shall be set forth in the Fellow Committee Manual.

    The Fellow Committee shall consist of twelve members chosen from among those of Fellow grade, eight being selected so that each of the eight Regions will have representation. Six of the twelve members shall be appointed each year for terms of two years each. A Chairman shall be appointed from among the twelve members to serve for a term of one year.
12. The Finance Committee shall consist of not more than five members of the Board of Directors and shall include the Treasurer, ex-officio. The Chairman of the Finance Committee shall be chosen from among the members of the Executive Committee.

    The Committee shall be responsible for periodically reviewing the fiscal affairs of the IRE concerning which it is to take the initiative for making recommendations to the Executive Committee when warranted. It shall review the annual budget in advance of its submission to the Executive Committee and the Board of Directors.
13. The History Committee shall be responsible for considering questions concerning historical matters in the fields covered by IRE activities, including assistance to the Editorial Board, assisting institutions of a public nature such as the Smithsonian Institution where helpful information is requested and can be secured, and for providing information and recommendations to the Executive Committee when pertinent.
14. The Nominations and Appointments Committee shall be appointed at the last meeting of the Board of Directors held prior to December tenth. Its membership shall be chosen from among those members of the Board of Directors whose terms continue through the following year and shall include two Directors who are currently serving the first year of their terms. Its membership may additionally include not more than two junior past Regional Directors.

    At least fourteen days before the next annual Assembly, the Nominations and Appointments Committee shall mail to the Delegates whose terms continue through the following year and to the new Delegates-elect, a list of candidates for the offices of Secretary, Treasurer, Editor and Directors to be elected by the annual Assembly.

    A list of candidates to fill vacancies that will exist among the chairmen and members of the Awards, Constitution and Laws, Executive, Fellow, Policy Study and Tellers Committees and the Editorial Board shall be sent to all of the Directors whose terms continue through the following year, to the new Directors-elect and to those candidates recommended by the Nominations and Appointments Committee for election as Directors by the annual Assembly.

    The Nominations and Appointments Committee shall also, subsequent to the termination of the fiscal year in which it was appointed, carry out the other provisions of these Bylaws. In addition, the Nominations and Appointments Committee shall recommend to the Board of Directors nominees for the Nominations and Appointments Committee to be appointed later in that year.
15. The Policy Study Committee shall be responsible for making studies and recommendations as the basis for the possible establishment of policies by the Board of Directors or for the taking of action by the Board of Directors for the good of the IRE. Such problems for study shall be referred to the Committee by the Board of Directors.

    The Policy Study Committee shall consist of the most recent past President, two Regional Directors serving the second year of their two-year terms and two Directors-at-large serving the second or third years of their three-year terms. In the event a Director is unable to serve out a term, the Board of Directors may appoint another Director who is serving the second or third year of his term. The Chairman of the Committee shall be the junior past President. Should the junior past President be unable to serve as Chairman, the Board of Directors shall appoint another member of the Committee as Chairman.
16. The Professional Groups Committee shall administer the formation and discontinuance of Groups. It shall also recommend to the Executive Committee the establishment or dissolution of a Group, provide a uniform Constitution, approve Bylaws for Groups involving specialized matters, provide a Manual of Instructions and develop the Group system to its fullest capacity consistent with a healthy growth, all within the limits of whatever framework the Executive Committee shall establish for the conduct of Groups.

    The Professional Groups Committee shall consist of the Chairman of each Professional Group, the President of the IRE, the Vice-President residing in North America, the Professional Groups Coordinator of the Executive Committee, the Technical Secretary and the Executive Secretary. The Professional Groups Committee shall additionally include a Chairman and a Vice-Chairman, neither of whom shall be an officer of any Professional Group.
17. The Tellers Committee shall be responsible to the Board of Directors for the supervision of the counting of ballots required to be obtained by the Constitution on questions submitted to the membership of IRE or to groups of members. The staff at IRE Headquarters will assist the Committee in the performance of its work. Reports by the Committee to the Board of Directors shall be signed by the Chairman of the Committee.
18. The Standards Committee shall be responsible for the coordination of the standardization activities of the Standing Technical Committees, the initiation of Standards activities, the establishment of the scope of activity of each Technical Committee and the rendering of final approval of all Standards evolved by IRE prior to publication.
19. Scopes of Technical Committee activities, organization and membership, procedures and methods of coordination between them, and with other standardization bodies shall be compiled in a Manual for Technical Committees (including the Standards Committee).
20. The Chairman of each Standing Technical Committee shall be a member of the Standards Committee, ex-officio.

505. *Executive Secretary*
   1. The Executive Committee shall appoint an Executive Secretary and shall fix his tenure of office and determine his salary.
   2. The Executive Secretary shall be in charge of IRE Headquarters, its staff and operations, for which he shall be responsible to the Executive Committee.

506. *Nominations and Elections*
   1. The Secretary shall circularize all Section Chairmen and Secretaries before March first of each year requesting the submission of suitable names to be considered by the Nominations and Appointments Committee for the various elective offices.
   2. The Nominations and Appointments Committee shall submit the name or names of one or more candidates for the office of President and for the office of the Vice President residing elsewhere than in North America and the names of more than one candidate for each of the other elective offices.
   3. The Nominations and Appointments Committee shall transmit its list of proposed nominees to all Directors at least one week before the date at which the Board of Directors is expected to act upon them. Under normal conditions, this date is the first Wednesday of May.
   4. Each Regional Committee shall submit to the Board of Directors by April thirtieth of the Regional election year, the names of at least one qualified nominee for the office of Regional Delegate-Regional Director. To qualify, each candidate shall indicate to the Regional Committee his acceptance of the nomination.
   5. Nominations by petition for the office of Regional Delegate-Regional Director may be made by the

submission, by the date stated and according to the procedure outlined in the Constitution, of a petition signed by at least one per cent of the total number of voting members residing within the Region, as listed in the official membership records of the IRE at the end of the previous year, but in no case shall the number be less than one hundred.

6. During the period between August fourteenth and September first of each year, the Executive Committee is authorized to take any necessary actions on any petitions and to approve the ballot.
7. Each proposed nominee named by the Board of Directors shall be consulted, and, if he so requests, his name shall be withdrawn.
8. The list of nominees required to be submitted to all voting members by the Constitution shall contain at least one name for the office of President, at least one name for each of the two offices of Vice President, and at least four names for the two offices of Delegate-at-large-Director-at-large. The ballot going to each of the Regions where an election of a Regional Delegate-Regional Director is to take place shall also contain the names of all nominees for the office of Regional Delegate-Regional Director for that particular Region.
9. The ballot required by the Constitution shall contain the number of names for each office to be voted upon, and the names of the nominees for Regional Delegate-Regional Director shall be suitably identified by Region since these will be voted on only by the voting members of each Region involved. The names of the nominees for each office shall be arranged in alphabetical order. The ballots shall carry a statement to the effect that the order of the names is alphabetical for convenience only and indicates no preference.
10. Voting members shall vote for the candidates whose names appear on the list of nominees, by written ballots in plain sealed envelopes, enclosed within mailing envelopes marked "Ballot" and bearing the member's written signature. No ballots within unsigned outer envelopes shall be counted. No votes by proxy shall be counted. Only ballots arriving at IRE Headquarters before twelve o'clock noon on the last working weekday prior to October twenty-fifth shall be counted. Ballots shall be checked, opened and counted under the supervision of the Tellers Committee between October twenty-fifth and the first Wednesday in November. The result of the count shall be reported to the Board of Directors at its next succeeding meeting and the nominee for each office for which the election is being held, receiving the greatest number of qualified votes shall be declared elected. In the event of a tie vote, the Board of Directors shall choose between the nominees involved.

507. *Amendments*

1. Before an amendment to the Constitution is submitted to the voting members, it shall be reviewed by legal counsel designated by the Executive Committee and a written opinion secured that such amendment is in accordance with the laws under which the IRE is incorporated and operated.
2. Ballots for Constitutional amendments shall carry a statement of the time limit for return to IRE Headquarters. The ballots after marking shall be placed in plain sealed envelopes, enclosed within mailing envelopes marked "Ballot" and bearing the member's written signature. Only ballots with signed outer envelopes shall be counted. No votes by proxy shall be counted. Only ballots arriving at IRE Headquarters prior to the stated time limit shall be counted. The votes will be counted under the supervision of the Tellers Committee and the results reported to the Board of Directors at its next meeting.
3. A complete history of amendments shall be kept in the files of the IRE.

508. *Fiscal Year*

The fiscal year of the IRE shall be the calendar year.

## 600. PUBLICATIONS

601. *Periodicals*

1. The IRE shall publish a periodical named PROCEEDINGS OF THE IRE.
2. The IRE shall publish periodicals of the various Professional Groups named IRE TRANSACTIONS.
3. The IRE shall publish a periodical named IRE STUDENT QUARTERLY.

602. *Standards*

1. The IRE shall publish from time to time, in the PROCEEDINGS OF THE IRE, Standards concerning technologies encompassed within the scope of the objects of the IRE, which have been issued by its Standards Committee.

## 700. CONVENTIONS

701. *Annual Convention*

1. There shall be held annually in New York City in the month of March or as near thereto as possible, a convention named the IRE International Convention and Radio Engineering Show. The IRE shall be the sole sponsor.

CUT HERE

Fill out this application in complete detail and mail with remittance to IRE Headquarters

**THE INSTITUTE OF RADIO ENGINEERS, INC., 1 EAST 79 STREET, NEW YORK 21, N. Y.**

Membership dues include $9.00 per year for the subscription to PROCEEDINGS, which amount is included in, but is non-deductible from dues.

### APPLICATION FOR ASSOCIATE, MEMBER OR SENIOR MEMBER GRADES

Made under Sec..... Clause.....

TO THE BOARD OF DIRECTORS

Gentlemen: I hereby make application for Transfer / Admission to ☐ Associate ☐ Member ☐ Senior Member grade in The Institute of Radio Engineers on the basis of my training and professional experience given herewith and refer to the references named, WHO ARE PERSONALLY FAMILIAR WITH MY WORK.

I certify that the statements made in the record of my training and professional experience are correct and agree, if elected, that I will be governed by the Constitution of the IRE as long as I continue a member. Furthermore, I agree to promote the objects of the IRE so far as shall be in my power.

DATE _____ SIGN FULL NAME WITH PEN _____

### Names of References

For Associate grade, the names of at least three Fellows, Senior Members, Members, Associates, or other responsible individuals are required.
For Member grade, the names of at least four Fellow, Senior Member or Member references are required.
For Senior Member grade, the names of at least five Fellow or Senior Member references are required.
In exceptional circumstances, the Admissions Committee may accept other references than those stipulated, provided they are thoroughly familiar with the ability and experience of the applicant.

SIGNATURES ARE NOT NECESSARY. PRINT OR USE TYPEWRITER

(Be sure reference qualifications are met.)

| Name of Reference | Mail Address |
|---|---|
| Name of Reference | Mail Address |
| Name of Reference | Mail Address |
| Name of Reference | Mail Address |
| Name of Reference | Mail Address |
| Name of Reference | Mail Address |

Entrance fee ..... $ 3.00
Annual dues ..... $ .....
Total remittance enclosed..... $ .....

DO NOT USE THIS SPACE

Receipt Acknowledged .....
Elected .....
No. (For office use).....
Notified .....

ADDRESS FOR *PROCEEDINGS* AND OTHER MAIL
Print or Use Typewriter

First Name _____ Middle Initial _____ Last Name _____

Street Address _____

City _____ Postal Zone _____ State (Country) _____

D-61

# RECORD OF TRAINING AND PROFESSIONAL EXPERIENCE

(PLEASE LETTER OR TYPE ALL INFORMATION)

FULL NAME (First Name) (Middle Initial) (Family Name) | BIRTHPLACE (State or Country) | NATIONALITY (Of what country is applicant a citizen?) | DATE OF BIRTH

## EDUCATION

SECONDARY SCHOOL | DATES

OTHER SCHOOLS (Names and dates)

COLLEGE OR UNIVERSITY (1) | DATES to

MAJOR COURSE | DEGREES RECEIVED | DATE

COLLEGE OR UNIVERSITY (2) | DATES to

MAJOR COURSE | DEGREES RECEIVED | DATE

## PRESENT OCCUPATION

Title or Position | Firm or Organization Name | Address

Nature of Work Done by Firm or Organization

Nature of Your Work

## PROFESSIONAL EXPERIENCE

Present occupation first, followed by previous experience. Indicate nature of your own work and clearly indicate degree of your responsibility for the particular work on which application is based. Please be *complete.* The Admissions Committee, which must review your application, can judge your qualifications *only* from the information you supply here.

DATES

List membership grade in other professional societies:

*Continue on separate sheet, if necessary*

CUT HERE

CUT HERE

## INSTRUCTIONS

(1) Applicants for Associate and Member fill in (a). Sections b, c, d, e optional.

(2) Applicants for Senior Member fill in a, b, c, d, e where applicable.

(3) Use extra sheets wherever necessary.

(4) *Give dates* where applicable.

a. Publication of important original engineering or scientific papers, books or inventions. Give the number of any issued patents and indicate those in use.

b. Technical direction with evidence of accomplishment of important scientific or engineering work. *Give Dates.*

c. **Creative contributions to the welfare of the scientific or engineering profession** _____

d. **Establishment or furtherance of important scientific or engineering courses in a school of recognized standing**

e. **Contributions equivalent to those of 'a' to 'd' above in such areas as technical editing, patent prosecution, or patent law, provided these contributions serve to advance progress substantially in the fields of electronics, radio, allied branches of engineering or the related arts and sciences.**

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# OFFICERS AND DIRECTORS, 1912–1960

| Name | Office held |
|---|---|
| Akerman, Ben | Bd. of Dir., 1949–50. |
| Alexanderson, E. F. W. | Bd. of Dir., 1917–23; Pres., 1921; V. Pres., 1920. |
| Appleton, E. V. | Bd. of Dir., 1932; V. Pres., 1932. |
| *Armstrong, E. H. | Bd. of Dir., 1916–22, 1936–38. |
| Ashbridge, Sir Noel | Bd. of Dir., 1947; V. Pres., 1947. |
| *Austin, L. W. | Bd. of Dir., 1914–17; Pres., 1914. |
| Bailey, Austin | Bd. of Dir., 1940–42. |
| Bailey, S. L. | Bd. of Dir., 1943–55; Pres., 1949; Treas., 1948. |
| Baker, W. R. G. | Bd. of Dir., 1940, 1946–60; Pres., 1947; Treas., 1951–60. |
| *Ballantine, Stuart | Bd. of Dir., 1935–37; Pres., 1935. |
| Barclay, A. P. H. | Bd. of Dir., 1959–60. |
| Barkhausen, G. Heinrich | Bd. of Dir., 1935; V. Pres., 1935. |
| Barrow, W. L. | Bd. of Dir., 1943–45. |
| Barton, F. S. | Bd. of Dir., 1943; V. Pres., 1943. |
| Batcheller, Arthur | Bd. of Dir., 1928–32, 1934–36. |
| Batsel, M. C. | Bd. of Dir., 1933. |
| *Bennett, E. M. | Bd. of Dir., 1923–25. |
| Bennett, R. D. | Bd. of Dir., 1953. |
| Berkner, L. V. | Bd. of Dir., 1959–60. |
| Beveridge, H. H. | Bd. of Dir., 1936–39; Pres., 1937. |
| Black, K. C. | Bd. of Dir., 1952. |
| Boone, E. M. | Bd. of Dir., 1955–56. |
| Bown, Ralph | Bd. of Dir., 1926–29, 1937–39; Pres., 1927; V. Pres., 1926. |
| Brainerd, J. G. | Bd. of Dir., 1956–57. |
| Brown, G. S. | Bd. of Dir., 1958–60. |
| Brown, J. E. | Bd. of Dir., 1938, 1947. |
| Browning, G. H. | Bd. of Dir., 1952–53. |
| *Bullard, W. H. G. | Bd. of Dir., 1920–21. |
| Burrows, C. R. | Bd. of Dir., 1956. |
| Byrne, J. F. | Bd. of Dir., 1955–57. |
| Cady, W. G. | Bd. of Dir., 1928–29, 1932–34; Pres., 1932; Editor, 1929. |
| Caldwell, O. H. | Bd. of Dir., 1932–35. |
| Carnahan, C. W. | Bd. of Dir., 1960. |
| Carter, E. F. | Bd. of Dir., 1943–45. |
| Chaffee, E. L. | Bd. of Dir., 1922; V. Pres., 1922. |
| Chamberlain, A. B. | Bd. of Dir., 1941–44. |
| Chambers, C. C. | Bd. of Dir., 1942. |
| Clark, T. H. | Bd. of Dir., 1950. |
| Clayton, J. M. | Bd. of Dir., 1928–29; Secy., 1928–29. |
| Clement, L. M. | Bd. of Dir., 1945. |
| Coggeshall, I. S. | Bd. of Dir., 1941–44, 1951–53; Pres., 1951. |
| Cole, R. I. | Bd. of Dir., 1958–59. |
| Coleman, J. B. | Bd. of Dir., 1948–49. |
| *Colpitts, E. H. | Bd. of Dir., 1921–23. |
| *Conrad, Frank | Bd. of Dir., 1927; V. Pres., 1927. |
| Cosentino, A. T. | Bd. of Dir., 1941; V. Pres., 1941. |
| Craven, T. A. M. | Bd. of Dir., 1937. |
| Crosby, M. G. | Bd. of Dir., 1947–49. |
| Cullum, A. E., Jr. | Bd. of Dir., 1948. |
| Cunningham, F. W. | Bd. of Dir., 1938–40. |
| Cutting, R. F. | Bd. of Dir., 1920–24; Pres., 1922; V. Pres., 1921. |
| Dart, H. F. | Bd. of Dir., 1951–52. |
| Dasher, B. J. | Bd. of Dir., 1960. |
| *Davis, G. S. | Bd. of Dir., 1915, 1917–19. |
| deForest, Lee | Bd. of Dir., 1930–32; Pres., 1930. |
| Dellinger, J. H. | Bd. of Dir., 1924–31; Pres., 1925; V. Pres., 1924. |
| Deloraine, E. M. | Bd. of Dir., 1946; V. Pres., 1946. |
| Doherty, W. H. | Bd. of Dir., 1951–53; 1958–60. |
| Dyer, J. N. | Bd. of Dir., 1955–56, 1960; V. Pres., 1960. |
| Eastham, Melville | Bd. of Dir., 1922–41; Treas., 1927–40. |
| Eastman, A. V. | Bd. of Dir., 1950–51. |
| Eckersley, P. P. | Bd. of Dir., 1937; V. Pres., 1937. |
| Edwards, C. P. | Bd. of Dir., 1931; V. Pres., 1931. |
| Engstrom, E. W. | Bd. of Dir., 1949. |
| Espenschied, Lloyd | Bd. of Dir., 1912–13, 1915–26, 1931. |
| Everitt, W. L. | Bd. of Dir., 1942–47, 1949–51; Pres., 1945. |
| Fay, Frank | Bd. of Dir., 1912. |
| Fink, D. G. | Bd. of Dir., 1949–51, 1956–60; Pres., 1958; Editor, 1956–57. |
| Fisk, E. T. | Bd. of Dir., 1938; V. Pres., 1938. |
| Forbes, E. D. | Bd. of Dir., 1912; Treas., 1912. |
| *Forbes, H. C. | Bd. of Dir., 1940. |
| Fowler, G. A. | Bd. of Dir., 1958–59. |
| Friis, H. T. | Bd. of Dir., 1941–43. |
| Fuller, L. F. | Bd. of Dir., 1928. |
| Gershon, J. J. | Bd. of Dir., 1956–57. |
| Goldsmith, Alfred N. | Bd. of Dir., 1912–60; Pres., 1928; Secy., 1918–27; Editor, 1912–28, 1930–53; Editor Emeritus, 1954—. |
| *Graf, A. W. | Bd. of Dir., 1952–53, 1957. |
| Graham, Virgil M. | Bd. of Dir., 1935–41, 1946–48. |
| Granqvist, C. E. | Bd. of Dir., 1958; V. Pres., 1958. |
| *Grebe, A. H. | Bd. of Dir., 1924–26, 1928. |
| *Gustafson, G. E. | Bd. of Dir., 1943. |
| Guy, R. F. | Bd. of Dir., 1944–48, 1950–52; Pres., 1950; Treas., 1947. |
| Hackbusch, R. A. | Bd. of Dir., 1938, 1944–46; V. Pres., 1944. |
| Haggerty, P. E. | Bd. of Dir., 1960. |
| Hamburger, F., Jr. | Bd. of Dir., 1950–51, 1959–60; Editor, 1960. |
| Hammond, J. H., Jr. | Bd. of Dir. 1912–17; Treas., 1913–14. |
| Hanson, O. B. | Bd. of Dir., 1938–43. |
| Harp, C. E. | Bd. of Dir., 1959–60. |
| Hazeltine, Alan | Bd. of Dir., 1923–28, 1936–39; Pres., 1936. |
| Hegbar, H. R. | Bd. of Dir., 1957–58. |
| Heising, R. A., | Bd. of Dir., 1927–31, 1933–35, 1939–41, 1943–45, 1947–49; Pres., 1939; Treas., 1943–45. |
| Henderson, J. T. | Bd. of Dir., 1953–59; Pres., 1957. |
| Henney, Keith | Bd. of Dir., 1945–48. |
| Herold, E. W. | Bd. of Dir., 1956–58. |
| Hewlett, W. R. | Bd. of Dir., 1950–57; Pres., 1954. |
| *Hill, Guy | Bd. of Dir., 1914–16, 1918–20. |
| Hogan, J. V. L. | Bd. of Dir., 1912–36, 1948–50; Pres., 1920; V. Pres., 1916–19. |
| Hoover, P. L. | Bd. of Dir., 1951–52. |
| *Horle, L. C. F. | Bd. of Dir., 1934, 1936–42, 1944–46; Pres., 1940. |
| Horn, C. W. | Bd. of Dir., 1933–34. |
| Horne, C. F. | Bd. of Dir., 1960. |
| Houck, H. W. | Bd. of Dir., 1931–42. |
| Howes, F. S. | Bd. of Dir., 1948. |
| *Hubley, Warren | Bd. of Dir., 1915–27; Treas., 1915–16, 1918–27. |
| Hull, L. M. | Bd. of Dir., 1929–35; Pres., 1933. |
| Hunter, T. A. | Bd. of Dir., 1948–50, 1956. |
| Hutcheson, J. A. | Bd. of Dir., 1948. |

*(Continued on page 26)*

* DECEASED.

# OFFICERS AND DIRECTORS, 1912–1960 (Cont'd)

| Name | Office held |
|---|---|
| Jansky, C. M., Jr. | Bd. of Dir., 1929–42; Pres., 1934. |
| Jensen, A. G. | Bd. of Dir., 1954–56. |
| Jett, E. K. | Bd. of Dir., 1938. |
| Johnson, J. K. | Bd. of Dir., 1942. |
| Jolliffe, C. B. | Bd. of Dir., 1936–37, 1944. |
| Kaar, I. J. | Bd. of Dir., 1939, 1948. |
| Kantebet, S. R. | Bd. of Dir., 1953; V. Pres., 1953. |
| *Kennelly, A. E. | Bd. of Dir., 1916–18; Pres., 1916. |
| Kirke, Harold L. | Bd. of Dir., 1952; V. Pres., 1952. |
| *Kolster, F. A. | Bd. of Dir., 1933–35. |
| Krantz, H. E. | Bd. of Dir., 1949–50. |
| Krumm, L. R. | Bd. of Dir., 1917, 1921; Treas., 1917. |
| Lack, F. R. | Bd. of Dir., 1940, 1946–47. |
| *Langmuir, Irving | Bd. of Dir., 1923–25; Pres., 1923. |
| Lee, A. G. | Bd. of Dir., 1930; V. Pres., 1930. |
| Lewis, G. H. | Bd. of Dir., 1918–19, 1923–26, 1935. |
| Llewellyn, F. B. | Bd. of Dir., 1939–48; Pres., 1946. |
| Loughren, A. V. | Bd. of Dir., 1952–58; Pres., 1956. |
| *Lowenstein, Fritz | Bd. of Dir., 1912; V. Pres., 1912. |
| Manson, R. H. | Bd. of Dir., 1927–33; Pres., 1931. |
| *Marriott, R. H. | Bd. of Dir., 1912–16, 1920–22, 1926–32; Pres., 1912; V. Pres., 1913. |
| Marshall, C. J. | Bd. of Dir., 1954–55. |
| *McDonald, A. S. | Bd. of Dir., 1949; V. Pres., 1949. |
| McFarlan, R. L. | Bd. of Dir., 1957–60; Pres., 1960. |
| *McNicol, Donald | Bd. of Dir., 1919–28; Pres., 1926; V. Pres., 1925. |
| *McRae, J. W. | Bd. of Dir., 1949–56; Pres., 1953. |
| *Meissner, Alexander | Bd. of Dir., 1929; V. Pres., 1929. |
| Moe, R. E. | Bd. of Dir., 1960. |
| *Morecroft, J. H. | Bd. of Dir., 1922–26; Pres., 1924; V. Pres., 1923. |
| Murray, A. F. | Bd. of Dir., 1936–39. |
| *Nelson, E. L. | Bd. of Dir., 1932–36. |
| Newton, K. V. | Bd. of Dir., 1957–58. |
| Nichols, H. W. | Bd. of Dir., 1924–25. |
| Niwa, Y. | Bd. of Dir., 1957; V. Pres., 1957. |
| Noble, D. E. | Bd. of Dir., 1957–59. |
| Oliver, B. M. | Bd. of Dir., 1959–60. |
| Olson, H. F. | Bd. of Dir., 1959–60. |
| Oxley, A. B. | Bd. of Dir., 1951–52, 1957–58. |
| Packard, L. E. | Bd. of Dir., 1954–55. |
| *Pederson, P. O. | Bd. of Dir., 1939; V. Pres., 1939. |
| Pettit, J. M. | Bd. of Dir., 1954–55. |
| *Pickard, G. W. | Bd. of Dir., 1912–15; Pres., 1913. |
| *Pierce, G. W. | Bd. of Dir., 1915, 1918–21; Pres., 1918–19; V. Pres., 1915. |
| Pierce, J. R. | Bd. of Dir., 1954–55; Editor, 1954–55. |
| Piore, E. R. | Bd. of Dir., 1951. |
| Polkinghorn, F. A. | Bd. of Dir., 1957–58. |
| Ponte, M. J. H. | Bd. of Dir., 1954; V. Pres., 1954. |
| Poppele, J. R. | Bd. of Dir., 1947. |
| *Poulsen, Valdemar | Bd. of Dir., 1936; V. Pres., 1936. |
| Pounsett, F. H. R. | Bd. of Dir., 1949–50. |
| Pratt, Haraden | Bd. of Dir., 1935–60; Pres., 1938; Treas., 1941–42; Secy., 1943–60. |
| Priest, C. A. | Bd. of Dir., 1953–54. |
| *Pupin, M. I. | Bd. of Dir., 1917–19; Pres., 1917. |
| Ragazzini, J. R. | Bd. of Dir., 1953–54. |
| Rappaport, G. | Bd. of Dir., 1954–56. |
| Ratcliffe, J. A. | Bd. of Dir., 1960. |
| Reich, H. J. | Bd. of Dir., 1944, 1948–51. |
| Reid, J. D. | Bd. of Dir., 1950–51. |
| *Reoch, A. E. | Bd. of Dir., 1924–27. |
| Rinia, Herre | Bd. of Dir., 1956; V. Pres., 1956. |
| Royden, G. T. | Bd. of Dir., 1946. |
| *Rush, W. A. | Bd. of Dir., 1942; V. Pres., 1942. |
| Russell, J. B., Jr. | Bd. of Dir., 1960. |
| Rust, W. M. | Bd. of Dir., 1951–52. |
| Rybner, Jorgen | Bd. of Dir., 1951; V. Pres., 1951. |
| Ryder, J. D. | Bd. of Dir., 1952–59; Pres., 1955; Editor, 1958–59. |
| Sarnoff, David | Bd. of Dir., 1915–20; Secy., 1915–17. |
| Schulz, E. H. | Bd. of Dir., 1958–59. |
| Seely, Samuel | Bd. of Dir., 1957–59. |
| Shackelford, B. E. | Bd. of Dir., 1945–50, 1953–55; Pres., 1948. |
| Shepherd, J. E. | Bd. of Dir., 1948–50. |
| Shepherd, W. G. | Bd. of Dir., 1960. |
| Shute, E. R. | Bd. of Dir., 1933–34. |
| Simon, E. J. | Bd. of Dir., 1912–15; Secy., 1912–14. |
| Sinclair, D. B. | Bd. of Dir., 1945–59; Pres., 1952; V. Pres., 1959; Treas., 1949–50. |
| Sinclair, G. | Bd. of Dir., 1960. |
| Sink, R. L. | Bd. of Dir., 1952–53. |
| Smith, D. B. | Bd. of Dir., 1947. |
| Smith-Rose, R. L. | Bd. of Dir., 1948; V. Pres., 1948. |
| *Squier, G. O. | Bd. of Dir., 1918–22. |
| *Stone, J. S. | Bd. of Dir., 1912–19; Pres., 1915; V. Pres., 1914. |
| Straiton, A. W. | Bd. of Dir., 1953–54. |
| Stratton, J. A. | Bd. of Dir., 1948–51, 1954. |
| Swinyard, W. O. | Bd. of Dir., 1945–46. |
| Tank, F. | Bd. of Dir., 1955; V. Pres., 1955. |
| Taylor, A. H. | Bd. of Dir., 1929–31; Pres., 1929. |
| Teal, G. K. | Bd. of Dir., 1959. |
| Terman, F. E. | Bd. of Dir., 1940–43, 1948–49; Pres., 1941; V. Pres., 1940. |
| *Thompson, B. J. | Bd. of Dir., 1937–44. |
| Town, G. R. | Bd. of Dir., 1949, 1951–53. |
| Tucker, D. J. | Bd. of Dir., 1955–56. |
| Turner, H. M. | Bd. of Dir., 1933–46; Pres., 1944. |
| *van der Bijl, H. J. | Bd. of Dir., 1945; V. Pres., 1945. |
| *van der Pol, Balth. | Bd. of Dir., 1934; V. Pres., 1934. |
| Van Dyck, A. F. | Bd. of Dir., 1930–35, 1939–44; Pres., 1942. |
| Vollum, C. H. | Bd. of Dir., 1955. |
| Watson-Watt, R. A. | Bd. of Dir., 1950; V. Pres., 1950. |
| Waynick, A. H. | Bd. of Dir., 1959–60. |
| *Weagant, R. A. | Bd. of Dir., 1913–17. |
| *Webb, W. L. | Bd. of Dir., 1946. |
| Weber, Ernst | Bd. of Dir., 1952–60; Pres., 1959. |
| Webster, E. M. | Bd. of Dir., 1946. |
| Wells, H. W. | Bd. of Dir., 1954–55. |
| Westman, H. P. | Bd. of Dir., 1930–42; Secy., 1930–42. |
| Wheeler, H. A. | Bd. of Dir., 1934, 1940–45. |
| *Wheeler, L. P. | Bd. of Dir., 1940–45; Pres., 1943. |
| Whinnery, J. R. | Bd. of Dir., 1956–58. |
| White, W. C. | Bd. of Dir., 1943–47; Treas., 1946. |
| Whittemore, L. E. | Bd. of Dir., 1926–29, 1935–37; V. Pres., 1928. |
| *Wilson, William | Bd. of Dir., 1932–36. |
| Wolcott, C. F. | Bd. of Dir., 1956–57. |
| Wolff, Irving | Bd. of Dir., 1952–53. |
| Zahl, H. A. | Bd. of Dir., 1949. |
| *Zenneck, Jonathan | Bd. of Dir., 1933; V. Pres., 1933. |

* DECEASED.

# MEMBERSHIP LISTS
## *Including*
## BIOGRAPHIES OF FELLOWS
## AND
## AN ALPHABETICAL ROSTER
## AND
## A GEOGRAPHICAL LISTING

### NOTE

In the following pages are set forth the names of the members of The Institute of Radio Engineers. These have been disposed under three headings, as follows:

*Biographies of Fellows;* a list of all Fellows, with a short biographical note on each.

*Membership Roster;* a complete listing of all members (not including Students) on record as of May 31, 1960; giving membership grades and business affiliations.

*Geographical Listing of Membership;* by states and foreign countries, and by cities within such areas; including a designation of the present grade of each member.

All listings include appointments and elections up to May 31, 1960.

In the Roster the following symbols indicative of grades are used, along with numerals indicating the year of admission to that grade:

(F) *Fellow*
(SM) *Senior Member*
(M) *Member*
(A) *Associate*
(VA) *Voting Associate.* Those who were Associates on or before March 1, 1939, automatically became Voting Associates as of that time.
(S) *Student*
(J) *Junior.* This grade no longer exists.

The Board of Directors waives the dues of all members who have attained the age of 65 years and who have been members of the IRE for 35 years. The following symbol is used to indicate this status:

(L) *Life Member*

# BIOGRAPHIES OF FELLOWS*

(As of May 31, 1960)

**ABRAHAM, Leonard G. (SM'46—F'57),** Director, Transmission Engineering, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: September, 1901, Watson, Ill. B.S.(E.E.), 1922, M.S. (E.E.), 1923, University of Illinois.

**ACHESON, Marcus A. (A'36—M'37—F'41),** Consulting Engineer, Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N.Y.
Born: January 18, 1903, Denison, Tex. B.S.(E.E.), 1924, Rice Institute. **Committees:** Editorial Reviewer, 1954–60; Papers, 1937; Papers Review, 1951–53.

**ADAIR, George P. (A'42—SM'44—F'47),** Consulting Radio Engineer, 1610 Eye St., N.W., Washington 6, D.C.
Born: December 8, 1903, Rancho, Tex. B.S.(E.E.), 1926, Agricultural and Mechanical College of Texas. **Sections:** Washington, *secretary, 1946; vice-chairman, 1947; chairman, 1948;* Mid-Atlantic Regional, *vice-chairman, 1948.* **Awards:** Life Honorary Member, International Municipal Signal Association, 1944.

**ADLER, Richard B. (S'44—A'48—SM'53—F'60),** Professor of Electrical Engineering, Massachusetts Institute of Technology, Building 26, Cambridge 39, Mass.
Born: May 9, 1922, New York, N.Y. S.B., 1943, Sc.D., 1949, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1955–60; Papers and Program; Semiconductor Devices, 1952–54; Transistor Internal Parameters, 1956–60. **Sections:** Boston, IRE Transistor Lecture Series Committee, 1955–56. **IRE Representative:** IRE-AIEE, University of Pennsylvania Transistor Circuits Conference, 1955-56. **Awards:** Premium Award of Royal Aeronautical Society, 1955; Sloan Award for Teaching, Massachusetts Institute of Technology, 1955–56.

**ADLER, Robert (A'42—SM'47—F'51),** Vice President and Associate Director of Research, Zenith Radio Corporation, 6001 W. Dickens Ave., Chicago 39, Ill.
Born: December 4, 1913, Vienna, Austria. Ph.D., 1937, University of Vienna. **Committees:** Awards, 1957, 1960; Editorial Reviewer, 1954–60; Modulation Systems, 1948–50. **Professional Groups:** Electron Devices, Broadcast and TV Receivers.

**AFFEL, Herman A. (A'14—M'40—SM'43—F'49),** Retired Consultant, RFD 2, Oakland, Me.
Born: August, 1893, Brooklyn, N.Y. S.B., 1914, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1954–60; Meetings and Papers, 1930; New York Program, 1939–41, *chairman, 1940;* Paper, 1931–45; Papers Review, 1946–53. **Awards:** Modern Pioneers Award, National Association of Manufacturers, 1940.

**AIKEN, Howard H. (SM'56—F'60),** Professor of Applied Mathematics, Director of Computation Laboratory, Computation Laboratory of Harvard University, 33 Oxford St., Cambridge 39, Mass.
Born: March 8, 1900, Hoboken, N.J. S.B., 1923, University of Wisconsin; S.M., 1937, Ph.D., 1939, Harvard University; Dr. Ing. (Honorary), 1952, Technische Hochschule, Darmstadt, Germany; LL.D. (Honorary), 1954, Wayne State University. **Awards:** Palmes de l'Academie Francais, 1949; Ingeniors Vetenskaps Akademien, 1950; National Fonds voor wetenschap Pelijk Onderzoek, Belgium, 1951; Chevalier, Legion of Honor, 1952; Consejero de Honor del Consejo Superior de Investigaciones Cientificas, Spain, 1954; Ralph E. Hackett Award, Science, 1954; Officer's Cross of the Order of the Crown, Belgium, 1955; Navy Distinguished Public Service Award, 1955; Decoration for Exceptional Civilian Service, Air Force, 1957; Testimonial of Eminent Professional Services, University of Wisconsin, 1958; La Medaille Vermeil de Paris, 1958; Fellow, American Academy of Arts and Sciences; Fellow, Association for Advancement of Science.

**ALBERSHEIM, Walter J. (SM'48—F'57),** Vice President, Engineering, Spencer-Kennedy Laboratories, Inc., 1320 Soldier's Field Rd., Boston 35, Mass.; Senior Consultant in Radar, Electronics Research Laboratories, School of Engineering, Columbia University, New York 27, N.Y.
Born: April 22, 1897, Cologne, Germany. E.E., 1922, Eng.D. 1924, Institute of Technology, Aachen, Germany; Professional Engineer, 1936, New York. **Committees:** Editorial Reviewer, 1954–60; Papers, 1951–53. **Sections:** Monmouth County Subsection, Membership Committee, *chairman, 1949.* **Awards:** Journal Award, Society of Motion Picture Engineers.

**ALBERT, Arthur L. (A'31—SM'47—F'50),** Professor, Communication Engineering, Oregon State College, Corvallis, Ore.
Born: March 13, 1899, Forest Grove, Ore. B.S., 1923, M.S., 1926, E.E., 1938, Oregon State College. **Committees:** Membership, 1947–48. **IRE Representative:** Oregon State College, 1942–59. **Awards:** Fellow, American Institute of Electrical Engineers, 1941.

**ALEXANDER, Samuel N. (A'44—M'55—SM'55—F'56),** Chief, Data Processing Systems Division, National Bureau of Standards, Department of Commerce, Connecticut Ave. & Van Ness St., Washington 25, D.C.
Born: February 22, 1910, Wharton, Tex. A.B., B.S.(E.E. and Physics), 1931, University of Oklahoma; M.S.(E.E.), 1933, Massachuetts Institute of Technology. **Committees:** Electronic Computers, 1948–59, *chairman, 1954–55.* **Sections:** Washington, D.C., Electronic Computers Group, *chairman 1954–55.* **Awards:** U. S. Department of Commerce Award for Exceptional Service, SEAC Staff, 1951; Silver Medal, Royal Academy of Engineering Sciences, Stockholm, 1956.

**ALEXANDERSON, Ernest F. W. (A'13—M'13—F'15)(L),** Retired. Consulting Engineer, 1132 Adams Road, Schenectady, N.Y.
Born: January 25, 1878, Uppsala, Sweden. E.E., 1900, Royal Technical University; Sc.D., 1926, Union College; Ph.D., 1938, Uppsala University; Dr. Technology, 1948, Royal Technical University, Stockholm, Sweden. **IRE Offices:** Manager, 1917–19; Director, 1920–23; Vice President, 1920; President, 1921. **Committees:** Meetings and Papers, 1928; Standardization, 1916–24; Wave Length Regulation, 1916–17, 1919–20. **Awards:** IRE Medal of Honor, 1919; John Ericsson Gold Medal, American Society of Swedish Engineers, 1928; Edison Medal, American Institute of Electrical Engineers, 1944; Cedergren Gold Medal, Royal Swedish Technical University, 1944; Valdemar Poulsen Gold Medal, Royal Danish Technical University, 1947.

**ALFORD, Andrew (A'35—M'40—F'42),** Owner, Andrew Alford Consulting Engineers, 299 Atlantic Ave., Boston 10, Mass.; President, Alford Manufacturing Company.
Born: August 5, 1904, Samara, Russia. A.B., 1924, University of California. **Committees.** Annual Review, 1944–46; Antennas, 1946–49, *chairman, 1944–46;* Papers Procurement, 1947–50; Radio Transmitters, 1944–45; Standards, 1944–45; Transmitters and Antennas, 1943–44. **Awards:** Presidential Certificate of Merit, 1948.

* In listing membership on committees, years during which members served as chairmen or as other officers are indicated by italics.





**ALFVEN, Hannes O. G. (SM'55—F'60),** Professor, Royal Institute of Technology, Stockholm 70, Sweden.
Born: May 30, 1908, Norrkoping, Sweden. Dr. Phil., 1934, University of Uppsala.

**ALLEN, Edward W., Jr. (M'44—F'53),** Chief Engineer, Federal Communications Commission, 13 St. & Pennsylvania Ave., Washington 25, D.C.
Born: February 14, 1903, Portsmouth, Va. E.E., 1925, University of Virginia; LL.B., 1933, George Washington University. **Committees:** Papers Review, 1946–49; Wave Propagation, 1948–56. **Professional Groups:** Antennas and Propagation; Broadcast Transmission Systems Administrative Committee. **Awards:** IRE Harry Diamond Award, 1958.

**ALMQUIST, Milton L. (A'43—SM'53—F'58),** Director of Systems Engineering, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: August 7, 1895, San Francisco, Calif. B.Sc.(E.E.), 1920, University of California. **Awards:** Army-Navy Certificate of Appreciation, 1948; Fellow, American Institute of Electrical Engineers, 1951.

**ANDERSON, A. Eugene (S'38—A'41—M'45—SM'58—F'59),** Works Engineer of Manufacture, Western Electric Co., Inc., 555 Union Blvd., Allentown, Pa.
Born: April 22, 1916, Lima, Ohio. B.S.(E.E.), 1939, M.S.(E.E.), 1939, Ohio State University. **Committees:** Editorial Reviewer, 1954–59; Electron Devices, 1954–55; Solid State Devices, *chairman, 1954; 1956;* Symbols, 1946–47. **Professional Groups:** Electron Devices Administrative Committee, 1958–59.

**ANDERSON, Clifford N. (A'19—F'34),** Teaching Staff, Electrical Engineering, Cornell University, Ithaca, N.Y. Residence: 133 Summit Ave., Summit, N.J.
Born: September 22, 1895, Scandinavia, Wis. Ph.B., 1919; M.S., 1920, University of Wisconsin. **Committees:** Admissions, 1930–31; New York Program, 1932; Papers Review, 1953; Sections, 1941–44; Tellers, 1932–33.

**ANDERSON, Earl I. (M'40—SM'43—F'54),** Chief Engineer, Home Instruments, Radio Corporation of America, Bldg. 204–2, Camden, N.J.
Born: April 19, 1907, Chicago, Ill. **Professional Groups:** Administrative Committee, 1950–60; Broadcast and Television Receivers, *vice-chairman, 1952–53; chairman, 1954–55;* Editor of *Transactions,* 1957–58.

**ANDREW, Victor J. (A'25—M'40—SM'43—F'55),** Chairman, Board of Directors, Andrew Corporation, 363 E. 75th St., Chicago 19, Ill.
Born: August 31, 1902, Medina County, Ohio, B.S., 1926, College of Wooster; M.S., 1928, Ph.D., 1932, University of Chicago; D.S. (Honorary), 1949, College of Wooster. **Committees:** Membership, 1942–44; Sections, 1940. **Sections:** Chicago, *secretary, 1937–38; chairman, 1939–40.*

**ANGELLO, Stephen J. (SM'52—F'59),** Project Manager, Westinghouse New Products Laboratories, Cheswick, Pa.
Born: March, 1918, Haddonfield, N.J. B.S.(E.E.), 1939, M.S. (E.E.), 1940, Ph.D. (Physics), 1942, University of Pennsylvania. **Committees:** Solid State Devices, 1949–59; Task Group, *chairman, 1953–55.*

**ANKENBRANDT, Francis L. (SM'50—F'57),** Major General, USAF, Retired. Administrator, Global Communications Program, Radio Corporation of America, Front & Cooper Sts., Camden, N.J.
Born: January 27, 1904, Chicago, Ill. B.S., 1926, U. S. Military Academy; M.S., 1927, Yale University. **Professional Groups:** Military Electronics Administrative Committee, 1956–58, 1961–.

**ANTON, Nicholas G. (M'44—SM'44—F'56),** President and Director of Research and Engineering, Anton Electronics Laboratories, Inc., 1226–1238 Flushing Ave., Brooklyn 37, N.Y.; Chairman, Board of Directors, Anton-Imco Electronic Corporation, Garland, Tex.
Born: December 14, 1906, Trieste, Italy. Graduate of the Technical Institute Leonardo da Vinci, 1925–26, Columbia University. **Professional Groups:** RETMA Nuclear Instrumentation and Control Committee, *chairman;* Advisory Nuclear Instrumentation Committee to the Federal Civil Defense Administration, *chairman;* Nuclear Instrumentation Manufacturers' Council of the Atomic Industrial Forum, *chairman.* **Awards:** Fellow, American Academy of Arts and Sciences; Fellow, American Physical Society.

**APSTEIN, Maurice (SM'51—F'59),** Associate Director for Research, Diamond Ordnance Fuze Laboratories, Washington 25, D.C.
Born: May 5, 1910, Bridgeport, Conn. B.S.(E.E.), 1932, City College of New York; M.E.A., George Washington University. **Sections:** Washington Chapter, PGEM, *vice-chairman, 1957–58; chairman, 1958–59.* **Awards:** Department of Commerce Gold Medal for "Outstanding Contributions to Technology in Fields of Aviation Ordnance and National and International Standardization of Weapons," 1951.

**ARNAUD, Jean P. (A'35—M'40—SM'43—F'53),** Systems Engineer, RCA International, Clark Township, N.J.
Born: September 1, 1905, London, England. E.E., 1929, University of Buenos Aires. **Sections:** Buenos Aires, *vice-chairman, 1941, chairman, 1942–43, 1949–50.* **IRE Representative:** La Plata, 1942.

**ASHBRIDGE, Sir Noel (F'38),** Director, Marconi's Wireless Telegraph Company, Ltd., Marconi House, Strand, London, W.C. 2, England.
Born: December 10, 1889, Wanstead, Essex, England. B.Sc. (Engineering), 1911, King's College, London University. **IRE Offices:** Vice President, 1947; Director, 1947. **Awards:** Fellow of King's College, London; Knight of Royal Order of Dannebrog (Danish), 1934; Knighted, 1935; James Watt Medal, The Institution of Civil Engineers, 1937; President, The Institution of Electrical Engineers, 1941–42, Honorary Member, 1957; President, Junior Institution of Engineers, 1949–50; MICE, MIEE.

**ASHBY, Robert M. (SM'51—F'55),** Chief Engineer, Autonetics Division of North American Aviation, Inc., Downey, Calif.
Born: May 9, 1912, American Fort, Utah. B.A., 1934, M.A., 1939, Brigham Young University; Ph.D., 1942, University of Wisconsin. **Sections:** Pasadena, Subsection, *chairman, 1956.*

**ASTIN, Allen V. (SM'50—F'54),** Director, National Bureau of Standards, Washington 25, D.C.
Born: June 12, 1904, Salt Lake City, Utah. B.S., 1925, University of Utah; M.S. (Physics), 1926; Ph.D. (Physics), 1928, New York University; Sc.D. (Honorary), 1953, Lehigh University. **Awards:** President's Certificate of Merit, 1948; Exceptional Service Award, Dept. of Commerce, 1952.

**AUERBACH, Isaac L. (S'46—M'49—SM'52—F'58),** President, Auerbach Electronics Corporation, 1634 Arch St., Philadelphia 3, Pa.
Born: October, 1921, Philadelphia, Pa. B.S.(E.E.), 1943, Drexel Institute of Technology; M.Sc. (Physics), 1947, Harvard University. **Committees:** International Convention, 1960; National Convention Program, 1954; Professional Group, 1959. **Professional Groups:** Electronic Computers, Philadelphia Chapter, *chairman, 1952–53;* National Membership, *chairman, 1953;* Administrative Committee, 1954–57. **Sections:** Philadelphia, *treasurer, 1955–56; secretary, 1956–57; vice-chairman, 1957–58; chairman, 1958–59;* Finance Committee, *chairman, 1954–55;* Nominations Committee, *chairman, 1959–60.* **IRE Representative:** JCC Technical Program Committee, 1957; U. S. Committee for the First International Conference on Information Processing, *general chairman, 1957–59;* UNESCO, Consultant for Information Processing, 1957–59; UNESCO Consultant for Automation Travelling Exhibition, 1959–60; International Federation of Information Processing Societies, *chairman,* Provisional Bureau, 1959–60 U. S. Representative, 1960–. **Awards:** City of Paris Medal, 1959.

**AUSTIN, Arthur O. (F'30),** President, A. O. Austin, Inc., P.O. Box 109, Barberton, Ohio.
Born: December 28, 1879, Stockton, Calif. A.B., 1903, Stanford University.

**AVINS, Jack (A'39—SM'49—F'57),** Manager, Research Applications Laboratory, RCA Laboratories, Princeton, N.J.
Born: March, 1911, New York, N.Y. A.B., 1932, Columbia University; M.E.E., 1949, Brooklyn Polytechnic Institute. **Committees:** Fellow, 1958–59; Intercarrier Sound TV Receivers, Subcommittee, *chairman, 1949–50;* Member-at-Large, 1957–60; Radio Receivers, 1948–54, 1957–60; *chairman, 1951, 1955;* Standards 1951–55. 1959–60; TV Receiver Standards, *chairman,* Ad Hoc, *1957–58.* **IRE Representative:** ASA Sectional Committee (C16) on Radio, 1953–55; Chief Delegate (C12–1) International Electrotechemical Committee, 1956.

**BABITS, Victor A. (A'33—M'35—SM'49—F'59),** Professor of Electrical Engineering, Rensselaer Polytechnic Institute, Troy, N.Y.
Born: March 14, 1900, Budapest, Hungary. B.E.E., 1922, D.Sc. (Eng.), 1931, Decretum Habilitationis, 1938, University of Technical Sciences, Budapest. **Committees:** Education, 1953–57; Papers Review, 1952–53. **Awards:** Fellow, American Association for the Advancement of Science; Fellow, Television Society, London, 1959.

**BACHMAN, Charles H. (S'32—A'35—VA'39—SM'54—F'55),** Professor of Physics, Physics Department, Steele Hall, Syracuse University, Syracuse, N.Y.
Born: December 8, 1908, Cedar Falls, Iowa. B.S.(E.E.), 1932, M.S., 1933, Ph.D., 1935, Iowa State College.

**BACHMAN, William S. (S'32—A'36—M'45—SM'54—F'56),** Director, Engineering & Development, Columbia Records, Inc., 799 Seventh Ave., New York 19, N.Y.
Born: October 29, 1908, Williamsport, Pa. E.E., 1932, Cornell University. **Committees:** Board of Editors, 1950–53; Editorial Reviewer, 1954–60. **Awards:** Emil Berliner Award, Audio Engineering Society, 1955.

**BACK, George I. (SM'53—F'55),** Major General, U. S. Army, Retired. 6211 3rd St., S., St. Petersburg 5, Fla.; Assistant to the President and Director, International Resistance Company, 401 N. Broad St., Philadelphia, Pa.
Born: February 25, 1894, Sioux City, Iowa. B.A., 1921, Morningside College; Post Graduate Communications Engineering Course, 1920–21, Yale University; Signal School, 1934, U. S. Army; Command and General Staff College, 1939, U. S. Army. **Awards:** Honorary Life Member, Armed Forces Communications Electronics Association, 1951; Silver Medal Award, Poor Richards Club, 1953. **U. S. Army Decorations:** Legion of Merit, 1944; Distinguished Service Medal with Oak Leaf Cluster, 1945, 1951; Commendation Ribbon, 1947; Air Medal, 1951; Silver Star, 1951. **Foreign Decorations:** Brazilian War Medal, 1945; Commander of the Order of the Crown of Italy, 1945; Commander of the Order of the British Empire, 1946; Cross of the Senior Knight Commanders of the Order of Phoenix (Greece), 1952.

**BAILEY, Austin (A'25—M'25—F'36)(L),** Consulting Engineer, 193 Sagamore Road; Millburn, N.J.
Born: June 9, 1893, Lawrence, Kan. A.B., 1915, University of Kansas; Ph.D., 1920, Cornell University. **IRE Offices:** Director, 1940–42. **Committees:** Admissions, 1934, *chairman, 1935;* Awards, 1945, 1949; Constitution and Laws, 1932–34, 1936–42, 1944–45, *chairman, 1942;* Convention Policy, 1947–50; Membership, 1941; National Convention, 1947–49; New York Program, 1930–34, 1937–40, *chairman, 1931, 1938;* Professional Groups, 1952–53, *vice-chairman, 1952;* Sections, 1929–33, *chairman, 1930;* Tellers, *chairman, 1939; 1940;* Winter Technical Meeting, 1946, *chairman, 1945.* **Professional Groups:** Vehicular Communications Administrative Committee, 1949–57, *chairman, 1950–51.* **IRE Representative:** ASA Sectional Committee on Graphic Symbols and Designations, 1940–58; ASA Sectional Committee (Y14) on Standards for Drawings and Drafting Room Practices, 1940–50, 1951–58; U. S. National Committee, IEC, Advisers on Symbols, 1952–57.

**BAILEY, George W. (A'38—SM'46—F'56),** Executive Secretary, Institute of Radio Engineers, Inc., 1 E. 79 St., New York 21, N.Y.
Born: May, 1887, Quincy, Mass. A.B., 1907, Harvard University; Sc.D. (Honorary), 1958, Lawrence College. **IRE Offices:** Executive Secretary, 1945–. **Committees:** IRE International Convention, *chairman, 1948–60;* Military Liaison, *chairman, 1949–;* Constitution and Laws, 1946–47; Office Quarters, 1947; Professional Groups, 1960; Public Relations, 1945–48; Winter Technical Meeting, 1946. **IRE Representative:** ASA Conference of Staff Executives, 1949–51; ASA Conference of Executives of Organization Members, 1954–59. **Awards:** Marconi Medal for Service, Veteran Wireless Operators Association, 1944; President's Certificate of Merit, 1946; Edison Award Citation, 1957.

**BAILEY, Stuart L. (A'28—M'36—SM'43—F'43),** President, Jansky and Bailey, Inc., 1339 Wisconsin Ave., N.W., Washington 7, D.C.
Born: October 7, 1905, Minneapolis, Minn. B.S.(E.E.), 1927, M.S., 1928, University of Minnesota. **IRE Offices:** Director, 1943–55; Treasurer, 1948; President, 1949. **Committees:** Admissions, 1943–44; Appointments, 1948; Awards, 1950–52; Broadcasting, 1931–32, 1934–35, *alternate, 1931–32;* Constitution and Laws, 1944, 1948, 1954–60; Executive, 1945–54, *vice-chairman, 1948, chairman, 1949;* Finance, 1948, 1950–51, 1953–54; National Convention, 1947–48, 1953–55, *vice-chairman, 1953–60;* Nominations, 1946–52, 1956–58, *chairman, 1946;* Office Practices, 1947; Planning, 1947; Policy Development, 1948, 1951; Professional Groups, 1950; Public Relations, 1950, *alternate, 1945–46;* Radio Wave Propagation, 1942–46; Radio Wave Propagation and Utilization, 1945–48; Sections, 1946–47; Special Publication Fund, 1947; Wave Propagation, 1937–42, 1948–56; Winter Technical Meeting, 1946. **IRE Representative:** ASA Sectional Committee (C16) on Radio, *chairman, 1953–54;* Executive Council Central Radio Propagation Laboratory; International Scientific Radio Union (URSI) Executive Committee, 1951–56; IRE-RMA Coordination Committee, 1949–50; Joint IRE-AIEE Coordination Committee, 1950–54; IRE Advisory Committee to National Bureau of Standards for Central Radio Propagation Laboratory, 1954–56; Joint Technical Advisory Committee, 1940, 1950; National Bureau of Standards Technical Advisory Committee, 1958–59; RMA-IRE Problem No. 2, 1949–50; U.S.A. National Committee, URSI, 1949–59; U. S. National Committee of the URSI Executive Committee, 1957, *alternate,* 1959.

**BAILEY, William F. (S'33—A'36—VA'39—SM'51—F'54),** Assistant Director of Research, Hazeltine Research Corporation, 59–25 Little Neck Parkway, Little Neck 62, L.I., N.Y.
Born: May 4, 1911, Buffalo, N.Y. M.E., 1933, M.S., 1941, Stevens Institute of Technology. **Committees:** Television, 1946–49; Television Systems, 1949, *vice-chairman, 1955–58; chairman, 1958–59;* Standards; Tellers, 1953–55, *chairman, 1954.* **Sections:** Long Island, *chairman, 1954–55.*

**BAILEY, William M. (M'23—SM'43—F'60)(L),** Formerly Vice President and Chief Engineer, Cornell-Dubilier Electric Corporation. Consulting Engineer. Residence: 23 Fort St., Fairhaven, Mass.
Born: October 8, 1894, Providence, R.I. **Awards:** Certificate Awarded as a Member of the War Committee on American War Standards, American Standards Association, 1946.

**BAKER, W. R. G. (A'19—F'28)(L),** President, Syracuse University Research Corporation.
Born: November 30, 1892, Lockport, N.Y. B.E., 1916, M.E.E., 1918, D.S. (Honorary), 1935, Union College; Dr. Engineering (Honorary), 1951, Syracuse University; Dr. Engineering (Honorary), 1955, Polytechnic Institute of Brooklyn. **IRE Offices:** President, 1947; Board of Directors, 1940, 1946–48, 1950–55, 1959; Treasurer, 1957–59; Standards Coordinator, 1948–50. **Committees:** Admissions, 1941; Annual Review, 1948–49; Appointments, 1948; Awards, 1940; Broadcasting, 1935–36, 1948–51, *vice-chairman, 1951–52;* Executive, 1947–58, *chairman, 1947; vice-chairman, 1951–57, 1959–60; treasurer, 1958–59;* Finance, *chairman, 1948–57, 1959–60;* Meetings and Papers, 1926, 1928–29, *alternate, 1928;* Membership, 1928; Nominations, 1930, 1948; Nuclear Studies,



1947–49, *chairman, 1947–48;* Policy Development, 1948; Preparedness, 1940–41; Professional Groups, *chairman, 1950–60;* Public Relations, 1950; Sections, 1931–32; Standardization, 1925–26; Standards, 1938–41, 1948–50. **Sections:** Connecticut Valley, *secretary, 1938–40;* Philadelphia, *chairman, 1930–31.* **IRE Representative:** ASME Glossary Review Board, 1948–52. **Awards:** IRE Medal of Honor, 1952; IRE Founders' Award, 1958.

**BALDWIN, Millard W., Jr. (A'40—SM'45—F'48),** Member, Technical Staff, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: December, 1902, Port Ewen, N.Y. E.E., 1925, Cornell University; M.A., 1928, Columbia University. **Committees:** Facsimile, 1941–42; Standards, 1949–60, *vice-chairman, 1951–56, chairman, 1956–59;* Television Systems, 1949–60; Video Techniques, 1949–52. **IRE Representative:** ASA Electrical Standards Board, 1957–60; ASA Sectional Committee (C16) on Radio, 1956–60; ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1951–60; International Radio Consultative Committee: Executive Committee of U. S. Delegation, Study Group XIV (Vocabulary), *alternate, 1952;* Joint IRE-RTMA-SMPTE-NARTB Committee for Inter-Society Co-ordination, *alternate, 1952–55; 1959–60;* U. S. National Committee of the International Electrotechnical Commission, 1957–60.

**BALLARD, B. Guy (SM'47—F'55),** Vice President (Scientific) and Director, Radio & Electrical Engineering Division, National Research Council, Ottawa 2, Ont., Canada.
Born: June 19, 1902, Fort Stewart, Ont., Canada. B.Sc., 1924, D.Sc., 1956, Queen's University. **Awards:** Order of the British Empire, 1946; Ross Medal, Engineering Institute of Canada, 1949.

**BARCO, Allen A. (A'40—SM'45—F'57),** Director, Systems Research Laboratory, RCA Laboratories, Princeton, N.J.
Born: March, 1916, St. Louis, Mo. B.S.(E.E.), 1937, Washington University.

**BARLOW, Harold M. (SM'54—F'56),** Pender Professor of Electrical Engineering, University of College, University of London, Gower St., London, England.
Born: November 15, 1899, London, England. B.Sc. (Engineering), 1922, Ph.D. (Science), 1924, University of London. **Awards:** Kelvin Premium, Fleming Premium and Extra Premiums of Institution of Electrical Engineers, 1930, 1952, 1954, 1957.

**BARNES, John L. (A'27—SM'44—F'52),** President, Systems Corporation of America, Los Angeles 24, Calif., Professor of Engineering, University of California, Los Angeles 24, Calif.
Born: October 16, 1906, Haddonfield, N.J. S.B.(E.E.), 1928, S.M.(E.E.), 1929, Massachusetts Institute of Technology; A.M. (Mathematics), 1930; Ph.D. (Mathematics), 1934, Princeton University. **Committees:** Papers Review, 1948–50; Radio Wave Propagation, 1942–46. **Professional Groups:** Circuit Theory Administrative Committee, 1952–55. **IRE Representative:** Tufts University, 1941–42.

**BARROW, Wilmer L. (A'28—VA'39—M'40—F'41),** Vice President for Research & Development, Sperry Gyroscope Company, Great Neck, L.I., N.Y.
Born: October, 1903, Baton Rouge, La. M.S., 1929, Massachusetts Institute of Technology, Sc.D., 1931, Technische Hochschule, Munich, Germany. **IRE Offices:** Director, 1943–45. **Committees:** Antennas, 1945–48; Awards, 1944–45, 1948–49; Board of Editors, 1946–53; Constitution and Laws, 1943–44; Editorial Reviewer, 1954–60; Executive, 1945; Nominations, 1943, 1949–50; Papers, 1941–45; Papers Procurement, 1942–43; Professional Groups, 1948; Regular Papers, 1941; Research, 1946–47, 1949–50; Standards, 1938–42; Wave Guides, 1943–44; Wave Propagation, 1941–42. **Sections:** Boston, *chairman, 1939–41.* **IRE Representative:** Radio Technical Planning Board, 1946, *alternate, 1944–45;* RMA-IRE Co-ordinating Committee, 1948. **Awards:** IRE Morris Liebmann Memorial Prize, 1943.

**BARSTOW, John M. (SM'47—F'59),** Television Systems Engineer, Bell Telephone Laboratories, Murray Hill, N.J.
Born: July, 1901, Topeka, Kan. B.S., 1923, Washburn University; M.S., 1924, University of Kansas. **Committees:** Editorial Reviewer, 1954–60; National Stereo Radio Committee, *vice-chairman,* Panel 2, 1959–; National Television Systems Committee, *vice-chairman,* Panel 17, 1952–; *acting chairman,* Panel 17, 1956–; Video Signal Transmission Methods of Measurement, *chairman, 1956–60;* Video Techniques, 1955–59, *vice-chairman, 1959–60.*

**BARTON, F. Sherbrooke (F'35),** Chief Scientific Officer, Ministry of Aviation, Shell Mex House, Strand, London, W.C. 2, England; Counsellor, Defense Research & Supply; United Kingdom High Commissioner, Ottawa, Ont., Canada.
Born: May 13, 1895, Nottingham, England. M.A., 1920, University of Cambridge; B.Sc., 1920, University of London. **IRE Offices:** Vice President, 1943; Director, 1943. **IRE Representative:** IRE-IEE International Liaison, 1947, 1955–59. **Awards:** Fellow, Institute of Physics; Commander of the Order of the British Empire.

**BARTON, Loy E. (M'29—SM '43—F'56),** Radio Research Engineer, RCA Laboratories, Princeton, N.J.
Born: November 7, 1897, Fayetteville, Ark. B.E.E., 1921, E.E., 1925, University of Arkansas. **Awards:** Distinguished Alumnus Citation, University of Arkansas, 1947.

**BATCHELDER, Laurence (A'29—SM'47—F'57),** Staff Engineer, Raytheon Company, Wayland, Mass.
Born: October, 1906, Cambridge, Mass. A.B., 1928, M.S., 1929, Harvard University. **Professional Groups:** Ultrasonics Engineering Administrative Committee, 1956–59; *vice-chairman, 1957–59.* **Awards:** Fellow, Acoustical Society of America.

**BATCHER, Ralph R. (J'16—A'18—M'22—SM'43—F'50),** Electronics Consultant, Automatic Processes, 240–02 42 Ave., Douglaston, L.I., N.Y.
Born: June, 1897, Dysart, Iowa. B.S.(E.E.), 1920, Iowa State College. **Committees:** Annual Review, *chairman, 1949–54;* Board of Editors, 1928–53; Meetings and Papers, 1927–29; Public Relations, *chairman, 1950–51;* Standards, 1949–54; Symbols, 1940–48; Television, 1939–42; Television and Facsimile, 1937–39. **Professional Groups:** Production Techniques, *chairman, 1954–57.* **IRE Representative:** ASA Sectional Committee (C16) on Radio, 1951–52, *secretary, 1952.*

**BATEMAN, Ross (A'42—M'55—F'59),** Page Communications Engineers, Inc., 2001 Wisconsin Ave., N.W., Washington 7, D.C.
Born: July 22, 1912, Toledo, Ore. B.S.(E.E.), 1934, Oregon State College. **Committees:** Papers Review, 1953.

**BATSEL, Max C. (A'21—F'27)(L),** Consultant, Defense Electronic Products, Radio Corporation of America, Front and Cooper Sts., Camden, N.J. Residence: 525 Kings Highway, Moorestown, N.J.
Born: June 16, 1894, Fulton, Ky. B.M.E., 1915, University of Kentucky. **IRE Offices:** Director, 1933. **Committees:** Bibliography, 1930–32; Meetings and Papers, 1928–29; Membership, 1926–27; New York Program, 1931–33; Professional Groups, 1956; Radio Receivers, 1927–28; Standardization, 1925–26, 1927–31; Use of Transmission Unit, 1928–29. **Professional Groups:** Engineering Management, 1952–55, *vice-chairman, 1954–55, chairman, 1955–56;* Administrative Committee, 1955–58. **Awards:** Modern Pioneer Award N.M.A., 1940; Certificate of Commendation, U. S. Navy; Fellow, Society of Motion Picture and Television Engineers.

**BAUER, Benjamin B. (S'27—A'39—SM'44—F'53),** Vice President, Acoustics and Magnetics, CBS Laboratories, 227 High Ridge Road, Stamford, Conn.
Born: June 26, 1913, Odessa, Russia. E.E., 1937, University of Cincinnati. **Committees:** Audio Techniques, 1958–59. Awards, 1955; Board of Editors, 1950–53; Editorial Reviewer, 1954–60; Electroacoustics, 1945–59, *vice-chairman, 1949–53, 1954–55, chairman, 1953–54, 1955–56.* Papers Procurement, 1947–50; Professional Groups, 1952–53; Recording and Reproducing, 1958–59; Standards, 1954–56. **Professional Groups:** Audio, *vice-chairman, 1950, chairman, 1951–52, secretary, 1958;* Editor of *Transactions,*

*1952;* Associate Editor, 1953–58; *secretary, 1953–60.* **Awards:** Fellow, Acoustical Society of America; Fellow, Audio Engineering Society; Eta Kappa Nu Honorable Mention Award, 1946; IRE Professional Group on Audio Achievement Award, 1955.

**BAYLY, Benjamin deF. (M'43—SM'43—F'47),** President, Bayly Engineering, Ltd., Ajax, Ont., Canada.
Born: June, 1903, London, Ont., Canada. B.A.Sc., 1930, University of Toronto; Professor, University of Toronto, 1930–51. **Committees:** Awards, 1940; Papers Review, 1947–49. **Sections:** Toronto, *chairman, 1936–37.* **IRE Representative:** University of Toronto, 1941–42. **Awards:** Member of the Order of the British Empire, 1946.

**BEAM, Robert E. (S'37—A'41—SM'44—F'56),** Professor of Electrical Engineering, Northwestern University, Evanston, Ill.; Vice President of Research and Development, Hallicrafters Company, Chicago, Ill.
Born: July 11, 1914, Cambridge, Ohio. B.E.E., 1937, Ohio State University; Ph.D., 1940, Iowa State College. **Committees:** Education, 1945–51; Membership, 1947–48; Policy Development, 1949–50. **Professional Groups:** Microwave Theory and Techniques Administrative Committee, 1954–59. **IRE Representative:** Northwestern University, 1945–47; Southern Methodist University, 1941–45.

**BECHMANN, Rudolf H. (SM'54—F'60),** Consultant, Frequency Control Division, U. S. Army Signal Research and Development Laboratory, Fort Monmouth, N.J.
Born: July, 1902, Nuremberg, Germany. Ph.D., 1927, University of Munich, Germany. **Committees:** Piezoelectric and Ferroelectric Crystals, 1953–60; Piezoelectric Crystals, *chairman, 1954–60.*

**BECK, Alfred C. (A'30—SM'46—F'58),** Member Technical Staff, Bell Telephone Laboratories, Inc., P.O. Box 107, Red Bank, N.J.
Born: July 26, 1905, Granville, N.Y. E.E., 1927, Rensselaer Polytechnic Institute. **Professional Groups:** Microwave Theory and Techniques Administrative Committee, *chairman, 1955–56;* Administrative Committee, 1954–60. **Sections:** New York, *secretary, 1953–54, vice-chairman, 1954–55, chairman, 1955–56;* Monmouth Subsection, *vice-chairman, 1949–50, chairman, 1955–56.*

**BECK, Arnold H. W. (S'36—A'39—M'55—F'59),** Cambridge University, Engineering Laboratory, Trumpington St., Cambridge, England.
Born: August, 1916, Norfolk, England. B.Sc.(Eng.), 1937, University College, London University; M.A., 1959, Queens' College, University of Cambridge.

**BEDFORD, Alda V. (A'31—SM'46—F'50),** Fellow, Technical Staff, RCA Laboratories Division, Radio Corporation of America, Princeton, N.J.
Born: January, 1904, Winters, Tex. B.S.(E.E.), 1925, University of Texas; M.S.(E.E.), 1929, Union College. **Sections:** Princeton Subsection, *secretary-treasurer, 1946, vice-chairman, 1947, chairman, 1948;* Princeton Section, *chairman, 1949.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Incentive Awards, RCA Laboratories, 1949, 1951; IRE Vladimir K. Zworykin Television Prize, 1954.

**BEDFORD, Leslie H. (M'34—SM'43—F'48),** Director of Engineering, Guided Weapons Division, English Electric Aviation, Ltd., Luton, Beds., England.
Born: June 23, 1900, London, England. B.Sc., 1919, B.Sc. (Engineering), 1921, University of London; M.A., 1924, Cambridge University. **Awards:** IEE Premium, Institute of Electrical Engineers, London, 1934; Officer of the Order of the British Empire, 1943; Commander of the Order of the British Empire.

**BEERS, George L. (A'27—M'29—SM'43—F'47),** Radio Corporation of America, Camden, N.J.
Born: May 13, 1899, Indiana, Pa. B.S.(E.E.), 1921, Sc.D. (Honorary), 1947, Gettysburg College. **Committees:** Papers Procurement, 1946; Radio Receivers, 1942–49; Receivers, 1949–51. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Fellow, Society of Motion Picture and Television Engineers.

**BEGGS, James E. (SM'52—F'56),** Electronic Engineer, General Electric Research Laboratory, P.O. Box 1088, Schenectady, N.Y.
Born: May 9, 1908, Omaha, Neb. B.S.(E.E.), 1931, Purdue University. **Committees:** Awards, 1957. **Awards:** Charles O. Coffin Award, 1936, 1940; Certificate of Commendation, U. S. Navy, Bureau of Ships, 1947.

**BEGUN, S. J. (S'46—F'52),** Director of Marketing, Clevite Corporation, 17000 St. Clair Ave., Cleveland 10, Ohio.
Born: December 2, 1905, Danzig, Germany. M.S., 1929, Ph.D. (Engineering), 1933, Institute of Technology, Berlin, Germany. **Committees:** Audio and Video Techniques, 1948–49; Electroacoustics, 1941–50; Sound Recording and Reproducing Technique, 1950–57, *chairman, 1950–51;* Standards, 1949–50. **Professional Groups:** Audio Administrative Committee, 1956–59. **Sections:** Cleveland, *vice-chairman, 1952–53; chairman, 1953–54.* **IRE Representative:** ASA Sectional Committee (Z57) on Standards for Sound Recording, 1948–50.

**BELL, John W. (M'46—F'53),** Vice President, Engineering, Canadian Aviation Electronics, Ltd., Montreal, P.Q., Canada.
Born: September 2, 1911, Toronto, Ont., Canada. B.A.Sc., 1933, University of Toronto. **Awards:** Member of the Order of the British Empire, 1943.

**BENNETT, Ralph D. (SM'44—F'52),** General Electric Vallecitos Atomic Laboratory, P.O. Box 846, Vallecitos Road, Pleasanton, Calif.
Born: June 30, 1900, Williamson, N.Y. B.S., 1921, M.S., 1923, Union College; Ph.D. (Physics), 1925, University of Chicago; Sc.D. (Honorary), 1945, Union College. **IRE Offices:** Director, 1953. **Committees:** Awards, 1954–55.

**BENNETT, Rawson (A'36—M'43—SM'43—F'50),** Rear Admiral, United States Navy, Chief of Naval Research, Navy Department, Washington 25, D.C.
Born: June, 1905, Chicago, Ill. B.S., 1927, United States Naval Academy; M.S., 1937, University of California. **Sections:** San Diego, *chairman, 1947.* **Awards:** Fellow, Acoustical Society of America, 1947; Fellow, American Association for Advancement of Science, 1954; Fellow, American Institute of Electrical Engineers, 1959.

**BENNETT, William R. (SM'45—F'56),** Data Communications Consultant, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: June 5, 1904, Des Moines, Iowa. B.S., 1925, Oregon State College; M.A., 1928, Ph.D., 1949, Columbia University. **Committees:** Circuits, 1949–60, *vice-chairman, 1951–53, chairman, 1953–56;* Information Theory and Modulation Systems, 1952–58; Papers Review, 1951–52; Standards, 1953–60. Member-at-Large, 1957–59. **Professional Groups:** Circuit Theory Administrative Committee, 1956–60; Editor of *Transactions, 1957–60.*

**BERANEK, Leo L. (S'36—A'41—SM'45—F'52),** President, Bolt, Beranek & Newman, Inc., Consultants in Acoustics, 50 Moulton St., Cambridge 38, Mass.; Lecturer on Communication Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: September 15, 1914, Solon, Iowa, B.A., 1936, D.Sc. (Honorary), 1946, Cornell College; M.S., 1937, D.Sc., 1940, Harvard University. **Committees:** Audio Techniques, 1949–51; Editorial Reviewer, 1954–60; National Convention, 1947; Professional Groups, 1948, 1951. **Professional Groups:** Audio, 1949–52, *chairman, 1949–51.*

**BERESKIN, Alexander B. (A'41—M'44—SM'46—F'58),** Professor of Electrical Engineering, University of Cincinnati, Cincinnati 21, Ohio.
Born: November 15, 1912, San Francisco, Calif. M.Sc.(Eng.),



1941, E.E., 1935, University of Cincinnati. **Committees:** Education, 1955–60; IRE International Convention Technical Program Committee, 1960; Professional Groups, 1959–60; Sections, 1952. **Professional Groups:** Audio, *national chairman, 1959–60;* Audio Administrative Committee, 1956–59; Editor of *Transactions, 1957–58.* **Sections:** Cincinnati, *vice-chairman, 1949–50; chairman, 1950–51.* **IRE Representative:** University of Cincinnati, 1947–59.

**BERKNER, Lloyd V. (A'26—M'34—SM'43—F'47),** President, Associated Universities, Inc., 10 Columbus Circle, New York 19, N.Y.; Board of Directors, Texas Instruments, Inc.; Member, President's Science Advisory Committee, 1956–59, Consultant, 1959–; Rear Admiral USNR, 1955–.
Born: February 1, 1905, Milwaukee, Wis. B.S.(E.E.), 1927, University of Minnesota; D.Sc. (Honorary), 1955, Brooklyn Polytechnic Institute; Ph.D. (Honorary), 1956, Uppsala University, Uppsala, Sweden; D.Sc. (Honorary), 1957, University of Calcutta, India; D.Sc. (Honorary), 1958, University of Notre Dame; D.Sc. (Honorary), 1959, Columbia University; LL.D. (Honorary), 1959, University of Edinburgh, Scotland. **IRE Offices:** Director, 1959–60. **Committees:** Board of Editors, 1941–42; Editorial Reviewer, 1954–55; Executive, 1960; Joint Technical Advisory, 1952, *vice-chairman, 1953, chairman, 1954;* Papers, 1941; Professional Groups, 1954; Wave Propagation, 1937–42. **Professional Groups:** Nuclear Science Administrative Committee, *chairman, 1953.* **IRE Representative:** American Geophysical Union, *vice president;* International Council of Scientific Unions, Head of U. S. Delegation to VIIth General Assembly at Oslo, *president, 1955–58, past-president, 1958–61;* Special Committee on the International Geophysical Year, *vice-president, 1953–59;* International Scientific Radio Union, *vice-president, 1954–57, president, 1957–60.* **Awards:** Special Gold Medal of Congress, Silver Medal of the Aeronautical Institute, Gold Medal of the City of New York for Work on the Byrd Antarctic Expedition, 1930; Science Award, Washington Academy of Science, 1941; Legion of Merit, 1946; Honorary Officer, Order of the British Empire; Member, National Academy of Science, Space Science Board, *chairman, 1958–;* Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society; Fellow, American Academy of Arts and Sciences; Fellow, Arctic Institute of North America.

**BEVERAGE, Harold H. (A'15—M'26—F'28),** Consultant, Communications. RCA Laboratories, Rocky Point, L.I., N.Y.
Born: October 14, 1893, North Haven, Me. B.S., 1915, D.E., 1938, University of Maine. **IRE Offices:** President, 1937; Director, 1936–39. **Committees:** Admissions, 1936, 1939, 1941–47; Awards, 1938–39, *chairman, 1938;* Board of Editors, 1932–37; New York Program, 1932–35; Nominations, 1942–43, *chairman, 1942;* Standardization, 1930–31; Standards, 1934–35; Wave Propagation, 1957–60. **Awards:** IRE Morris Liebmann Memorial Prize, 1923; Armstrong Medal, Radio Club of America, 1938; Signal Corps Certificate of Appreciation, 1944; IRE Medal of Honor, 1945; Presidential Certificate of Merit, 1948; AIEE Lamme Medal, 1957; IRE PGCS Achievement Award, 1958.

**BINGLEY, Frank James (A'34—M'36—SM'43—F'50),** Television Research Engineer, Philco Corporation, C & Tioga Sts., Philadelphia 34, Pa.
Born: November 13, 1906, Bedford, Bedfordshire, England. B.Sc. (mathematics), 1926, B.Sc. (physics), 1927, University of London. **Committees:** Admissions, 1940, 1943; Awards, 1957, 1959–60; Editorial Reviewer, 1954–60; Fellow, 1958; Papers Review, 1946–53. **Awards:** Gold Medal, Television Broadcasters' Association; IRE Vladimir K. Zworykin Television Award, 1957.

**BISHOP, Sir Harold (F'38),** Director of Engineering, British Broadcasting Corporation, Broadcasting House, London, W.1, England.
Born: October 29, 1900, London, England. City and Guilds College (Imperial College of Science and Technology), 1917–20; B.Sc. (Engineering), University of London, 1920. **Awards:** Institution Premium, Institution of Electrical Engineers, 1935; Commander of the Order of the British Empire, 1938; Fellow, The City and Guilds Institute, 1947; Institution of Electrical Engineers, Vice President, 1948–53; President, 1953–54; Fellow, Imperial College of Science & Technology, 1954; Knight Bachelor, 1955; President, Association of Supervising Electrical Engineers, 1956–58; Vice President, Television Society, 1957–; Member, Institution of Mechanical Engineers.

**BLACK, Harold S. (M'42—SM'43—F'48),** Research Engineer, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: April 14, 1898, Leominster, Mass. B.S., 1921, Eng.D. (Honorary), 1955, Worcester Polytechnic Institute. **Committees:** Administrative, Board of Editors, 1951–53; Annual Review, 1948–49; Awards, 1948; Board of Editors, 1949–53; Editorial Administrative, 1948–50; Editorial Reviewer, 1956–60; Education, 1948; Frequency Modulation, 1946–47; Modulation Systems, 1947–50, *chairman, 1948–50;* Papers Review, 1947–48; Standards, 1948–50. **Awards:** Best Paper Prize, AIEE, 1934; Modern Pioneer Award, National Association of Manufacturers, 1940; John Price Wetherill Medal, The Franklin Institute, 1941; Certificate of Appreciation, U. S. War Department, 1946; Research Corporation Annual Award for Contribution to Science, 1952; Honorary Member, Audio Engineering Society, 1954; AIEE Lamme Medal, 1957; John H. Potts Memorial Award, Audio Engineering Society, 1959; Fellow, American Institute of Electrical Engineers; Fellow, American Association for the Advancement of Science.

**BLACK, Knox Charlton (M'29—SM'43—F'49),** Scientific Advisor to SACEUR, SHAPE, Paris, France.
Born: April 23, 1905, Cambridge, Mass. A.B., 1924, A.M., 1926, Ph.D., 1927, Harvard University. **IRE Offices:** Director, 1952. **Committees:** Awards, 1951–52, *chairman, 1952;* Electroacoustic Devices, 1930–31; Policy Advisory, 1953–54; Policy Development, 1949–50; Standardization, 1930–31. **Professional Groups:** Aeronautical and Navigational Electronics, *chairman, 1953–54.* **Awards:** President's Certificate of Merit, 1948.

**BLACK, Leonard J. (A'31—SM'46—F'53),** Professor of Electrical Engineering and Assistant Dean, College of Engineering, University of California, Berkeley 4, Calif.
Born: July 29, 1904, Santa Clara, Calif. B.S., 1928, M.S., 1930, Ph.D., 1935, University of California. **Committees:** Education, 1949–51; Executive, 1937–42, 1949–52; Speakers and Papers, *chairman, 1937;* West Coast Convention, *general chairman, 1951.* **Sections:** San Francisco, *secretary-treasurer, 1938–39; vice-chairman, 1940, chairman, 1941.* **IRE Representative:** University of California, 1941–52.

**BLACKWELL, Otto B. (M'20—F'28)(L),** Retired. 15 North Drive, Plandome, N.Y.
Born: August 21, 1884, Bourne, Mass. S.B., 1906, Massachusetts Institute of Technology. **Committees:** Standardization, 1920–24. **Awards:** Edison Medal, 1950.

**BLOMBERG, Hugo (M'45—F'50),** President, Svenska, Radioaktiebolaget, 12 Alstromergatan, Stockholm, Sweden.
Born: October 25, 1897, Stockholm, Sweden. E.E., 1920, Royal Technical University of Stockholm.

**BODE, H. W. (M'41—SM'43—F'52),** Vice President, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: December 24, 1905, Madison, Wis. A.B., 1924, M.A., 1926, Ohio State University; Ph.D., 1935, Columbia University. **Committees:** Annual Review, 1947–48; Circuits, 1944–48, *chairman, 1947–48;* Standards, 1947–48.

**BOHNERT, John I. (M'46—SM'57—F'60),** Superintendent of Electronics Division, U. S. Naval Research Laboratory, Washington 25, D.C.
Born: August, 1910, Pittsburgh, Pa. B.S. (Math.), 1932, Carnegie Institute of Technology; M.A. (Math.), 1935, Ph.D. (Math.), 1940, University of Pittsburgh. **Committees:** Fellow, 1960–61. **Professional Groups:** Antennas & Propagation, *national chairman, 1957–58; national vice-chairman, 1956–57.*

**BOLLJAHN, John T. (A'43—SM'53—F'59),** Executive Vice President, Granger Associates, 974 Commercial St., Palo Alto, Calif.

Born: June 10, 1918, Oakland, Calif. B.S.(E.E.), 1941, Ph.D., 1950, University of California. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Antennas & Propagation Administrative Committee, 1953–56.

**BOND, Donald S. (SM'46—F'54),** Member, Technical Staff, Weapons Systems Evaluation Group, Office of the Secretary of Defense, Washington, D.C.
Born: June, 1909, Libertyville, Ill. B.S., 1929, S.M., 1931, University of Chicago. **Committees:** Papers Review, 1949–53.

**BOOKER, Henry G. (SM'45—F'53),** Director, School of Electrical Engineering; Professor, Department of Physics and Engineering Physics, Cornell University, Ithaca, N.Y.
Born: December, 1910, Barking, Essex, England. B.A., 1933, Ph.D., 1936, Cambridge University. **Committees:** Editorial Reviewer, 1954–60; Standards, 1949–52; Wave Propagation, 1949–59, *vice-chairman, 1949–50, chairman, 1950–52.* **Professional Groups:** Antennas and Propagation, *vice-chairman, 1955–56, 1957–58.* **IRE Representative:** National Bureau of Standards Technical Advisory Committee, *chairman, 1960.* **Awards:** Duddell, 1946; Institution, 1947; Kelvin, 1948; Premiums, I.E.E. (London).

**BOONE, E. Milton (A'43—SM'46—F'56),** Professor of Electrical Engineering; Director, Electron Device Laboratory, Ohio State University, Columbus 10, Ohio.
Born: February 17, 1903, Millersburgh, Ky. B.A.(Physics), 1926, M.S.(Physics), 1932, University of Colorado; M.S.(E.E.), 1937, University of Michigan. **IRE Offices:** Director, 1955–56. **Committees:** Awards, 1960–61; Education, 1956–60; Electron Devices, 1952–55; Electron Tubes, 1955–60; Electron Tubes and Solid State Devices, 1951–52; Fellow, 1958–60; Nominations, 1956; Papers Review, 1946. **Sections:** Columbus, *chairman, 1946–47.* **IRE Representative:** Ohio State University, 1946–50.

**BOOTHROYD, Wilson P. (SM'47—F'56),** Manager, Engineering, Philco Corporation, Tioga & C Sts., Philadelphia, Pa.
Born: February, 1916, Lawrence, Mass. B.S., 1937, Rhode Island State College. **Committees:** Radio Receiver, *vice-chairman, 1958–59.* **Professional Groups:** Broadcast and Television Receivers, *chairman, 1955.*

**BORN, William T. (A'27—VA'39—SM'51—F'57),** Vice President, Geophysical Research Corporation, 136 Mohawk Blvd., Tulsa 6, Okla.
Born: August 3, 1903, Chicago, Ill. B.S., 1925, University of Chicago. **Sections:** Sixth Southwestern IRE Conference, *chairman, 1954;* Southwestern IRE Conference Organization, *secretary, 1955.*

**BOSOMWORTH, George P. (A'36—VA'39—F'57),** Manager, Engineering Laboratories for the Tire Company and Chief Engineer for U. S. Liberia Radio Corporation, Firestone Tire and Rubber Company, 1200 Firestone Parkway, Akron 17, Ohio.
Born: August 26, 1896, Gateshead, Durham, England. Whitworth Exhibition, 1916; Honors Diploma, E.E., 1917, Sunderland Technical College, England. **Committees:** Annual Review, 1947–50; Industrial Electronics, 1946–59, *chairman, 1947–58;* Standards, 1947–49. **Professional Groups:** Industrial Electronics Administrative Committee, 1951–58, *chairman, 1954–56.* **IRE Representative:** AIEE-IRE-NEMA Coordination Committee on Commercial Induction and Dielectric Heating Apparatus, 1948–49, *alternate, 1952–54.* **Awards:** Whitworth Bronze Medal, Board of Education, England, 1916.

**BOSSART, Paul N. (A'29—SM'46—F'56),** Senior Consulting Physicist, Union Switch and Signal, Division Westinghouse Air Brake Company, Pittsburgh 18, Pa.
Born: May 10, 1896, Buffalo, N.Y. B.S.(E..E.), 1916, Carnegie Institute of Technology; E.E., 1920, Columbia University; Ph.D., 1933, University of Pittsburgh. **Sections:** Pittsburgh, *vice-chairman, 1940–41, chairman, 1941–42.*

**BOWIE, Robert M. (A'34—M'37—SM'43—F'48),** Vice President and General Manager, Bayside Laboratory, General Telephone and Electronics Laboratories, Inc., Bayside, L.I., N.Y.
Born: August 24, 1906, Table Rock, Neb. B.S., 1929, M.S. (Physics), 1931, Ph.D. (Physics), 1933, Iowa State College. **Committees:** Administrative Board of Editors, 1952–53; Admissions, 1945–48; Awards, 1953–55; Board of Editors, 1947–52; National Convention, 1950; Nuclear Studies, 1948–52; Papers Procurement, 1945–50; Research, 1946–47; Television, 1948–49; Television Systems, 1949–56, *vice-chairman, 1951–53.*

**BOWLES, Edward L. (A'22—M'28—SM'43—F'47),** Consulting Professor, School of Industrial Management, Massachusetts Institute of Technology, Cambridge 39, Mass.; Consulting Engineer; Consultant to the President, Raytheon Company.
Born: December 9, 1897, Westphalia, Mo. B.S., 1920, Washington University; M.S., 1922, Massachusetts Institute of Technology; D.Sc. (Honorary), 1945, Norwich University. **Committees:** Membership, 1937–40; Papers Procurement, 1942–43; Regular Papers, 1941; Standardization, 1929–32; Standards, 1932–33. **Sections:** Boston, *chairman, 1935–37.* **Awards:** Distinguished Service Medal, 1945; Honorary Commander, Civil Division of the Most Excellent Order of the British Empire, 1948; Presidential Medal for Merit, 1948.

**BOWN, Ralph (M'22—F'25)(L),** 85 Pine St., Millburn, N.J.
Born: February 22, 1891, Fairport, N.Y. M.E., 1913, M.M.E., 1915, Ph.D., 1917, Cornell University. **IRE Offices:** President, 1927; Vice President, 1926; Director, 1926–29, 1937–39. **Committees:** Admissions, 1926, 1939–40, *chairman, 1926;* Awards, 1928–31, 1938–42, 1946, *chairman, 1942;* Board of Editors, 1946–53; Constitution and Laws, 1929, 1937–40; Convention Policies, 1940; Finance, *chairman, 1926;* Meetings and Papers, 1929; Nominations, 1937, 1940–44, 1949–51, *chairman, 1944;* Receiving Sets, 1927–28; Research, 1949–50; Standardization, 1925–27, *chairman, 1925–26;* Standards, 1941–42. **IRE Representative:** IRE-RMA Joint Technical Advisory Committee, 1948–58, *chairman, 1952–53;* IRE-IEE International Liaison, 1955–59. **Awards:** IRE Morris Liebmann Memorial Prize, 1926; IRE Medal of Honor, 1949.

**BRADLEY, William Earle (SM'45—F'53),** Associate Director of Research, Institute for Defense Analyses, 1710 "H" St., Washington 6, D.C.
Born: January 7, 1913, Lansdowne, Pa. B.S.(E.E.), 1936, Moore School of Electrical Engineering, University of Pennsylvania. **Committees:** Editorial Reviewer, 1954–59. **Awards:** Certificate of Commendation, U. S. Navy, 1947; Citation, University of Pennsylvania Schools of Engineering, 1955.

**BRAINERD, John G. (A'33—M'39—SM'43—F'51),** Professor and Director, Moore School of Electrical Engineering, University of Pennsylvania, 200 S. 33 St., Philadelphia 4, Pa.
Born: August 7, 1904, Philadelphia, Pa. B.S.(E.E.), 1925, D.Sc., 1934, University of Pennsylvania. **IRE Offices:** Director, 1956–57. **Committees:** Annual Review, 1948–49; Circuits, 1947–59, *chairman, 1948–49;* Editorial Reviewer, 1955–60; Standards, 1948–56, *chairman, 1949–51,* Member-at-Large, 1957–59. **Professional Groups:** Circuit Theory, *chairman, 1950–51;* Educational Administrative Committee, 1959–. **Sections:** Philadelphia, *secretary, 1951–52, chairman, 1953–54.* **IRE Representative:** ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1949–59; ASA Sectional Committee (C16) on Radio, 1950–51; ASA Standards Council, 1949–51; ASA Subcommittee (C42.1) on General Terms, 1948, 1952–59; AAAS Council, 1956–58; National Bureau of Standards Technical Advisory Committee, 1959.

**BREIT, Gregory (SM'45—F'45),** Donner Professor of Physics, Sloane Physics Laboratory, Yale University, New Haven 11, Conn.
Born: July 14, 1899, Russia. A.B., 1918, A.M., 1920, Ph.D., 1921, The Johns Hopkins University; D.Sc., 1954, University of Wisconsin. **Committees:** Research, 1949–50.

**BREITWIESER, Charles J. (A'35—VA'39—SM'56—F'58),** President, Metrolog Corporation, 169 N. Halstead St., Pasadena, Calif.; Vice President, Air Logistics Corporation, 3600 E. Foothill Blvd., Pasadena, Calif.



Born: September 23, 1910, Colorado Springs, Colo. B.S.(E.E.), 1930, University of North Dakota; M.Sc., 1931, California Institute of Technology; D.Sc. (Honorary), 1949, University of North Dakota. **Professional Groups:** Engineering Management Administrative Committee, 1951–58, *chairman, 1954.* **Awards:** First Papers Award, American Institute of Electrical Engineers, 1945.

**BRIDGES, James M. (SM'47—F'59),** Director, Office of Electronics, Office Director, Defense Research & Engineering, The Pentagon, Washington 25, D.C.
Born: August 29, 1906, Hancock, Me. B.S.(E.E.), 1928, University of Maine. **Awards:** Commendation for Contribution to Advancement of Naval Fire Control, U. S. Navy, 1945.

**BRIGGS, Maynard R. (A'37—SM'46—F'54),** Manager, Communications and Control Engineering, Westinghouse Electric Corporation, P.O. Box 1897, Baltimore 3, Md.
Born: July 19, 1904, St. Paul, Minn. B.S.(E.E.), 1929, University of Minnesota. **Committees:** Antennas, 1944–45; Professional Groups, 1948; Radio Transmitters, 1948–58, *chairman, 1951–53;* Standards, 1951–53; Symbols, 1940–48; Transmitters and Antennas, 1939–48. **Sections:** Baltimore, *vice-chairman, 1957, chairman, 1957–58.* **IRE Representative:** IRE-RTMA Problems #2 Committee, 1948–49; IRE-RTMA-SMPTE Coordinating Committee, 1949–52; ASA Sectional Committee (C16) on Radio, 1952.

**BRONWELL, Arthur B. (A'39—SM'43—F'56),** President, Worcester Polytechnic Institute, Worcester, Mass.
Born: August 18, 1909, Chicago, Ill. B.S., 1933, M.S., 1936, Illinois Institute of Technology; M.B.A., 1947, Northwestern University; LL.D. (Honorary), 1955, Northeastern University; D.Eng. (Honorary), Wayne State University. **Committees:** Education, 1944–47, *chairman, 1945–46;* Papers Procurement, 1945–47. **Sections:** Chicago, *chairman, 1943–44.* **IRE Representative:** Northwestern University, 1941–45.

**BROOKS, Frederick E., Jr. (S'42—A'44—M'48—SM'54—F'58),** Director of Research and Development, Collins Radio Company, 1930 HiLine Drive, Dallas, Tex.
Born: October 14, 1916, Mineola, L.I., N.Y. B.S.(E.E.), 1940, University of Kansas; D.Eng., 1944, Yale University. **Sections:** San Antonio, *vice-chairman, 1948–49, chairman, 1950.*

**BROTHERS, James T. (A'29—SM'45—F'59),** Manager, Component Engineering Division, Philco Corporation, Tioga & C Sts. Philadelphia 34, Pa.
Born: April 30, 1908, New York, N.Y. Physics, New York University. **Committees:** Admissions, 1947–49; Papers Procurement, 1956; Sections, 1949–51; Standards, 1932–33; Symbols, 1948–50. **Professional Groups:** Component Parts Administrative Committee, 1953–59, *vice-chairman, 1958.* **Sections:** Philadelphia, *secretary-treasurer, 1947, vice-chairman, 1948, chairman, 1949–50.*

**BROWN, Archibald S. (A'14—SM'47—F'56)(L),** Special Assistant to Director of Engineering Research, Stanford Research Institute, Menlo Park, Calif.
Born: July 1, 1889, Minneapolis, Minn. B.S., 1910, Montana State College; E.E., 1915, University of Montana; Dr.Eng. (Honorary), 1958, Montana State College. **Professional Groups:** Administrative Committee, Aeronautical & Navigational Electronics, 1950–51; Engineering Management, San Francisco, *chairman, 1954;* Administrative Committee, Engineering Management, 1957–60; Administrative Committee, Military Electronics, 1958–61; Military Electronics, San Francisco, *vice-chairman, 1957;* Technical Program Committee WESCON, 1959; Technical Program Committee, Winter Convention, Los Angeles, 1960. **Sections:** San Francisco, *vice chairman, 1933.* **Awards:** Commendation, Chief Signal Officer, U. S. Army, 1940; U. S. Navy Commendation, 1946; Order of the British Empire, 1946.

**BROWN, George H. (A'30—VA'39—F'41),** Vice President, Engineering, Radio Corporation of America, Princeton, N.J.
Born: October 14, 1908, North Milwaukee, Wis. B.S., 1930, M.S., 1931, Ph.D., 1933, E.E. (Professional), 1942, University of Wisconsin. **Committees:** Annual Review, 1947–48; Antennas, 1944–49; Papers Procurement, 1948–50. **Awards:** Fellow, American Institute of Electrical Engineers; Fellow, American Academy of Arts and Sciences.

**BROWN, Gordon S. (SM'53—F'55),** Dean of Engineering, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge 39, Mass.
Born: August 30, 1907, Drummoyne, N.S.W., Australia. M.E. (E.E.), 1925, Melbourne Technical School; B.S., 1931, M.S., 1934, Sc.D., 1938, Massachusetts Institute of Technology. **IRE Offices:** Director, 1958–60. **Committees:** Nominations, 1959–60; Policy Advisory, 1959–60. **Awards:** Certificate for Distinguished Service to Naval Ordnance Development, 1945; President's Certificate of Merit, 1948; Fellow, American Academy of Arts and Sciences, 1950; Fellow, American Institute of Electrical Engineers, 1950; 7th George Westinghouse Award, American Society for Engineering Education, 1952; Lamme Medal Engineering Education, American Society Engineering Education, 1959; Electrical Engineering Education Medal, American Institute of Electrical Engineers, 1959.

**BROWN, Jesse E. (A'24—M'28—SM'43—F'49),** Vice President, Engineering, Zenith Radio Corporation, 6001 W. Dickens Ave., Chicago 29, Ill.
Born: September, 1902, Greenport, N.Y. Attended Cornell University, 1920–24. **IRE Offices:** Director, 1938, 1947. **Committees:** Admissions, 1940; Awards, 1940; Frequency Modulation, 1940–47; Industrial Electronics, 1947–49; Membership, 1949–50; Modulation Systems, 1947–48; Nominations, 1947; Papers Procurement, 1942–45; Public Relations, 1940; Radio Receivers, 1941–42, 1945–49; Receivers, 1949–51; Regular Papers, 1941; Sections, 1937; Special Publications Funds, 1947; Television, 1940–49; Television Systems, 1949–60. **Sections:** Chicago, *secretary, 1936–37, chairman, 1938–39.* **IRE Representative:** Army Signal Association, 1947.

**BROWN, William C. (A'39—M'55—SM'58—F'59),** Assistant Vice President, Raytheon Company, Foundry Ave., Waltham 54, Mass.
Born: May, 1916, Lewis, Iowa. B.S.(E.E.), 1937, Iowa State College; M.S., 1941, Massachusetts Institute of Technology. **Awards:** Naval Ordnance Development Award, 1945; Certificate of Commendation for Outstanding Service During World War II, 1947.

**BROWNING, Glenn H. (A'24—M'28—SM'43—F'55),** Retired. RFD 1, Sebago Lake, Me.
Born: March 9, 1897, Solon, Iowa. B.A., 1921, Sc.D. (Honorary), 1950, Cornell College. **IRE Offices:** Director, 1952–55. **Committees:** Nominations, 1955. **Sections:** Boston, *chairman, 1946–47.*

**BRUECKMANN, Helmut L. (SM'49—F'58),** Principal Research Scientist, U. S. Army Signal Research & Development Laboratory, Fort Monmouth, N.J.
Born: May 20, 1906. Frankfurt am Main, Germany, Dipl.E., 1930, D.Eng., 1935, Technical University, Berlin, Germany.

**BRUNETTI, Cledo (A'37—SM'46—F'49),** Vice President and General Manager, Grand Central Rocket Company, Redlands, Calif.; Executive Assistant to Executive Vice President and Manager, Ordnance Division, Food Machinery and Chemical Corporation, 1105 Coleman Ave., San Jose, Calif.
Born: April, 1910, Virginia, Minn. B.E.E. (with High Distinction), 1932, Ph.D., 1937, University of Minnesota. **Committees:** Awards, 1957; Circuits, 1944–51, *vice-chairman, 1949–50;* Fellow, 1958; Industrial Electronics, 1955–58; Papers Procurement, 1948–50; Radio Transmitters, 1946–49. **Professional Groups:** Automatic Controls Administrative Committee, 1954. **IRE Representative:** Member, Visiting Committee for Department of Aero-Space Engineering, The University of Texas. **Awards:** National Scholarship Key, National I.A. Civic League, 1937; Outstanding Young Electrical Engineer, Eta Kappa Nu, 1941; Certificate of Appreciation of Services, Office of Scientific Research and Development, 1945; Certificate for Outstanding Service, War Department, 1945; Naval Ordnance Development Award for

Exceptional Service, United States Navy, 1945; Army-Navy Certificate of Appreciation for Outstanding Services during World War II, War and Navy Department, 1947; The Material and Methods Achievement Grand Award, Materials and Methods Magazine, 1947; Fellow, American Institute of Electrical Engineers; Outstanding Achievement Award, University of Minnesota, 1958.

**BRUSTMAN, Joseph A. (A'39—SM'48—F'59),** Manager, Product Development and Design, Electronic Data Processing Engineering, Radio Corporation of America, Camden 2, N.J.
Born: March, 1913, Vienna, Austria. Dipl.Ing., 1938, Technical University, Vienna, Austria. **Awards:** Award from the Office of Scientific Research and Development, Washington, D.C., 1945.

**BUDENBOM, Horace T. (A'40—SM'46—F'56),** Retired from Bell Telephone Laboratories, Inc., Whippany, N.J.; Associated with Stavid Division, Lockheed Electronics Co., Plainfield, N.J.; Residence: 82 Wellington Ave., Short Hills, N.J.
Born: August 4, 1902, Brooklyn, N.Y. B.S.(E.E.), 1922, E.E., 1929, Purdue University. **Sections:** New York, *secretary, 1950–51, vice-chairman, 1951–52, chairman, 1952–53.*

**BULLINGTON, Kenneth (A'45—SM'53—F'55),** Transmission System Engineer, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: January 11, 1913, Guthrie, Okla. B.S.(E.E.), 1936, University of New Mexico; M.S.(E.E.), 1937, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1954–60; Papers Review, 1949–53; Wave Propagation, 1954–56, 1959–60. **Awards:** IRE Morris Liebmann Memorial Prize, 1956; Stuart Ballantine Medal, Franklin Institute, 1956; IRE-PGCS Achievement Award, 1959.

**BURKE, Charles T. (A'25—M'27—F'37),** Director of Planning, General Radio Company, 22 Baker Ave., West Concord, Mass.
Born: August 4, 1902, Watertown, Mass. S.B., 1924, S.M., 1924, Massachusetts Institute of Technology. **Committees:** Handbook, 1945–48; Papers Procurement, 1946; Power Supply, 1928–29; Radio Receivers, 1927–28; Standards, 1941–44.

**BURNAP, Robert S. (A'30—F'47),** Consultant, Electron Tube Division, Radio Corporation of America, Fifth & Sussex Sts., Harrison, N.J.
Born: July 12, 1894, Monterey, Mass. S.B., 1916, Massachusetts Institute of Technology. **Committees:** Ad Hoc Committee to Make Critical Review of Organization of Committee, 1952–53; Administrative Committee of the Board of Editors, 1951–53; Annual Review, 1943–49; Awards, 1948; Board of Editors, 1944–53; Editorial Administrative, 1946–53; Editorial Reviewer, 1954; Electron Devices, 1952–56; Electron Tubes, *chairman, 1946–49;* Electron Tubes and Solid State Devices, 1949–52; Electronics, 1936–46, *chairman, 1942–46;* Handbook, 1945–48; Papers Procurement, 1942–44; Regular Papers, 1941; Standards, 1943–49; Symbols, 1940–41, 1943–48; Tellers, *chairman, 1942;* Vacuum Tubes, 1945–46. **IRE Representative:** ASA Subcommittee (C42.14) on Electronics, 1947–51.

**BURROWS, Charles R. (A'24—M'38—SM'43—F'43),** Vice President, Engineering, Radiation, Inc., Melbourne, Fla.
Born: June 21, 1902, Detroit, Mich. B.S.E.(E.E.), 1924, University of Michigan; A.M., 1927, Columbia University; E.E., 1935, University of Michigan; Ph.D., 1938, Columbia University. **IRE Offices:** Director, 1956. **Committees:** Annual Review, 1943–46; Appointments, 1956; Circuits, 1945–50; Editorial Reviewer, 1955–60; National Convention, 1948; Radio Wave Propagation, 1942–45, *chairman, 1943–45;* Radio Wave Propagation and Utilization, 1945–47; Standards, 1943–45, 1949–50; Symbols, 1940–52; Wave Propagation, 1937–59, *vice-chairman, 1948–49, chairman, 1949–50.* **Professional Groups:** Engineering Management, 1953–60, *vice-chairman, 1956–57, chairman, 1957–58.* **Sections:** Ithaca, *chairman, 1953–54.* **Awards:** Presidential Certificate of Merit; Distinguished Alumnus, University of Michigan; Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society.

**BUSIGNIES, Henri (M'42—SM'43—F'45),** Vice-President and General Technical Director, International Telephone and Telegraph Corporation, 67 Broad St., New York, N.Y.
Born: December 29, 1905, Sceaux, Paris, France. E.E., 1926, Institute Normal Electro-technique, Paris, France; D.Sc. (Honorary), 1958, Newark College of Engineering. **Committees:** Annual Review, 1948–49; Awards, 1955–57; Navigation Aids, 1946–51; *vice-chairman, 1947–48; chairman, 1948–50;* Standards, 1948–50. **Awards:** Presidential Certificate of Merit, 1948.

**BUTTNER, Harold H. (M'27—SM'43—F'44),** Retired as Vice President, International Telephone and Telegraph Corporation, 67 Broad St., New York 4, N.Y.; Director, Hewlett Packard Co., Palo Alto, Calif.; Director, F. L. Moseley Co., Pasadena, Calif.; Director, Boonton Radio Corporation, Boonton, N.J.; Director, Lunn Laminates, Huntington Station, L.I., N.Y.
Born: November 3, 1892, Port Costa, Calif. B.S.(E.E.), 1915, University of California. **Committees:** Electronics, 1940–41; Meetings and Papers, 1929; Standards, 1938–39.

**BYRNE, John F. (SM'45—F'50),** General Manager, Riverside Research Laboratory, Motorola, Inc., Adams & Indiana Aves., Riverside, Calif.
Born: October 26, 1905, Cincinnati, Ohio. B.S., 1927, M.S.(E.E.), 1928, Ohio State University. **IRE Offices:** Director, 1955–57. **Committees:** Appointments, 1955; Awards, 1953–55; Policy Advisory, 1956–57; Tellers, 1949. **Awards:** United States Navy Certificate of Commendation, 1947; Presidential Certificate of Merit, 1948.

**BYRNES, Irving F. (A'23—M'39—SM'43—F'54),** Manager, Radiomarine Engineering, Radio Corporation of America, 75 Varick St., New York 13, N.Y.
Born: October, 1898, Beacon, N.Y. Union College Extension Courses in Electrical Engineering completed in 1926. **Committees:** Paper Procurement, 1947–50; Standardization, 1930–31. **IRE Representative:** ASA Sectional Committee on Electrical Installations on Shipboard, 1939–48. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; U. S. Navy, Bureau of Ships Certificate of Commendation, 1947.

**CADY, Walter G. (A'14—F'27)(L),** Consultant, 3350 Calvert Road, Pasadena 8, Calif.
Born: December 10, 1874. Providence, R.I. Ph.B., 1895, M.A., 1896, Brown University; Ph.D., 1900, University of Berlin: D.Sc., 1938, Brown University; 1958, Wesleyan University. **IRE Offices:** President, 1932; Editor, 1929; Director, 1929, 1932–34. **Committees:** Annual Review, 1942–50; Awards, 1928–30, 1933, *chairman, 1930;* Bibliography, 1930–31; Board of Editors, 1928–29, 1945, *chairman, 1929;* Institute Sections, 1928; Meetings and Papers, 1928–29; Nominations, 1930, 1933–34, 1939, *chairman, 1933;* Papers, 1931; Piezoelectric Crystals, 1941–60, *chairman, 1942–49;* Standards, 1943–51. **Sections:** Connecticut Valley, *chairman, 1927–28.* **Awards:** IRE Morris Liebmann Memorial Prize, 1928; Duddell Medal, Physical Society of London, 1936.

**CAHOON, Roy D. (A'35—SM'47—F'56),** Prairie Regional Engineer, Canadian Broadcasting Corporation, 541 Portage Ave., Winnipeg, Man., Canada.
Born: March 1, 1911, Cardston, Alta., Canada. B.A.Sc.(E.E.), 1934, University of Toronto; 1943, McGill University. **Sections:** Winnipeg Subsection, *chairman, 1949–50.*

**CALLAHAN, John L. (A'21—M'31—SM'43—F'53),** Administrator, Radio Research Laboratory, RCA Laboratories, Rocky Point, L.I., N.Y.
Born: December 9, 1898, Minneapolis, Minn. 1919, Sorbonne, Paris; 1941, New York University. **Committees:** Admissions, 1944–48; Annual Review, 1940–45; Awards 1951; Facsimile, 1939–46, *chairman, 1940–45;* Papers, 1942; Professional Groups, 1955; Standards, 1940–45; Symbols, 1940–41; Television and Facsimile, 1937–38; Tellers, 1949–51; *chairman, 1950.* **Professional Groups:** Communications Systems Administrative Committee, *secretary, 1952–54.* **Awards:** Army-Navy Certificate of



Appreciation, 1948; Fellow, American Institute of Electrical Engineers; Fellow, Radio Club of America.

**CALVERT, John F. (SM'49—F'60),** Professor, University of Pittsburgh, Pittsburgh 13, Pa.
Born: October 14, 1898, Columbia, Mo. B.S.(E.E.), 1922, E.E., 1924, University of Missouri; M.S.(E.E.), 1930, Ph.D.(Math.), 1936, University of Pittsburgh. **Awards:** Fellow, American Institute of Electrical Engineers, 1945; Electrical Engineering Education Medal, American Institute of Electrical Engineers, 1958; Award in Engineering, University of Missouri, 1959.

**CAMPBELL, Richard D. (A'34—SM'46—F'51),** Point-to-Point Radio Engineer, American Telephone and Telegraph Company, 195 Broadway, New York, N.Y.
Born: May 26, 1899, St. Louis, Mo. B.S.(E.E.), 1922, George Washington University. **Committees:** Industrial Electronics, 1947–48; National Convention, 1947.

**CAMRAS, Marvin (S'41—A'42—SM'48—F'52),** Senior Engineer, Armour Research Foundation, 10 W. 35 St., Chicago 16, Ill.
Born: January 1, 1916, Chicago, Ill. B.S.(E.E.), 1940, Armour Institute of Technology; M.S.(E.E.), 1942, Illinois Institute of Technology. **Committees:** Chapters, *chairman, 1956;* Nominations, *chairman, 1954–56;* Recording and Reproducing, 1954–60. **Professional Groups:** Audio, 1951–60, *secretary, 1951–52, chairman, 1953–54; Transactions on Audio,* Editor, 1958–60. **Awards:** Illinois Institute of Technology Alumni Association Distinguished Service Award, 1948; Eta Kappa Nu Award (Honorable Mention), 1948; U. S. Camera Award for Contribution to Motion Picture Photography, 1949; Fellow, Acoustical Society of America, 1951; John Scott Medal, 1955; Indiana Technical College Citation, 1958; IRE-PGA Achievement Award, 1958; Fellow, American Institute of Electrical Engineers, 1959.

**CARLIN, Herbert J. (M'47—SM'50—F'56),** Research Professor and Associate Director, Microwave Research Institute of the Polytechnic Institute of Brooklyn, 55 Johnson St., Brooklyn 1, N.Y.
Born: May 1, 1917. B.S., 1938, Columbia College; M.S., 1940, Columbia University School of Engineering; D.E.E., 1947, Polytechnic Institute of Brooklyn. **Committees:** Awards Committee, *chairman, 1958–60;* Editorial Reviewer, 1954–60. **Professional Groups:** Circuit Theory, *secretary, 1950–52, vice-chairman, 1953–55, chairman, 1955–56;* Instrumentation, *secretary, 1950–53.*

**CARLSON, Wendell L. (A'36—SM'47—F'49),** Technical Advisor, Patents and Licensing, Radio Corporation of America, Princeton, N.J.
Born: January, 1897, Jamestown, N.Y. **Committees:** Radio Receivers, 1946–47.

**CARNAHAN, C. Wesley (A'34—SM'45—F'52),** Director, Central Research Planning, Varian Associates, Palo Alto, Calif.
Born: July 4, 1907, Berkeley, Calif. B.A., 1927, M.A., 1931, Stanford University. **Committees:** Board of Editors, 1947–53; Papers Review, 1946. **Sections:** New Mexico, *chairman, 1949, 1953;* San Francisco, *director, 1957–59;* Director, Seventh Region, 1960.

**CARSON, Victor S. (S'39—A'42—SM'51—F'55),** Head Systems Analysis, Communication Systems Department, Ramo Wooldridge, Reseda, Calif.
Born: June 29, 1908, Pocatello, Idaho. B.S.(E.E.), 1938, Oregon State College; Eng., 1940, Ph.D., 1946, Stanford University. **Sections:** North Carolina-Virginia, *secretary-treasurer, 1950–54, vice-chairman, 1951, chairman, 1952.* **IRE Representative:** University of Connecticut, 1941–42; Stanford Universiy, 1945.

**CARTER, E. Finley (A'23—F'36),** President and Member of Board of Directors, Stanford Research Institute, Menlo Park, Calif.
Born: July 1, 1901, Elgin, Tex. B.S., 1922, Rice Institute. **IRE Offices:** Director, 1943–45. **Committees:** Admissions, 1944; Constitution and Laws, 1945, 1948; Editorial Administrative, 1949–50; Executive, 1944–45; National Convention, 1947–48. **Awards:** Professional Recognition, 1947.

**CARTER, Philip S. (A'29—M'38—SM'43—F'49),** Research Engineer, RCA Laboratories Division, Rocky Point, L.I., N.Y.
Born: July, 1896, Glastonbury, Conn. A.B. (Mechanical Engineering), 1918, Stanford University. **Committees:** Annual Review, 1945–48; Antennas, *chairman, 1945–48;* Antennas and Wave Guides, 1949–60; Board of Editors, 1937–46; Standards, 1945–60. **Professional Groups:** Antennas and Propagation, 1949–58, *chairman, 1953.* **IRE Representative:** U.S.A. National Committee, URSI, 1953–56. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Citation for Overseas Work on Countermeasures "V2" Rocket, Secretary of War, 1947; Army-Navy Certificate of Appreciation, 1948.

**CAWEIN, Madison (M'36—SM'43—F'54),** Consultant in Television and Physics, 27 Hussa Place, Denville, N.J.; Vice President, Grimson Color, Inc., 381 Fourth Ave., New York, N.Y.
Born: March, 1904, Louisville, Ky. B.S. (Physics), 1924, University of Kentucky; 1925, Cornell University; 1927–30, University of Kentucky. **Committees:** Papers Procurement, 1945–47.

**CHAFFEE, E. Leon (M'17—F'21)(L),** Professor, Applied Physics, Emeritus, Harvard University, Cambridge 38, Mass.
Born: April, 1885, Somerville, Mass. S.B., 1907, Massachusetts Institute of Technology; A.M., 1908, Ph.D., 1911, S.D. (Honorary), 1944, Harvard University; D.Engr. (Honorary), 1954, Case Institute of Technology. **IRE Offices:** Vice President, 1922; Director, 1922. **Committees:** Electron Tubes, 1946–47; Electronics, 1936–45; Membership, 1925; Papers, 1918–19; Papers Procurement, 1942–43; Regular Papers, 1941; Research, 1949–50; Standardization, 1927–31; Symbols, 1940–43; Vacuum Tubes, 1930–31, 1945–46. **Sections:** Boston, *chairman, 1932–35.* **IRE Representative:** Harvard University, 1941–53. **Awards:** Longstreth Medal of Merit, Franklin Institute, 1912; IRE Medal of Honor, 1959.

**CHAFFEE, Joseph G. (A'26—M'40—SM'43—F'54),** Member, Technical Staff, Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y.
Born: March, 1901, Hackensack, N.J. S.B., 1923, Massachusetts Institute of Technology.

**CHAMBERLAIN, Adolph B. (A'27—M'30—F'41),** Director of Engineering, CBS Television Network, 485 Madison Ave., New York 22, N.Y.
Born: February 3, 1901, Franklin, Mass. **IRE Offices:** Director, 1941–44. **Committees:** Admissions, 1940–41; Annual Review, 1947–48; Awards, 1942; Broadcast, *alternate, 1932–33;* Constitution and Laws, 1947; Frequency Modulation, 1940–41; Membership, 1949–50; National Convention, 1947; New York Program, 1938–42, *chairman, 1940;* Papers, 1942; Professional Groups, 1948–49; Public Relations, 1946; Radio Transmitters and Antennas, 1929–30; Regular Papers, 1941; Standardization, 1929–31; Standards, 1946–50, *chairman, 1947–48;* Tellers, *chairman, 1942;* Transmitters and Antennas, 1936–37. **Sections:** Buffalo-Niagara, *chairman, 1930–31;* Rochester, *chairman, 1928–29.* **IRE Representative:** ASA Standards Council, 1948–49; ASA Sectional Comittee on Definitions of Electrical Terms, 1948–49. **Awards:** Legion of Merit, 1946.

**CHAMBERS, Carl C. (A'30—M'42—SM'43—F'59),** Vice President for Engineering Affairs, University of Pennsylvania, 107 Towne Building, 220 S. 33 St., Philadelphia 4, Pa.
Born: May 8, 1907, Philadelphia, Pa. B.S.(Math.), 1929, Dickinson College, Carlisle, Pa.; Sc.D.(Major E.E.), 1934, University of Pennsylvania. **IRE Offices:** Board of Directors, 1942. **Committees:** Annual Review, 1943–45; Awards, 1949; Board of Editors, 1948–53; Education, 1944–46, 1950–54; Frequency Modulation, 1941–47, *chairman, 1943–46;* Measurements and Instrumentation, 1949–52; Modulation Systems, 1947–50; Radio Frequency Interference, 1955–58; Standards, 1941–45. **Special Committees:** Professional Recognition, 1955–60. **Sections:** Philadelphia, *chairman, 1941–42.* **IRE Representative:** ASA Sectional Committee (C63) on Radio Electrical Coordination, 1948–51, 1954; Member-at-

Large, 1955–60, *vice-chairman, 1955–60;* University of Pennsylvania, 1948–51; U. S. National Committee of the International Electro-technical Commission—Member-at-Large; Member, U. S. Commission IV of URSI, 1949–59. **Awards:** Fellow, American Institute of Electrical Engineers; Fellow, American Society of Electrical Engineers.

**CHAMBERS, Dudley E. (M'41—SM'43—F'48),** Manager, Engineering Services Research, General Electric Company, 1 River Road, Schenectady 5, N.Y.
Born: November 27, 1905, Kansas City, Mo. B.A., 1927, E.E., 1928. Stanford University. **Committees:** Awards, 1948–51: Board of Editors, 1953; Education, 1953; Research, *chairman, 1949–50;* Standards, 1949–50. **Awards:** Fellow, American Institute of Electrical Engineers, 1948.

**CHAMBERS, Joseph A. (A'28—M'30—SM'43—F'55),** Vice President, Motorola, Inc.; General Manager, Motorola Western Military Electronic Center, 8201 E. McDowell Road, Phoenix, Ariz.
Born: August 1, 1903, Union, S.C. B.S., 1924, Clemson. **Committees:** Editorial Reviewer, 1954–60.

**CHANCE, Britton (M'46—SM'46—F'54),** Professor of Biophysics, Director of the Johnson Foundation for Medical Physics, 36 & Spruce Sts., Philadelphia 4, Pa.
Born: July 24, 1913, Wilkes-Barre, Pa. B.S., 1935, M.S., 1936, Ph.D., 1940, University of Pennsylvania; Ph.D., 1942, Sc.D., 1952, University of Cambridge. **Awards:** President's Certificate of Merit, 1949; Paul Lewis Award in Enzyme Chemistry, 1950, American Chemical Society; Fellow, American Physical Society; Fellow, American Association for the Advancement of Science; President's Scientific Advisory Committee, 1959.

**CHENG, David K. (S'44—A'48—M'48—SM'50—F'60),** Professor of Electrical Engineering, Syracuse University, Syracuse 10, N.Y.
Born: January 10, 1918, I-Shing, Kiangsu, China. B.S.(E.E.), 1938, Chiao-Tung University, Shanghai, China; S.M., 1944, Sc.D., 1946, Harvard University. **Awards:** Charles Storrow Scholar, 1944–45; Gordon McKay Scholar, 1945–46, Harvard University.

**CHINN, Howard A. (A'42—SM'45—F'45),** Chief Engineer, CBS Television, 485 Madison Ave., New York 22, N.Y.
Born: January 5, 1906, New York, N.Y. S.B., 1927, S.M., 1929, Massachusetts Institute of Technology. **Committees:** Admissions, 1945–48; Audio and Video Techniques, *chairman, 1948;* Constitution and Laws, 1952; Editorial Reviewer, 1954–60; Education, 1945; Membership, 1934, 1936–38; Papers, 1935–40, 1944–45; Papers Review, 1946–52; Professional Groups, 1948; Standards, 1948–49; Tellers, 1946–47, *chairman, 1947.* **Awards:** Presidential Certificate of Merit, 1949; John H. Potts Memorial Award, 1950; Fellow, Audio Engineering Society; Fellow, Acoustical Society of America; Fellow, Society Motion Picture and Television Engineers; Fellow, American Institute of Electrical Engineers.

**CHIPP, Rodney D. (A'34—SM'43—F'55),** Director, Engineering, ITT Communication Systems, Inc., Garden State Plaza, Paramus, N.J.
Born: May 16, 1910, New Rochelle, N.Y. **Committees:** Constitution and Laws, 1950; Industrial Electronics Committee, 1956–58; National Convention, 1947–52; Video Signal Transmission Methods of Measurement, 1952–55. **Professional Groups:** Engineering Management Administrative Committee, 1958–61. **Sections:** New York, *secretary, 1948–49, vice-chairman, 1949–50, chairman, 1950–51.* **Awards:** U. S. Navy Commendation, 1946; President, Technical Societies Council of New York, 1953–54.

**CHITTICK, Kenneth A. (A'26—SM'49—F'53),** Manager, Engineering Administration, Consumer Products Department, Radio Corporation of America, Camden, N.J.
Born: November 6, 1903, Old Bridge, N.J. B.S., 1925, Rutgers University. **Committees:** Measurements and Instrumentation, 1949–50; Papers Procurement, 1947–50; Radio Frequency Interference, 1955–60; Radio Receivers, 1951–60; Television, 1945–48; Television Systems, 1949–60. **Awards:** Award of Merit, RCA, 1947; Certificate of Commendation, U. S. Navy, 1947.

**CHODOROW, Marvin (A'43—SM'47—F'54),** Professor, Applied Physics and Electrical Engineering, Stanford University; Director of Microwave Laboratory, Stanford, Calif.
Born: July 16, 1913, Buffalo, N.Y. B.A., 1934, University of Buffalo; Ph.D., 1939, Massachusetts Institute of Technology. **Committees:** Awards, 1956–59; Editorial Reviewer, 1954–60.

**CHRISTALDI, P. Samuel (S'35—A'40—SM'44—F'52),** 132 Squire Hill Road, Upper Montclair, N.J.
Born: November 26, 1914, Philadelphia, Pa. E.E., 1935, Ph.D. (Physics), 1938, Rensselaer Polytechnic Institute. **Committees:** Admissions, 1949–53, *chairman, 1950–51;* Measurements and Instrumentation, 1949–60, *vice-chairman, 1952–54, chairman, 1954–58;* Standards, 1954–58; Tellers, 1956. **Sections:** Northern New Jersey Subsection, *secretary, 1951–53, chairman, 1955–56.* **IRE Representative:** U. S. National Committee, International Electrotechnical Commission, Advisers on Electric Measuring Instruments, 1955; ASA Sectional Committee (C39) on Electrical Measuring Instruments, 1955–56; Joint IRE-AIEE Committee on High Frequency Measuring Instruments, 1956. **Awards:** Fellow, Radio Club of America.

**CHU, Lan J. (A'39—VA'39—SM'48—F'52),** Professor of Electrical Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: August 24, 1913, Hweiying, Kiangsu, China. B.S., 1934, Chiao Tung University; M.S., 1935, Sc.D., 1938, Massachusetts Institute of Technology. **Committees:** Antennas, 1948–49; Antennas and Wave Guides, 1949–51, *vice-chairman, 1949–50;* Editorial Reviewer, 1954–60; Technical Program, 1949–50.

**CLAPP, James K. (A'24—M'28—F'33),** Retired from General Radio Company, 22 Baker Ave., West Concord, Mass.
Born: December 30, 1897, Denver, Colo. B.S., 1923, S.M., 1926, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1954–58; Papers, 1931–45; Papers Review, 1946–55; Piezoelectric Crystals, 1940–56; Standards, 1934–35.

**CLARK, Ralph L. (A'29—SM'48—F'58),** Assistant Director, Defense Research and Engineering (Communications), The Pentagon, Washington 25, D.C.
Born: June 2, 1908, East Jordan, Mich. B.S.(E.E.), 1930, Michigan State University. **Professional Groups:** Communication Systems Engineering Management Education; Joint Technical Advisory Committee, 1959; National Administrative Committee, Military Electronics, 1955–57.

**CLARK, Trevor (A'32—SM'45—F'60),** Assistant to the Engineering Manager, Westinghouse Electric Corporation, Air Arm Division, P.O. Box 746, Baltimore 3, Md.
Born: July 16, 1909, Haviland, Kan. A.B. (Physics & Math.), 1930, Friends University; M.S. (Physics), 1933, University of Michigan; 1936–37, Polytechnic Institute of Brooklyn. **IRE Offices:** Director, 1950. **Committees:** Admissions, *chairman, 1949;* Annual Review, 1948–53, *vice-chairman, 1948–49;* Membership, 1937–38, 1950–51, 1953–56, *chairman, 1950–51;* National Convention, 1948, *vice-chairman,* 1949–50; Banquet Committee, 1946–47, *chairman, 1948;* Tellers, 1945, *chairman, 1946;* Transmitters, 1958. **Awards:** U. S. Navy Certificate of Commendation, 1947; O.S.R.D. Certificate of Merit, 1948.

**CLAVIER, André G. (M'30—F'39),** Retired as Vice President and Technical Director; Scientific Adviser to the President, International Telephone and Telegraph Laboratories, 500 Washington Ave., Nutley 10, N.J.
Born: February 15, 1894, Cambrai, France. Licéncie-ès-sciénces physiques et mathématiques, 1918, Sorbonne, Paris; Ingénieur diplôme de l'Ecole Supérieure d'Eléctricité, 1920, Paris, France; Professeur à l'Ecole Supérieure d'Eléctricité, 1942–47. **Committees:** Admissions, 1950–52; Professional Groups, 1955; Standards, 1951–60; Symbols, 1949–54, *vice-chairman, 1949–50, chairman, 1951–53;* Wave Propagation, 1957–60. **Professional Groups:** Communication Systems, Administrative Committee, 1953–56, 1959; Microwave Theory and Techniques, *chairman, 1953.* **IRE Representative:** ASA Drawings and Symbols Correlating Committee, *alternate, 1951–52;* ASA Graphic Standards Board, 1953; ASA Sectional Committee (Y10) on Letter Symbols, 1951–53; ASA Sectional Committee (Y14) on Standards for Drawings and Drafting Room Practice. *alternate, 1951–52;* ASA Sectional Committee (Y15) on Standards for Graphic Presentation, 1951; ASA Sectional Committee (Y15) on Preferred Practice for the Preparation of Graphs, Charts and Other Technical Illustrations, *alternate, 1952;* U. S. National Committee, International Electrotechnical Commission, Advisors on Symbols, 1955; ASA Sectional Committee (Y32) on Graphical Symbols and Designations, 1955–59. **Awards:** Fellow, American Institute of Electrical Engineers; Membre, Lauréat de la Société Francaise des Eléctriciens; President, Fifth Section, Société des Radioélétriciens, Paris, 1945–47; Vice President, American Section of Société des Ingénieurs Civils de France, 1952–56, President, 1958.

**CLEETON, Claud E. (A'41—SM'46—F'55),** Superintendent, Applications Research Division, Naval Research Laboratories, Washington 25, D.C.
Born: December 11, 1907, Downing, Mo. B.S., 1928, Northeast Missouri State Teachers College; M.A., 1930, University of Missouri; Ph.D., 1935, University of Michigan. **Awards:** President's Certificate of Merit, 1946; Meritorious Civilian Service Award, 1947.

**CLEMENT, Lewis M. (A'14—M'17—F'26)(L),** Consultant, Baldwin Piano Company, Cincinnati, Ohio; Electronic Consultants, Inc., New York, N.Y.; Electronic Engineering Company of California, Santa Ana, Calif.
Born: January 25, 1892, Oakland, Calif. B.S.(E.E.), 1914. University of California. **IRE Offices:** Director, 1945. **Committees:** Board of Editors, 1941–53; Electroacoustic Devices, 1930–31; Meetings and Papers, 1929; Papers Procurement, 1948–50; Professional Groups, 1953–54; Radio Receivers, 1927–28; Regular Papers, 1941; Standardization, 1927–31; Vacuum Tubes, 1929–30. **Professional Groups:** Broadcast and Television Receivers, *secretary, 1953–55.* **Sections:** Cincinnati, *chairman, 1945.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Naval Ordnance Development Award, Bureau of Ordnance, USN, 1945; A Pioneer in the Feld of Aircraft Electronic Development, Dayton Section IRE, 1950; Pioneer Award, PG on Aeronautical & Navigational Electronics, 1951; Pioneer Award, in the Field of Aeronautical Electronics Design; Contribution to Creation of Color TV Standards, Radio-Electronics-Television Manufacturers Association, 1954; Radio-Electronics-Television Manufacturers Association IRE Annual Award, Radio Fall Meeting Plaque, Syracuse, 1955.

**CLEWELL, Dayton (M'49—SM'49—F'54),** General Manager, Research Department, Socony Mobil Oil Co., Inc., 150 E. 42 St., New York, N.Y.
Born: December 15, 1912, Berwick, Pa. B.S., 1933, Ph.D., 1936, Massachusetts Institute of Technology.

**COBINE, James D. (A'34—SM'44—F'57),** Physicist, Research Laboratory, General Electric Company, The Knolls, Schenectady, N.Y.
Born: May, 1905, Oklahoma City, Okla. B.S.(E.E.), 1931, University of Wisconsin; M.S.(E.E.), 1932, Ph.D.(E.E.), 1934, California Institute of Technology. **Committees:** Admissions, 1946–49; Board of Editors, 1945–54; Editorial Reviewer, 1954–57, 1959–60; Education, 1945–46. **Sections:** Schenectady, *secretary-treasurer, 1949–51.* **Awards:** Army-Navy Certificate of Appreciation, World War II, 1947; Fellow, American Physical Society.

**COGGESHALL, Ivan S. (A'26—M'29—F'42),** Manager, Technical Operations Services, American Institute of Electrical Engineers, 33 West 39 St., New York 18, N.Y.
Born: September 30, 1896, Newport, R.I. D.Eng. (Honorary), 1951, Worcester Polytechnic Institute. **IRE Offices:** President, 1951; Director, 1941–44, 1951–53. **Committees:** Admissions, 1934–35, 1941–42; Annual Review, 1944–47; Building Fund, *vice-chairman, 1945;* Constitution and Laws, 1942, 1945–50, 1953–60, *chairman, 1948, 1950;* Executive, 1942, 1951–52, *chairman, 1951;* Finance, 1948–52, *ex officio, 1951;* History, 1960; Membership, 1928–31, 1934–41, *chairman, 1929–30, 1934–35, 1941;* National Convention, *vice-chairman, 1948;* New York Program, 1938–40, *chairman, 1939;* Nominations, 1944, 1953; Papers, 1942–45; Papers Procurement, 1945–46, *chairman, 1945;* Papers Review, 1946–47; Professional Groups, 1950; Public Relations, 1943–46, *chairman, 1943–45;* Sections, 1933–35, 1938–42; Standards, 1945–46. **IRE Representative:** Joint IRE-RTMA Co-ordination Committee, 1951; Joint Technical Advisory Committee, 1951. **Awards:** Fellow, American Institute of Electrical Engineers.

**COHN, Seymour B. (S'41—A'44—M'46—SM'51—F'59),** Vice President and Technical Director of Rantec Corporation, Calabasas, Calif.
Born: October 21, 1920, Stamford, Conn. B.E., 1942, Yale University, M.S., 1946, Ph.D., 1948, Harvard University. **Committees:** Antennas and Waveguides, 1951–53; Papers, 1945; Papers Review, 1945–53. **Professional Groups:** Associate Editor of *Microwave Journal;* Microwave Theory and Technique Administrative Committee, 1955. **Awards:** Annual Award for Advancement of Basic and Applied Science, Yale Engineering Association, 1954.

**COLE, Ralph I. (A'29—SM'46—F'58),** Manager, Military Project Planning, Melpar, Inc., 3000 Arlington Blvd., Falls Church, Va.
Born: August, 1905, St. Louis, Mo. B.S.(E.E.), 1927, Washington University; M.Sc. (Physics), 1936, Rutgers University. **IRE Offices:** Director, 1958–59. **Committees:** Ad Hoc Committee on Manpower, 1958; National Convention, Technical Program, 1950–51; Policy Advisory Committee, 1959–60; Radio Receivers, 1936–41. **Professional Groups:** Engineering Management, *chairman, 1951–52.* **Sections:** Monmouth Subsection, *secretary, 1947, vice-chairman, 1950;* Washington Section, *secretary-treasurer, 1954–55, vice-chairman, 1955–57;* Region #3, *director, 1958.* **Awards:** Legion of Merit, 1947.

**COLEMAN, John B. (A'25—M'29—SM'43—F'48),** Administrator, High Power Transmitters, Defense Electronic Products, Radio Corporation of America, Front & Cooper Sts., Camden, N.J.
Born: August, 1899, Indiana County, Pa. B.S.(E.E.), 1923, Carnegie Institute of Technology. **IRE Offices:** Director, 1948–49. **Committees:** Broadcast, 1933–34; Constitution and Laws, 1952–55; Membership, 1949–51. **Sections:** Philadelphia, *chairman, 1942–43.*

**COLLINS, Arthur A. (J'26—A'32—VA'39—SM'49—F'53),** President, Collins Radio Company, 855 35 St., N.E., Cedar Rapids, Iowa.
Born: September 9, 1909, Kingfisher, Okla.

**COLTMAN, John W. (SM'49—F'55),** Manager, Electronics and Nuclear Physics Department, Westinghouse Research Laboratories, Pittsburgh 35, Pa.
Born: July 19, 1915, Cleveland, Ohio. B.S., 1937, Case Institute of Technology; M.S., 1939, Ph.D., 1941, University of Illinois. **Committees:** Board of Editors, 1951–53; Editorial Reviewer, 1954–60; Research, 1949–50. **Sections:** Nuclear Science, Pittsburgh, *chairman, 1956.* **Awards:** Fellow, American Physical Society, 1954; Edward Longstreth Medal, The Franklin Institute, 1960.

**COLTON, Roger B. (SM'46—F'54),** Major General, U. S. Army, Retired. 624 E. Hunting Towers, Alexandria, Va.
Born: December 15, 1887, Jonesborough, N.C. Ph.B., 1908, Sheffield Scientific School, Yale University; M.S., 1920, Massachusetts Institute of Technology; Graduate of following Army Schools: C. Artillery School, 1922; C. Artillery School, Advanced Course, 1927; C. & G. S. School, 1928; Army War College, 1938. **Awards:** Distinguished Service Medal, War Department, 1946; Legion of Merit, War Department, 1946; Fellow, American Institute of Electrical Engineers.

**COMSTOCK, George C. (A'47—M'47—SM'51—F'57),** Vice President, Electronic Systems and Techniques Division, Airborne Instrument Laboratory, Walt Whitman Rd., Melville, L.I., N.Y.
Born: May, 1911, Peoria, Ill. B.S., 1932, Bradley University; Ph.D. (Physics), 1938, University of Chicago. **Committees:** Navigation Aids, 1949-51. **Professional Groups:** Engineering Management Administrative Committee, *secretary-treasurer, 1959–60.* **Awards:** War-Navy Department Award of Appreciation, 1947.

**CONDON, Edward U. (M'42—SM'43—F'53),** Wayman Crow Professor of Physics, Washington University, St. Louis 30, Mo.
Born: March 2, 1902, Alamogordo, N.M. A.B., 1924, Ph.D., 1926, University of California; D.Sc. (Honorary), 1950, University of Delhi, India and New Mexico School of Mines; 1952, Alfred University and American University. **Awards:** President, American Physical Society, 1946; Philosophical Society of Washington, 1951; American Association for Advancement of Science, 1953.

**COOK, Ellsworth D. (A'21—VA'39—F'41),** Consulting Engineer, Electronic Systems Engineering, formerly Manager, Electronic Engineering, Electrical Engineering Laboratory, General Engineering Laboratory, General Electric Company, 1 River Rd., Schenectady, N.Y.
Born: June 17, 1898, Schenectady, N.Y. B.S.(E.E.), 1920, M.S. (E.E.), 1921, Ph.D.(E.E.), 1923, Union College. **Committees:** Admissions, 1944–48; Membership, 1936–40, 1942–48 *chairman, 1940, 1944–45;* Sections, 1935, 1937–47, *chairman, 1938–39, 1940–48;* Standards, 1932–33. **Sections:** Philadelphia, *chairman, 1934–35.* **IRE Representative:** ASA Sectional Committee on Acoustical Measurements and Terminology, 1936, 1939–46.

**COOLEY, Austin G. (M'44—F'55),** Vice President and Director of Research, Westrex Corporation, 540 W. 58 St., New York 19, N.Y.
Born: February 9, 1900, Seattle, Wash. **Committees:** Facsimile, 1945-57, *vice-chairman, 1953–55.* **Awards:** Certificate of Appreciation, War Department, 1946; Marconi Memorial Medal of Achievement, 1956.

**CORCORAN, George F. (A'43—SM'53—F'56),** Professor and Chairman, Department of Electrical Engineering, University of Maryland, College Park, Md.
Born: September, 1900, Redfield, S.D. B.S., 1923, South Dakota State College; M.S., 1926, University of Minnesota. **Sections:** Washington Sections Awards Committee, *chairman, 1959.* **IRE Representative:** University of Maryland, 1950–53. **Awards:** Fellow, American Institute of Electrical Engineers, 1950.

**CORRINGTON, Murlan S. (SM'49—F'54),** Leader, RCA Defense Electronics Products, Camden 2, N.J.
Born: May 26, 1913, Bristol, S.D. B.S.(E.E.), 1934, South Dakota School of Mines and Technology; M.Sc., 1936, Ohio State University. **Committees:** Ad Hoc Committee on Spurious Radiation, 1954–55; Professional Groups, 1956–58; Radio Frequency Interference, 1955–59; Sound Recording and Reproducing, 1950–56, *vice-chairman, 1953–56.* **Professional Groups:** Audio Administrative Committee, 1952–60, *vice-chairman, 1954–56, 1958–59;* Philadelphia Chapter, *chairman, 1953–54;* Circuit Theory Administrative Committee, 1954–57. **Sections:** Philadelphia, *treasurer, 1953–54, secretary, 1954–55, vice-chairman, 1955–56, chairman, 1956–57.*

**CORWITH, Howard P. (M'26—SM'43—F'52),** Retired as Vice President, Research and Engineering, The Western Union Telegraph Company, 60 Hudson St., New York 13, N.Y. Residence: 37 Dale Drive, Chatham, N.J.
Born: December 3, 1892, Water Mill, L.I., N.Y. M.E., 1916, Cornell University. **Committees:** Admissions, 1949–54, *chairman, 1952–53;* Electronics, 1938–45; Tellers, 1941. **Awards:** Fellow, American Institute of Electrical Engineers, 1951.

**COSENTINO, Adolfo, T. (A'37—VA'39—F'40),** Minister of Communications (Argentina) Palacio de Correos y Telegrafos, Buenos Aires, Argentina.
Born: November 18, 1898, Buenos Aires, Argentina. National School, Buenos Aires. **IRE Offices:** Vice President, 1941; Director, 1941. **Committees:** Sections, *ex-officio, 1940–41, 1947–48.* **Sections:** Buenos Aires, *chairman, 1940–41, 1947–48.*

**COSTA, Helio (A'50—M'55—F'58),** Major Brigadeiro Do Ar, Retired. Rua Assembleia 104–S 1103 Rio de Janeiro, Brazil.
Born: September 19, 1910, Rio de Janeiro, Brazil. E.E., Stanford University, 1945.

**CRAIG, Palmer M. (A'34—SM'45—F'54),** Vice President, Engineering, Television and Radio Division; Philco Corporation, Tioga & C Sts., Philadelphia 34, Pa.
Born: January 29, 1904, Cherry Hill, Md. B.S.(E.E.), 1927, University of Delaware. **Sections:** Philadelphia, *secretary, 1945, vice-chairman, 1946, chairman, 1947.* **Awards:** Navy Ordnance Award, U. S. Navy, 1945; U. S. Certificate of Commendation, U. S. Navy, 1947.

**CRAIN, Cullen M. (S'42—M'49—SM'54—F'58),** Group Leader, Electronics Department, The RAND Corporation, 1700 Main St., Santa Monica, Calif.
Born: September 10, 1920, Goodnight, Tex. B.S.(E.E.), 1942, M.Sc.(E.E.), 1947, Ph.D., 1952, University of Texas. **Sections:** San Antonio, *chairman, 1954–55.* **IRE Representative:** University of Texas, 1950–52.

**CRAPUCHETTES, Paul W. (M'44—F'60),** Technical Director, Electron Tube Division; Manager, Magnetron Product Line, Litton Industries, Inc., 90 Industrial Way, San Sarlos, Calif.
Born: February 12, 1917, San Francisco, Calif. B.S.(Chemistry), 1940, University of California; Three years graduate of General Electric's Advanced Course in Engineering, 1944. **Committees:** Editorial Reviewer, 1955–60.

**CRAVEN, Tunis A. M. (F'29),** Commissioner, Federal Communications Commission, New Post Office Building, Washington 25, D.C. Mail: 203 Old Georgetown Pike, McLean, Va.
Born: January 31, 1893, Philadelphia, Pa. Graduate. 1913, United States Naval Academy. **IRE Offices:** Director, 1937. **Committees:** Broadcast, 1934–35; Meetings and Papers, 1930–31; Papers, 1932–41; Radio Transmitters and Antennas, 1930–31; Standardization, 1929–31. **Professional Groups:** Communication Systems, 1957.

**CRAWFORD, Arthur B. (A'29—SM'46—F'52),** Radio Research Engineer, Bell Telephone Laboratories, Inc., Box 107, Red Bank, N.J.
Born: February 26, 1907, Graysville, Ohio. B.S.(E.E.), 1928, Ohio State University. **Committees:** Editorial Reviewer, 1954–55; Wave Propagation, 1949–60, *vice-chairman, 1959–60.*

**CROSBY, Murray G. (A'25—M'38—SM'43—F'43),** President and Director of Research and Engineering, Crosby-Teletronics Corporation, 299 Robbins Lane, Syosset, L.I., N.Y.
Born: September, 1903, Elrov. Wis. B.S., 1927, E.E., 1943, University of Wisconsin. **IRE Offices:** Director, 1947–49. **Committees:** Admissions, 1945–46; Annual Review, 1946–47, Appointments, 1947–48, *chairman, 1948;* Awards, 1950–52, *chairman, 1950;* Board of Editors, 1946–53; Editorial Administrative, 1946–50; Editorial Reviewer, 1954–60; Executive, 1949; Frequency Modulation, 1940–47, *chairman, 1946–47;* Modulation Systems, 1947–50, *chairman, 1947–48;* National Convention, 1948; Papers, 1944–45; Papers Procurement, 1945; Papers Review, 1946–51, *chairman, 1946–48;* Policy Development, 1948–50; Professional Groups, 1948; Standards, 1946–48. **IRE Representative:** IRE-RTMA, Problem No. 2, *chairman, 1951.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

**CULLUM, A. Earl, Jr. (J'28—A'31—SM'45—F'48),** Head, A. Earl Cullum, Jr., Consulting Engineers, Inwood P.O., Dallas 9, Tex.
Born: September, 1909, Abilene, Tex. B.S. (Communications Engineering), 1931, Massachusetts Institute of Technology. **IRE Offices:** Director, 1948. **Committees:** Annual Review, 1948–49;



Nominations, 1949–50; Policy Development, 1949–50; Radio Wave Propagation and Utilization, 1946–47; Standards, 1948–49; Wave Propagations, 1948–56, *chairman, 1948–49.* **Professional Groups:** Broadcast Transmission Systems Administrative Committee, 1956–59. **Awards:** Presidential Certificate of Merit, 1948.

**CULVER, Charles A. (M'20—SM'43—F'54)(L),** Consulting Engineer, 740 W. Harrison Ave., Claremont, Calif.
Born: September 22, 1875, Preston, Minn. B.S., 1902, Carleton College; Ph.D., 1907, University of Pennsylvania; Research Fellow, 1917, Harvard University; 1930, University of Cambridge, England. **Sections:** Twin Cities, *chairman, 1941–42.* **IRE Representative:** Carleton College, 1941–45. **Awards:** Fellow, American Institute of Electrical Engineers.

**CURTISS, Arthur N. (A'36—SM'44—F'60),** General Manager, West Coast Missile and Surface Radar Division, Radio Corporation of America, 8500 Balboa Blvd., Van Nuys, Calif.
Born: March, 1906, Buffalo, N.Y. B.S.(E.E.), 1927, University of Pittsburgh; Dipl. Business Management, 1955, University of California at Los Angeles. **Committees:** Audio Techniques, 1950–51. **Professional Groups:** Audio, 1946–51, *secretary, 1950–51;* Engineering Management Administrative Committee, 1957–60; Engineering Management Committee for Improved Utilization of Engineers, 1956–59; Military Electronics Administrative Committee, 1959; IRE Ad Hoc Committee on Manpower, 1959. **Sections:** Indianapolis, *chairman, 1940–44;* Philadelphia, *secretary-treasurer,* 1 year, *vice-chairman, 1948–49;* WESCON Field Trip Committee, *chairman, 1960.* **Awards:** Award of Merit, Radio Corporation of America.

**CUTLER, C. Chapin (A'40—SM'53—F'55),** Assistant Director of Electronics & Radio Research, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: December 16, 1914, Springfield, Mass. B.S., 1937, Worcester Polytechnic Institute. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Electron Devices, Information Theory, Space Electronics and Telemetry; Electron Tube Conference, 1950–54, *chairman, 1954.*

**CUTTING, Fulton (M'15—F'21)(L),** Trustee, Professor of Physics and Assistant to the President, Stevens Institute of Technology, Hoboken, N.J.
Born: December 27, 1886, New York, N.Y. **IRE Offices:** President, 1922; Vice President, 1921; Director, 1921–24; Manager, 1920. **Committee:** Education, 1944; Investments, 1944–46.

**DARLINGTON, Sidney (SM'53—F'57),** Member, Technical Staff, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: July, 1906, Pittsburgh, Pa. B.S., 1928, Harvard University; B.S.(E.E.), 1929, Massachusetts Institute of Technology; Ph.D., 1940, Columbia University. **Committees:** Editorial Reviewer, 1954–60; Professional Groups, 1960. **Professional Groups:** Circuit Theory, *vice-chairman, 1957–58, chairman, 1959–60.*

**DART, Harry F. (A'20—M'26—SM'43—F'59),** Patent Engineer, Electronic Tube Division, Westinghouse Electric Corporation, P.O. Box 284, Elmira, N.Y.
Born: October 20, 1895, Forrest, Ill. E.E., 1917, Professional Degree of E.E., 1923, Purdue University. **IRE Offices:** Director, 1951–52. **Committees:** Admissions, 1927–29; Broadcast, 1932–33; Editorial Administrative, 1949–50; First Annual Convention, 1926; Meetings and Papers, 1926–28, 1938–40; Membership, 1938–40, *chairman, 1926–28;* Nominations, 1933; Standardization, 1929–30; Symbols, 1945–51; Tellers, 1939, 1943–44, *chairman, 1944.* **Special Committees:** Professional Recognition, 1949–60. **Professional Groups:** Director, Electron Devices, 1951–55. **Sections:** New York, *secretary-treasurer, 1942–43, chairman, 1949–50;* Elmira-Corning, *chairman, 1953–54.* **Awards:** Fellow, American Institute of Electrical Engineers, 1958.

**DASHER, Benjamin J. (A'41—M'55—SM'57—F'59),** Director, School of Electrical Engineering, Georgia Institute of Technology, 225 North Ave., Atlanta, Ga.
Born: December 1912, Macon, Ga. B.S.(E.E.), 1935, M.S.(E.E.), 1945, Georgia Institute of Technology; Sc.D.(E.E.), 1952, Massachusetts Institute of Technology. **IRE Offices:** Director, 1960–61. **Committees:** Editorial Reviewer, 1954–60; Nominations and Appointments, 1960. **Professional Groups:** Instrumentation Administrative Committee, 1958–. **IRE Representative:** Georgia Institute of Technology, 1953–57.

**DAVENPORT, Wilbur B., Jr. (S'40—A'42—M'48—SM'54—F'58),** Professor of Electrical Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: July 27, 1920, Philadelphia, Pa. B.S.(E.E.), 1941, Alabama Polytechnic Institute; M.Sc.(E.E.), 1943, D.Sc., 1950, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1954–59; Information Theory and Modulation Systems, 1953–55. **Professional Groups:** Information Theory Administrative Committee, 1954–60, *vice-chairman, 1956–57; chairman, 1957–58.*

**DAVIS, Harry I. (A'44—SM'49—F'55),** Special Assistant, Director of Defence Research and Engineering, Washington 25, D.C. Residence: 2623 N. Van Dorn St., Alexandria, Va.; Special Lecturer, Graduate Electrical Engineering, Columbia University, New York, N.Y.
Born: December, 1909, New York, N.Y. B.S., 1931, E.E., 1933, College of the City of New York; M.E.E., 1948, Polytechnic Institute of Brooklyn. **Committees:** Navigation Aids, 1950–55. **Sections:** Rome-Utica, *chairman, 1954.*

**DAVIS, Thomas McL. (M'28—SM'43—F'56),** Retired. 4302 Brandywine St., N.W., Washington 16, D.C.
Born: August 17, 1890, Farmington, Me. **Committees:** Registration and Arrangements. IRE National Convention, *chairman, 1929;* Standardization, 1929–31. **Sections:** Washington, *acting-secretary, 1928–29, vice-chairman, 1929–30, chairman, 1934–35.* **Awards:** Distinguished Service Award of Washington Section, 1957; Navy Distinguished Civilian Service Award, 1957; RESA.

**DAWSON, John W. (A'39—SM'52—F'55),** Chief Product Engineer, D. S. Kennedy & Company, Cohasset, Mass.
Born: February 22, 1901, Sumner, Iowa. B.S.(E.E.), 1926, Iowa State College; M.S.(E.E.), 1938, University of Pittsburgh. **Awards:** National Prize for Best Paper in the Field of Engineering Practice for 1937, American Institute of Electrical Engineers.

**DEAN, Charles E. (A'29—M'36—SM'43—F'60),** Consulting Engineer, Hazeltine Research Corporation, 5925 Little Neck Parkway, Little Neck 62, L.I., N.Y.
Born: May, 1898, Pickens County, S.C. B.A., 1921, Harvard College; M.A. (Physics), 1923, Columbia University; Ph.D. (Physics), 1927, The Johns Hopkins University. **Committees:** Admissions, 1948; Bibliography, 1931. **Professional Groups:** Broadcast & Television Receivers, *secretary, 1952–53; 1956–58.* **Awards:** Certificate of Commendation for Outstanding Civilian Service, U. S. Navy, 1947; Plaque for Outstanding Service to Professional Group on Broadcast and Television Receivers, 1959.

**DEARDORFF, Ralph W. (A'14—SM'44—F'51),** Retired. 1831 N.W. Ramsey Drive, Portland 10, Ore.
Born: August 9, 1894, Portland, Ore. **Sections:** Portland, *chairman, 1942–43, vice-chairman, 1946–47.*

**deBETTENCOURT, Joseph T. (A'50—M'55—F'59),** Vice President, Research and Development, D. S. Kennedy & Company, Cohasset, Mass.
Born: June 9, 1912, Washington, D.C. B.E.E., 1932, M.S. (Physics), 1934, Catholic University of America; Sc.M.(Communications), 1937; Sc.D.(Communications), 1949, Harvard University. **Committees:** Wave Propagation, 1956–60. **Sections:** Boston, Antenna and Propagation, *chairman, 1956–57.* **Awards:** U.S.A. Delegate, National Academy of Sciences, National Research Council, to XI General Assembly of URSI, 1954, The Hague; XII General Assembly at Boulder, 1957.

**DeCOLA, Rinaldo E. (A'37—SM'43—F'57),** Manager, Radio-Phono Division, Warwick Manufacturing Co., Chicago, Ill.

Born: September 7, 1907, Niles, Ohio. **Committees:** Radio Receivers, 1951–54. **Professional Groups:** Broadcast and Television Receivers Administrative Committee, 1956–60, *secretary, 1959–60.*

**De FOREST, Lee (Charter Member) (A'12—M'14—F'18) (L),** 8190 Hollywood Blvd., Los Angeles 46, Calif.
Born: August 26, 1873, Council Bluffs, Iowa. Ph.B., 1896, Ph.D., 1899, Yale University; ScD., 1919, Syracuse University; D.Sc., 1926, Yale University; D.Eng., 1937, Lewis Institute; LL.D., Talladega College, Beloit College; D.Sc., College of Osteopathic Surgery, 1951. **IRE Offices:** President, 1930; Director, 1930–32. **Committees:** Specifications for Steamship Radio Equipment, 1914–15; Wave Length Regulations, 1916–17. **Awards:** President, Society of Wireless Telegraph Engineers, 1909–10; Legion of Honor, 1921; IRE Medal of Honor, 1922; Edison Medal, 1947.

**DEL CAMP, Scipione M. (A'48—M'55—F'59),** Director and Vice President of Research and Development, Cinch Manufacturing Corporation, Chicago, Ill.
Born: San Marco, Italy. M.E., 1912, Polytechnic Institute, Foggia, Italy. **Professional Groups:** Engineering Management, *chairman* **IRE Representative:** EIA-08C Committee, *chairman, 1937–59; chairman* P-5 Committee; IEC 40-4 Committee, *chairman, 1955;* Member, ASA-C83 Sectional Committee on Components; Member, International Electro-Technical Commission.

**DELLINGER, John Howard (F'23)(L),** Radio Consultant and Adviser, 3900 Connecticut Ave., Washington 8, D.C.
Born: July 3, 1886, Cleveland, Ohio. A.B., 1908, George Washington University; Ph.D., 1913, Princeton University; D.Sc., 1932, George Washington University. **IRE Offices:** President, 1925; Vice President, 1924; Director, 1924–27; Manager, 1928–31. **Committees:** Annual Review, 1938–43; Awards, 1934, 1936; Bibliography, 1930–32, 1934, *chairman, 1931;* Meetings and Papers, *chairman, 1928;* Nominations, 1928, 1931, 1935, *chairman, 1931;* Radio Receivers, 1927–28; Radio Wave Propagation, 1942–45, *chairman, 1942–44;* Revision of the Constitution, *chairman, 1927;* Standardization, 1920–25, 1927–32, *chairman, 1929–31;* Standards, 1932–41, 1943–44; Symbols, 1940–41, 1943–48; Use of the Transmission Unit, 1928–29; Wave Propagation, 1937–59, *chairman, 1937–41, 1956–59.* **Sections:** Washington, D.C., *chairman, 1932–33.* **IRE Representative:** American Documentation Institute, 1944–52; ASA Sectional Committee (C60) on Electric and Magnetic Magnitudes and Units, 1936, 1939–48, 1950; International Electrotechnical Commission, Scandinavia, 1930. **Awards:** IRE Medal of Honor, 1938; Distinguished Service Award of Washington Section, 1956.

**DELORAINE, Edmond M. (M'25—F'41),** Vice President and Technical Director, International Standard Electric Corporation, 67 Broad St., New York 4, N.Y.; President, Le Materiel Telephonique; President, Laboratoire Central de Telecommunications, Paris, France.
Born: May 16, 1898, Clichy, Seine, France. B.S., 1920, Ecole de Physique et Chimie, Ingénieur-Docteur, University of Paris. **IRE Offices:** Vice President, 1946; Director, 1946. **Commttees:** Board of Editors, 1944–45; Membership, 1927. **IRE Representative:** International Liaison Committee, 1947.

**DEMPSTER, Burgess (A'31—M'44—SM'48—F'57),** President, Electronic Engineering Company of California, 1601 E. Chestnut Ave., Santa Ana, Calif.
Born: November, 1907, Berkeley, Calif. B.S.(E.E.), 1929, University of California. **Professional Groups:** Los Angeles Chapter, *chairman,* Engineering Management, 1955–56. **Sections:** 7th Region, *secretary-treasurer, 1956–57;* Cincinnati, Membership Committee, *chairman, 1948;* Los Angeles Research Committee, *chairman, 1957–58;* Los Angeles Section, *vice-chairman, 1958–59;* Los Angeles Section Awards Committee, 1958–59; Los Angeles Section, *chairman, 1959–60.* **IRE Representative:** Publicity Committee, IRE-WESCON, 1948; Visitors' Hospitality Committee, IRE-WESCON, *chairman, 1950, 1960;* Convention Registration Committee, IRE-WESCON, *chairman, 1952, 1954;* IRE-WESCON, *chairman, 1958,* Field Trips Committee.

**DENNIS, James L. (SM'46—F'59),** Consulting Engineer, 1420 Glendale Ave., Dayton 6, Ohio.
Born: July, 1915, Quincy, Ill. B.S.(E.E.), 1937, University of Illinois. **Professional Groups:** Aeronautical and Navigational Electronics Administrative Committee, *secretary-treasurer, 1954–55, chairman, 1956;* National Conference on Aeronautical Electronics, Board of Directors, 1955–57, *chairman, 1955.* **Sections:** Dayton, *chairman, 1952.* **Awards:** Department of the Air Force Exceptional Civilian Service Award, 1950.

**deROSA, Louis A. (A'45—SM'51—F'52),** Vice President, Electronic Countermeasures Laboratory, International Telephone and Telegraph Laboratories, a division of IT&T Corp., 500 Washington Ave., Nutley 10, N.J.
Born: September 10, 1910, Tenafly, N.J. B.S.(E.E.), 1932, Polytechnic Institute. **Committees:** Information Theory and Modulation Systems, 1951–59. **Professional Groups:** Information Theory, *vice-chairman, 1954–55, chairman, 1955–56.*

**DESCHAMPS, Georges A. (SM'51—F'60),** Professor, University of Illinois, Urbana, Ill.
Born: October, 1911, Vendome, Loir-et-Cher, France. Licence (Math. & Physics), 1933; Ecole Normale Superieure, Paris; Agrega on (Math.), 1934. **Committees:** Antennas and Waveguides, 1951–60, *vice-chairman, 1955–56, chairman, 1957–59;* Standards, 1957–59. **Professional Groups:** Information Theory Administrative Committee, *chairman, 1958–60;* Editor of *Transactions on Information Theory,* 1958–60.

**DEVORE, Lloyd T. (A'42— SM'44—F'52),** Vice President and Director, Hoffman Science Center, 415 E. Montecito St., Santa Barbara, Calif.
Born: November 14, 1909, Monongahela, Pa. B.S., 1930, M.S., 1931, Ph.D., 1933, Pennsylvania State College. **Committees:** Awards, 1952–53; Papers Review, 1951–53; Program, 1952–53, *chairman, 1948–49.* **Professional Groups:** Engineering Management, *secretary, 1951–54.* **Awards:** Exceptional Civilian Service Award, War Department, 1947.

**De WITT, John H., Jr. (A'31—M'38—SM'43—F'51),** President, WSM Incorporated, 301 Seventh Ave., N., Nashville 3, Tenn.
Born: February 20, 1906, Nashville, Tenn. **Committees:** Professional Groups, 1948.

**DICKIESON, Alton C. (SM'44—F'60),** Director of Transmission Systems Development I, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: August 16, 1905, New York, N.Y. **Committees:** Editorial Reviewer, 1954–60. **Awards:** U. S. Naval Ordnance Development Award, 1945.

**DIEHL, William F. (A'19—F'36),** Assistant Vice President, Dumont Airplane and Marine Instruments, Inc., Clearfield, Pa.
Born: December 18, 1896, New York, N.Y. **Committees:** Building Fund, 1945; Radio Receivers, 1928–29; Radio Transmitters and Antennas, 1929–30. **Sections:** Philadelphia, *chairman, 1933–34, convention chairman, 1934.* **Awards:** United States Navy Certificate Commendation P.E., Pa.

**DIETZOLD, Robert L. (M'40—SM'43—F'55),** Director, Military Systems Studies, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: August 3, 1904, Akron, Ohio. B.S., 1925, Massachusetts Institute of Technology; Ph.B., 1927, Yale University. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Board of Editors, 1951–53; Circuits, 1949–53; Circuit Theory, *chairman, 1952–53;* Editorial Administrative, *alternate, 1949–50;* Handbook, 1945–47; Papers Review, 1948–49.

**DINGER, HAROLD E. (A'27—M'43—SM'43—F'58),** Electronics Scientist, Naval Research Laboratory, Washington 25, D.C.
Born: May 7, 1905, Barberton, Ohio. **Committees:** Interference Measurements, 1959; Measurements and Instrumentation, 1952–53; Radio Frequency Interference, 1955–60; Wave Propagation, 1953–56. **Awards:** Meritorious Civilian Service Award, U. S. Navy, 1945; Service Appreciation Award, American Standards Association, 1946; Fellow, American Association for the Advancement of Science.



**DINGLEY, Edward N., Jr. (A'28—M'43—SM'43—F'56),** Senior Staff Engineer, Electronic Communications, Inc., 1501 72 St. N., St. Petersburg 10, Fla.
Born: July 18, 1902, Kalamazoo, Mich. 1922–25, Massachusetts Institute of Technology; B.Sc.(E.E.), 1936, George Washington University. **Committees:** Papers Procurement, *vice-chairman, 1955.* **Professional Groups:** Communications Systems Administrative Committee, *vice-chairman, 1957–58, chairman, 1958–59;* Chapter Activities Sub-Committee, *chairman, 1956–57;* Nominations Sub-Committee, *chairman, 1959–60;* Washington Chapter PGCS, *vice-chairman, 1955–56, chairman 1956–57, secretary, 1954–55;* Technical Papers Committee, PGCS National Symposium on Global Communications, Washington, *vice-chairman, 1954;* PGCS 2nd National Symposium on Communications Systems, St. Petersburg, Fla., *general-chairman, 1959.* **Sections:** Florida West Coast, *secretary-treasurer, 1959;* Professional Groups Committee, *chairman, 1957–58.* **Awards:** Fellow, American Institute of Electrical Engineers, 1957; Department of Defense Distinguished Civilian Service Medal, 1955; Patron Award of Florida West Coast Section, 1959.

**DISHAL, Milton (A'41—SM'46—F'57),** Senior Scientist, International Telephone and Telegraph Laboratories, 500 Washington Ave., Nutley 10, N.J.
Born: March, 1918, Philadelphia, Pa. B.S., 1939, M.A. (Physics), 1941, Temple University. **Committees:** Convention record, 1955–56; Editorial Reviewer, 1953–60. **Professional Groups:** Circuit Theory, *secretary-treasurer, 1953–56;* Administrative, 1954–57.

**DiTORO, Michael J. (A'37—SM'45—F'58),** Director of Engineering, Polytechnic Research and Development Company, Inc., Brooklyn, N.Y.: Adjunct Professor, Polytechnic Institute of Brooklyn.
Born: June 24, 1910, Campobasso, Italy. E.E., 1931, M.E.E., 1933, D.E.E., 1946, Polytechnic Institute of Brooklyn. **Committees:** Electroacoustics, 1946, 1951–52; Papers Review, 1945–53. **Professional Groups:** Administrative Committee, Information Theory, *chairman, 1956.* **Awards:** Fellow, Acoustical Society of America.

**DOBA, Stephen (A'45—SM'54—F'60),** Transmission Measurement Engineer, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: May 27, 1907, New York, N.Y. **Committees:** Standards, 1959–60; Video Techniques, 1951, 1959–60, *vice-chairman, 1955–56, chairman 1957–59.*

**DOHERTY, William H. (A'29—M'36—SM'43—F'44),** Manager, Government Sales, Western Electric Company, 120 Broadway, New York 5, N.Y.
Born: August 21, 1907, Cambridge, Mass. S.B., 1927, S.M., 1928, Harvard University; Sc.D., 1950, Catholic University of America. **IRE Offices:** Director, 1951–53, 1958–60. **Committees:** Appointments, 1957; Editorial Reviewer, 1954–55; Membership, 1943–46; Nominations, 1952–53, *chairman, 1953;* Policy Advisory, 1952–53, 1959–60; Policy Development, 1951; Professional Groups, 1948–51. **IRE Representative:** Joint AIEE-IRE Student Activities Coordination Committee, 1958–59. **Awards:** IRE Morris Liebmann Memorial Prize, 1937.

**DOME, Robert B. (A'27—M'38—SM'43—F'48),** Consulting Engineer, Television Receiver Department, Radio and Television Division, Consumer Products Group, General Electric Company, Syracuse, N.Y.
Born: October 12, 1905, Tell City, Ind. B.S.(E.E.), 1926, Purdue University; M.S.(E.E.), 1929, Union University. **Committees:** Board of Editors, 1946–53; Editorial Reviewer, 1954–60; Papers, 1940–45. **Awards:** Charles A. Coffin Award, 1936, 1948; IRE Morris Liebmann Memorial Prize, 1951; RESA, 1951.

**DOOLITTLE, Franklin M. (A'13—M'30—F'54)(L),** Retired. 52 Churchill Road, Hamden 17, Conn.
Born: June, 1893, New Haven, Conn. Ph.B., 1915, Yale University. **Committees:** Modulation Systems, 1947–48; Standardization, 1927–28.

**DORSEY, Herbert Grove (M'19—F'34)(L),** Retired. 3708 33 Place, N.W., Washington 8, D.C.
Born: April 24, 1876, Kirkersville, Ohio. B.S., 1897, M.S., 1898, Sc.D. (Honorary), 1937, Denison University; Ph.D., 1908, Cornell University. **Sections:** Washington, D.C., *secretary, 1930–32, chairman, 1933.* **Awards:** First Annual Award, Washington Society of Engineers, 1941; Fellow, Acoustical Society of America; Fellow, American Institute of Electrical Engineers; Fellow, American Association for the Advancement of Science.

**DOW, Jennings B. (M'26—F'42),** Vice President and Director, Hazeltine Corporation; President Hazeltine Corporation; President, Hazeltine Electronics Division, Little Neck, L.I., N.Y.
Born: January 2, 1897, Bowling Green, Ohio. B.S., 1919, United States Naval Academy; M.S. 1926, Graduate School of Engineering, Harvard University.

**DOW, William G. (M'39—SM'43—F'50),** Professor and Chairman of the Department of Electrical Engineering, University of Michigan, Ann Arbor, Mich.
Born: September 30, 1895, Faribault, Minn. B.S.(E.E.), 1916, E.E., 1917, University of Minnesota; M.S.E.(E.E.), 1929, University of Michigan. **Committees:** Board of Editors, 1944–53; Electron Tubes, 1946–47; Electron Tubes and Solid State Devices, 1949–52; Electronics, 1939–45; Papers, 1941–44; Research, 1949–50; Vacuum Tubes, 1945–46. **Awards:** Fellow, American Institute of Electrical Engineers.

**DRAKE, Frederick H. (A'25—M'28—SM'43—F'57),** Inventor, Squire Road, Roxbury, Conn.
Born: June, 1901, Watertown, Mass. A.B., 1923, A.M., 1925, Ph.D., 1926, Harvard University. **Committees:** Papers, 1933.

**DRAPER, Charles S. (A'53—F'55),** Professor and Head, Department of Aeronautics and Astronautics; Director of Instrumentation Laboratory, Massachusetts Institute of Technology, 68 Albany St., Cambridge 39, Mass.
Born: October 2, 1901, Windsor, Mo. B.A., 1922, Stanford University; B.S., 1926, M.S., 1928, Sc.D., 1938, Massachusetts Institute of Technology. **Committees:** Electronic Computers, 1948–49. **Awards:** IAS Sylvanus Albert Reed Award, 1946; Presidential Medal for Merit, 1946; Naval Ordnance Development, 1946; New England Award, Engineering Societies of New England, 1947; Exceptional Civilian Service Award, Department of the Air Force, 1951; Testimonial of Appreciation, Society of Mechanical Engineers, 1951; 43rd Wilbur Wright Memorial Lecturer, Royal Aeronautical Society, London, 1955; Navy Distinguished Public Service Award, 1956; Airpower Award of Massachusetts Wing of Air Force Association, 1957; Thurlow Award of Institute of Naviagation, 1957; Airpower Trophy of Air Force Association, 1957; Holley Medal of American Society of Mechanical Engineers, 1957; Blandy Medal of the American Ordnance Association, 1958; American Honorary Fellowship, Institute of the Aeronautical Sciences, 1958; Godfrey L. Cabot Award, Aero Club of New England, 1959; Magellanic Medal, American Philosophical Society, 1959; William Proctor Prize of Scientific Research Society of America, 1959.

**DREHER, Carl (F'57),** Writer, RD 3, Brewster, N.Y.
Born: February 16, 1896, Vienna, Austria. B.S., 1917, College of the City of New York. **Committees:** Board of Editors, 1928–29; Broadcasting, 1928–29; Meetings and Papers, 1926–29; Standardization, 1929–30.

**DUBILIER, William (A'14—M'18—F'29)(L),** Retired. Consultant only to Cornell-Dubilier Electric Corporation; President, Radio Patents Corporation, P.O. Box 942, New Rochelle, N.Y.; Consultant to Dublier Condenser Co., Ltd., London, England.

Born: July 25, 1888, New York, N.Y. Attended Cooper Institute. **Awards:** Fellow, American Institute of Electrical Engineers, 1925; French Legion of Honor and Officer of the French Academy, 1949; Cano Dunn Medal, Cooper Union, 1955.

**DUFFENDACK, Ora S. (SM'44—F'56),** Retired. Consultant Physicist, 4110 Council Crest, Madison, Wis.
Born: May, 1890, Napoleon, Mo. B.S., 1917, University of Chicago; A.M., 1921, Ph.D., 1922, Princeton University. **Committees:** Papers Review, 1946–53. **Awards:** King's Medal for Service in the Cause of Freedom, 1948; President's Certificate of Merit, 1948.

**DuMONT, Allen B. (M'30—F'31),** Chairman of the Board, Allen B. DuMont Laboratories, Inc., 750 Bloomfield Ave., Clifton, N.J.
Born: January 29, 1901, Brooklyn, N.Y. E.E., 1924, D.Eng., 1944, Rensselaer Polytechnic Institute; D.Eng., 1949, Brooklyn Polytechnic Institute; D.Laws, 1955, Fairleigh Dickinson University; D. Science, 1955, New York University. **Committees:** Standardization, 1929–31; Standards, 1932; Television, 1939–45. **Awards:** Westinghouse Award, 1927; American Television Society Award, 1943; Television Broadcasters Award, 1944; Marconi Memorial Medal of Achievement, 1945; AAAA Gold Medal Award, 1947; American Schools and Colleges Awards; Chevalier in National Order of French Legion of Honor, 1952.

**DUNN, William L. (M'41—S'43—F'54),** Vice President, Director of Engineering and Research, Admiral Corporation, 3800 W. Cortland St., Chicago 47, Ill.
Born: December 19, 1903, Asheville, N.C. A.B., 1926, The Johns Hopkins University. **Committees:** Radio Receivers, 1940–48.

**DUNNING, Orville M. (A'34—SM'44—F'55),** Vice President, Engineering and Production Division, Airborne Instrument Laboratory, 160 Old Country Road, Mineola, L.I., N.Y.
Born: February 21, 1904, St. Louis, Mo. B.S.(E.E.), 1925, Rose Polytechnic Institute. **Committees:** Admission, 1946–47. **Sections:** Long Island Subsection, *chairman, 1949–50.*

**DYER, John N. (J'30—A'32—SM'45—F'49),** Vice President and Technical Director, Airborne Instrument Laboratory, a Division of Cutler-Hammer, Inc., Comac Road, Deer Park, L.I., N.Y.
Born: July, 1910, Haverhill, Mass. B.S., 1931, Massachusetts Institute of Technology. **IRE Offices:** Director, 1955–56, 1960; Vice President, 1960. **Committees:** Appointments, 1955–56; Awards, 1960; Education, 1955–60; Executive, 1960; Fellow, 1958, *chairman, 1959;* Navigation Aids, 1949–50; Nominations, 1956; Policy Advisory, 1955–57, *chairman, 1956;* Professional Groups, 1960. **Sections:** Long Island Subsection, *vice-chairman, 1949–50, chairman, 1950–51.* **IRE Representative:** AIEE-IRE Coordination Committee on Student Activities, 1955–56.

**EARLY, James M. (A'48—SM'54—F'59),** Transistor Development Engineer, Sub-Department Head, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: July, 1922, Syracuse, N.Y. B.Sc. (Pulp & Paper Manufacturing), New York State College of Forestry; M.Sc.(E.E.), Ph.D.(E.E.), 1951, Ohio State University. **Committees:** Semiconductor Devices, *chairman, 1957–60;* Solid State Devices, 1956–60.

**EASTHAM, Melville (A'13—M'13—F'25)(L),** 8 Graygardens, E., Cambridge, Mass.
Born: June 26, 1885, Oregon City, Ore. Dr.Eng., 1946 (Honorary), Oregon State College. **IRE Offices:** Manager, 1922–27; Treasurer, 1928–40; Director, 1927–41. **Committees:** Admissions, 1937–39, 1941–42; Awards, 1929, 1931, 1935, 1939, 1941–42, *chairman, 1929, 1941;* Bibliography, 1930–32, 1934, *chairman, 1932, 1934;* Building Fund, *Administrator, 1947–48;* Constitution and Laws, 1930–31, 1933; Education, 1944–48; Electroacoustic Devices, 1929–30; History, 1954–60; Nominations, 1929–30, 1932, 1935–36, 1938–39, 1941, 1949–50, *chairman, 1929, 1935;* Papers, 1916–19; Revision of the Constitution, 1925; Sections, 1925; Standardization, 1925–31; Standards, 1936–38; Wave Length Regulation, 1916–17. **Sections:** Boston, *secretary, 1914–15, secretary-treasurer, 1916–29, secretary, 1930–32.* **IRE Representative:** Engineering Index National Committee, 1936, 1939–43; Radio Broadcasting Committee, American Engineering Council, 1930, 1936, 1939, 1940; United States National Committee, Advisers on Electrical Measuring Instruments, 1936, 1939–40, 1949–51. **Awards:** IRE Medal of Honor, 1937; Medal of Merit, 1948; New England Engineering Award, 1948; Armstrong Medal.

**EASTMAN, Austin V. (A'23—M'32—F'41),** Professor and Head of Department of Electrical Engineering, University of Washington, Seattle 5, Wash.
Born: May 16, 1902, Seattle, Wash. B.S.(E.E.), 1922, M.S. (E.E.), 1929, University of Washington. **IRE Offices:** Director, 1950–51. **Committees:** Awards, 1951; Membership, 1941–48; Nominations, 1954; Papers Procurement, 1942–43; Policy Development, 1949–51; Regular Papers, 1941. **Sections:** Seattle, *chairman, 1929–30.* **IRE Representative:** University of Washington, 1941–47. **Awards:** Fellow, American Institute of Electrical Engineers, 1946.

**EASTON, Ivan G. (S'39—A'41—SM'45—F'60),** Engineering Manager, General Radio Company, 22 Baker Ave., West Concord, Mass.
Born: November, 1916, Sweden. B.S.(E.E.), 1938, Northeastern University; M.S., 1939, Harvard University. **Committees:** Audio Techniques, 1949–50. **Professional Groups:** Industrial Electronics, 1949–52; Instrumentation, *chairman, 1952–54.* **Sections:** New York, *secretary, 1947–48.* **IRE Representative:** Joint IRE-AIEE Committee on High Frequency Measurements, 1952–56.

**ECKERSLEY, Peter Pendleton (F'25),** Telephone Manufacturing Co., Ltd., West Dulwich, S.E. 21, London, England.
Born: January, 1892, La Puebla, Mexico. Certificate of Technology, 1915, Manchester School of Technology; Higher Certificate, 1910, Bedales School. **IRE Offices:** Vice President, 1937; Director, 1937. **Awards:** Premium Prize Award, Institution of Electrical Engineers, 1928, 1930.

**ECKERT, John Presper (S'41—A'47—F'56),** Vice President, Univac Engineering, Remington Rand, Inc., Remington Rand Univac, Division of Sperry Rand Corporation, 2300 W. Allegheny Ave., Philadelphia 29, Pa.
Born: April 9, 1919, Philadelphia, Pa. B.S.(E.E.), 1941, M.S. (E.E.), 1943, University of Pennsylvania. **Committees:** Electronic Computers, 1948–50. **Awards:** Howard W. Potts Medal, Franklin Institute, 1949.

**EDGERTON, Harold E. (SM'55—F'56),** Professor of Electrical Measurements, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: April 6, 1903, Fremont, Neb. B.S., 1925, University of Nebraska; M.S., 1927, D.Sc., 1931, Massachusetts Institute of Technology; Dr. Eng. (Honorary), 1948, University of Nebraska. **Awards:** Modern Pioneers Award, National Association of Manufacturers, 1940; Howard W. Potts Medal, The Franklin Institute, 1941; Medal of Freedom, 1946; Joseph A. Sprague Memorial Award, National Press Photographic Association, 1949; Franklin L. Burr Prize, National Geographic Society, 1953; Progress Award, Society of Motion Picture & Television Engineers, 1959; New England Award for 1959, Engineering Societies of New England, Inc.; Certificate of Appreciation, War Department; Fellow, American Institute of Electrical Engineers; Fellow, Eta Kappa Nu.

**EDLEFSEN, Niels E. (SM'52—F'54),** Vice President and Director of Engineering, Vickers, Inc., Division of Sperry Rand Corporation, Administrative and Engineering Center, Detroit 32, Mich.
Born: January 29, 1893. B.S. (physics), 1916, Utah State University; M.A. (physics), 1923, Ph.D. (physics), 1930, University of California. **Awards:** Fellow, American Physical Society; Fellowship, Charles A. Coffin, 1928–30; Honorable Mention, Nobel Prize, Physics, 1939.



**EDSON, William A. (M'41—SM'43—F'57),** Manager, Klystron Subsection, General Electric Microwave Laboratory, 601 California Ave., Palo Alto, Calif.
Born: October, 1912, Burchard, Neb. B.S., M.S., 1934–35, University of Kansas; Sc.D., 1937, Harvard University. **Committees:** Editorial Reviewer, 1953–60; Education, 1955–60; Papers, 1951–53; Piezoelectric and Ferroelectric Crystals, 1959–60; Piezoelectricity, 1949–58. **Sections:** Atlanta, *vice-chairman, 1947, chairman, 1948;* San Francisco, *director, 1955–59.* **IRE Representative:** WESCON, Technical Program Committee, 1955; Microwave Theory and Techniques National Symposium, Steering Committee; WESCON, Technical Program Committee, *vice-chairman, 1959.*

**EDWARDS, Martin (SM'48—F'54),** Manager, Advanced Product Planning Operation, Electronic Components Division, General Electric Company, 1 River Road, Schenectady, N.Y.
Born: March 22, 1905, Chautauqua, Kan. B.S.(E.E.), 1928, B.S.(M.E.), 1929, M.E., 1934, D.Sc., 1946, Kansas State College. **Awards:** Fellow, American Institute of Electrical Engineers, 1946.

**EDWARDS, Paul G. (SM'47—F'60),** Director of Development, Merrimack Valley Laboratory, Bell Telephone Laboratories, Inc., 1600 Osgood St., North Andover, Mass.
Born: February, 1901, Careytown, Ohio. B.E.E., 1924, E.E., 1929, Ohio State University. **Awards:** Fellow, American Institute of Electrical Engineers, 1959.

**EITEL, William W. (A'39—SM'52—F'53),** President, Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif.
Born: January 16, 1908, San Jose, Calif. **Awards:** Distinguished Service Award, U. S. Navy, 1950.

**ELIAS, Peter (S'48—A'51—M'56—F'59),** Associate Professor of Electrical Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: November 26, 1923, New Brunswick, N.J. S.B., 1944, Massachusetts Institute of Technology; M.A., 1948, M.(Eng. Sci.), 1949, Ph.D., 1950, Harvard University. **Committees:** Information Theory and Modulation Systems, 1953–59, *vice-chairman, 1957–59, chairman, 1958–60;* Standards, 1958–60. **Professional Groups:** Information Theory Symposium, *chairman, 1954, 1956;* Information Theory Administrative Committee, 1958–59, *chairman, 1959–60.*

**ELLEFSON, Bennett S. (A'38—M'44—F'48),** Vice President, General Telephone & Electronics Laboratories Incorporated, 730 Third Ave., New York 17, N.Y.
Born: January 10, 1911, Canby, Minn. B.A., 1932, St. Olaf College; M.S., 1933, University of Minnesota; Ph.D., 1937, Pennsylvania State University. **Committees:** Annual Review, 1946–47.

**ELLIOTT, Harold F. (M'25—SM'43—F'51),** Consulting Engineer, 800 Westridge Drive, Menlo Park, Calif.
Born: June 17, 1892, Durango, Colo. A.B., 1916; Engineer, 1925, Stanford University.

**ELWELL, Cyril F. (M'14—F'18)(L),** Consulting Engineer, Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, Calif.
Born: August 20, 1884, of American Parents, Melbourne, Victoria, Australia. A.B., 1907, E.E., 1908, Stanford University. **Committees:** Increase of Membership, 1913–14. **Awards:** Honorary Life Member of the Institution of Radio Engineers, Australia, 1954.

**ENGLEMAN, Christian L. (SM'46—F'54),** President, Engleman and Company, Inc., 2480 16 St., N.W., Washington 9, D.C.
Born: April 3, 1906, Vancouver, Clark County, Wash. B.S., 1930, United States Naval Academy College; M.S., 1938, Harvard University. **Committees:** Professional Groups, 1958–59. **Professional Groups:** Communications Systems National Committee, 1954–57, 1959–60, *vice-chairman, 1956, 1959;* Military Electronics National Committee, 1956–59, *national chairman, 1956, treasurer, 1958–59;* Washington Chapter, Communications Systems, *chairman, 1954.*

**ENGSTROM, Elmer W. (A'25—M'38—F'40),** Senior Executive Vice President and Director, Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N.Y.; Director, National Broadcasting Company; Director, RCA Communications, Inc.
Born: August 25, 1901, Minneapolis, Minn. B.S.(E.E.), 1923, University of Minnesota; Sc.D. (Honorary), 1949, New York University. **IRE Offices:** Director, 1949. **Committees:** Awards, 1945–49, *chairman, 1946;* Board of Editors, 1940–51; Nominations, 1947; Public Relations, 1940; Regular Papers, 1941; Research, 1946–47, 1949–50; Television, 1939–40; Television and Facsimile, 1936–38.

**ENGSTROM, Howard T. (SM'53—F'59),** Vice President, Remington Rand, Division of Sperry Rand Corporation, 315 Fourth Ave., New York 10, N.Y.
Born: April 23, 1902, Boston, Mass. B.Ch.E., 1922, Northeastern University; M., 1925, University of Maine; Ph.D., 1929, Yale University. **Awards:** Distinguished Service Medal, U. S. Navy; Officer of the British Empire; Naval Security Medal; Distinguished Civilian Service Award.

**EPPERSON, Joseph B. (A'34—M'38—SM'43—F'58),** Engineering Vice President, Scripps-Howard Radio, Inc., Euclid Ave. and E. 30 St., Cleveland 15, Ohio.
Born: May, 1910, Charleston, Tenn. **Committees:** Constitution and Laws, 1951; Sections, 1951–52. **Professional Groups:** Administrative Committee, Broadcast Transmission Systems, 1951–55; Annual Symposium, *chairman, 1954.* **Sections:** Cleveland, *secretary-treasurer, 1948–49, vice-chairman, 1949–50, chairman, 1950–51.* **Awards:** Award Certificate for Service as Chairman of National AIEE Committee on TV and Aural Broadcasting Systems, 1955–56; Fellow, American Institute of Electrical Engineers, 1958.

**EPSTEIN, David W. (A'34—SM'43—F'52),** Manager, Conversion Tube Operations, RCA Electron Tube Division, Radio Corporation of America, Lancaster, Pa.
Born: January 11, 1908, Russia. B.S. (Physics), 1930, Lehigh University; M.S.(E.E.), 1934; D.Sc.(E.E.), 1937, University of Pennsylvania. **Committees:** Editorial Reviewer, 1954–60.

**ESPENSCHIED, Lloyd (IRE Charter Member) (A'12—M'13—F'24)(L),** Retired from Bell Telephone Laboratories, Inc.; Consultant, 99 82 Road, Kew Gardens 15, N.Y.
Born: April 27, 1889, St. Louis, Mo. Pratt Institute, 1909, D.Sc. (Honorary), 1957. **IRE Offices:** Manager, 1912–13, 1915–26, 1931. **Committees:** Admissions, 1942–47; Awards, 1919; Editing, 1914; History, 1954–60; Increase of Membership, 1917–18; Radio Telephone and Receiver Terminology, *chairman, 1924–25;* Revision of the Constitution, 1925; Standardization, 1924–25; Wave Length Regulation, 1916–17, 1919–20. **Sections:** New York, *chairman 1944–45.* **IRE Representative:** National Advisory Council on Radio in Education, 1936–37, 1939–40; Committee on Engineering Developments, 1941–43. **Awards:** AIEE Award (co-receiver), 1935; IRE Medal of Honor, 1940; Medal Award, Television Broadcasters Association, 1944; Radio Pioneers Citation, 1954.

**ESPERSEN, George A. (A'34—VA'39—SM'51—F'56),** Research Physicist, Philips Laboratories, Irvington-on-Hudson, N.Y.
Born: May 17, 1906, Jersey City, N.J. B.S. (Physics), 1931, New York University. **Committees:** Electron Devices, 1952–56; Electron Tubes, 1955–56, *vice-chairman, 1956–57, chairman, 1957–60;* Electron Tubes & Solid State Devices, 1951–52; Standards, 1957–60. **Professional Groups:** Electron Devices, 1953–56, *vice-chairman, 1954, chairman, 1954–55.* **IRE Representative:** ASA Sectional Committee (C60) on Standardization on Electron Tubes, 1959–60; ASA Subcommittee (C42.14) on Electron Tubes, 1959–60. **Awards:** Samuel F. B. Morse Medal for Excellence in Physics, New York University, 1929; Mrs. Andrew Carnegie Scholarship, 1930.

**ESPLEY, Dennis C. (SM'52—F'54),** Chief Executive, Computer Developments, Ltd., Computer House, Kenton Road, Kenton, Middlesex, England.
Born: September 19, 1906, Wellington, Shropshire, England. B.Eng. (1st Class Honors), 1928; D.Eng., 1940, Liverpool Uni-

versity. **Awards:** Ambrose Fleming; Duddell; John Hopkinson; Officer of the Order of the British Empire, 1950.

**EVANS, Porter H. (M'23—F'31),** Retired from Technical Staff, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: January 11, 1891, Erie, Pa. B.S.(E.E.), 1914, M.S., 1920, University of Michigan. **Committees:** Standardization, 1930–31.

**EVERITT, William L. (A'25—M'29—F'38),** Dean of the College of Engineering, University of Illinois, Urbana, Ill.
Born: April 14, 1900, Baltimore, Md. E.E., 1922, Cornell University; M.S., 1926, University of Michigan; Ph.D., 1933, Ohio State University. **IRE Offices:** President, 1945; Director, 1942–47, 1949–51. **Committees:** Awards, 1943–44, 1948–49, *chairman, 1944;* Awards Coordination, *chairman, 1955;* Board of Editors, 1941–53; Circuits, 1944–51; Editorial Reviewer, 1954–60; Education, 1944, 1950, *chairman, 1944;* Executive, *chairman, 1945;* Frequency Modulation, 1941–45; Investments, 1945; Membership, 1947–43; Nominations, 1942, 1946, 1948–50, 1952, *chairman, 1948, 1952;* Papers, 1941; Papers Procurement, *vice-chairman, 1943–45;* Policy Development, 1948, 1950–51; Professional Groups, 1948–53, *chairman, 1949;* Public Relations, 1950–51; Regular Papers, *vice-chairman, 1941;* Research, 1946–47. **IRE Representative:** Ohio State University, 1941–42; Joint IRE–AIEE Coordination Committee, 1951; Committee on Evaluation of Bureau of Standards, 1953; Ad Hoc Committee on Coordination of Student Branches, 1954; Advisory Committee to National Bureau of Standards, 1954–58. **Awards:** IRE Medal of Honor, 1954.

**EWING, Douglas H. (SM'46—F'54),** Vice President, Research and Engineering, Radio Corporation of America, Princeton, N.J.
Born: June 24, 1915, Mitchell, Ind. A.B., 1935, Butler University; M.S., 1937, Ph.D., 1939, University of Rochester; D.Sc. (Honorary), 1955, Butler University. **Committees:** Education, 1953–55; Navigation Aids, 1948–49.

**FANO, Robert M. (S'41—A'45—SM'48—F'54),** Professor of Electrical Communications, Department of Electrical Engineering and Research Laboratory of Electronics, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge 39, Mass.
Born: November 11, 1917, Torino, Italy. S.B., 1941, Sc.D., 1947, Massachusetts Institute of Technology. **Committees:** Antennas, 1949–50; Awards, 1956–57; Editorial Reviewer, 1954–60; Education, 1949–56; Papers Review, 1953. **Professional Groups:** Administrative Committee, Information Theory, 1951–58. Editorial Advisory Board of Transactions of the PGIT, *chairman.* **Awards:** Fellow, American Academy of Arts & Sciences.

**FARNSWORTH, Philo T. (A'28—M'34—F'39),** Technical Consultant, International Telephone & Telegraph Laboratories, 3700 E. Pontiac St., Fort Wayne, Ind.
Born: August 19, 1906, Beaver, Utah. D.Sc. (Honorary), 1951, Indiana Technical College. **Committees:** Television, 1940–41; Television and Facsimile, 1936–40. **Awards:** Honorable Mention Citation for Outstanding Young Electrical Engineers, Eta Kappa Nu, 1937; Distinguished Alumni Award, Brigham Young University, 1937; Durward Howes' list of ten most distinguished young men for "America's Young Men," 1940; Fellow, Society of Motion Picture and Television Engineers; Fellow, American Association for the Advancement of Science; IRE Morris Liebmann Memorial Prize, 1941; First Award by Television Broadcasters Association, 1944.

**FARRAND, Clair L. (A'14—M'23—F'31),** President, Farrand Optical Company; President, Farrand Controls, Inc., President, Inductosyn Corporation, Bronx Blvd. & E. 238 St., New York 70, N.Y.
Born: October 22, 1895, Newark, N.J.

**FARRELL, John J. (A'43—SM'47—F'48),** General Manager, Heavy Military Electronics Department, Defense Electronics Division, General Electric Company, Syracuse, N.Y.
Born: March, 1897, Watervliet, N.Y. **Committees:** Nominations, 1947. **IRE Representative:** ASA Sectional Committee (C16) on Radio, 1949–51; RMA-IRE Coordinating Committee, 1945–47.

**FAULKNER, Harry (M'24—SM'43—F'53)(L),** Director, Telecommunications Engineering & Manufacturing Association, 40 Norfolk St., London, W.C. 2, England.
Born: April 17, 1892. Nottingham, England. B.Sc. (Eng.), 1911, London **Awards:** Special Premium, IEE, 1927; Companion of the Order of St. Michael and St. George.

**FAY, Clifford E. (A'26—SM'45—F'56),** Member, Technical Staff, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: December 2, 1903, St. Louis, Mo. B.S.(E.E.), 1925, M.S. (E.E.), (Physics), 1927, Washington University. **Committees:** Electron Devices, 1952–53; Electron Tubes and Solid State Devices, 1949–52. **Professional Groups:** Electron Devices, *treasurer, 1954–55.* **IRE Representative:** ASA Sectional Committee (C60) on Standardization of Electron Tubes, 1949–55.

**FELCH, Edwin P. (A'32—M'42—SM'43—F'54),** Director of Military Systems Development, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: January, 1909, Madison, N.J., A.B. (Physics), 1929, Dartmouth College. **Committees:** Awards, 1959–60. **Professional Groups:** Instrumentation, Charter Member of Administrative Committee through 1953. **IRE Representative:** Joint Committee-Joint AIEE-IRE Committee on High Frequency Measurements, 1948–53, *chairman, 1952.*

**FELKER, Jean H. (A'46—SM'53—F'60),** Transmission Engineer, American Telephone and Telegraph Company, 195 Broadway, New York 7, N.Y.
Born: March 14, 1919, Centralia, Ill. B.S.(E.E.), 1941, Washington University. **Committees:** Editorial Reviewer, 1954; Professional Groups, 1956. **Professional Groups:** Electronic Computers Administrative Committee, 1953–56; Electronic Computers, *chairman, 1955–56.*

**FERRELL, Enoch B. (A'25—M'29—SM'43—F'53),** Director, Communications Techniques Research, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: June 1, 1898, Sedan, Kan. B.A., 1920, B.S.(E.E.), 1921, M.A., 1924, University of Oklahoma. **Committees:** Awards, 1955–57, *chairman, 1956;* Awards Coordination, *chairman, 1958;* Papers 1933–45. **Awards:** Fellow, American Society for Quality Control, 1948.

**FERRIS, Warren R. (SM'46—F'53),** Professor of Electrical Engineering, University of South Carolina, Columbia, S.C.
Born: May 14, 1904, Terre Haute, Ind. B.S.(E.E.), 1927, Rose Polytechnic Institute; M.S.(E.E.), 1932, Union College; Dr. E.E., 1946, Polytechnic Institute of Brooklyn. **Committees:** Electron Devices, 1952–56; Standardization, 1929–32; Standards, 1932–33.

**FETT, Gilbert H. (SM'45—F'58),** Professor of Electrical Engineering, University of Illinois, Urbana, Ill.
Born: June 19, 1909, Chicago, Ill. B.Sc.(E.E.), 1931, University of Illinois; M.Sc., 1932, Iowa State College; Ph.D., 1940, University of Illinois. **Committees:** Education, 1945–51; Fellow, 1959–60. **Awards:** Fellow, American Physical Society, 1950.

**FICK, Clifford G. (A'25—SM'46—F'51),** Manager, Research Liaison Section, Research Application Department, Research Laboratory, General Electric Company, Schenectady, N.Y.
Born: December 13, 1904, Ida Grove, Iowa. B.Sc.(E.E.), 1925, Iowa State College. **Committees:** Annual Review, 1949–50; Television Systems, 1948–60.

**FIEDLER, George J. (A'40—SM'46—F'60),** Principal Engineer, Systems Engineering Section, Sverdrup & Parcel Engineering Co., 915 Olive St., St. Louis 1, Mo.
Born: March 18, 1904, Bushton, Kan. B.S.(E.E.), 1926, M.S. (E.E.), 1932, Professional (E.E.), 1934, Kansas State University. **IRE Representative:** Montana State College, 1940–43. **Awards:** Fellow, American Institute of Electrical Engineers, 1956.



**FIELD, George S. (A'30—VA'39—SM'48—F'57),** Chief Scientist, Defense Research Board, Department of National Defense, "A" Building, Elgin St., Ottawa, Ont., Canada.
Born: October 23, 1905, Wimbledon, Middlesex, England. B.Sc., 1929, M.Sc., 1930, D.Sc., 1937, University of Alberta. **Awards:** Fellow, Acoustical Society of America, 1943; Fellow, Royal Society of Canada, 1944; Member of the British Empire, 1946.

**FIELD, Lester M. (M'48—F'52),** Manager, Microwave Tube Division; Scientific Staff Advisor, Research Laboratories, Hughes Aircraft Company, Culver City, Calif.
Born: February 9, 1918, Chicago, Ill. B.S., 1939, Purdue University; Ph.D., 1941, Stanford University. **Committees:** Editorial Reviewer, 1954–58; Papers Review, 1950–53. **Professional Groups:** Electron Devices Administrative Committee, 1957. **IRE Representative:** California Institute of Technology, 1954–55. **Awards:** Honorable Mention, Outstanding Young Electrical Engineer, 1949, Eta Kappa Nu.

**FIELD, Robert F. (A'18—M'30—SM'43—F'47)(L),** Retired. 104 Church St., Watertown 72, Mass.
Born: July 10, 1885, Tuftonboro, N.H. A.B., 1906, A.M., 1907, Brown University; A.M., 1916, Harvard University. **Committees:** Meetings and Papers, 1930. **Sections:** Boston, *chairman, 1942–44.* **Awards:** Award of Merit, American Society for Testing Materials, 1954.

**FINCH, William G. H. (J'16—A'18—M'25—SM'43—F'56),** Capt., USNR, Retired. P.O. Box 44, Newtown, Conn.
Born: June 28, 1895, Birmingham, England. **Committees:** Annual Review, 1939–40; Board of Editors, 1945–53; Constitution and Laws, 1928–31; Facsimile, 1939–43, 1949–50, *chairman, 1939–40;* Meetings and Papers, 1927–28; Membership, 1926–27; Publicity, 1926–34, *chairman, 1926–30;* Standards, 1939–40. **Awards:** Legion of Merit, U. S. Navy, 1946.

**FINK, Donald G. (A'35—SM'45—F'47),** Director of Research and General Manager, Research Division, Philco Corporation, Tioga & C Sts., Philadelphia 34, Pa.
Born: November 8, 1911, Englewood, N.J. B.Sc., 1933, Massachusetts Institute of Technology; M.S., 1942, Columbia University. **IRE Offices:** President, 1958, Director, 1949–51, 1956–60; Editor, 1956–57. **Committees:** Annual Review, 1946–49; Appointments, 1948–49, 1957; Awards, 1947; Board of Editors, 1946–53; Editorial Board, *vice-chairman, 1954–55, chairman, 1956–57;* Executive, 1956–60, *chairman, 1958;* Finance, 1959–60; Handbook, 1945–47; Membership, 1942–48, *chairman, 1946;* Navigation Aids, 1946–51, *chairman, 1946–48;* Nominations, 1959–60; *Papers,* 1943–45; Policy Advisory, 1959–60; Preparedness, 1940–41; Professional Groups, 1956–57; Public Relations, 1940–42; Research, 1946–47; Standards, 1946–49, 1959–60; Television, 1946–49, *chairman, 1948–49;* Television Systems, 1949–60; Tellers, 1949. **Professional Groups:** Broadcast and Television Receivers, *vice-chairman, 1955.* **IRE Representative:** ASA Sectional Committee (C16) on Radio, *chairman, 1959–60;* Joint Technical Advisory, 1948–53, 1956–57, *vice-chairman, 1948, chairman, 1949.* **Awards:** Medal of Freedom, War Department, 1946; Presidential Certificate of Merit, 1948; Fall Meeting Plaque, 1951; Journal Award, Society of Motion Picture and Television Engineers, 1955.

**FINK, Lyman R. (SM'48—F'53),** General Manager, Atomic Products Division, General Electric Company, 701 University Ave., Palo Alto, Calif.
Born: November, 1912, Elk Point, S.D. B.S.(E.E.), 1933, M.S. (E.E.), 1934–35, Ph.D.(E.E.), 1937, University of California. **Committees:** Awards, 1955–57, *chairman, 1957;* Sections, 1950–51. **Professional Groups:** Administrative Committee, Broadcast and Television Receivers, 1954–59, *vice-chairman, 1955, chairman, 1956–58.* **Sections:** Syracuse, *vice-chairman, 1949–50, chairman, 1950–51.*

**FISK, Sir Ernest T. (M'15—F'26)(L),** Consultant, Electronics Telecommunications also Finance and Production, P.O. Box 9, Roseville, N.S.W., Australia.
Born: August 8, 1886, Sunbury-on-Thames, Middlesex, England. **IRE Offices:** Vice President, 1938; Director, 1938. **Awards:** Fellow, IRE, Australia; President, 1932–37, 1939–43; Honorary Member, Institution of Electrical Engineers, London; Honorary Member, British Institution of Radio Engineers; Silver Medalist, Royal Society of Arts (London); Honorary Member, Institution of Radio Engineers, Australia; Chartered Engineer, Australia.

**FISK, James B. (SM'52—F'55),** President, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: August 30, 1910, West Warwick, R.I. B.S., 1931, Ph.D., 1935, Massachusetts Institute of Technology; M.A. (Honorary), 1947, Harvard University; Sc.D. (Honorary), 1956, Carnegie Institute of Technology; Sc.D. (Honorary), 1958, Williams College; Sc.D. (Honorary), 1959, Newark College of Engineering. **Awards:** Fellow, American Physical Society; Fellow, National Academy of Sciences; Presidential Certificate of Merit.

**FLORY, Leslie E. (A'35—SM'46—F'57),** Research Engineer, RCA Laboratories, Princeton, N.J.
Born: March 17, 1907, Sawyer, Kan. B.S.(E.E.), 1930, University of Kansas. **Professional Groups:** Administrative Committee, Medical Electronics, 1955–59, *vice-chairman, 1959–60;* Metropolitan New York Chapter PGME, *chairman, 1959–60.* **Awards:** Overseas Award, British Institute of Electrical Engineers, 1938; RCA Laboratories Award, 1949, 1950, 1958.

**FORRESTER, Jay W. (SM'49—F'55),** Professor of Industrial Management, Massachusetts Institute of Technology, Cambridge, Mass.
Born: July 14, 1918, Anselmo, Neb. B.S.(E.E.), 1939, University of Nebraska; M.S.(E.E.), 1945, Massachusetts Institute of Technology; Dr. of Eng. (Honorary), 1954, University of Nebraska. **Committees:** Editorial Reviewer, 1954–58; Electronic Computers, 1948–52, *chairman, 1949–51;* Measurements and Instrumentation, 1949–50; Papers Review, 1951–53; Standards, 1949–51. **Awards:** Honorable Mention Award for Young Engineers, Eta Kappa Nu, 1948.

**FOSTER, Dudley E. (A'26—M'37—SM'43—F'50),** President, Hazeltine Research, Inc. of California, 3320 Burbank Blvd., Burbank, Calif.
Born: December 12, 1900, Newark, N.J. E.E., 1922, Cornell University. **Committees:** Annual Review, 1938–41, 1945–46; Awards, 1953–57; Building Fund, 1944–55; New York Program, 1937; Papers Procurement, 1942–43; Radio Receivers, 1936–48, *chairman, 1938–41, 1945–47;* Regular Papers, 1941; Standards, 1938–42, 1945–46; Television, 1939–47; Television and Facsimile, 1938–39. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

**FOSTER, Ronald Martin (SM'53—F'54),** Professor of Mathematics, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn 1, N.Y.
Born: October 3, 1896, Brooklyn, N.Y. S.B., 1917, Harvard University; Sc.D., 1960, Fairleigh Dickinson University. **Committees:** Circuits, 1947–60.

**FOWLER, Glenn A. (A'46—SM'48—F'60),** Vice President, Research, Sandia Corporation, P.O. Box 5800, Albuquerque, N.M.
Born: June 18, 1918, Riverdale, Calif. B.S.(E.E.), 1941, University of California, Berkeley. **IRE Offices:** Director, 1958–59. **Committees:** Appointments, 1957; Editorial Reviewer, 1954–60; Nominations, 1959–60; Policy Advisory, 1959–60. **Sections:** Albuquerque-Los Alamos, *treasurer, 1954–55, secretary, 1955–56, chairman, 1956;* Region #7, *director, 1958.*

**FOX, A. Gardner (A'40—SM'45—F'56),** Radio Research Engineer, Bell Telephone Laboratories, Inc., P.O. Box 107, Red Bank, N.J.
Born: November 22, 1912, Syracuse, N.Y. B.S.(E.E.), 1934, M.S.(E.E.), 1935, Massachusetts Institute of Technology. **Committees:** Annual Review, 1949–50; Antennas, 1948–49; Antennas and Waveguides, 1949–54, *chairman, 1949–52;* Editorial Reviewer, 1954–55; Radio Wave Propagation and Utilization, 1947–48; Standards, 1949–52; Wave Propagation, 1949–50. **Awards:** Naval Ordnance Development Award, U. S. Navy, 1945.

**FRANKEL, Sidney (A'37—SM'44—F'57),** Director of Engineering, Sierra Electronic Corporation, Menlo Park, Calif.
Born: October 6, 1910, New York, N.Y. B.S.(E.E.), 1931, M.S., (Math.), 1934, Ph.D. (Math), 1936, Rensselaer Polytechnic Institute. **Committees:** Antennas, 1944–49; Antennas and Waveguides, 1949–50, *vice-chairman, 1950–51, 1953–54;* Handbook, 1945–47; Transmitters, 1944–45; Transmitters and Antennas, 1943–44. **Sections:** West Coast Subcommittee on Antennas and Waveguides, *chairman, 1952–54.*

**FREDENDALL, Gordon L. (A'41—SM'46—F'55),** Senior Member, Technical Staff, RCA Laboratories Division, Princeton, N.J.
Born: December 20, 1909, Kettle Falls, Wash. B.S., 1931, M.S., 1932, Ph.D., 1936, University of Wisconsin. **Committees:** Editorial Reviewer, 1954–60; Frequency Modulation, 1946–47; Measurements and Instrumentation, 1950–58; Standards, 1959–60; Video Techniques, 1949, *vice-chairman, 1957–59, chairman, 1959–60.*

**FRIEND, Albert (A'34—M'39—SM'43—F'54),** Consulting Engineer and Physicist, P.O. Box 29, Bala-Cynwyd, Pa. Office: 5903 City Line Ave., Merion, Pa.
Born: January 24, 1910, Morgantown, W.Va. B.S.(E.E.), 1932, M.S. (Physics), 1936, West Virginia University; S.D. (Communication Engr.), 1948, Harvard University. **Committees:** Sound Recordings and Reproducing, 1948–59, *vice-chairman, 1950–51, chairman, 1952–56;* Standards, 1952–56. **IRE Representative:** ASA Sectional Committee (Z57) on Sound Recording, *alternate, 1952–59;* IRE-AIEE Committee on Noise Definitions, 1951–53. **Awards:** RCA Laboratories Award, 1951; Second National Electronics Conference Award, 1955; Fellow, American Physical Society.

**FRIIS, Harald T. (A'18—M'26—F'29)(L),** Consulting Engineer, 30 E. River Road, Rumson, N.J.
Born: February 22, 1893, Neastved, Denmark. E.E., 1916, Dr. Eng., 1938, Royal Technical College, Copenhagen. **IRE Offices:** Director, 1941–43. **Committees:** Admissions, 1941; Papers, 1941; Research, 1946–47. **Awards:** IRE Morris Liebmann Memorial Prize, 1939; Knight of the Danish Order of Dannebrog, 1954; Valdemar Poulsen Gold Medal, Danish Academy of Technical Sciences, 1954; IRE Medal of Honor, 1955; Stuart Ballantine Medal, Franklin Institute, 1958.

**FRISCHE, Carl A. (SM'54—F'57),** President, Sperry Gyroscope Company, Division of Sperry Rand Corporation, Great Neck, L.I., N.Y.
Born: August, 1906, Freeport, Kan. A.B., 1928, Miami University, Ohio; M.S., Ph.D., 1932, Iowa State University; Research Fellowship, 1933, Columbia University; D.Sc. (Honorary), 1955, Miami University, Ohio.

**FRY, Donald W. (A'37—M'58—F'60),** Director, United Kingdom Atomic Energy Authority, Atomic Energy Establishment, Winfrith, Dorchester, Dorset, England.
Born: November 30, 1910, Weymouth, Dorset, England. B.Sc. (Special Physics, 1st Class Honors), 1931, M.Sc., 1932, King's College, London University, England. **Awards:** Duddell Medal of the Physical Society, 1950; Fellow, King's College, London, 1959.

**FUBINI, Eugene G. (A'36—SM'46—F'54),** Vice President, Research and Systems Engineering Division, Airborne Instrument Laboratory, Inc., Walt Whitman Road, Melville, L.I., N.Y.
Born: April, 1913, Turin, Italy. Doctor of Physics, 1933, University of Rome, Italy. **Committees:** Editorial Reviewer, 1954–60; Papers Review, 1949–53; Tellers, 1948; Wave Propagation, 1949–53. **Sections:** Long Island, *vice-chairman, 1956–57, chairman, 1957–58.* **Awards:** Presidential Certificate of Merit.

**FULLER, Leonard F. (A'14—M'14—F'25)(L),** Retired. 2345 Waverley St., Palo Alto, Calif.
Born: August 21, 1890, Portland, Ore. M.E., 1912, Cornell University; Ph.D., 1919, Stanford University. **IRE Offices:** Manager, 1928. **Committees:** Admissions, 1928–29; Radio Transmitters and Antennas, 1930–31; Sections, 1926–28; Specifications for Steamship Radio Equipment, 1914–15; Standardization, 1916–20, 1930–31; Transmitters and Antennas, 1929–30; Wave Length Regulation, 1916–17, 1919–20. **Sections:** San Francisco, *chairman, 1928–29.* **Awards:** IRE Morris Liebmann Memorial Prize, 1919.

**GAFFNEY, Francis J. (A'38—M'45—SM'46—F'55),** Executive Vice President and General Manager, FXR, Inc., Woodside, L.I., N.Y.
Born: June 27, 1912, Middleton, Lancashire, England. B.S. (E.E.), 1935, Northeastern University. **Committees:** Measurements and Instrumentation, 1949–50; *vice-chairman, 1950–51; chairman, 1951–54;* Standards, 1951–54. **IRE Representative:** ASA Sectional Committee (C39) on Electrical Measuring Instruments, 1953–55; ASA Subcommittee (C42.6) on Electrical Instruments, *alternate, 1953;* Joint IRE-AIEE Committee on High Frequency Measurements, 1952–56; U. S. National Committee, International Electrotechnical Commission, Advisers on Electrical Measuring Instruments, *alternate, 1953–55.* **Awards:** Certificate of Merit, 1947.

**GANNETT, Danforth K. (M'31—SM'43—F'59),** Lecturer, Virginia Polytechnic Institute, Blacksburg, Va., In Communications Training Program for C. & P. Telephone Company Personnel.
Born: November, 1894, Minneapolis, Minn. B.S., 1916, E.E., 1917; University of Minnesota. **IRE Representative:** Member, ASA Technical Committee (C16), 1939; Member, Subcommittee (23.4), Video Signal Transmission Methods of Measurement, 1948–49. **Awards:** Letter of Appreciation for wartime service as Consultant to Office of Scientific Research and Development, 1944.

**GARMAN, Raymond, L. (A'39—SM'51—F'58),** Vice President, Engineering and Research, General Precision Equipment Corporation, 92 Gold St., New York 38, N.Y.
Born: July 21, 1907, Schoeneck, Pa. B.S., 1929, Franklin and Marshall; M.Sc., 1931, Ph.D., 1932, New York University. **Committees:** Video Techniques, *chairman, 1949–53.* **Awards:** Presidential Certificate of Merit, 1947; Fellow, SMPTE; Fellow, New York Academy of Sciences.

**GEBHARD, Louis August (A'29—M'42—SM'43—F'49),** Superintendent, Radio Division, United States Naval Research Laboratory, Washington 25, D.C.
Born: June, 1896, Buffalo, N.Y. B.S.(E.E.), George Washington University; LL.B., Georgetown University. **Awards:** Presidential Certificate of Merit, 1946; Fellow, American Physics Society; Scientific Research Society of America; American Association for the Advancement of Science; Armed Forces Communication Association; Naval Institute.

**GERBER, Eduard A. (A'50—SM'56—F'58),** Director, Frequency Control Division, U. S. Army Signal Research & Development Laboratory, Fort Monmouth, N.J.
Born: April 3, 1907, Fuerth, Bavaria, Germany, M.S., 1931, Ph.D., 1934, Institute of Technology, Munich, Germany. **Committees:** Piezoelectric and Ferroelectric Crystals, *chairman, 1957–60;* Standards, 1957–60.

**GERKS, Irvin, H. (A'32—M'41—SM'43—F'58),** Engineer, Collins Radio Company, 5225 C Ave., N.E., Cedar Rapids, Iowa.
Born: October 30, 1905, New London, Wis. B.Sc.(E.E.), 1927, University of Wisconsin; M.Sc.(E.E.), 1932, Georgia Institute of Technology. **Committees:** Wave Propagation, 1948–60. **Sections:** Atlantic, *chairman, 1935–37;* Dayton, *chairman, 1944.*

**GIACOLETTO, Lawrence J. (S'37—A'42—M'44—SM'48—F'58),** Research Manager, Scientific Laboratory, Ford Motor Company, 20000 Rotunda Drive, Dearborn, Mich.
Born: November 14, 1916, Clinton, Ind. B.Sc.(E.E.), 1938, Rose Polytechnic Institute; M.Sc. (Physics), 1939, State University of Iowa; Ph.D.(E.E.), 1952, University of Michigan. **Committees:** Administrative Committee, Board of Editors, 1952–53; Editorial Reviewer, 1954–60; Papers Review, 1953. **Sections:** Monmouth Subsection, *secretary, 1945, chairman, 1945–46;* Princeton, *secretary, 1948–49, vice-chairman, 1949; chairman, 1950;* Detroit, *chairman, 1959–60.* **Awards:** Fellow, American Association for the Advancement of Science.



**GILBERT, Roswell W. (M'46—F'60),** Vice President of Research and Development, Daystrom, Incorporated, Weston Instruments Division, 614 Frelinghuysen Ave., Newark 12, N.J.
Born: July 21, 1909, Brooklyn, N.Y. **Committees:** Electrical Techniques in Medicine and Biology, 1952–55.

**GILL, Archibald J. (M'20—F'40)(L),** Chairman and Director, British Telecommunications Research, Ltd., Taplow, Buckinghamshire, England.
Born: May 13, 1889, Stoke-Sub-Hamdon, Somerset, England. B.Sc. (Eng.), 1909, University of London.

**GILLETT, Glenn D. (A'22—M'27—F'34),** Design Specialist, Lockheed Missiles System Division, Lockheed Aircraft Corporation, 1122 Jagels Road, Sunnyvale, Calif.
Born: April 14, 1898, Sterling, Colo. A.B., 1919, Harvard University; S.B.(E.E.), 1921, Harvard Engineering School. **Committees:** Broadcast, 1935–38; Radio Wave Propagation, 1942–46; Wave Propagation, 1937–42.

**GILMAN, George W. (A'29—SM'47—F'50),** Director of Telegraph, Signaling and Special Systems Development, Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y.
Born: August, 1901, Salmon River, N.S., Canada. M.S., 1923, Massachusetts Institute of Technology. **Committees:** Board of Editors, 1944–48; Frequency Modulation, 1940–41; Public Relations, 1940–42; Publicity, 1941.

**GINZTON, Edward L. (S'39—A'40—SM'46—F'51),** Professor of Applied Physics and Electrical Engineering, Stanford University, Stanford, Calif.; Chairman, Board of Directors, Varian Associates, Inc., Palo Alto, Calif.
Born: December 27, 1915, Ekaterinoslavsk, Russia. B.S., 1936, M.S., 1937, University of California; E.E., 1938, Ph.D., 1940, Stanford University. **Committees:** Awards, 1957. **Awards:** IRE Morris Liebmann Memorial Prize, 1958.

**GIORDANO, Anthony B. (SM'46—F'58),** Associate Dean-in-charge of the Graduate School; Professor, Electrical Engineering, Polytechnic Institute of Brooklyn, 85-99 Livingston St., Brooklyn 1, N.Y.
Born: February 1, 1915, New York, N.Y. B.E.E., 1937, M.E.E., 1939, D.E.E., 1946, Polytechnic Institute of Brooklyn. **Committees:** Antennas and Waveguides, 1951–53; National Convention Papers, *secretary, 1946–47; vice-chairman, 1950–51.* **Professional Groups:** Circuit Theory Symposium, *chairman, 1957–58;* Circuit Theory Program, *chairman, 1958–60;* Microwave Theory and Techniques, Microwave Prize Committee, 1957–58. **Sections:** Awards Committee, *chairman, 1957–60;* New York, *secretary, 1952–53; vice-chairman, 1953–54; chairman, 1954–55;* Executive Committee, 1955–59; Long Island Program Committee, 1958–59. **IRE Representative:** Polytechnic Institute of Brooklyn, 1947–53; Engineering Advisory Committee of the New York City Board of Education, *chairman, 1958–60.* **Awards:** New York Section Certificate of Appreciation, 1956; UNICO National, Gold Oscar for Science, 1957; Polytechnic Institute of Brooklyn, Certificate of Distinction, 1957; AIEE Certificate of Appreciation, 1957.

**GLASGOW, Roy S. (M'26—SM'43—F'55),** Dean, U. S. Naval Postgraduate School, Monterey, Calif.
Born: May 20, 1895, St. Louis, Mo. B.S., 1918, Washington University; M.S., 1922, Harvard University. **Sections:** St. Louis, *chairman, 1941–42.* **IRE Representative:** Washington University, 1941–42. **Awards:** Fellow, American Institute of Electrical Engineers; Distinguished Service Award, U. S. Army, 1951; Honorary Life Member, St. Louis Engineers Club, 1954; Alumni Citation, Washington University, 1955.

**GLINSKI, George S. (A'42—M'45—SM'53—F'60),** Chairman, Electrical Engineering Department; Professor of Electrical Engineering, University of Ottawa.
Born: March 11, 1912, St. Petersburg, Russia. Dipl. Eng., 1937, Warsaw Technical University. **Sections:** Ottawa, *vice-chairman, 1954–55, chairman, 1955–56.*

**GLOVER, Alan M. (A'39—SM'46—F'56),** Vice President and General Manager, Semiconductor and Materials Division, Radio Corporation of America, Somerville, N.J.
Born: September, 1909, Rochester, N.Y. B.A., 1930, M.A., 1932, Ph.D., 1935, University of Rochester. **Committees:** Electron Tubes, 1946–49; Electron Tubes and Solid State Devices, 1949–52; Electronics, 1943–46; Papers Procurement, 1946; Vacuum Tubes, 1945–46. **Sections:** Lancaster Subsection, *chairman, 1948–49.*

**GOLAY, Marcel J. E. (SM'51—F'60),** Scientific Consultant, 116 Ridge Road, Rumson, N.J.
Born: May, 1902, Neuchatel, Switzerland. B.Sc., 1920, Gymnase of Neuchatel; Licensed E.E., 1924, Federal Institute of Technology, Zurich; Ph.D., 1931, University of Chicago. **Committees:** Editorial Reviewer, 1954–55; Information Theory and Modulation Systems, 1954–60, *vice-chairman, 1955–56.* **Professional Groups:** Information Theory Administrative Committee. **Awards:** IRE Harry Diamond Award, 1951.

**GOLDBERG, Harold (A'38—M'44—SM'44—F'55),** Vice President, Emerson Radio & Phonograph Corporation, Emerson Research Laboratories, 1140 East West Highway, Silver Spring, Md.
Born: January 31, 1914, Milwaukee, Wis. B.S.(E.E.), 1935, M.S.(E.E.), 1936, Ph.D.(E.E.), 1937, Ph. D. (physiology), 1941; University of Wisconsin. **Committees:** Radio Transmitters, 1949–60, *vice-chairman, 1955, chairman, 1956–58;* Solid State Devices, 1955–58; Standards, 1956–58. **Professional Groups:** Washington Chapter, Information Theory, *chairman, 1956.* **Sections:** Rochester, *secretary, 1944–45.* **Awards:** Exceptional Service Award, U. S. Department of Commerce, 1953.

**GOLDMAN, Stanford (A'36—M'43—SM'43—F'56),** Professor of Electrical Engineering, Syracuse University, Syracuse 10, N.Y.
Born: November 14, 1907, Cincinnati, Ohio. B.A., 1926, M.A., 1928, University of Cincinnati; Ph.D. (Physics), 1933, Harvard University. **Committees:** Circuits, 1947–51; Information Theory and Modulation Systems, 1956–58; Papers, 1944–45; Papers Review, 1946–50. **IRE Representative:** IRE-AIEE Committee on Noise Definitions, 1949–53.

**GOLDMARK, Peter C. (A'36—M'38—F'42),** President and Director of Research, CBS Laboratories, a Division of Columbia Broadcasting System, Inc., High Ridge Rd., Stamford, Conn.
Born: December 2, 1906, Budapest, Hungary. B.Sc., 1930, Ph.D., 1931, Vienna Technical University. **Committees:** Board of Editors, 1941–50; Television, 1939–49; Television and Facsimile, 1938–39; Television Systems, 1949–60. **Awards:** Technical Progress Medal, Television Broadcasters Association, 1944; IRE Morris Liebmann Memorial Prize, 1945.

**GOLDSMITH, Alfred N. (IRE Founder and Charter Member), (A'12—F'15)(L),** Consulting Engineer, 597 Fifth Ave., New York 17, N.Y.
Born: September, 1889, New York, N.Y. B.S., 1907, College of the City of New York; Ph.D., 1911, Columbia University; Sc.D., 1935, Lawrence College. **IRE Offices:** President, 1928; Secretary, 1918–27; Editor, 1912–28, 1930–53; Editor Emeritus, 1954–; Director, 1912–60. **Committees:** Administrative Committee of the Board of Editors, *chairman, 1951–53;* Admissions, 1925; Awards, 1919, 1930–33, 1935–38, *chairman, 1919, 1931;* Bibliography, 1934; Board of Editors, *chairman, 1928, 1930–53;* Circuit Elements, 1928–29; Constitution and Laws, 1935–40, *chairman, 1935;* Convention Policies, 1940; Editorial Administrative, *chairman, 1946–53;* Executive, 1942–53; Finance, 1914–15, *chairman, 1915;* Fiscal, 1947–48; Meetings and Papers, 1925–26; Membership Solicitation Policy, 1945; Nominations, 1929–31, 1936, 1940, *chairman, 1930, 1940;* Office Quarters, 1947; Papers, *chairman, 1913–19;* Planning, 1947; Special Papers, 1940–41; Standardization, 1913–32, *secretary, 1913, chairman, 1915–16;* Standards, 1932–37; Televi-

sion and Facsimile, 1936–39; Tellers, *chairman, 1932;* Wave Length Regulation, 1916–17, 1919–20. **IRE Representative:** ASA Sectional Committee on Radio, 1936, 1939–40, *chairman, 1942–48;* ASA Standards Council, 1936, 1939–46; ASA Subcommittee on Insulating Material Specifications for the Military Services, *chairman, 1943–48;* ASA War Committee on Radio, 1943–48; National Advisory Council on Radio in Education, 1936, 1939–40; National Advisory Council on Radio in Education, Committee on Engineering Developments, 1941–43; Joint IRE-AIEE, Co-ordination Committee, 1952; National Television Film Council, *president, 1957;* National Television Systems, 1940–43; Panel 2, *chairman, 1947–13.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; IRE Medal of Honor, 1941; Townsend Harris Medal, College of the City of New York, 1942; Medal Award, Television Broadcasters Association, 1945; IRE Founders' Award, 1954; Eminent Member, Eta Kappa Nu; Life Member New York Medico-Surgical Society; Fellow, International College of Surgeons; Pioneer Award, Society of Motion Picture and Television Engineers; Fellow, International Committee on Television.

**GOLDSMITH, Thomas T., Jr. (A'38—SM'46—F'49),** Vice President, Engineering and Research, Allen B. DuMont Laboratories, Inc., 760 Bloomfield Ave., Clifton, N.J.
Born: January, 1910, Greenville, S.C. B.S., 1931, Furman University; Ph.D., 1936, Cornell University; LL.D., 1959, Furman University. **Committees:** Admissions, 1944–47; Electron Tubes, 1946–47; Electronics, 1942–46; Professional Groups, 1948; Regular Papers, 1941; Television, 1939–46; Tellers, 1944; Vacuum Tubes, 1945–46. **Sections:** Northern New Jersey, *chairman, 1958–59.* **Awards:** Fellow, Society of Motion Picture and Television Engineers.

**GOLDSTEIN, Ladislas (SM'54—F'56),** Professor of Electrical Engineering, University of Illinois, Urbana, Ill.
Born: February 6, 1906, Dombard, Hungary. B.A., 1925, Nagyvarad College, Hungary; M.S., 1928, D.Sc., 1937, University of Paris.

***GOLDUP, Thomas E. (SM'52—F'55),** Director, Mullard, Ltd., Mullard House, Torrington Place, London, W.C. 1, England.
Born: April 30, 1894, London, England. **Awards:** Commander of the Order of the British Empire, 1954.

**GOOD, William E. (M'45—SM'50—F'59),** Consulting Engineer, Television Receiver Department, General Electric Company, Syracuse, N.Y.
Born: April 25, 1916, Hillsdale, Mich. A.B., 1937, Kalamazoo College; M.S. (Physics), 1939, University of Illinois; Ph.D. (Physics), 1946, University of Pittsburgh. **Sections:** Syracuse, *chairman, 1955–56.*

**GOODALL, William McH. (A'29—M'37—SM'43—F'51),** Technical Staff, Bell Telephone Laboratories, Inc., P.O. Box 107, Red Bank, N.J.
Born: September 7, 1907, Washington, D.C. B.Sc., 1928, California Institute of Technology. **Committees:** Editorial Reviewer, 1954–60; New York Program, 1939–41, 1949–53; Papers Review, 1946–53; Tellers, 1939, 1941, *chairman, 1939.* **Sections:** Monmouth, N.J. Subsection, *secretary-treasurer, 1950, vice-chairman, 1954, chairman, 1955.*

**GOODWIN, W. Nelson, Jr. (A'15—M'29—SM'43—F'57)(L),** Consulting Engineer, Weston Electrical Instrument Corporation, Newark 12, N.J. Residence, R.D. 2, Box 126, New Hope, Pa.
Born: October, 1876, Philadelphia, Pa. B.S., 1897, E.E., 1908, University of Pennsylvania. **Awards:** Modern Pioneer Award, 1940, American Manufacturers Association; National Electrical Manufacturers Association, 1948; Fellow, American Institute of Electrical Engineers; John H. Potts Medal for Science, the Franklin Institute, 1958; Fellow, American Association for the Advancement of Science.

*Deceased.

**GOUBAU, Georg J. E. (A'49—SM'56—F'57),** Consultant, U. S. Army Signal Research & Development Laboratory, Fort Monmouth, N.J.
Born: November 29, 1906, Munich, Germany. M.S., 1931, Ph.D. (Physics), 1932, Dr. habil., 1935, Institute of Technology, Munich, Germany. **Awards:** IRE Harry Diamond Memorial Award, 1957.

**GOUDET, Georges (SM'50—F'60),** General Manager, Laboratoire Central de Telecommunications, 46 Avenue de Breteuil, Paris 7, France.
Born: June, 1912, Dijon, Cote d'Or, France. M. (Licencie en Physique), 1934, Ph.D. (Docteur es-Sciences), 1943, University of Paris.

**GRAHAM, Robert E. (M'45—SM'57—F'59),** Vice President and Director of Research, Harrison Laboratories, Inc., Berkeley Heights, N.J.
Born: October 4, 1916, Kansas City, Mo. Associate in Sc., 1935, Kansas City Junior College; B.S.(E.E.), 1937, Purdue University. **Committees:** Servo Systems, 1951–52; Video Techniques, 1951–53. **Awards:** Naval Ordnance Development Award, U. S. Navy, Bureau of Ordnance, 1945.

**GRAHAM, Virgil M. (A'24—M'27—F'35),** Associate Director, Engineering Department, Electronic Industries Association, Room 2260, 11 W. 42 St., New York 36, N.Y.
Born: January 22, 1902, Rochester, N.Y. Attended University of Rochester. **IRE Offices:** Director, 1935–41, 1946–48. **Committees:** Appointments, 1948; Awards, 1940, 1947–49; Broadcast and Television Receivers, 1949–52, *chairman, 1949–51;* Constitution and Laws, 1940, 1944; Executive, 1948; Meetings and Papers, 1928–29; Membership, 1949–50; National Convention, 1947–50; Nominations, 1940; Papers Procurement, 1942–43, 1946; Professional Groups, 1948–49; Public Relations, *chairman, 1940, 1947–48, 1951;* Publicity, 1935–36; Radio Receivers, 1927–28, 1936–40; Radio Receivers and Parts, 1929–30; Regular Papers, 1941; Sections, 1930–34, 1938–45, 1948, *chairman, 1936–37;* Standardization, 1925–26, 1929–30; Standards, 1932, 1935–43, 1945–48, 1954–57, 1959–60. **Professional Groups:** Broadcast and Television Receivers, *chairman, 1950.* **Sections:** Rochester, *chairman, 1926–27.* **IRE Representative:** ASA Sectional Committee on National Electrical Safety Code, Radio Broadcast Reception Equipment, *alternate, 1939–48, chairman, 1948–50;* ASA Sectional Committee on Radio (C16), *chairman, 1950;* RMA-IRE Co-ordinating Committee, *chairman, 1947–49.*

**GRAMMAR, George (A'49—F'59),** Technical Director, Technical Editor, QST., American Radio Relay League, 38 LaSalle Road, West Hartford 7, Conn.
Born: January 25, 1905, Philadelphia, Pa. 1923–26, Drexel Institute. **Committees:** Antennas, 1946–48; Electron Tubes, 1947–48; Membership, 1930, 1947–49; Modulation Systems, 1947–48; Public Relations, 1940–44; Radio Transmitters, 1947–48. **Sections:** Connecticut Valley, *secretary, 1931–32.*

**GRANGER, John V. N. (S'42—A'45—M'46—SM'51—F'56),** President, Granger Associates, 974 Commercial St., Palo Alto, Calif.
Born: September, 14, 1918, Cedar Rapids, Iowa. A.B., 1941, Cornell College; M.S., 1942, Ph.D., 1948, Harvard University. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Aeronautical and Navigational Electronics, Editor of *Transactions, 1955–56.* **Sections:** Palo Alto Subsection, *secretary, 1952, chairman, 1954–55.* **IRE Representative:** Member, WESCON Board of Directors, 1959–. **Awards:** Eta Kappa Nu Recognition, Outstanding Young Electrical Engineer, 1952; Seventh Region Electronic Achievement Award, 1955.

**GRANQVIST, Carl E. (A'46—F'55),** Director, Svenska AB Gasaccumulator, Stockholm-Lidingö, Sweden.
Born: March 2, 1910, Ljungby, Småland, Sweden. M.A., 1933, Tekniska Högskolan, Stockholm. **IRE Offices:** Vice President, 1958.



**GREEN, Estill I. (A'27—M'36—SM'43—F'55),** Executive Vice President, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: November 24, 1895, St. Louis, Mo. B.A., 1915, Westminster College; B.S.(E.E.), 1921, Harvard University; D.Sc. (Honorary), 1956, Westminster College. **Committees:** Institute Sections, 1928; Measurements and Instrumentation, 1950–53. **IRE Representative:** Joint IRE-AIEE Committee on High Frequency Measurements, 1950–52.

**GRIEMSMANN, John W. E. (A'45—M'55—SM'57—F'59),** Research Professor, Microwave Research Institute, Polytechnic Institute of Brooklyn; Associate Director of Microwave Research Institute, 55 Johnson St., Brooklyn 1, N.Y.
Born: May, 1916, Brooklyn, N.Y. B.(E.E.), 1936. M.(E.E.), 1938; D.(E.E.), 1946, Polytechnic Institute of Brooklyn.

**GROSS, Gerald C. (A'27—M'30—SM'43—F'57),** Secretary-General, International Telecommunication Union, Palais Wilson, Geneva, Switzerland.
Born: December 27, 1903, New York, N.Y. B.S.(E.E.), 1926, Haverford College. **Sections:** Washington, *secretary-treasurer, 1936–37, vice-chairman, chairman, 1939–40.*

**GROVER, Frederick W. (M'17—SM'43—F'49)(L),** Professor Emeritus of Electrical Engineering, Union College, Schenectady 8, N.Y.
Born: September 3, 1876, Lynn, Mass. S.B., 1899, Massachusetts Institute of Technology; M.S., 1901, Wesleyan University; Ph.D., 1907, George Washington University; Ph.D., 1908; Ludwig Maximilian University, Munich, Germany. **Committees:** Board of Editors, 1932–53; Papers, 1941–45. **IRE Representative:** Union College, N.Y., 1941–48.

**GRUEN, Wolf J. (M'47—SM'53—F'57),** Head, Counter-countermeasures Systems Department, Ramo Wooldridge, a Division of Thompson Ramo Wooldridge Inc., 8433 Fallbrook Ave., Canoga Park, Calif.
Born: September, 1914, Berlin, Germany, Dipl. Eng. (E.E.), 1940, Swiss Federal Institute of Technology, Zurich; M.E.E., 1952, Syracuse University.

**GUÉNARD, Pierre R. (SM'50—F'55),** Directeur Technique du Centre de Physique Electronique et Corpusculaire de la Compagnie Générale de T.S.F., Boite Postale n° 10, ORSAY (Seine et Oise), France; Professeur à l'Ecole Supérieure d'Electricité.
Born: January 22, 1914, Amiens, France, Licencié ès Sciences, 1935, Agrégé des Sciences Physiques, 1937, Ecole Normale Supérieure. **Awards:** Prix d'Aumale de l'Académie des Sciences de Paris, 1952; Médaille Ampère de la Société Française des Electriciens; Médaille Blondel, 1956.

**GUILLEMIN, E. A. (A'41—SM'48—F'49),** Webster Professor of Electrical Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: May, 1898, Milwaukee, Wis. B.S., 1922, University of Wisconsin; S.M.(E.E.), 1924, Massachusetts Institute of Technology; Ph.D., 1926, University of Munich, Germany (Saltonstall Fellow). **Committees:** Annual Review, 1944–47; Board of Editors, 1952–53; Circuits, 1944–51, *chairman, 1944–47;* Editorial Reviewer, 1954–60; Education, 1947–48; Standards, 1944–47. **IRE Rrepresentative:** Massachusetts Institute of Technology, 1945–54. **Awards:** Presidential Certificate of Merit, 1948.

**GUNN, Ross (A'35—SM'47—F'49),** Research Professor of Physics, American University, Washington 16, D.C. Assigned full time to the Controlled Thermonuclear Branch of the Atomic Energy Commission.
Born: May, 1897, Cleveland, Ohio. B.S.(E.E.), 1920, M.S., 1921, University of Michigan; Ph.D., 1926, Yale University. **Awards:** Exceptionally Distinguished Service Citation, United States Navy, 1945; Air Safety Distinguished Service Award, 1951; Distinguished Alumnus Citation, University of Michigan, 1953; Robert M. Losey Award, Institute of Aeronautical Sciences, 1956; U. S. Department of Commerce Gold Medal for Exceptional Service, 1957; Fellow, American Physical Society; Fellow, National Academy of Sciences.

**GUNTHER, Clarence (A'27—SM'48—F'54),** Chief Defense Engineer, Defense Engineering Department, Defense Electronic Products, Radio Corporation of America, Camden 2, N.J.
Born: June 29, 1903, Los Angeles, Calif. B.S.E., 1926, Princeton University. **Sections:** Philadelphia, *secretary-treasurer, 1948–49, vice-chairman, 1950, chairman, 1950.* **Awards:** Award of Merit, Radio Corporation of America, 1952.

**GUY, Raymond F. (A'25—M'31—F'39),** Director, Radio Frequency and Allocations Engineering, National Broadcasting Company, Inc., 30 Rockefeller Plaza, New York 20, N.Y.
Born: July 4, 1899, Hartford, Conn. I.E.E., 1921, Pratt Institute. **IRE Offices:** President, 1950; Treasurer, 1947; Director, 1944–52. **Committees:** Admissions, 1958–60; Annual Review, 1943–47; Antennas, 1944–48; Broadcasting, 1929–33; Building Fund, *vice-chairman, 1948;* Constitution and Laws, 1945–53, *chairman, 1946;* Education, 1945–48; Executive, 1946–47, 1950–52, *vice-chairman, 1947, chairman, 1950;* Finance, 1951–52; Fiscal, 1947–48; Founders, *chairman, 1947, 1949–50;* Frequency Modulation, 1942–47; Investments, 1947, 1949, *chairman, 1949;* Membership, 1947–49, *chairman, 1949;* Modulation Systems, 1947–50; Nominations, 1951; Office Practices, *chairman, 1947;* Professional Groups, 1951–52; Public Relations, 1949, 1951–54, *chairman, 1949;* Radio Transmitters, *chairman, 1944–45;* Standards, 1943–46, *chairman, 1945–46;* Transmitters and Antennas, 1936–44, *chairman, 1943–44;* Winter Technical Meeting, 1946. **IRE Representative:** ASA Standards Council, *alternate, 1946–48;* Joint RMA-IRE Co-ordination Committee, 1950; Joint Technical Advisory Committee, 1950. **Awards:** 1st Vice President, Veteran Wireless Operators Association; President, Radio Pioneers, 1956; Marconi Memorial Gold Medal of Achievement, 1956; Fellowship Award, 1959, American Institute of Electrical Engineers; President, De Forest Pioneers, 1960; Special Award from Broadcast Pioneers.

**HACKBUSCH, Ralph A. (A'26—M'30—F'37),** President, Hackbusch Electronics, Ltd., 23 Primose Ave., Toronto 4, Ont., Canada.
Born: September 18, 1900, Hamilton, Ont., Canada. **IRE Offices:** Vice President, 1944; Director, 1938, 1944–46. **Committees:** Admissions, 1940; Awards, 1947–49; Public Relations, 1940, 1947–51; Sections, 1936–37; Standards, 1949–59. **Sections:** Toronto, *secretary, 1930–31, chairman, 1932–33.* **Awards:** Fall Meeting Plaque, 1943.

**HAEFF, Andrew V. (A'34—M'40—SM'43—F'49),** Vice President, Director, Research Laboratories, Hughes Aircraft Company, Culver City, Calif.
Born: December, 1904, Moscow, Russia. E.E. and M.E., 1928, Russian Polytechnic Institute, Harbin, China; M.S.(E.E.), 1929, Ph.D., 1932, California Institute of Technology. **Committees:** Awards, 1956–60; Board of Editors, 1951–53; Editorial Administrative, 1949–51; Editorial Reviewer, 1954–60; Nuclear Studies, 1948–49. **Awards:** Special Research Fellowship, California Institue of Technology, 1932–33; IRE Harry Diamond Memorial Award, 1950.

**HAFSTAD, Lawrence R. (SM'52—F'53),** Vice President, General Motors Corporation, Research Laboratories, Warren, Mich.
Born: June 18, 1904, Minneapolis, Minn. B.S.(E.E.), 1926, University of Minnesota; Ph.D. (Physics), 1933, The Johns Hopkins University. **Committees:** Annual Review, 1949–50; Nominations, 1951; Nuclear Studies, *chairman, 1948–50.* **Professional Groups:** Nuclear Science, *chairman, 1952.* **Awards:** American Association for the Advancement of Science Award, 1931; U. S. Delegate to International Radio Union Conference in London, 1934; British "King's Medal in Defense of Freedom," 1946; Medal of Merit from Secretary of the Navy, 1946; Distinguished Service Award, U. S. Atomic Energy Commission, 1954; Proctor Prize, Scientific Research Society of America, 1956.

**HAGEN, John P. (A'37—SM'47—F'54),** Director, Office for the United Nations Conference, National Aeronautics and Space Administration, Washington 25, D.C.
Born: July, 1908, Amherst, N.S., Canada. A.B., 1929, Boston University; M.A., 1931, Wesleyan University; Ph.D., 1949, Georgetown University. **Awards:** President's Certificate of Merit for work in the early development of Radar; Distinguished Public Service Award by the Secretary of the Navy; RESA, Sigma Xi.

**HAGGERTY, Patrick E. (A'45—SM'53—F'58),** President and Director, Texas Instruments, Inc., 6000 Lemmon Ave., Dallas 9, Tex.
Born: March 17, 1914, Harvey, N.D. B.S.(E.E.), 1936, Marquette University. **IRE Offices:** Delegate-Director, 1960. **Committees:** Awards, 1954–55. **Sections:** Dallas, *advisor, 1955–60.*

**HALL, Albert C. (A'39—SM'46—F'58),** Vice President, Engineering, The Martin Company, Denver Division, P.O. Box 179, Denver 1, Colo.
Born: June 27, 1914, Port Arthur, Tex. B.S.(E.E.), 1936, Texas A. & M.; M.Sc.(E.E.), 1938, S.D.(E.E.), 1943, Massachusetts Institute of Technology. **Awards:** Naval Ordnance Development Award; Outstanding Young Electrical Engineer Award, Eta Kappa Nu.

**HALL, Nathan I. (SM'47—F'56),** Vice President, Engineering, Hughes Aircraft Company, Culver City, Calif.
Born: October, 1910, Elkins, W.Va. B.S.(E.E.), 1934, M.S.(E.E.), 1934, D.Sc. (Honorary), 1956, West Virginia University; E.E., 1937, Stanford University; D.Sc. (Honorary), 1959, Davis and Elkins College. **Committees:** Editorial Reviewer, 1955–60. **Awards:** Outstanding Electrical Engineer, Eta Kappa Nu, 1934.

**HALL, Robert N. (SM'53—F'57),** Physicist, General Electric Research Laboratory, The Knolls, Schenectady, N.Y.
Born: December 25, 1919, New Haven, Conn. B.S., 1942, Ph.D., 1948, California Institute of Technology. **Awards:** Predoctoral Fellowship, National Research Council, 1946.

**HALLER, George L. (A'28—M'36—SM'43—F'50),** Vice President and General Manager, Defense Electronics Division, General Electric Company, Syracuse, N.Y.
Born: May 8, 1907, Pittsburgh, Pa. B.S.(E.E.), 1927; E.E., 1934; M.S. (Physics), 1935, Ph.D. (Physics), 1942, Pennsylvania State University. **Committees:** Papers Review, 1946–50; Technical Program Committee, National Convention, *chairman, 1958–59.* **Professional Groups:** Aeronautical and Navigational Electronics, *chairman, 1958–59;* Airborne Electronics Administrative Committee, 1951–53; Military Electronic Administrative Committee, 1956–57. **Sections:** Dayton, *chairman, 1944–45;* Centre County Subsection, *chairman, 1949–50.* **Awards:** Legion of Merit, United States Air Force, 1946.

**HALLMAN, Ludlow B., Jr. (J'27—A'29—SM'44—F'52),** Technical Director, C. and N. Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.
Born: July 21, 1907, Sneads, Fla. B.S., 1929, E.E., 1934, Alabama Polytechnic Institute. **Committees:** Modulation Systems, 1948–50. **Professional Groups:** Adminstrative Committee, Aeronautical and Navigational Electronics, 1951–53, 1956–59; National Conference on Aeronautical Electronics, Board of Directors, *chairman, 1954;* Papers Committee, Areonautical and Navigational Electronics, *chairman, 1951–53.* **Sections:** Dayton, *chairman, 1945–46.* **Awards:** War Department Commendation, 1946.

**HAMBURGER, Ferdinand, Jr. (A'32—M'39—SM'43—F'53),** Professor and Chairman, Electrical Engineering Department; Director, Radiation Laboratory, The Johns Hopkins University.
Born: July 5, 1904, Baltimore, Md. B.E., 1924, Dr. Eng., 1931, The Johns Hopkins University. **IRE Offices:** Director, 1950–51, 1959–60; Editor, 1960. **Committees:** Appointments, 1951, 1959–60; Editorial Board, 1956–59, *vice-chairman, 1958–59, chairman, 1960.* Education, 1955–60; Executive, 1960; Nominations, 1951; Policy Advisory, 1952–55, 1960. **Sections:** Baltimore, *chairman, 1940–41.* **IRE Representative:** The Johns Hopkins University, 1941–54.

**Awards:** Fellow, American Institute of Electrical Engineers, 1949.

**HAMM, William J. (A'47—M'51—SM'52—F'60),** Professor, St. Mary's University, Cincinnati & St. Louis Aves., San Antonio 1, Texas.
Born: July 26, 1910, Belleville, Ill. B.S., 1930, University of Dayton; M.S., 1935, Catholic University; Ph.D., 1942, Washington University. **Sections:** San Antonio, *chairman, 1951.* **IRE Representative:** Chairman of Board of Advisors of SWIRECO, Southwestern IRE Conference Organization, 1954–56, 1959–60. **Awards:** Francis P. Garvan American Chemical Society Prize Paper Award, 1929; Minnie Stevens Piper Foundation Science Teaching Award, 1959.

**HAMMOND, John H., Jr. (M'36—SM'43—F'59)(L),** President, Hammond Research Corporation, Gloucester, Mass.
Born: April 13, 1888, San Francisco, Calif. B.S., 1910, Sheffield Scientific School of Yale University; Sc.D., 1919, George Washington University. **IRE Offices:** Director, 1913–14; Treasurer, 1913–14; Member of First Board of Managers, 1915–17. **Committees:** Special Committee on Membership, *chairman, 1913–14;* Finance, *chairman, 1914.* **Awards:** Elliott Cresson Medal, Franklin Institute, 1959.

**HANSEL, Paul G. (S'39—A'42—SM'50—F'57),** Chief Radio Engineer, Servo Corporation of America, 111 New South Road, Hicksville, L.I., N.Y.
Born: June, 1917, Grand Island, Neb. B.S., 1946, University of Kansas. **Committees:** Tellers, 1955–58. **Sections:** Long Island, *secretary, 1954, chairman, 1955–56.* **Awards:** War Department Commendation for Meritorious Civilian Service, 1946.

**HANSELL, Clarence W. (A'26—M'29—SM'43—F'45),** Fellow, RCA Laboratories, Radio Corporation of America, Princeton, N.J.
Born: January 20, 1898, Medaryville, Ind. B.S.(E.E.), 1919, D.E.E. (Honorary), 1952, Purdue University. **Awards:** Joint Modern Pioneer Award, National Association of Manufacturers, 1940.

**HANSEN, Edmund H. (A'25—M'26—SM'43—F'59),** Lt. Commander, U. S. Navy, Retired. Physicist, E. H. Hansen Laboratories, P.O. Box 6, Balboa Island, Calif.
Born: November 13, 1894, Springfield, Ill. **Committees:** Picture Transmission, 1922; Publicity, 1915–17, 1927–28. **Awards:** Motion Picture Academy of Arts & Sciences Sound Award, 1928, 1945; Fellow, SMPTE, 1928; Fellow, American Academy of Arts & Sciences, 1959.

**HANSON, O. B. (A'18—M'27—F'41)(L),** Retired. Consultant, Radio Corporation of America. Residence: P.O. Box 244, Westport, Conn.
Born: February 11, 1894, Huddersfield, Yorkshire, England. **IRE Offices:** Director, 1938–43. **Committees:** Meetings and Papers, 1929; Members, 1950; Nominations, 1944–45, 1948; Papers, 1942–45; Papers Procurement, 1942–43; Papers Review, 1946–53; Public Relations, 1940–46; Regular Papers, 1941; Standardization, 1929; Tellers, *chairman, 1941.*

**HARDY, Howard C. (M'46—SM'51—F'60),** Consultant in Acoustics, Howard C. Hardy and Associates, 22 West Madison St., Chicago 2, Ill.
Born: October 3, 1911, Martinsburg, W.Va. A.B., 1936, M.S., 1938, West Virginia University; Ph.D., 1941, The Pennsylvania State University. **Committees:** Audio and Electroacoustics, *vice-chairman, 1958–60;* Electroacoustics, 1947–58, *vice-chairman, 1952–54, chairman, 1954–59;* Standards, 1955–58.

**HARMON, Ralph N. (A'30—SM'45—F'52),** Vice President, Engineering, Director, Westinghouse Broadcasting Company, Inc., 122 East 42 St., New York 17, N.Y.
Born: August 29, 1905, California, Pa. B.S.(E.E.), 1928, Carnegie Institute of Technology. **Committees:** Broadcast, 1935–38; Membership, 1950–51; Radio Transmitters, 1956–60; Television,



1945–49; Television Systems, 1949–58, *vice-chairman, 1959–60.* **Sections:** Baltimore, *chairman, 1945–46.* **Awards:** Award of Merit, U. S. Navy, Bureau of Ships, U. S. Navy Ordnance, National Defense Research Council; Patent Awards, Westinghouse Electric Corporation.

**HARNETT, Daniel E. (A'25—M'35—F'42),** Engineer, General Electric Company, Syracuse, N.Y.
Born: July 20, 1899, Elmira, N.Y. A.B., 1922, E.E., 1925, Columbia University. **Committees:** Admissions, 1941–43; Awards, 1945–46; New York Program, 1940; Papers Procurement, 1947–48; Radio Receivers, 1936–41, 1953–60, *vice-chairman, 1955–56, chairman, 1956–58;* Standards, 1956–58; Vacuum Tubes, 1929–30. **Professional Groups:** Broadcast & Television Receivers, *vice-chairman, 1960.* **IRE Representative:** ASA Sectional Committee (C16) on Radio, 1957–60. **Awards:** U. S. Navy Certificate of Commendation, 1947; Fellow, American Institute of Electrical Engineers.

**HARRIS, Donald B. (SM'45—F'56),** Senior Executive Engineer, Stanford Research Institute, Menlo Park, Calif.
Born: February 10, 1901, Minneapolis, Minn. B.A., 1922, Yale University. **Committees:** Awards, 1959–60; Board of Editors, 1950–53; Constitution and Laws, 1951; Editorial Reviewer, 1954–60; Mobile Communications, 1950–57, 1959–60; Railroad and Vehicular Communications, 1948–50. **Professional Groups:** Electron Devices Administrative Committee; Awards Committee, *chairman.* **Sections:** Cedar Rapids, *chairman, 1950;* San Francisco, *director, 1953–56.* **IRE Representative:** Western Electronics Show and Convention, *vice-chairman, 1955, chairman, 1957.* **Awards:** Certificate of Appreciation, Navy Department, 1948.

**HARRIS, William A. (SM'50—F'55),** Engineer, Application Engineering Group, RCA Victor Division, 415 S. 5 St., Harrison, N.J.
Born: January 9, 1907, Terre Haute, Ind. B.S., 1927, Rose Polytechnic Institute.

**HARRISON, Arthur E. (A'41—SM'45—F'55),** Professor, Electrical Engineering, University of Washington, Seattle 5, Wash.
Born: January 20, 1908, San Luis Obispo, Calif. B.S., 1936, University of California; M.S., 1937, Ph.D., 1940, California Institute of Technology. **Committees:** Awards, 1956; Editorial Reviewer, 1954–60; Education, 1949–58; Electron Tube Conference, 1960; Membership, 1951; Papers Procurement, 1945–46; Papers Review, 1946–53; **Sections:** Princeton Subsection, *secretary, 1947;* Princeton Section, *secretary, 1947, vice-chairman, 1948;* Seattle, *chairman, 1954–55.*

**HARTIG, Henry E. A'36—M'41—SM'43—F'52),** Professor, Electrical Engineering Department, University of Minnesota, Minneapolis 14, Minn.
Born: January 28, 1892, Minneapolis, Minn. B.E.E., 1918, Ph.D., 1924, University of Minnesota. **Committees:** Awards, 1954–56; Education, 1952–57. **Sections:** Twin Cities, *chairman, 1945–46.* **IRE Representative:** University of Minnesota, 1941–42. **Awards:** Fellow, American Institute of Radio Engineers.

**HARTLEY, Ralph V. L. (M'19—F'28)(L),** Retired. 174 Summit Ave., Summit, N.J.
Born: November 30, 1888, Spruce, Nev. A.B., 1909, University of Utah; B.A., 1912, B.Sc., 1913, Oxford University. **Committees:** Sections, 1945. **Awards:** IRE Medal of Honor, 1946.

**HARVEY, Norman L. (A'41—M'46—SM'48—F'54),** Vice President, Engineering, CBS Electronics, a Division of the Columbia Broadcasting System, 100 Endicott St., Danvers, Mass.
Born: October 9, 1911, Ossian, Iowa. B.S.(E.E.), 1934, Iowa State College. **Committees:** Navigation Aids, 1947–48.

**HAUSZ, Walter (A'44—SM'46—F'54),** Technical Military Planning Operation, General Electric Company, Santa Barbara, Calif.
Born: May, 1917, Queens County, N.Y. B.S.(E.E.), 1937; M.S. (E.E.), 1938, Columbia University. **Committees:** Admissions, 1951–52; National Convention, Convention Record, *chairman, 1953–54;* Papers Review, 1951–53. **Sections:** Santa Barbara Subsection, *chairman, 1957–58.* **Awards:** Charles A. Coffin Award, General Electric, 1952.

**HAYES, John Edmund (A'39—VA'39—SM'53—F'54),** Chief Engineer, Canadian Broadcasting Corporation, 5253 Decarie Blvd., Montreal, P.Q., Canada.
Born: February, 1910, Arcola, Sask., Canada, B.Sc., 1935, Queens' University; M.Eng., 1947, McGill University. **Committees:** Education, 1946–50; Television Systems, 1952–60.

**HAYES, Leslie W. (F'38),** Vice Director, International Radio Consultative Committee (C.C.I.R.), International Telecommunication Union, Palais Wilson, Geneva, Switzerland.
Born: May 31, 1896, London, England.

**HAZELTINE, Alan (A'16—M'18—F'21)(L),** Consulting Engineer, 15 Tower Drive, Maplewood, N.J.
Born: August 7, 1886, Morristown, N.J. M.E., 1906, Sc.D. (Honorary), 1933, Stevens Institute of Technology; A.M., 1938, Columbia University. **IRE Offices:** President, 1936; Manager, 1923–28, 1937–38; Director, 1936–39. **Committees:** Admissions, 1925–28; Awards, 1937–38, *chairman, 1937;* Education, 1945–47; Meetings and Papers, 1925, 1927; New York Program, 1935; Radio Receivers, 1927–28; Standardization, 1924–29; Vacuum Tube Terminology, *chairman, 1924–25;* Vacuum Tubes, *chairman, 1927–28.* **Awards:** Armstrong Medal, Radio Club of America, 1937.

**HEADRICK, Lewis B. (A'36—M'38—SM'43—F'53),** Staff Engineer, Microwave Tubes, RCA Laboratories, Princeton, N.J.
Born: June 6, 1904, Chattanooga, Tenn. B.S. (Physics), 1926, University of Chattanooga; Ph.D. (Physics), 1930, University of Michigan. **Committees:** Board of Editors, 1944–53; Editorial Reviewer, 1954–60; Electron Tubes, 1946–49; Electron Tubes and Solid State Devices, 1949–50; Electronics, 1942–46; Membership, 1943–46; Vacuum Tubes, 1945–46. **Sections:** Lancaster Subsection, *chairman, 1952;* Princeton Section Awards Committee, 1959.

**HEGBAR, Howard R. (S'41—A'42—SM'46—F'57),** Assistant Chief Engineer, Goodyear Aircraft Corporation, Akron 15, Ohio.
Born: February 22, 1915, Valley City, N.D. B.S.(E.E.), 1937, North Dakota State College; M.S.(E.E.), 1938, Ph.D.(E.E.), 1941, University of Wisconsin. **IRE Offices:** Director, 1957–58. **Committees:** Awards, 1959–60; Nominations, 1958; Policy Advisory, 1958. **Sections:** Akron Subsection, *chairman, 1948–49;* Akron, *chairman, 1949–50.*

**HEINTZ, Ralph M. (A'21—M'27—F'30)(L),** Consulting Engineer; Owner, The Ramohs, P. O. Box 546, Los Gatos, Calif.
Born: April 20, 1892, St. Louis, Mo. A.B., 1920, Stanford University. **Committees:** Membership, 1938–40; New York Program, 1938; Papers Review, 1946; Sections, 1938–40. **Sections:** San Francisco, *chairman, 1931–32.* **Awards:** Fellow, American Institute of Electrical Engineers, 1945.

**HEISING, Raymond A. (A'20—F'23)(L),** Retired from Bell Telephone Laboratories; Consulting Engineer and Patent Agent, 232 Oak Ridge Ave., Summit, N.J.
Born: August 10, 1888, Albert Lea, Minn. E.E., 1912, University of North Dakota; M.S., 1914, University of Wisconsin, D.Sc., 1947, University of North Dakota. **IRE Offices:** President, 1939; Treasurer, 1943–45; Manager, 1927–31; Director, 1933–35, 1939–41, 1943–45, 1947–49. **Committees:** Admissions, 1927–31, 1933, 1935–38, *chairman, 1928–30, vice-chairman, 1931;* Appointments, 1948; Constitution and Laws, 1930–34, 1941–60, *chairman, 1943–44, 1951–53;* Executive, *vice-chairman, 1943–45;* Investments, 1944–46, *chairman, 1944–45;* Meetings and Papers, 1926; Membership Solicitation Policy, 1945; New York Program, 1933, 1935–37; Nominations, 1933, *chairman, 1941, 1950;* Office Quarters, *chairman, 1945–47;* Planning, *chairman, 1947;* Policy Development, 1948–50; Preparedness, 1940–41; Professional Groups, 1948–60; Sections, 1941–52, *chairman, 1941–45;* Standardization, 1925–26. **Awards:** IRE Morris Liebmann Memorial Prize, 1921; Modern

Pioneer Award, National Association of Manufacturers, 1940; Armstrong Medal, 1953; IRE Founders Award, 1957, Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society.

**HELLIWELL, Robert A. (S'41—A'45—SM'50—F'60),** Professor, Radioscience Laboratory, Stanford University, Stanford, Calif.
Born: September 2, 1920, Red Wing, Minn. A.M., 1942, E.E., 1944, Ph.D., 1948, Stanford University. **Committees:** Member, Panel on Ionospheric Physics of the U. S. National Committee for the International Geophysical Year. **Professional Groups:** Antennas and Propagation Administrative Committee. **IRE Representative:** International President of Commission IV of the U. S. National Committee of URSI; Delegate-at-Large to URSI General Assemblies in Zurich, 1950, Sydney, 1952, The Hague, 1954, Boulder, 1957.

**HELLMANN, Reinhard K. (A'38—M'55—SM'59—F'60),** Vice President, Hazeltine Research Corporation, 59-25 Little Neck Parkway, Little Neck 62, L.I., N.Y.
Born: August 25, 1909, Aachen, Germany. Dipl. Ing., 1932, Dr. Ing., 1937, Technische Hochschule, Aachen. **Professional Groups:** Broadcast Transmission Systems Administrative Committee, 1955–56. **Sections:** Long Island, *chairman, 1958.*

**HENDERSON, John T. (A'28—SM'47—F'51),** Principal Research Officer, National Research Council, Sussex St., Ottawa, Ont., Canada.
Born: December 9, 1905, Montreal, P.Q., Canada. B.S., 1927, M.S., 1928, McGill University; Ph.D., 1932, University of London. **IRE Offices:** Director, 1953–59; President, 1957. **Committees:** Appointments, 1954–57, *chairman, 1959;* Executive, 1956–59, *chairman, 1957;* Nominations, 1954–59, *chairman, 1959;* Policy Advisory, 1955–56, 1958, *chairman, 1955, 1959;* Professional Groups, 1954–60. **Sections:** *Ottawa, vice-chairman, 1949, chairman, 1950.* **Awards:** Member of the Order of the British Empire, 1943; Fellow, Royal Society of Canada, 1944.

**HENNEY, Keith (A'18—M'26—SM'43—F'43),** Editorial Advisor, McGraw-Hill Book Company, Inc., 330 W. 42 St., New York, N.Y.
Born: October 28, 1896, McComb, Ohio. B.A., 1921, Western Reserve University; M.A., 1925, Harvard University. **IRE Offices:** Director, 1945–48. **Committees:** Annual Review, 1937–49; Awards, 1945–46, 1948–50, *chairman, 1949;* Editorial Board, 1958–60; Executive, 1946–47; History, 1954–60; Membership Solicitation Policy, 1945; New York Program, 1934, 1936–38, 1940–42, *chairman, 1942;* Nominations, 1950; Nuclear Studies, 1948–49; Planning, 1947; Policy Development, 1951; Publicity, 1937–39; Public Relations, 1943–50; Standards, 1945–49. **IRE Representative:** Advisory Committee on Industrial Information, Atomic Energy Commission, 1952–60; Joint IRE-RMA Co-ordination Committee, 1947–49, 1951.

**HERBST, Philip J. (M'41—SM'43—F'53),** 50 E. Oak Ave., Moorestown, N.J.
Born: January 24, 1903, Philadelphia, Pa. B.S. (Physics), 1925, St. Thomas College; M.S. (Physics), 1927, La Salle College. **Committees:** Editorial Reviewer, 1954–60; Radio Transmitters, 1952–59, *chairman, 1953–56;* Standards, 1953–56.

**HERBSTREIT, Jack W. (A'40—SM'45—F'58),** National Bureau of Standards, Boulder Laboratories, Boulder, Colo.
Born: September 7, 1917, Cincinnati, Ohio. E.E., 1939, University of Cincinnati. **Professional Groups:** Administrative Committee, Antennas and propagation, 1956–58, *chairman, 1958.* **Sections:** Denver, *vice-chairman, 1954–55; chairman, 1955–56.* **IRE Representative:** Colorado Engineering Council, 1956. **Awards:** IRE Harry Diamond Memorial Award, 1959.

**HERGENROTHER, Rudolf C. (A'37—VA'39—SM'52—F'56),** Manager of Beam Tube Research and Development Laboratory, Spencer Laboratory, Raytheon Company, Burlington, Mass.
Born: September, 1903, Chemnitz, Germany. A.B., 1925, Cornell University; M.S., 1928, Pennsylvania State College; Ph.D., 1931, California Institute of Technology.

**HEROLD, Edward W. (A'30—M'38—SM'43—F'48),** Vice President, Research, Varian Associates, Palo Alto, Calif.
Born: October 15, 1907, New York, N.Y. B.Sc., 1930, University of Virginia; M.Sc., 1942, Brooklyn Polytechnic Institute. **IRE Offices:** Director, 1956–58. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Appointments, 1957–58; Board of Editors, 1946–53; Editorial Administrative, 1946–51; Editorial Board, 1956–60, *vice-chairman, 1957–58;* Education, 1957–60; Membership, 1942; Nominations, 1957; Papers, 1944–45; Policy Advisory, 1956–58; Winter Technical Meeting, 1945. **Sections:** Princeton, *vice-chairman, 1948, chairman, 1949.* **IRE Representative:** Joint AIEE-IRE Student Activities Co-ordination Committee, 1957.

**HERSHBERGER, W. D. (A'37—SM'45—F'54),** Professor of Engineering, University of California, Los Angeles 24, Calif.
Born: May 10, 1903, Wellman, Iowa. A.B. (Math.), 1927, Goshen College: M.A. (Physics), 1930, George Washington University; Ph.D.(E.E.), 1937, University of Pennsylvania. **Committees:** Education, 1946; Subcommittee on Basic Waveguide Symbols, 1947; Wave Propagation, 1957–60.

**HERWALD, Seymour W. (SM'52—F'60),** Vice President, Westinghouse Electric Corporation, Westinghouse Research Laboratories, Churchill Borough, Pittsburgh 35, Pa.
Born: January 17, 1917, Cleveland, Ohio. B.S.(M.E.), 1938, Case School of Applied Science; M.S.(M.E.), 1940, Ph.D., 1944, University of Pittsburgh. **Committees:** Fellow, 1960. **Professional Groups:** Military Electronics Administrative Committee, 1959–62.

**HERZOG, Edward F. (A'41—SM'48—F'59),** Manager, Engineering, Heavy Military Electronics Department, General Electric Company, Syracuse, N.Y.
Born: March 26, 1907, Birmingham, Ala. B.S.(E.E.), 1929, Alabama Polytechnic Institute. **Awards:** Citation from Radio Technical Commission for Aeronautics, 1950; Charles A. Coffin Award, General Electric Co., 1956; Certificate of Commendation by U. S. Navy, Bureau of Ships, 1957.

**HERZOG, Gerhard (SM'46—F'55),** Assistant General Manager, Research and Technical Department, The Texas Company, P.O. Box 425, Bellaire, Tex.; Consular Agent of Switzerland.
Born: April 30, 1904, Zurich, Switzerland. M.M., 1926, Ph.D., 1926, Swiss Institute of Technology. **Awards:** Fellow, American Physical Society.

**HESSEL, John (A'31—VA'39—SM'48—F'53),** Chief, Electronics Section, NATO International Staff, U. S. Embassy, Paris, France.
Born: March 15, 1908, Grand Rapids, Mich. B.S.(E.E.), 1929, M.S.(E.E.), 1930, University of Michigan. **Committees:** Papers Procurement, 1948–50; Tellers, 1956–57. **Professional Groups:** Communication Systems Administrative Committee, *chairman, 1953.* **Awards:** Legion of Merit with Oak Leaf Cluster; Distinguished Alumnus Citation, University of Michigan, 1953.

**HEWLETT, William R. (S'35—A'38—M'47—F'48),** Executive Vice President, Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, Calif.
Born: May 20, 1913, Ann Arbor, Mich. A.B., 1934, Stanford University; M.S., 1936, Massachusetts Institute of Technology; E.E., 1939, Stanford University. **IRE Offices:** President, 1954; Director, 1950–57. **Committees:** Appointments, 1954–55, *chairman, 1956;* Constitution and Laws, 1956–60; Editorial Board, 1955; Editorial Reviewer, 1955; Executive, 1953–55, *chairman, 1954;* Finance, 1953–55; Nominations, 1950–56, 1958, *chairman, 1956;* Papers Review, 1952–53; Policy Advisory, *chairman, 1952;* Policy Development, 1950–51. **Sections:** San Francisco, *vice-chairman, 1948–49, chairman, 1949–50.*

**HIGGINS, William H. C. (M'46—SM'51—F'60),** Director of Military Electronics Development, Bell Telephone Laboratories, Inc., Whippany, N.J.



Born: April, 1908, Montclair, N.J. B.S.(E.E.), 1929, E.E., 1934, Purdue University. **Awards:** Naval Ordnance Development Award, U. S. Navy, Bureau of Ordnance, 1945.

**HIGHT, Stuart C. (A'31—M'39—SM'43—F'55),** Director of Special Communications Projects, Bell Telephone Laboratories, Whippany, N.J.
Born: July 28, 1906, Berkeley, Calif. B.S.(E.E.), 1930, University of California; M.A., 1934, Columbia University. **Awards:** Naval Ordnance Award, 1945.

**HIGINBOTHAM, William A. (SM'53—F'59),** Head, Instrumentation Division, Brookhaven National Laboratory, Upton, L.I., N.Y.
Born: October 25, 1910, Bridgeport, Conn. A.B., 1932, Williams College. **Professional Groups:** Nuclear Science Administrative Committee, 1954–57, *secretary-treasurer, 1954–55; vice-chairman, 1956–57;* Nuclear Science Planning Committee, 1957–60. **IRE Representative:** National Bureau of Standards, Technical Advisory Committee, 1959–60.

**HILL, Albert G. (SM'46—F'50),** Professor of Physics, Massachusetts Institute of Technology, Cambridge, Mass.; Trustee, Institute for Defense Analyses, Washington, D.C.
Born: January 11, 1910, St. Louis, Mo. B.S., 1930, M.S., 1934, Washington University; Ph.D., 1937, University of Rochester. **Awards:** Presidential Certificate of Merit, 1948; U.S.A.F. Distinguished Civilian Service Award, 1955; Yankee Post, American Ordnance Association, First Annual Distinguished Service Award, 1956; Meritorious Civilian Award of the Office of Secretary of Defense, 1959.

**HILLIARD, John K. (A'25—M'29—SM'43—F'52),** Vice President and Managing Director, Ling Altec Research Division, Ling Altec Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif.
Born: October 22, 1901, Wyndmere, N.D. B.S., 1924, Hamline University; D.Sc.(Honorary) in E., University of Hollywood. **Committees:** Audio Techniques, 1950–54; Board of Editors, 1950–53; Editorial Reviewer, 1954–60; Professional Groups, 1952. **Professional Groups:** Audio, *vice-chairman, 1951–60;* Medical Electronics, Los Angeles Chapter, *chairman, 1955–56.* **Sections:** Los Angeles, *chairman, 1933–34;* Director-at-Large, Los Angeles Section, 1960. **Awards:** Fellow, Acoustical Society of America; Fellow, Audio Engineering Society; Fellow, Society of Motion Pictures and Television Engineers.

**HILLIER, James (SM'55—F'57),** Vice President, RCA Laboratories, Radio Corporation of America, Princeton, N.J.
Born: August 22, 1915, Brantford, Ont., Canada. B.A. (Math. and Physics), 1937, M.A. (Physics), 1938, Ph.D. (Physics), 1941, University of Toronto.

**HINMAN, Wilbur S., Jr. (SM'46—F'57),** Technical Director, Diamond Ordnance Fuze Laboratories, Ordnance Corps, U. S. Army, Connecticut Ave. at Van Ness St., N.W., Washington 25, D.C.
Born: March 14, 1906, Washington, D.C. Attended, 1922–23, George Washington University; B.S.(E.E.), 1926, Virginia Military Institute. **Awards:** Medal for Meritorious Service, Department of Commerce; Presidential Certificate of Merit, 1948; Merit Citation, National Civil Service League, 1955; IRE Harry Diamond Memorial Award, 1956; Medal for Exceptional Civilian Service, U. S. Army, 1958.

**HINNERS, Frank A. (IRE Charter Member) (A'12—M'15—F'26)(L),** President, Hinners-Galanek Radio Corporation, (Manufacture Cavalier & Private Label Radios, Stereo Phonos), 66-02 Austin St., Forest Hills 74, L.I., N.Y.
Born: February 19, 1894, New York, N.Y. I.E.E., 1915, Pratt Institute. **Committees:** New York Program, 1941–42. **Awards:** Charter Member, Wireless Institute.

**HIRSCH, Charles J. (M'39—SM'43—F'51),** Administrative Engineer, Radio Corporation of America, Princeton, N.J.
Born: October, 1902, Pittsburgh, Pa. A.B., 1923, Columbia College; E.E., 1925, Columbia University. **Committees:** Awards, 1956–58; Board of Editors, 1952–53; Editorial Reviewer, 1954–60; Navigation Aids, 1947–53, *vice-chairman, 1950-52.* **Sections:** Long Island Subsection, *chairman, 1952;* Long Island Section, 1958. **Awards:** Certificate of Commendation, U. S. Navy, 1947; Certificate of Appreciation, British Radio Equipment Manufacturers Association, 1955; Fall Meeting Plaque, 1959.

**HOBSON, Jesse E. (M'45—F'56),** Vice President and Director of Research, United Fruit Company, 80 Federal St., Boston, Mass.
Born: May 2, 1911, Marshall, Ind. B.S.(E.E.), 1932, M.S.(E.E.), 1933, Purdue University; Ph.D., 1935, California Institute of Technology; D.Eng. (Honorary), 1957, Purdue University. **Awards:** Fellow, Tau Beta Pi Research, 1932–33; Fellow, Charles A. Coffin Foundation, 1933–34; Outstanding Young Electrical Engineer, Eta Kappa Nu, 1940.

**HOEPPNER, Conrad H. (SM'47—F'58),** Chief Scientist, Radiation, Incorporated, Melbourne, Fla.
Born: March, 1918, Spooner, Wis. B.Sc.(E.E.), 1939, M.Sc.(E.E.), 1940, E.E.(Professional), 1947, University of Wisconsin, Massachusetts Institute of Technology. **Committees:** Activities, 1958–60; IRE International Convention Program, 1959–60; Professional Groups, 1958–60. **Professional Groups:** Telemetry and Remote Control, *secretary, 1953–55; chairman, 1955–57; editor, 1958–59;* Space Electronics and Telemetry, *chairman, 1959–60, editor, 1959–60.* **Awards:** Fellow, Wisconsin Alumni Research Foundation, 1939–40; Fellow, Tau Beta Pi, 1940–41; Fellow Massachusetts Institute of Technology, 1940–41.

**HOGAN, C. Lester (SM'54—F'60),** General Manager, Semi-Conductor Products Division, Motorola, Inc., 5005 E. McDowell Road, Phoenix, Ariz.
Born: February 8, 1920, Great Falls, Mont. B.S.(C.E.), 1942, Montana State College; M.S. (Physics), 1947, Ph.D. (Physics), 1950, Lehigh University. **Committees:** Education, 1958–60. **IRE Representative:** Harvard University, 1955–58.

**HOGAN, John V. L. (IRE Founder and Charter Member) (A'12—M'12—F'15) (L),** Chairman of the Board, Hogan Faximile Corporation, 155 Perry St., New York 14, N.Y.
Born: February 14, 1890, Philadelphia, Pa. D.Eng. (Honorary), 1957, Polytechnic Institute of Brooklyn. **IRE Offices:** President, 1920; Vice President, 1916–19; Manager, 1912–15, 1921–32; Director, 1916–20, 1932–36, 1948–50. **Committees:** Annual Review, 1927–28, 1947–51; Appointments, 1948; Awards, 1919, 1928, 1932–33, 1945, 1948, *chairman, 1928;* Broadcasting, 1929–38; Constitution and Laws, 1928–29, 1935–36, 1954–55, *chairman, 1932–34;* Constitutional Amendments, *chairman, 1915;* Editing, *chairman, 1914;* Facsimile, 1939–53, *chairman, 1947–51;* Finance, 1915; Financial Matters, 1915; Increase of Membership, 1916–19, *chairman, 1916;* Nominations, 1931, 1937–38, 1943–44, *chairman, 1945;* Papers, 1915–19, 1942–45; Papers Procurement, 1947; Papers Review, 1946; Policy Advisory, 1952; Policy Development, 1950–51; Professional Groups, 1950; Professional Recognition, 1947; Publicity, 1913–19, *chairman, 1913, 1915;* Radio Receivers, 1927–28; Revision of the Constitution, 1925–27, *chairman, 1925;* Sections, 1925; Specifications for Steamship Radio Equipment, 1914–15; Standardization, 1913, 1915–30, *chairman, 1916–20;* Standards, 1932–33, 1936–38, 1947–51; Use of the Transmission Unit, *chairman, 1928–29;* Vacuum Tubes, *chairman 1927–28.* **IRE Representative:** ASA Sectional Committee on Electrical Installation on Shipboard, 1930, 1936; ASA Sectional Committee on Radio, 1930; ASA Sectional Committee on Radio Electrical Co-ordination, 1936, 1939–46; Joint Technical Advisory Committee, 1948–60. **Awards:** IRE Medal of Honor, 1956.

**HOK, Gunnar (A'31—SM'46—F'57),** Professor, Electrical Engineering, University of Michigan, Ann Arbor, Mich.
Born: March 29, 1903, Eskilstuna, Sweden, E.E., 1926, Royal Institute of Technology, Stockholm. **Committees:** Editorial Reviewer, 1955–60, Papers Review, 1952–59. **Professional Groups:** Electron Devices Administrative Committee, 1956–59.

**HOLLAND, Lewis N. (A'27—M'32—SM'43—F'59),** Professor of Electrical Engineering, University of Michigan, College of Engineering, Ann Arbor, Mich.
Born: December, 1900, Jackson, Mich. B.S.E.(E.E.), 1923, M.S.(E.E.), 1926, University of Michigan. **Committees:** Education, 1945–49; Standards, 1930–31. **Sections:** Detroit, *chairman, 1930–32.* **IRE Representative:** University of Michigan, 1941–54.

**HOLLMANN, Hans E. (A'48—F'53),** Vice President, Dresser Dynamics, Inc., Northridge, Calif; Consultant Scientist for Southwestern Industrial Electronic Company and Hermetic Seal Transformer Company, Subsidiaries of Dresser Industries in Dallas, Tex., Orbitec Corporation, Newport Beach and others.
Born: November 4, 1899, Solingen, Germany. Ph.D., 1928, Dr. Habil., 1933, Technical University, Berlin; Dr. h.c. 1957, Technical University, Dresden, Germany.

**HOLLYWOOD, John M. (SM'50—F'60),** Scientific Aide to the President, CBS Laboratories, 227 High Ridge Road, Stamford, Conn.
Born: February, 1910, Red Bank, N.J. B.S., 1931, M.S., 1932, Massachusetts Institute of Technology. **Awards:** Army-Navy Certificate of Appreciation, 1946.

**HOLMES, Lynn C. (M'44—SM'49—F'49),** Director of Engineering Operations, Stromberg-Carlson Company, A Division of General Dynamics, 100 Carlson Road, Rochester 3, N.Y.
Born: April, 1904, Brookfield, N.Y. E.E., 1925, M.E.E., 1932, Rensselaer Polytechnic Institute. **Awards:** Fellow, American Institute of Electrical Engineers.

**HOLMES, Ralph S. (A'25—SM'45—F'52),** Director, Project Pangloss, Radio Corporation of America, David Sarnoff Research Center, RCA Laboratories, Princeton, N.J.
Born: May 26, 1902, Murray, Neb. B.S., 1923, University of Nebraska. **Committees:** Radio Receivers, 1938–41. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1937.

**HONNELL, Pierre M. (J'27—A'29—M'41—SM'43—F'58),** Professor of Electrical Engineering, Washington University, St. Louis 30, Mo.
Born: January 28, 1908, Paris, France. B.S.(E.E.), 1930, E.E., 1938, The A. & M. College of Texas; M.Sc.(E.E.), 1939, Massachusetts Institute of Technology; M.Sc., 1940, California Institute of Technology; Ph.D.(Geophysics), 1950, St. Louis University. **Awards:** Legion of Merit, War Department, 1946; Marconi Premium, British Institution of Radio Engineers, 1957; Fellow, American Academy of Arts & Sciences, 1957; Fellow, American Institute of Electrical Engineers, 1958.

**HOPPER, Francis L. (A'26—SM'44—F'60),** Military Development Engineer, Bell Telephone Laboratories, Lexington Road, Winston-Salem, N.C.
Born: February 24, 1901, Chicago, Ill. B.S.(Physics, Eng.), 1922, California Institute of Technology. **Committees:** Audio and Electroacoustics, 1958–60; Audio Techniques, 1950–59; Electroacoustics, 1946–51; Sound Recording and Reproducing, 1949–51. **Sections:** North Carolina, Membership Committee, 1953–55; Symposium, *chairman, 1956;* Awards Committee, 1959–60. **IRE Representative:** National Stereophonic Radio Committee, 1959. **Awards:** Sound Recording Advances, Academy of Motion Picture Arts and Sciences, 1933; War Effort, Office of Scientific Research and Development, 1945; War Effort Standardization, American Standards Association, 1945; Editor's Award for Paper Transients in Color TV, 1953.

**HORN, Charles W. (A'14—M'28—F'30),** Partner and Manager, Radio Impulsora Mexicana, S.A.; Cia. Distribuidora Mercantil, S.A., Calle Rhin 33, Colonia Cuauhtemoc, Mexico City, D.F., Mexico.
Born: July 9, 1894, New York, N.Y. **IRE Offices:** Director, 1933–34. **Committees:** Admissions, 1933–37, 1940–42; Broadcast, 1933–38; Broadcasting, 1928–33; Institute Sections, 1929–33, *chairman, 1931–32;* New York Program, 1932–34, *chairman, 1933;* Public Relations, 1945–46; Television and Facsimile, 1936–39. **IRE Representative:** Normal Advisory Council on Radio in Education, 1936, 1939–40; Committee on Engineering Developments, 1941–43.

**HORN, Heinz (SM'57—F'59),** Dr.-Ing. E.h., Felton & Guilleaume Carlswerk AG, Koln-Mulheim, Germany.
Born: September 29, 1905, Koln, Germany. E.E., 1926, Staatliche Ingenieurschule, Koln, Germany.

**HORNE, Charles F. (A'35—SM'53—F'58),** Rear Admiral, USN, Retired. Vice President of Convair, Division of General Dynamics Corporation and Manager, Convair/Pomona, P.O. Box 1011, Pomona, Calif.
Born: January 3, 1906, New York, N.Y. B.S., 1926, U. S. Naval Academy, Annapolis; M.Sc., 1935, Harvard University. **IRE Offices:** Director, 1960–61. **Professional Groups:** Military Electronics; Education; Engineering Management, Administrative Committee, 1956–58, *chairman, 1956–57.* **Awards:** International Region Medal, CAA.

**HORNER, S. George L. (M'46—SM'50—F'57),** Superintendent, Radio Division, Hudson Bay Company, Northern Stores Department, Hudson Bay Company Radio Laboratory, 487 Hay St., Winnipeg 13, Man., Canada.
Born: May 17, 1907, Limavady, County Derry, North Ireland. B.Sc.E., 1934, University of New Brunswick. **Sections:** Winnipeg Subsection, *secretary-treasurer, 1948–49, vice-chairman, 1949–50, chairman, 1950–51.*

**HORTON, Arthur W., Jr. (SM'49—F'59),** Technical Relations Manager, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: August 25, 1898, Philadelphia, Pa. A.B., 1920, E.E., 1922, Princeton University. **Awards:** Naval Ordnance Development Award, 1945.

**HORTON, J. Warren (A'20—F'29)(L),** Technical Director, United States Navy Underwater Sound Laboratory, New London, Conn.
Born: December 18, 1889, Ipswich, Mass. S.B., 1914, Sc.D., 1935, Massachusetts Institute of Technology. **Committees:** Awards 1932; Board of Editors, 1930–31, 1935–40; Meetings and Papers, 1929–30, *chairman, 1930;* Membership, 1947–48; Standardization, 1929–31, *chairman, 1931;* Standards, *chairman, 1932–33;* Vacuum Tubes, 1929–30. **IRE Representative:** ASA Sectional Committee (C61) on Electric and Magnetic Magnitudes and Units, 1952–60; United States National Committee, Advisers on Symbols (International Electrotechnical Committee), 1936, 1939–51.

**HOUCK, Harry W. (A'19—M'28—SM'43—F'57),** Vice President, Thomas A. Edison Industries, McGraw-Edison Co., General Manager, Measurements Division; President and General Manager, Measurements Corporation of Canada, Ltd.; Vice President, Armstrong Memorial Research Foundation; Director, Sag Harbor Industries, Inc., Intervale Road, Boonton, N.J.
Born: April 11, 1896, New Cumberland, Pa. Extension Course, 1931, Columbia University. **IRE Offices:** Manager, 1931–32; Director, 1932. **Committees:** Admissions, 1932; Constitution and Laws, 1932; History, 1954–60; Radio Receivers, 1928–29; Tellers, 1940. **Professional Groups:** Radio Club of New York, *director, 1928, recording secretary, 1930–32, vice president, 1933, president, 1934.* **Awards:** Armstrong Medal, Radio Club of America, 1941; Marconi Memorial Medal of Achievement, Veteran Wireless Operators Association, 1955.

**HOWE, George W. O. (F'55),** Professor, Lismore House, Kelvin Drive, Glasgow, Scotland.
Born: December 4, 1875, London, England. D.Sc., 1914, Durham University; D.Sc.(Honorary), 1914, Adelaide University (Australia); LL.D. (Honorary), 1948, Glasgow University.

**HOWES, Frederick S. (A'37—M'43—SM'43—F'50),** Professor of Electrical Engineering, McGill University, Montreal, P.Q., Canada.



Born: July 25, 1896, Paris, Ont., Canada. B.S.(E.E.), 1924, M.Sc.(E.E.), 1926, McGill University; Ph.D.(E.E.), 1929, Imperial College, University of London. **IRE Offices:** Director, 1948. **Committees:** Awards, 1950–51; Education, 1945–46, 1951–56. **Sections:** Montreal, *chairman, 1944–45;* Canadian Council, *chairman, 1947–48.* **IRE Representative:** McGill University, 1941–58.

**HOWELLS, Paul W. (M'52—SM'57—F'60),** Consultant, Heavy Military Electronics Department, General Electric Company, Erie Blvd., DeWitt, N.Y.
Born: April 24, 1921, Dunkirk, N.Y. B.(E.E.), 1942, Syracuse University; M.(E.E.), 1949, University of Maine. **Sections:** Syracuse, *chairman, 1956–57.* **Awards:** Editor's Award for Paper Transients in Color TV, 1953.

**HUGGINS, William H. (S'39—A'44—SM'55—F'57),** Professor of Electrical Engineering, The Johns Hopkins University, Baltimore, Md.
Born: January 11, 1919, Rupert, Idaho, B.S., 1941, M.S., 1942, Oregon State College; ScD., 1953, Massachusetts Institute of Technology. **Committees:** Circuits, 1949–60; Editorial Reviewer, 1951–57, 1959–60; Papers, 1951–53. **Professional Groups:** Circuit Theory, *secretary, 1952–53, editor, 1954–57, vice-chairman, 1956–57, chairman, 1957–58.* **IRE Representative:** The Johns Hopkins University, 1955–58. **Awards:** IRE Browder J. Thompson Memorial Prize, 1948; Air Force Decoration for Exceptional Civilian Service, 1954; National Electronics Conference Award, 1956.

**HULL, David R. (A'36—F'47),** Captain, United States Navy, Retired. Vice President, Raytheon Company, The Solar Building, Suite 601, 1000 16 St., Washington 6, D.C.
Born: October, 1903, Newton, N.J. B.S., 1925, United States Naval Academy; M.S., 1933, Harvard University. **Committees:** Awards, 1956–59; Electron Tubes, 1946–47; Electronics, 1943–46; Vacuum Tubes, 1945–46. **Awards:** Fellow, Acoustical Society of America; Legion of Merit; Navy Commendation Ribbon.

**HULL, Lewis M. (J'17—A'19—M'27—F'28),** Consultant, Boonton, N.J.
Born: February 27, 1898, Great Bend, Kan. A.B., 1917, A.M., 1918, University of Kansas; Ph.D., 1922, Harvard University. **IRE Offices:** President, 1933; Manager, 1929–32; Director, 1932–35. **Committees:** Admissions, 1927–28; Awards, 1935–37, *chairman, 1935;* Broadcasting, 1928–32, *chairman, 1928–31;* Meetings and Papers, 1928–30; New York Program, 1931; Nominations, 1928, 1931, 1934–35, *chairman, 1934;* Papers, 1931; Radio Receivers, 1927–28; Registration of Engineers, 1940; Use of the Transmission Unit, 1928–29. **IRE Representative:** ASA Sectional Committee on Radio, 1930; National Advisory Council on Radio in Education, 1936, 1939–40; National Advisory Council on Radio in Education, Committee on Engineering Developments, 1941–43; Radio Advisory Committee, Bureau of Standards, Department of Commerce, 1930, 1936.

**HUNT, Frederick V. (A'28—M'41—SM'43—F'47),** Rumford Professor of Physics and Gordon McKay Professor of Applied Physics, 222 Lyman Laboratory, Harvard University, Cambridge 38, Mass.
Born: February 15, 1905, Barnesville, Ohio. B.A., 1924, B.E.E., 1925, Ohio State University; A.M., 1928, Ph.D., 1934, S.D. (Honorary), 1945, Harvard University. **Committees:** Audio Techniques, 1949–50; Electroacoustics, 1941–51; Papers, 1942–45; Papers Procurement, 1942–43, 1947–48; Papers Review, 1946–48; Regular Papers, 1941.

**HUNTER, Theodore A. (A'29—M'45—SM'46—F'53),** President, Hunter Manufacturing Company, 108 N. Linn St., Iowa City, Iowa; Research Professor at State University of Iowa.
Born: December 5, 1900, Dike, Iowa. B.S.(E.E.), 1922, M.S.(Physics), 1923, M.S.(E.E.), 1931, State University of Iowa. **IRE Offices:** Director, 1948–50, 1956; Editor, *Student Quarterly,* 1954–60. **Committees:** Editorial Board, 1954–60; Education, 1954–60; Nominations, 1949–50, *chairman, 1949;* Papers Procurement, 1945–50; Policy Advisory, 1948–53; Policy Development, 1948–51; Professional Groups, 1957; Sections, 1950. **Professional Groups:** Education; Editor, *Transactions,* 1958–59. **Sections:** Cedar Rapids, *temporary chairman, 1945, chairman, 1946–47.*

**HUNTLEY, Harold R. (SM'51—F'60),** Retired from American Telephone and Telegraph Company. Residence: 546 Upper Mountain Ave., Upper Montclair, N.J.
Born: December 29, 1894, Neillsville, Wis. B.S., 1921, University of Wisconsin.

**HUNTOON, Robert D. (A'40—SM'47—F'54),** Deputy Director also Associate Director for Physics, National Bureau of Standards, Washington 25, D.C.
Born: July, 1909, Waterloo, Iowa. B.A., in Education, 1932, Iowa State Teachers College; M.S. (Experimental Physics), 1935, Ph.D. (Nuclear Physics), 1938, State University of Iowa. **Awards:** Naval Ordnance Development Award, U. S. Navy, Bureau of Ordnance, 1945, Washington Academy of Sciences Award, 1948, in Physical Sciences; Presidential Certificate of Merit, 1948; Exceptional Service Award, Department of Commerce, 1949; Fellow, American Physical Society, 1955.

**HUTCHESON, John A. (A'28—M'30—SM'43—F'48),** Vice President, Engineering, Westinghouse Electric Corporation, Pittsburgh, Pa.
Born: January, 1905, Park River, N.D. B.S., 1926, D.Sc. (Honorary), 1943, University of North Dakota. **IRE Offices:** Director, 1948. **Committees:** Board of Editors, 1946–50; Nominations, 1948; Nuclear Studies, 1948–49; Policy Development, 1948. **Sections:** Connecticut Valley, *chairman, 1935–36;* Pittsburgh, *chairman, 1945–46.*

**HUTTER, Rudolf G. (SM'46—F'54),** Chief Engineer, Special Tube Operations; Manager, Mountain View Components Laboratories, Sylvania Electric Products, Inc., Mountain View, Calif.
Born: February 12, 1910, Berlin, Germany. State Examination, 1936, University of Berlin; Ph.D., 1944, Stanford University. **Committees:** Board of Editors, 1953; Editorial Reviewer, 1954–60.

**HYLAND, Lawrence A. (A'29—VA'39—SM'53—F'55),** Vice President and General Manager, Hughes Aircraft Company, Florence Ave. at Teale St., Culver City, Calif.
Born: August 26, 1897, Nova Scotia, Canada, D.E. (Honorary), 1954, Lawrence Institute of Technology. **Awards:** Medal for Distinguished Public Service, U. S. Navy, 1950.

**IAMS, Harley A. (A'31—M'38—SM'43—F'50),** Acting Director, Research Laboratories, Hughes Aircraft Company, Florence Ave. at Teale St., Culver City, Calif.
Born: March 13, 1905, Lorentz, W.Va. B.A.(M.E.), 1927, Stanford University. **Committees:** Papers, 1941–45; Papers Review, 1946–47. **Awards:** Joint Award, Modern Pioneers, National Association of Manufacturers, 1940.

**ISBISTER, Eric J. (A'39—SM'45—F'53),** Chief Engineer, Surface Armament Division, Sperry Gyroscope Company, Division of the Sperry Rand Corporation, Great Neck, L.I., N.Y.
Born: June 11, 1912, Brooklyn, N.Y. B.S.(E.E.), 1934, Massachusetts Institute of Technology; M.S.(E.E.), 1940, Polytechnic Institute of Brooklyn. **Committees:** Registration, 1952; Tellers, 1950–51, *chairman, 1951.* **Professional Groups:** Military Electronics, Nominating Committee, 1956. **Sections:** Long Island Subsection, *chairman, 1947–49;* New York, *treasurer, 1951–52;* Long Island Section Awards, *chairman, 1954–55.* **Awards:** U. S. Navy Certificate of Commendation, 1947; Polytechnic Institute of Brooklyn, Certificate of Distinction, 1956; New York Section Certificate of Appreciation, 1958.

**ISRAEL, Dorman D. (A'23—M'30—F'42),** Executive Vice President, Emerson Radio & Phonograph Corporation, 14 & Coles Sts., Jersey City, N.J.
Born: July 21, 1900, Newport, Ky. E.E., 1923, University of Cincinnati. **Committees:** Administrative, 1949–51; Awards, 1943–

44, 1947; Editorial Reviewer, 1954–60; Membership, 1941; National Convention, 1947; New York Program, 1940–41; Nominations, 1946; Papers, 1940–41; Papers Procurement, *chairman, 1942–43, general chairman, 1944–47;* Professional Groups, 1953–54; Public Relations, 1940–44; Radio Receivers, 1938–42; Regular Papers, *chairman, 1941;* Television and Facsimile, 1936–37; Winter Technical Meeting, 1946. **Professional Groups:** Broadcast and Television Receivers, *chairman, 1951–53.* **Sections:** Cincinnati, *chairman, 1931–32.* **IRE Representative:** Joint Technical Advisory Committee, 1952–56, *chairman, 1956;* IRE-RMA Coordination Committee, 1947–48; Member, National Stereo Radio Committee, Panel 1, *chairman,* NSRC Committee 1.1, System Classification, 1959.

**JACKSON, William E. (A'29—M'34—SM'43—F'51),** Chief, Development Division, Bureau of Research and Development, Federal Aviation Agency, Building T-5, Washington 25, D.C.
Born: May 8, 1904, Bridgewater, Mass. B.S.(E.E.), 1925, Brown University. **Committees:** Antennas, 1944–47; Navigation Aids, 1947–48; Radio Transmitters, 1946–47; Transmitters, 1944–45; Transmitters and Antennas, 1938–44. **Awards:** Citation for Service on Radio Technical Commission for Aeronautics Special Committee, SC 31; Cull Prize in Engineering, Brown University, 1925.

**JACKSON, Sir Willis (SM'48—F'50),** Director, Research and Education, Associated Electrical Industries (Manchester), Ltd., Trafford Park, Manchester 17, England.
Born: October 20, 1904, Burnley, Lancashire, England. D.Sc., 1936, Manchester University; D.Phil., 1936, Oxford University; D.Sc., Tech., Zurich, 1955; D.Sc.(Eng.), 1956, Bristol; D.Eng., 1959, Sheffield. **IRE Representative:** IRE-IEE International Liaison Committee, 1955–59. **Awards:** Fellow, Royal Society, 1953.

**JANES, Robert B. (A'37—M'50—SM'51—F'55),** Manager, Computer Transistor Engineering, Semi-conductor Division, Radio Corporation of America, Somerville, N.J.
Born: February 2, 1909, Burlington, Mass. B.S., 1928, Kenyon College; Ph.D., 1935, University of Wisconsin. **Committees:** Electron Devices, 1952–56; Electron Tubes and Solid Devices, 1950–52. **Sections:** Lancaster Subsection, *chairman, 1955–56;* Princeton Section, Awards and Nominations, *chairman, 1959–60.*

**JANSKY, C. M., Jr. (A'18—M'25—F'28),** Chairman of the Board, Jansky and Bailey, Inc., 1735 DeSales St., N.W., Washington 6, D.C.
Born: June 28, 1895, Delton, Mich. B.A., 1917, M.A., 1919, University of Wisconsin. **IRE Offices:** President, 1934; Manager, 1929–32; Director, 1932–12. **Committees:** Admission, 1929–33, 1936–10, *chairman, 1931, 1936–37;* Awards, 1942; Board of Editors, 1942–50; Broadcast, 1935–38, *chairman, 1937–38;* Broadcasting, 1931–34; Constitution and Laws, 1932–35, 1941; Convention Policies, 1940; Education, 1944; Frequency Modulation, 1940–46; Membership, 1925–28, 1941–43; Nominations, 1936–42, 1945, *chairman, 1937, 1939;* Preparedness, 1940–41; Professional Groups, 1960; Public Relations, 1945–46; Publicity, 1936; Radio Receivers, 1928–29; Sections, 1925; Standardization, 1928–32; Standards, 1932–33; Use of the Transmission Unit, 1928–29. **Professional Groups:** Human Factors in Electronics, *chairman, 1959–60.* **IRE Representative:** American Council on Education, Planning Committee, National Conference on Educational Broadcasting, 1936–37, 1939–43; American Documentation Institute, 1939–43; ASA Sectional Committee on Radio Electrical Co-ordination, 1926, 1939–46; First National Conference on Educational Broadcasting, 1937; URSI Executive Committee, 1936, 1939–50.

**JARVIS, Kenneth W. (A'24—M'27—F'34),** President, Jarvis Electronics Corporation. Residence: 1140 Cherry St., Winnetka, Ill.
Born: October 18, 1901, Mansfield, Ohio. B.E.E., 1923, Ohio State University. **Committees:** Radio Receivers and Parts, 1930–32; Receivers, 1947–59; Receiver Sets, 1927–28. **Sections:** Chicago, *chairman, 1948–49.*

**JASIK, Henry (A'40—SM'47—F'58),** Consulting Engineer, President, Jasik Laboratories, Inc., 100 Shames Drive, Westbury, L.I., N.Y.
Born: March, 1919, New York, N.Y. B.S.(E.E.), 1938, Newark College of Engineering; M.E.E., 1951, D.E.E., 1953, Polytechnic Institute of Brooklyn. **Committees:** Antennas and Waveguides 1950–60, *vice-chairman, 1954, chairman, 1955–56;* Papers Review, 1950–53; Standards, 1955–56. **Professional Groups:** Microwave Theory and Techniques Administrative Committee, 1954–55. **Sections:** Long Island, *vice-chairman, 1959–60.*

**JENSEN, Axel G. (A'23—M'26—F'42),** Retired from Bell Telephone Laboratories; Consulting Engineer in TV Communications, 21 Mea Drive, Berkeley Heights, N.J.
Born: February 7, 1896, Copenhagen, Denmark. E.E., 1920, Royal Technical College; Post Graduate, 1921–22, Columbia University. **IRE Offices:** Director, 1954–56. **Committees:** Appointments, 1954–55; Audio and Video Techniques, 1948–49; Editorial Reviewer, 1954–60; Executive, 1955–56; Measurements and Instrumentation, 1949–50; Policy Advisory, 1954–56; Standards, 1948–60, *vice-chairman, 1949–51, chairman, 1951–54;* Television, 1939–49, *chairman, 1948–49;* Television and Facsimile, 1938–39; Television Systems, 1949–60, *vice-chairman, 1949, chairman, 1949–51.* **IRE Representative:** ASA Electrical Standards Board, 1953–58, *alternate, 1957;* ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1949–58; ASA Sectional Committee (C16) on Radio (sponsored by IRE), 1951–57, *chairman, 1953–57;* ASA Standards Council, 1951–54, *alternate, 1955–59;* International Radio Consultative Committee, Executive Committee of U. S. Delegation, 1952–59; International Radio Consultative Committee, Executive Committee of U. S. Study Group XIV (Vocabulary), *chairman, 1952–58;* IRE-AIEE Committee on Noise Definitions, 1951–52; IRS Steering Committee, 1951; Joint IRE-ASA (C42) Definitions Co-ordinating Committee, 1949–51; Joint IRE-RTMA-SMPTE-NARTB Committee for Inter-Society Coordination, 1952–55; U. S. National Committee of the International Electrotechnical Commission, 1953–57, *alternate, 1958.*

**JESTY, Leslie C. (M'54—F'56),** In-Charge-of Colour Television Research, Sylvania-Thorn Colour TV Laboratories, Ltd., Great Cambridge Road, Enfield, Middlesex, England.
Born: August, 1907, Alresford, England. B.Sc.(Physics), 1927, B.Sc.(General), 1928, University College, Southampton, England. **Awards:** Fellow, Television Society, 1946; Fellow, British Kinematograph Society, 1954.

**JETT, Ewell K. (A'29—M'38—F'39),** Vice President and Director of Television, Baltimore Sunpapers, Baltimore, Md.; formerly, Chief Engineer and Commissioner, Federal Communications Commission.
Born: March 20, 1893, Baltimore, Md. **IRE Offices:** Director, 1938. **Committees:** Public Relations, 1945–46. **Sections:** Washington, D.C., *chairman, 1935–36.*

**JOHNSON, Edward O. (S'46—A'49—M'52—SM'58—F'60),** Manager, Advanced Development, RCA Semiconductor and Materials Division, Somerville, N.J.
Born: December 21, 1919, Hartford, Conn. B.S.(E.E.), 1948, Pratt Institute; Graduate Courses, 1950–53, Princeton University; Graduate Courses, 1954–55, Swiss Federal Institute of Technology. **Committees:** Electron Devices, 1954–56; Electron Tubes, 1955–59; Solid State Devices, 1956, 1958–60, *vice-chairman, 1959–60;* Subcommittee on Gas Tubes, *chairman, 1953–54.* **IRE Representative:** ASA Sectional Committee (C94) on Semiconductor Electron Devices, 1959. **Awards:** Editor's Award, 1953; Honorable Mention for Outstanding Young Electrical Engineer, Eta Kappa Nu, 1952.

**JOHNSON, Harwick (SM'45—F'60),** Associate Director, Electronic Research Laboratory, RCA Laboratories, Princeton, N.J.
Born: June, 1913, Republic, Mich. B.S.(E.E.), 1934, Michigan College of Mining and Technology; M.S., 1941, Ph.D., 1944, University of Wisconsin. **Committees:** Editorial Reviewer, 1954–60. **Sections:** Princeton, Papers Procurement Committee, 1956–57.



**JOHNSON, J. Kelly (A'25—M'35—SM'43—F'49),** Consulting Engineer, 184 South Ave., New Canaan, Conn.
Born: January, 1903, Oskaloosa, Iowa. A.B., 1924, B.S., 1926, E.E., 1927, Columbia University. **IRE Offices:** Director, 1942. **Committees:** Board of Editors, 1946–53; Nominations, 1942; Papers Procurement, 1944–45; Radio Receivers, 1936–37, 1941–60; Receivers, 1950–53; Registration of Engineers, 1940–43; Regular Papers, 1941; Sections, 1943–44. **Sections:** Chicago, *secretary, 1935–36, chairman, 1937–38;* New York, *treasurer, 1948–49.*

**JOHNSON, John B. (M'40—SM'43—F'51),** Retired from Bell Telephone Laboratories, Inc.; Head, Physics Department, Edison Laboratory, Thomas A. Edison, Inc., West Orange, N.J.
Born: October 2, 1887, Gothenberg, Sweden. B.S., 1913, M.S., 1914, University of North Dakota; Ph.D., 1917, Yale University. **Awards:** Longstreth Medal, 1957.

**JOLLIFFE, Charles B. (M'25—F'30),** Vice President and Technical Director, Radio Corporation of America, Princeton, N.J.
Born: November 13, 1894, Mannington, W.Va. B.S., 1915, M.S., 1920, West Virginia University; Ph.D., 1922, Cornell University; LL.D., 1942, West Virginia University. **IRE Offices:** Director, 1936–37, 1944. **Committees:** Admissions, 1938; Awards, 1942; Bibliography, 1930–32; Broadcast, 1932–33, 1936–37; Frequency Modulation, 1940–41; Meetings and Papers, 1930; Nominations, 1937, 1941; Piezoelectric Crystals, 1940–41; Policy Development, 1948; Preparedness, 1940–41; Radio Receivers, 1927–28; Standardization, 1925–30, *chairman, 1928;* Television and Facsimile, 1936–39; Vacuum Tubes, 1927–29, *chairman, 1928–29.* **Sections:** Washington, D.C., *chairman, 1929–30.* **IRE Representative:** American Council on Education, Planning Committee, National Conference on Educational Broadcasting, 1936, 1939–43.

**JORDAN, Edward C. (S'36—A'39—SM'45—F'53),** Professor and Head of Department of Electrical Engineering, University of Illinois, Urbana, Ill.
Born: December 31, 1910, Edmonton, Alta., Canada. B.S.(E.E.), 1934, M.S.(E.E.), University of Alberta; Ph.D.(E.E.), 1940, Ohio State University. **Committees:** Annual Review, 1949–51; Antennas, 1945–49; Antennas and Waveguides, 1949–52; Editorial Reviewer, 1954–60; Membership, 1950–51; Papers Review, 1951–53. **Professional Groups:** Antennas and Propagation, *chairman, 1960;* Awards Committee, *chairman, 1958–60.* **Sections:** Columbus Subsection, *chairman, 1945.* **IRE Representative:** Ohio State University, 1942–45; University of Illinois, 1946–50; National Bureau of Standards, Technical Advisory Committee, 1958–60.

**JORDAN, John F. (A'40—M'45—SM'53—F'54),** Vice President in-charge-of Manufacturing, The Baldwin Piano Company, 1801 Gilbert Ave., Cincinnati, Ohio.
Born: November 23, 1908, Pittston, Pa. E.E., 1932, University of Cincinnati. **Committees:** Awards, 1955–57; Sections, 1949–52, *chairman, 1950–51.* **Sections:** Cincinnati, *secretary-treasurer, 1945–46, vice-chairman, 1946–47, chairman, 1947–48, 1951–52.*

**KAAR, Ira J. (J'22—M'29—F'41),** Vice President and Engineering Director, Hoffman Electronics Corporation, Los Angeles, Calif.
Born: October 17, 1902, Dunsmuir, Calif. B.S.(E.E.), 1924, University of Utah. **IRE Offices:** Director, 1939, 1948. **Committees:** Admissions, 1940; Annual Review, 1940–46; Awards, 1947–48; Nominations, 1949–50; Public Relations, 1940, 1942; Standards, 1940–46; Television, 1939–48, *chairman, 1940–47;* Television Systems, 1949–58. **Professional Groups:** Administrative Committee, Broadcast Transmission Systems, 1950–60. **IRE Representative:** Joint Technical Advisory, 1950–60, *chairman, 1950–52.* **Awards:** Certificate of Commendation, U. S. Navy, 1947; Fellow, American Institute of Electrical Engineers, 1951, E.I.A. Engineering Award, 1957.

**KALLMANN, Heinz E. (A'38—M'41—SM'43—F'59),** Consulting Engineer, 417 Riverside Drive, New York 25, N.Y.
Born: March 10, 1904, Berlin, Germany. Ph.D.(Physics), 1929, Goettingen University, Germany. **Awards:** U. S. (O.S.R.D.) Certificate of Appreciation by N.D.R.C., 1945.

**KALMUS, Henry P. (A'39—SM'45—F'56),** Associate Director for Advanced Research, Diamond Ordnance Fuze Laboratories, Washington 25, D.C.
Born: January 9, 1906, Vienna, Austria. Dipl. Ing., 1930, Technical University, Vienna. **Awards:** Award for Exceptional Service, U. S. Department of Commerce, 1954; Certificate of Achievement, U. S. Army, 1954, 1957; Certificate of Achievement, Army Science Conference, 1959.

**KANDOIAN, Armig G. (S'35—A'36—SM'44—F'51),** Vice President and General Manager, International Telephone and Telegraph Laboratories, 500 Washington Ave., Nutley, N.J.
Born: November 28, 1911, Van, Armenia. B.S., 1934, M.S., 1935, Harvard University. **Committees:** Papers Review, 1946–53. **Sections:** Northern New Jersey, *vice-chairman, 1958–59.* **Awards:** Honorable Mention, Eta Kappa Nu, 1943.

**KANTEBET, Shankar R. (A'25—M'31—SM'43—F'49),** Director General, Retired. Overseas Communication Service, Eleventh Road, Santa Cruz East, Bombay 25, India.
Born: December, 1900, Kanara, Bombay, India. B.A. (Honours), M.N.; Technical Scholar, 1922, Bombay University. **IRE Offices:** Vice President, 1953; Director, 1953. **Awards:** AMIEE, 1928; MIE (1), 1944; Marconi Veteran, 1951.

**KARPLUS, Eduard (A'31—F'38),** Engineer, General Radio Company, 22 Baker Ave., West Concord, Mass.
Born: September 7, 1899, Moedling, Austria. Ingenieur, 1923, Technische Hochschule, Vienna, Austria.

**KATZIN, Martin (J'27—A'29—M'42—SM'43—F'55),** President and Director of Research, Electromagnetic Research Corporation, 711 14 St., N.W., Washington 5, D.C.
Born: February 17, 1908, New York, N.Y. B.S.E.(E.E.), 1928, B.S.E.(Math.), 1929, M.S.E.(E.E.), 1929, University of Michigan. **Committees:** Editorial Reviewer, 1954–60; Papers Procurement, 1946–50; Papers Review, 1948–53; Wave Propagation, 1954–60. **Awards:** Presidential Certificate of Merit, 1948; Distinguished Alumnus Citation for Contributions to Engineering, University of Michigan, 1953; Navy Meritorious Civilian Service Award, 1955.

**KEAR, Frank G. (A'24—M'31—SM'43—F'53),** Consulting Radio Engineer, 1302 18 St., N.W., Washington 6, D.C.
Born: October 18, 1903, Minersville, Schuykill County, Pa. E.E., 1926, Lehigh University; S.M.(E.E.), 1928, Sc.D.(E.E.), 1933, Massachusetts Institute of Technology. **Committees:** Radio Transmitters and Antennas, 1929–31; Standards, 1934–35.

**KEISTER, James E. (A'41—SM'46—F'57),** Manager, Engineering, Electronic Components Division, Semiconductor Products Department, General Electric Company, Syracuse, N.Y.
Born: July 11, 1914, Coburg, Iowa. B.S.(E.E.), 1935, Cornell University. **Committees:** Annual Review, 1949–50; Audio-Video Techniques, *vice-chairman, 1948–49;* Standards, 1949–51; Video Techniques, *chairman, 1949–53, 1949–51.* **Awards:** Navy "E," 1944; Navy Certificate of Commendation, 1947.

**KELL, Ray D. (A'35—F'47),** Fellow, Technical Staff, RCA Laboratories Division, Radio Corporation of America, Princeton, N.J.
Born: June 7, 1904, Kell, Ill. B.S.(E.E.), 1926, University of Illinois. **Committees:** Editorial Reviewer, 1954–60; Television, 1941–42, 1946–49; Television Systems, 1949–60. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Stuart Ballantine Medal, Franklin Institute, 1948; David Sarnoff Gold Medal, SMPTE, 1954.

**KELLER, Ernest A. (A'49—SM'55—F'60),** Associate Director of Engineering, Motorola, Inc., Chicago Military Electronics Center, 1450 N. Cicero Ave., Chicago 51, Ill.
Born: March, 1913, Zurich, Switzerland. M.S., 1938, Dr. Tech.

...1942, Swiss Federal Institutes of Technology, Zurich. **Committees:** Industrial Electronics, 1956–58, *vice-chairman, 1959–...*; ...Electronics Instrumentation and Control, 1956–60. **Professional Groups:** Industrial Electronics Administrative Committee, 1957–60; Industrial Electronics Paper Procurement Committee, *chairman* and *liaison*. **Sections:** Mid-Hudson Subsection, ...*1955, 1955–56, vice-chairman, 1954–55.*

**KELLY, Melvin J. (M'25—F'38),** Retired as President, Bell Telephone Laboratories, Inc.; Retired as Chairman of the Board, Bell Telephone Laboratories, Inc.; Research Management Consultant, International Business Machines, Inc. and ... A. Loub Optical Company, 2 Windemere Terrace, ... Hills, N.J.
Born: February 14, 1894, Princeton, Mo. B.S., 1914, Missouri ... of Mines and Metallurgy; M.S., 1915, University of Kentucky; Ph.D., 1918, University of Chicago; D.Eng., 1936, University of Missouri; D.Sc., 1946, University of Kentucky; LL.D., ... University of Pennsylvania; D.Eng., 1955, New York University; D.Eng., 1955, Polytechnic Institute of Brooklyn; D.Sc., ... University of Pittsburgh; D.Honoris Causa, 1957, University of Lyons; D.Eng., 1958, Wayne State University; 1959 ... Award, Stevens Institute of Technology; D.Sc., 1959, Case ... of Technology. **Committees:** Vacuum Tubes, 1927–31. **IRE Representative:** ASA Technical Committee, Vacuum Tubes, ... **Awards:** Air Force Association Trophy, 1953; Presidential ... of Merit; Industrial Research Institute Medal, 1954; ... Columbus International Communication Prize, 1955; ... Exceptional Service Award, 1957; James Forrestal ... Award, 1958; John Fritz Medal, 1959.

**KENNEDY, Maurice E. (A'41—SM'47—F'56),** Director and ... Engineer, Department of Communications, Los Angeles ..., 500 West Temple St., Los Angeles 12, Calif.
... September 8, 1907, Galva, Ill. **Committees:** Professional ..., 1955–58. **Professional Groups:** Administrative Committee, ... Communications, 1954–60. **IRE Representative:** ...SCAN, *vice-chairman, 1950;* Technical Societies Council, ...47–48.

**KETO, John E. (A'38—SM'46—F'48),** Chief Scientist, Wright ... Development Division, Wright-Patterson Air Force Base, ...
... June 9, 1909, Maynard, Mass. E.E., 1932, M.S., 1935, University of Cincinnati. **Committees:** Awards, 1956–58; Wave ..., 1948–52. **Professional Groups:** Aeronautical and ... Electronics, *chairman, 1951.* **Sections:** Dayton, *chairman, 1946–47.* **Awards:** Presidential Medal of Merit, 1946; Air ... (USAF) Exceptional Civilian Service Award, 1959.

**KIEBERT, Martin V., Jr. (A'31—M'38—SM'43—F'59),** Consulting Engineer, Electronic Research Corporation, 305 W. ... Blvd., Claremont, Calif.
Born: November, 1908, Wallace, Idaho. E.E., 1931, University of Idaho; Physics, 1934, Reed College. **Professional Groups:** Radio Telemetry and Remote Control Administrative Committee, *chairman, 1952–54.* **Sections:** Orange Belt Subsection, *chairman, 1955–56.* **Awards:** American Chemical Society, Idaho, 1928; Royal Aeronautical Society, 1947.

**KILGORE, G. Ross (A'30—M'40—SM'43—F'57),** Manager, Applied Research Department, Westinghouse Electric Corporation, P.O. Box 746, Baltimore 3, Md.
Born: January 31, 1907, Fremont, Neb. B.S.(E.E.), 1928, University of Nebraska; M.S.(E.E.), 1931, University of Pittsburgh. **Committees:** Electron Devices, 1952–54. **Professional Groups:** Electron Devices Administrative Committee, 1953, 1956–59, *chairman, 1958–59.*

**KILLIAN, Thomas J. (A'47—SM'47—F'51),** Deputy Chief and Chief Scientist, Office of Naval Research, Washington 25, D.C.
Born: August 4, 1904, Schenectady, N.Y. B.S., M.S., 1926, Massachusetts Institute of Technology; M.A., 1927, Ph.D., 1929, Princeton University. **Committees:** Nuclear Studies, 1947–51. **IRE Representative:** Washington Chapter, *program chairman, 1956–57.* **Awards:** Regional Prize, American Institute of Electrical Engineers, 1936.

**KIMBALL, Charles N. (A'34—M'40—SM'43—F'52),** President, Midwest Research Institute, Kansas City, Mo.
Born: April 21, 1911, Boston, Mass. B.E.E., 1931, Northeastern University; S.M., 1932, Sc.D., 1934, Harvard University; Eng.D. (Honorary), 1955, Northeastern University; Sc.D. (Honorary), 1958, Park College; LL.D. (Honorary), Parsons College, 1959. **Committees:** Awards, 1956–60; Mobile Communication Systems, 1950–56; Railroad and Vehicular Communication, 1945–50. **Sections:** Kansas City, *vice-chairman, 1941–43.*

**KING, Donald D. (M'46—SM'57—F'59),** Vice President, Research, Electronic Communications, Inc., 1830 York Road, Timonium, Md.
Born: August 7, 1919, Rochester, N.Y. A.B., 1942, A.M., 1944, Ph.D., 1946, Harvard University. **Professional Groups:** Antennas and Propagation Administrative Committee, 1954–57; Microwave Theory and Techniques Administrative Committee, 1952–57; Editor, *Transactions* on Microwave Theory and Techniques, 1959–.

**KING, Ronold W. P. (A'30—SM'43—F'53),** Gordon McKay Professor of Applied Physics, Gordon McKay Laboratory, Harvard University, Cambridge 38, Mass.
Born: September 19, 1905, Williamstown, Mass. B.A., 1927, M.S., 1929, University of Rochester; Ph.D., 1932, University of Wisconsin. **Committees:** Antennas, 1944–47; Papers Review, 1952–53; Transmitters, 1944–45; Transmitters and Antennas, 1942–44. **IRE Representative:** Harvard University, 1954. **Awards:** Fellow, American Physical Society; Fellow, American Academy of Arts and Sciences; Corresponding Member, Bavarian Academy of Science; Guggenheim Fellow, 1937–38, 1958.

**KINN, Theodore P. (A'36—SM'45—F'59),** President, Kinn Electronics Corporation, 4104 Pinkney Road, Baltimore 15, Md.
Born: January, 1907, El Paso, Tex. B.S.(E.E.), 1928, Colorado University. **Committees:** Industrial Electronics, 1954–59; Papers Procurement, 1946. **Professional Groups:** Industrial Electronics Administrative Committee, 1950–59. **IRE Representative:** Joint IRE-AIEE-NEMA Coordination Committee on Induction and Dielectric Heating, 1947–50.

**KLEEN, Werner J. (SM'50—F'57),** Dr. Phil. Nat. Habil., Director, Research Laboratory, Siemens and Halske, Balanstrasse 73, Munich 8, Germany.
Born: October 29, 1907, Hamburg, Germany. Dr.Phil.Nat., 1931, Dr.habil., 1940, University of Heidelberg. **Committees:** Electron Tubes, 1955–60. **Awards:** Medal of Svenska Teknologföreningen, Stockholm, 1950; Honorary Member, Instituto Nacionale de Electrónica, Madrid, 1952; Gauss-Weber Medal, University of Göttingen, 1955; Honorary Professor, Technische Hochschule, Munich, 1956.

**KLOEFFLER, Royce G. (SM'46—F'53),** Professor, Electrical Engineering, Kansas State College, Manhattan, Kan.; Engineer, National Security Agency, Washington, D.C.
Born: June 18, 1890, Armada, Mich. B.S.(E.E.), 1913, University of Michigan; S.M., 1930, Massachusetts Institute of Technology.

**KNOBLAUGH, Armand F. (A'33—M'44—SM'54—F'58),** Professor of Physics, University of Cincinnati.
Born: June, 1903, Cincinnati, Ohio. B.S.(Eng.), 1925, M.A., 1927, Ph.D., 1929, University of Cincinnati. **Sections:** Cincinnati, *chairman, 1935–36.*

**KNOWLES, Hugh S. (A'25—F'41),** Consulting Engineer, President and Director of Research, Industrial Research Products, 9400 Belmont Ave., Franklin Park, Ill.; President, Knowles Electronics.
Born: September 23, 1904, Hynes, Iowa. A.B., 1928, Columbia University. **Committees:** Annual Review, 1938–41; Board of Editors, 1945–53; Editorial Reviewer, 1954–55; Electroacoustics, 1936–41, 1946–47, 1953–55, *chairman, 1938–42, vice-chairman, 1957–59;* Papers, 1941; Papers Procurement, 1942–43; Regular Papers, 1941; Standards, 1938–42; Symbols, 1940–41, 1943–48. **Professional Groups:** Audio, *chairman, 1960.* **Sections:** Chicago, *chairman, 1934–35.* **IRE Representative:** ASA Sectional Committee (Z24) on Acoustical Measurement and Terminology, 1954–56.



**KNOX, James B. (A'34—SM'46—F'51),** RCA Victor Company, Ltd., 1001 Lenoir St., Montreal 30, P.Q., Canada.
Born: November, 1910, Winnipeg, Man., Canada. **Committees:** Radio Transmitters, 1947–53.

**KOBER, Carl L. (A'55—SM'57—F'60),** Vice President, Missiles and Ordnance, AVCO Corporation, Crosley Division, 1329 Arlington St., Cincinnati 25, Ohio.
Born: November 22, 1913, Vienna, Austria. Dr.Phil., 1935, University of Vienna; Dr.phil.habil., 1939, Technical University of Vienna.

**KOCH, Winfield, R. (A'28—SM'48—F'54),** Engineer, Radio Corporation of America, Building 101-222, Borton Landing Road, Moorestown, N.J.
Born: December 23, 1903, Omaha, Neb. B.S.(E.E.), 1925, University of Minnesota. **Committees:** Radio Receivers, 1951–60. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

**KOCK, Winston E. (SM'45—F'52),** Director & General Manager, Bendix Research Laboratories, Bendix Corporation, P.O. Box 5115, Detroit 35, Mich.
Born: December 5, 1909, Cincinnati, Ohio. E.E., 1932, M.S. (Physics), 1933, University of Cincinnati; Ph.D., 1934, University of Berlin; D.Sc. (Honorary), 1952, University of Cincinnati. **Committees:** Administrative, 1956, Antennas, 1946–48, *alternate, 1946–47;* Antennas and Waveguides, 1950–51; Editorial Reviewer, 1953–60; Papers Review, 1951–53. **Professional Groups:** Audio, Administrative Committee, *chairman, 1955.* **Awards:** Outstanding Young Electrical Engineer, Eta Kappa Nu, 1938; HKN Award of Merit, University of Cincinnati, 1959; Fellow, Acoustical Society of America; Fellow, American Physical Society.

**KOEHLER, Glenn (A'27—M'43—SM'43—F'56),** Professor of Electrical Engineering, University of Wisconsin, Madison 6, Wis.
Born: November 30, 1894, Van Wert, Ohio. B.S., 1918, University of Illinois; M.S., 1928, University of Wisconsin. **Committees:** Education, 1946, 1951–56. **IRE Representative:** University of Wisconsin, 1941–60.

**KOGA, Issac (SM'54—F'57),** Dean, School of Engineering, University of Tokyo, Bunkyo-ku, Tokyo, Japan.
Born: December, 1899, Tosu City, Saga Province, Japan. B.E., 1923, Ph.D.(Eng.), 1930, University of Tokyo. **Committees:** Papers, *chairman, 1956–57.* **Sections:** Tokyo, *vice-chairman, 1957–59, chairman, 1959–60.* **IRE Representative:** URSI, *vice president;* Japanese National Committee, *chairman.* **Awards:** Asano Memorial Prize, 1934; Army Technical Prize, 1939; Japanese Academy of Science Prize, 1948; Memorial Prize, Institute of Electrical Communication Engineers of Japan, 1950; Medal of Honor, Japanese Government, 1956.

**KOHL, Walter H. (A'35—M'39—SM'43—F'58),** Senior Engineering Specialist, Sylvania Electric Products, Inc., Mountain View Component Laboratories, Mountain View, Calif.; Lecturer, Electrical Engineering Department, Stanford University, Stanford, Calif.
Born: January 22, 1905, Kitzingen, Bavaria, Germany. Dipl. Ing., 1928, Dr. Ing., 1930, Technische Hochschule, Dresden, Germany. **Sections:** Toronto, *chairman, 1937–38.*

**KOMPFNER, Rudolf (F'50),** Director of Electronics and Radio Research, Bell Telephone Laboratories, Inc., Holmdel, N.J.
Born: May 16, 1909, Vienna, Austria. Engineering Diploma, 1933, Technical College, Vienna; D.Phil., Oxford University. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Electron Devices Administrative Committee, 1955. **Awards:** Duddell Medal, Physical Society, London, 1955.

**KORMAN, Nathaniel I. (S'38—A'39—SM'45—F'56),** Director, Advanced Military Systems, Radio Corporation of America, Princeton, N.J.
Born: February 23, 1916, Providence, R.I. B.S.(E.E.), 1937, Worcester Polytechnic Institute; M.S.(E.E.), 1938, Massachusetts Institute of Technology; Ph.D.(E.E.), 1958, University of Pennsylvania. **Awards:** Charles A. Coffin Fellowship, 1937; Award of Merit, RCA, 1951.

**KRAUS, John D. (A'32—M'43—SM'43—F'54),** Professor, Electrical Engineering, Physics and Astronomy; Director, Radio Observatory, Ohio State University, 2024 Neil Ave., Columbus 10, Ohio.
Born: June 28, 1910, Ann Arbor, Mich. B.S., 1930, M.S., 1931, Ph.D., 1933, University of Michigan. **Committees:** Board of Editors, 1940–52. **Sections:** Detroit, *chairman, 1940.*

**KRUTTER, Harry (SM'47—F'60),** Chief Scientist, Naval Air Development Center, Johnsville, Pa.
Born: March 17, 1911, Boston, Mass. S.B., 1932, S.M., 1933, Ph.D., 1935, Massachusetts Institute of Technology. **Professional Groups:** Airborne Electronics Administrative Committee, 1950–51; Engineering Management Administrative Committee, 1956–59. **Awards:** Distinguished Civilian Service Award, Department of Navy, 1956; Distinguished Civilian Service Award, Department of Defense, 1957.

**KUPER, J. B. Horner (A'37—SM'45—F'54),** Department Chairman, Brookhaven National Laboratory, Upton, L.I., N.Y.
Born: November 5, 1909, New York, N.Y. B.A., 1930, Williams College; Ph.D., 1938, Princeton University. **Committees:** Board of Editors, 1947–53; Editorial Reviewer, 1954–60; Measurements and Instrumentation, 1949–50; Nuclear Studies, 1948–49. **Professional Groups:** Nuclear Science Administrative Committee, 1949–54. **Awards:** Fellow, American Physical Society, 1950.

**LACK, Frederick R. (A'20—F'37),** Consulting Engineer, 176 Main St., Southport, Conn.
Born: July 18, 1895, Eastbourne, England. S.B., 1925, Harvard University. **IRE Offices:** Director, 1940, 1946–47. **Committees:** Appointments, 1948; Awards, 1941, 1948; Board of Editors, 1946; Electronics, 1936–41; Executive, 1947; Fiscal, 1947–48; National Convention, 1947; Nuclear Studies, 1948–49; Office Practices, 1947; Papers, 1942–45; Special Publication Fund, 1947; Tellers, 1940. **IRE Representative:** ASA Board of Directors, 1945–51; RMA-IRE Coordinating Committee, 1948.

**LAFFERTY, James (M'46—SM'48—F'54),** Manager, Physical Studies Section, General Electric Research Laboratory, The Knolls, Schenectady, N.Y.
Born: April 27, 1916, Battle Creek, Mich. B.S.,(Engr. Physics), 1939; M.S.(Physics), 1940; Ph.D.(E.E.), 1946, University of Michigan.

**LAMB, James J. (A'28—SM'48—F'54),** Member of Staff, Intellectronics Laboratories, Ramo Wooldridge Division of Thompson Ramo Wooldridge Inc., P.O. Box 997, Sierra Vista, Ariz.
Born: November 30, 1900, Michigan, N.D. B.S.(E.E.), 1922, Catholic University of America. **Committees:** Fellow, 1960–61; Functional Symbols, 1958–59; High Frequency Receivers, 1929–30; Nomenclature, Symbols and Definitions, 1929–30; Papers Review, 1948–53; Radio Transmitters and Antennas, 1929–30; Symbols, 1929–30. **Professional Groups:** Administrative Committee, Industrial Electronics, 1959–61. **Sections:** Connecticut, Awards Committee, *chairman, 1954–59;* Fairfield County Subsection, *vice-chairman, 1959.* **Awards:** O.S.R.D. Certificate, 1945; Fellow, Radio Club of America, 1958; Merit Award, A.R.R.L., 1959.

**LAMSON, Horatio W. (A'15—M'27—F'33)(L),** Engineer, Retired from General Radio Company, 22 Baker Ave., West Con-

cord, Mass.; Faculty Member, Northeastern University, Boston, Mass. Residence: 72 Oakland Ave., Arlington, Mass.
Born: January 2, 1893, Somerville, Mass. S.B., 1915, Massachusetts Institute of Technology; A.M., 1917, Harvard University. **Sections:** Boston, *chairman, 1937–39.*

**LANDON, Vernon D. (A'27—M'29—SM'43—F'51),** Manager, Technical Advisory Staff, RCA Astro Electronic Products, Princeton, N.J.
Born: May, 1901, Denver, Colo. Attended Detroit Junior College, 1920. **Committees:** Frequency Modulation, 1941–47; Information Theory and Modulation Systems, 1952–56; Modulation Systems, 1947–52; Papers Review, 1947–52.

**LANGLEY, Ralph H. (A'12—M'16—F'29)(L),** Retired. 18 Prescott Ave., Bronxville, N.Y.
Born: January 5, 1889, New York, N.Y. E.E., 1913, Columbia University, Assistant Secretary, 1913. **Committees:** Admissions, 1945; Awards, 1934; Bibliography, 1930–32; New York Program, 1934; Radio Receivers and Parts, 1930–31; Radio Telegraph and Receiver Terminology, *chairman, 1924–25;* Registration of Engineers, 1940–41; Sections, 1930–33, 1935; Standardization, 1924–28; Standards, 1934–35; Wave Length Regulation, 1916–17. **Sections:** Cincinnati, *chairman, 1929–30.*

**LAPORT, Edmund A. (A'25—M'27—SM'43—F'53),** Director of Communications Engineering, Radio Corporation of America, Princeton, N.J.
Born: July 2, 1902, Nashua, N.H. **Committees:** Annual Review, 1946–47; Policy Development, 1948; Radio Transmitters, 1946–48, *chairman, 1947–48;* Standards, 1946–56. **Sections:** Montreal, *chairman, 1940–43;* Northern New Jersey, *vice-chairman, 1955–56.* **IRE Representative:** ASA Electrical Standards Committee, 1948–52; U. S. National Committee of the International Electrotechnical Commission, 1949–51.

**LAW, Harold B. (SM'46—F'52),** Research Engineer, RCA Laboratories Division, Princeton, N.J.
Born: September 7, 1911, Douds, Iowa. B.S., 1934, Kent State University; M.S., 1936, Ph.D., 1941, Ohio State University. **Committees:** Editorial Reviewer, 1954–60. **Awards:** Television Broadcasters Association Award, 1946; IRE Vladimir K. Zworykin Television Prize, 1955.

**LAW, Russell R. (A'34—M'40—SM'43—F'53),** Associate Director, Hughes Research Laboratories; Director, Electronics Laboratory, Hughes Aircraft Company, Malibu, Calif.
Born: January 11, 1907, Hampton, Iowa. B.S., 1929, M.S., 1931, Iowa State College; D.S., 1933, Harvard Engineering School. **Committees:** Editorial Reviewer, 1954–60; National Convention, 1956; Solid State Devices, *vice-chairman, 1956–57.* **Professional Groups:** Electron Devices, *vice-chairman, 1956, chairman, 1957.*

**LEARNED, Vincent R. (A'38—M'40—SM'47—F'55),** Director of Research and Development, Electronic Tube Division, Sperry Gyroscope Company, Great Neck, L.I., N.Y.
Born: January 21, 1917, San José, Calif. B.S.(E.E.), 1938, University of California; Ph.D., 1943, Stanford University. **Committees:** Editorial Reviewer, 1955–60; Electron Tubes, 1959–60. National Convention, 1954; Tellers, 1952–53, *chairman, 1953.* **Sections:** Long Island, *chairman, 1953;* Awards Committee, 1955–56, 1960, *chairman, 1956–57.*

**LEDERER, Ernest A. (M'28—SM'43—F'55),** Consulting Engineer, Fells Road, Essex Fells, N.J.
Born: January 25, 1895, Prague, Austria, Ph.D., 1920, University of Vienna. **Awards:** Modern Pioneer Award, N.M.A., 1940.

**LEE, Low K. (S'39—A'41—M'48—SM'51—F'59),** Manager, Product Engineering, Space Technology Laboratories, Inc., P.O. Box 95001, Los Angeles 45, Calif.
Born: February 12, 1916, Oakland, Calif. B.S., 1937, M.S., 1939, University of California. **Professional Groups:** Automatic Control Administrative Committee, 1954–55; Component Parts Administrative Committee, 1953–60, *vice-chairman, 1956–57.*

**LEE, Reuben (A'32—SM'45—F'54),** Consulting Engineer, Electronics Division, Westinghouse Electric Corporation, P.O. Box 1897, Baltimore 3, Md.
Born: November, 1902, Shirland, Derbyshire, England. B.S.(E.E.), 1924, West Virginia University. **Sections:** Baltimore, Awards Committee, 1959, *chairman, 1960.*

**LEEDS, Laurence M. (A'30—M'40—SM'43—F'57),** Consulting Engineer, Advance Engineering, Heavy Military Electronics Department, General Electric Company, Syracuse, N.Y.
Born: October, 1906, Tulsa, Okla. B.S.(E.E.), 1934, Rutgers University. **Committees:** Television, 1940–47.

**LEHDE, Pendleton E. (A'14—F'27)(L),** President, Pendleton Terminal Corporation, 1050 Constance St., New Orleans, La.; President, Electron Equipment Company; President, Sunshine Building, Inc.
Born: October 2, 1892, New Orleans, La. B.E., 1914, M.E.E., 1926, Tulane University. **Committees:** Membership, 1927–29. **Sections:** New Orleans, *chairman 1928–33.*

**LEHOVEC, Kurt (SM'52—F'56),** Director of Solid State Research and Development, Sprague Electric Company, Marshall St., North Adams, Mass.
Born: June 12, 1918, Ladowitz, Czechoslovakia. Ph.D., 1940, Prague University. **Awards:** Fellow, American Physical Society, 1954.

**LEIFER, Meyer (A'46—M'48—SM'50—F'55),** Manager, Special Tube Operations, Sylvania Electric Products, Inc., Mountain View, Calif.
Born: April 18, 1914, New York, N.Y. B.S., 1933, Brooklyn College; M.A., 1935, Columbia University. **Committees:** Papers Review, 1951–53. **Sections:** San Francisco, *treasurer, 1955–56, vice-chairman, 1956–57, chairman, 1957–58.*

**LePAGE, Wilbur R. (SM'46—F'59),** Chairman, Electrical Engineering Department, Syracuse University, Syracuse 10, N.Y.
Born: November, 1911, Kearny, N.J. E.E., 1933, Cornell University; M.S., 1939,. University of Rochester; Ph.D., 1941, Cornell University. **Committes:** Editorial Reviewer, 1954–60. **Professional Groups:** Education *Transactions, editor, 1959–60.*

**LEVERENZ, Humboldt W. (SM'54—F'56),** Director of Research, RCA Laboratories, Princeton, N.J.
Born: July 9, 1909, Chicago, Ill. B.A.(Chemistry), 1930, Stanford University. **Awards:** Frank P. Brown Medal, Franklin Institute, 1954.

**LEWIS, George (A'12—M'15—SM'43—F'51)(L),** Retired as Assistant Vice President, International Telephone and Telegraph Corporation, 67 Broad St., New York, N.Y.
Born: September 15, 1887, Media, Pa. M.E.I, 1911, Bliss School of Applied Science. **IRE Offices:** Manager, 1918–19, 1923, 1926; Director, 1935. **Committees:** Admissions, 1929–30, 1942; Awards, 1935; Electronics, 1936–40; Facsimile, 1939–42; New York Program, 1935–36, *chairman, 1935;* Public Relations, 1947–48; Standardization, 1916–17, 1919–20, 1925–26, 1928–31; Symbols, 1940–41; Television, 1939–42; Vacuum Tubes, 1929–30.

**LEWIS, Willard D. (A'44—SM'52—F'54),** Director of Research, Communications Systems, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: January 6, 1915, Augusta, Ga. A.B.(Physics), 1935, Harvard University; B.A.(Math.), 1938, Oxford University; Ph.D. (Theoretical Physics), 1941, Harvard University. **Committees:** Editorial Reviewer, 1955–60. **Awards:** Rhodes Scholarship, 1935; Naval Ordnance Development Award, U. S. Navy, 1946.

**LIBBY, Tyng M. (A'14—M'16—SM'43—F'55),** Transmission Engineer, Alaska Communication System, 1322 Woodbine Way, Seattle 77, Wash.
Born: August 9, 1889, Kingman, Kan. **Sections:** Seattle, *secretary-treasurer, 1917, chairman, 1927.* **Awards:** Bailey Medal, U. S. Navy, 1907.



**LIDDEL, Urner (SM'49—F'55),** Chief, Bionucleonics, National Institutes of Health, Bethesda, Md.
Born: September 3, 1905, Butler, Mo. B.A., 1926, Central College; Ph.D., 1941, George Washington University. **Committees:** Awards, 1956–60, *chairman, 1959–60;* Nuclear Studies, 1948–49. **Professional Groups:** Medical Electronics, *vice-chairman, 1957–58, chairman, 1958–59;* Nuclear Science, *vice-chairman, 1950–51, secretary, 1953–54.* **IRE Representative:** ASME Glossary Review Board (Nuclear Physics), *alternate, 1952;* International Conference on Medical Electronics, 1959.

**LINDENBLAD, Nils E. (M'34—SM'43—F'48),** Fellow, Technical Staff, RCA Laboratories Division, Princeton, N.J.
Born: October 30, 1895, Norrkoping, Sweden. M.E., 1915, Norrkoping Polytechnic Institute; E.E., 1919, Royal Institute of Technology, Stockholm. **Committees:** Antenna Subcommittee, 1940–41. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; RCA Laboratories Award for Pioneering in Slot Antennas, 1947; War Department Citation for Patriotic Service in Position of Trust and Responsibility, 1947; RCA Laboratories Awards for Development of Thermoelectric Refrigerator, 1955; Advances in Electronic Cooling, 1956; Fellow, Technical Staff RCA Laboratories, 1959; David Sarnoff Outstanding Achievement Award in Science, 1959.

**LINDER, Ernest G. (A'40—SM'49—F'55),** Administrator, Research, RCA Laboratories, Radio Corporation of America, Princeton, N.J.
Born: May 16, 1902, Waltham, Mass. B.A., 1925, M.S., 1927, University of Iowa; Ph.D., 1931, Cornell University. **Awards:** Fellow, American Physical Society.

**LINDSAY, William W., Jr. (A'24—M'26—F'39),** Research and Development Scientist, Operations Research Division, Lockheed Aircraft Corporation, Burbank, Calif.; Consulting Engineer, 230 S. Thurston Ave., Los Angeles 49, Calif.
Born: November 16, 1899, Overbrook, Pa. Privately educated, equivalent "Doktor Ingenieur" degree. **Committees:** Nominations, 1942; Transmitters, 1946–47. **Sections:** Los Angeles, *secretary-treasurer, 1928–30, chairman, 1940–41.*

**LINVILL, John G. (A'49—M'55—F'60),** Professor, Electrical Engineering, Stanford University, Stanford Electronics Laboratories, Stanford, Calif.
Born: August 8, 1919, Kansas City, Mo., A.B., 1941, William Jewell College; S.B., 1943, S.M., 1945, Sc.D., 1949, Massachusetts Institute of Technology. **Committees:** Circuits, 1949–56; Editorial Reviewer, 1954–60; Fellow, 1960; Solid State Circuits, 1953–60. **Professional Groups:** Circuit Theory Administrative Committee, 1954–60. **IRE Representative:** Stanford University, 1955–57.

**LITTLE, Donald G. (A'20—M'27—F'29)(L),** Retired. 408 Old Orchard Road, Baltimore 29, Md.
Born: May 17, 1893, Kalamazoo, Mich. B.S.(E.E.), 1917, University of Michigan. **Committees:** Board of Editors, 1944–53; Meetings and Papers, 1928–29; Radio Transmitters and Antennas, 1929–30; Standardization, 1931–32; Standards, 1932–33; Transmitters and Antennas, 1936–39. **Sections:** Baltimore, *chairman, 1951.* **Awards:** Fellow, American Institute of Electrical Engineers.

**LITTON, Charles V. (A'25—SM'44—F'47),** President, Litton Engineering Laboratories, P.O. Box 949, Grass Valley, Calif.
Born: March 13, 1904, San Francisco, Calif. A.B., 1924, E.E., 1925, Stanford University. **Committees:** Editorial Reviewer, 1954; Papers, 1945; Papers Review, 1946–53. **Sections:** San Francisco, *chairman, 1932–33.*

**LLEWELLYN, Frederick B. (A'23—F'38),** Assistant to President, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: September 16, 1897, New Orleans, La. M.E., 1922, Stevens Institute of Technology; Ph.D., 1928, Columbia University. **IRE Offices:** President, 1946; Director, 1939–48. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Awards, 1942, 1947–48, *chairman, 1947;* Awards Coordination, 1956–58; Board of Editors, 1949–53; Constitution and Laws, 1947, 1950; Editorial Administrative, 1946–53; Editorial Reviewer, 1954–60; Electronics, 1939–44; Executive, 1942–44, 1946, *chairman, 1946;* Finance, 1948–51; Fiscal, 1947–48; Investment, 1946; Membership, 1941, 1949–50; Membership Solicitation Policy, 1945; Nominations, 1944, 1947–48; Office Quarters, 1947; Papers, 1932–46, *vice-chairman, 1940–42, chairman, 1943–46;* Policy Advisory, 1952–53; Policy Development, 1949–51, *chairman, 1951;* Professional Groups, 1948; Public Relations, 1950; Symbols, 1940–41. **Special Committees:** IRE-IEE International Liaison, 1947, 1949, 1955–59. **IRE Representative:** ASA Electrical Standards Committee, 1948–55; National Research Council, Division of Engineering and Industrial Research, 1948–57; United States National Committee of the International Electrotechnical Commissions, 1949–54. **Awards:** IRE Morris Liebmann Memorial Prize, 1935.

**LODGE, William B. (A'34—M'37—SM'43—F'49),** Vice President, Affiliate Relations and Engineering, CBS Television Network, 485 Madison Ave., New York 22, N.Y.
Born: August 17, 1907, Whitemarsh, Pa. B.S., 1930, M.S., 1931, Massachusetts Institute of Technology. **Committees:** Annual Review, 1946–49; Antennas, 1944–45; Awards, 1946; Transmitters, 1944–45; Transmitters and Antennas, 1940–41; Winter Technical Meeting, 1946.

**LOOMIS, Alfred L. (M'28—SM'43—F'44),** President, Loomis Institute for Scientific Research, 14 Wall St., New York, N.Y.
Born: November 4, 1887, New York, N.Y. A.B., 1909, Yale University; LL.B., 1912, Harvard University; D.Sc., 1932, Wesleyan University; M.Sc., 1933, Yale University; LL.D., 1941, University of California. **Awards:** John Price Wetherill Medal, The Franklin Institute, 1934.

**LOUGHLIN, Bernard D. (A'40—M'45—SM'53—F'55),** Electronic Research Consultant, Little Neck Road, R.D. 5, Huntington, L.I., N.Y.
Born: May 19, 1917, New York, N.Y. B.E.E., 1939, E.E., 1945, Cooper Union Institute of Technology; M.S.(E.E.), 1946, Stevens Institute of Technology. **Committees:** Modulation Systems, 1947–49; Papers Review, 1948–50; Radio Receivers, 1948–51. **Awards:** IRE Vladimir K. Zworykin Television Prize, 1952; SMPTE David Sarnoff Gold Medal Award, 1955; PGBTR, 1957.

**LOUGHREN, Arthur V. (A'24—M'29—SM'43—F'44),** Vice President, Apparatus Division, Airborne Instrument Laboratory, Division of Cutler-Hammer, Inc., Comac Road, Deer Park, L.I., N.Y.
Born: September 15, 1902, Rensselaer, N.Y. B.A., 1923, E.E., 1925, Columbia University. **IRE Offices:** Director, 1952–55, 1957–58; President, 1956. **Committees:** Admissions, 1931–33, Ex officio, 1957; Appointments, 1956–57, *chairman, 1957;* Awards, 1949–55; Awards Coordination, 1955–57, *chairman, 1957;* Constitution and Laws, 1960; Editorial Board, 1957; Editorial Reviewer, 1954; Executive, 1955–57, *chairman, 1956;* Finance, 1953, 1955–57; Membership, 1934; Nominations, 1957, *chairman, 1958;* Papers Procurement, 1947–50; Policy Advisory, 1953–54, *chairman, 1954, 1958–59;* Professional Groups, 1957; Radio Receivers, 1927–28; Standards, 1947–48; Television, 1940–46; Vacuum Tubes, 1927–28. **IRE Representative:** Joint Technical Advisory Committee, 1951–52, *chairman, 1953–55.* **Awards:** Fellow, Society of Motion Picture and Television Engineers; Fellow, American Institute of Electrical Engineers; U. S. Navy Certificate of Commendation, 1947; SMPTE David Sarnoff Gold Medal Award, 1953; IRE Morris Liebmann Memorial Prize, 1955.

**LUBCKE, Harry R. (A'26—M'32—SM'43—F'51),** Consulting Engineer and Registered Patent Agent, 2443 Creston Way, Hollywood 28, Calif.
Born: August 25, 1905, Alameda, Calif. B.S., 1929, University of California. **Committees:** Building Fund, 1945; Papers Review, 1946–47. **Awards:** "Best Branch Paper" Award, Institute of Electrical Engineers, 1930; Academy of Television Arts and Sciences Award, 1951; Certificate of Commendation, U. S. Navy, World War II; Certificate, War Department (U. S. Army), World

War II; Fellow, American Association for the Advancement of Science, 1958.

**LUCK, David G. C. (M'46—SM'50—F'51),** Technical Staff, Advanced Military Systems, Radio Corporation of America, Princeton, N.J.
Born: July, 1906, Whittier, Calif. B.S., 1927, Ph.D., 1932, Massachusetts Institute of Technology. **Awards:** Ballantine Medal, Franklin Institute, 1953; Pioneer Award, PGANE, 1953.

**LUSTED, Lee B. (A'45—SM'53—F'59),** Associate Professor of Radiology, University of Rochester School of Medicine, 260 Crittenden Blvd., Rochester 20, N.Y.
Born: May 22, 1922, Mason City, Iowa. B.A., 1943, Cornell College; M.D., 1950, Harvard Medical School. **Professional Groups:** Medical Electronics Administrative Committee, 1954–59, *vice-chairman, 1955–57; chairman, 1957–59; Editor,* IRE *Transactions* on Medical Electronics, 1959—. **Awards:** Fellow, American Cancer Society, 1952; Fellow, American Academy of Arts & Sciences, 1959; Fellow, New York Academy of Sciences, 1959.

**LYNCH, William A. (A'44—SM'52—F'60),** Professor, Electrical Engineering, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn 1, N.Y.
Born: July, 1904, Brooklyn, N.Y. M.E., 1925, M.E.E., 1948, Polytechnic Institute of Brooklyn. **Committees:** Audio-Video Techniques, 1948; Circuits, 1952–60, *vice-chairman, 1955, chairman, 1956–58;* Linear Active Circuits Including Networks with Feedback Servomechanism, 1952–60; Standards, 1956–58. **IRE Representative:** ASA Subcommittee (Y10.4) on Nomenclature Feedback Control System, 1951, 1953–59.

**LYONS, Harold (SM'50—F'58),** Head, Atomic Physics Department, Research Laboratories, Hughes Aircraft Company, Malibu, Calif.
Born: February 16, 1913, Buffalo, N.Y. B.A.(Physics), 1933, University of Buffalo; M.A.(Physics), 1935, Ph.D.(Physics), 1939, University of Michigan. **IRE Representative:** Joint AIEE-IRE Committee on High Frequency Measurements, *vice-chairman, 1950.* **Awards:** O.S.R.D.-N.D.R.C. Certificate of Effective Service, 1945; Arthur S. Fleming Government Award, 1949; First Prize, American Institute of Electrical Engineers Prize Paper-Competition, Washington, D.C., 1949; National Bureau of Standards Superior Accomplishment Award, 1949; U. S. Department of Commerce Gold Medal, 1949; Washington Academy of Sciences Award, 1952; University of Buffalo Citation, 1957; The Franklin Institute Certificate of Merit, 1958.

**MACDONALD, J. Ross (S'44—A'48—SM'54—F'59),** Director of Solid State Physics Research Department; Acting Director, Data Systems and Earth Science Research Department, Texas Instruments, Incorporated, 13500 North Central Expressway, Dallas 21, Tex.
Born: February, 1923, Savannah, Ga. B.A.(Physics), 1944, Williams College; S.B.(E.E.), 1944, S.M.(E.E.), 1947, Massachusetts Institute of Technology; Ph.D.(Physics), 1950, Oxford University, England. **Committees:** Editorial Reviewer, 1954–60; Solid State Devices, 1956–58. **Professional Groups:** Electron Devices Committee, 1955–57; Administrative Committee, Audio, 1959–60; Audio Chapter's Committee: *chairman, 1958–60.* **Awards:** Fellow, American Physical Society, 1955; IRE Senior Paper Award, 1957; Fellow, American Association for the Advancement of Science, 1959.

**MacDONALD, William A. (A'19—M'26—SM'43—F'53),** Chairman and Director, Hazeltine Corporation, Little Neck, L.I., N.Y.
Born: December, 1895, New York, N.Y. Attended University of Paris, 1918–19. **Committees:** Radio Receivers and Parts, 1930–31; Standardization, 1930–31. **Awards:** Certificate of Merit, U. S. Government, 1947; Corporate Member, Institution of Engineers, Australia.

**MacKINNON, Keith Abbott (SM'46—F'49),** Consulting Engineer, P.O. Box 542, Ottawa, Ont., Canada.
Born: September, 1905, Kingston, Ont., Canada. B.Sc.(E.E.), 1926, B.Sc.(Physics), 1928, M.Sc.(Physics), 1929, Queens' University. **Committees:** Antennas, 1946–49. **Sections:** Ottawa, *chairman, 1947.*

**MALOFF, Ioury G. (M'27—F'36),** Engineering Consultant, 100 Coolidge Ave., Collingswood, N.J.
Born: June 3, 1899, Vladivostok, Russia. **Committees:** Bibliography, 1928; Papers Procurement, 1947–50; Receiving Sets, 1928; Standardization, 1928; Tellers, 1940.

**MALTER, Louis (A'37—SM'45—F'52),** Manager, Vacuum Products Division, Varian Associates, Palo Alto, Calif.
Born: April 28, 1907, New York, N.Y. B.S., 1926, College of the City of New York; M.A., 1931, Ph.D., 1936, Cornell University. **Committees:** Electron Tubes, 1947–48; Electron Tubes and Solid State Devices, 1949–50; Papers Review, 1947–49. **IRE Representative:** Semiconductor Devices Research Conference, 1956–57, *chairman, 1957;* Semiconductor Devices, 1957. **Awards:** Fellow, American Physical Society.

**MANLEY, Jack M. (A'43—SM'49—F'60),** Member, Technical Staff, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: March, 1909, Farmington, Mo. B.S.(E.E.), 1930, University of Missouri. **Committees:** Circuits, Subcommittee 4.7, 1950–60.

**MANSON, Ray H. (M'23—F'50)(L),** Retired. Five Elmwood Hill Lane, Rochester 10, N.Y.
Born: August 25, 1877, Bath, Me. B.S.(E.E.), 1898, E.E., 1901, D.Eng., 1933, University of Maine. **IRE Offices:** President, 1931; Manager, 1927–30; Director, 1931–33. **Committees:** Awards, 1932, 1940; Bibliography, 1930; Electroacoustic Devices, 1930; Nominations, 1929–30, 1932, 1934, 1940, *chairman, 1932;* Public Relations, 1940, 1947–48; Regular Papers, 1941; Standardization, 1926–31; Television and Facsimile, 1936–39; Tellers, 1932–33. **IRE Representative:** ASA Electrical Standards Committee, 1936–39.

**MARCUVITZ, Nathan (S'36—A'37—VA'39—M'55—SM'57—F'58),** Professor, Polytechnic Institute of Brooklyn; Director, Microwave Research Institute, 55 Johnson St., Brooklyn 1, N.Y.
Born: December 29, 1913, Brooklyn, N.Y. D.E.E., 1947, Polytechnic Institute of Brooklyn. **Committees:** Editorial Reviewer, 1954–60.

**MARKS, William S., Jr. (A'44—SM'44—F'52),** Consultant, 42 Lake Drive, Winter Park, Fla.
Born: March 18, 1900, Nashville, Tenn. B.S.(E.E.), 1929, Louisiana State University. **Sections:** Fort Huachuca, Ariz., Awards Committee, *chairman, 1957–58;* Central Florida, Awards Committee, *chairman, 1959;* Orlando, Awards Committee, *chairman.* **Awards:** Legion of Merit; Army Commendation Medal with Oak Leaf Cluster; Commendation for Meritorious Civilian Service, U. S. Army; Certificate of Achievement, Chief Signal Officer, U. S. Army.

**MARRISON, Warren A. (M'28—SM'43—F'58),** Member, Technical Staff, Space Technology Laboratories, Inc., 5500 W. El Segundo Blvd., Los Angeles 45, Calif.
Born: May, 1896, Inverary, Ont., Canada. B.Sc., 1920, Queens' University; M.A., 1921, Harvard University; D.Sc., (Honorary), 1953, Queens' University; **Awards:** Gold Medal of the British Horological Institute, 1947; The Tompion Gold Medal, The Worshipful Company of Clockmakers of The City of London, 1955.

**MARSHALL, Charles J. (J'31—A'33—SM'45—F'55),** Staff Electronic Engineer, Aerial Reconnaissance Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.
Born: March 27, 1912, San Antonio, Tex. B.S.(E.E.), 1939, E.E., 1946, University of Cincinnati. **IRE Offices:** Director, 1954–55. **Committees:** Nominations, 1955; Professional Groups, 1957. **Sections:** Dayton, *secretary, 1948–50, vice-chairman, 1949–50, chairman, 1950–51;* National Conference on Aeronautical Electronics, *secretary, 1948–50, president, 1950–51, director, 1955–57.*



**MARSTEN, Jesse (J'17—A'18—M'25—SM'43—F'57),** Senior Vice President, International Resistance Company, 401 N. Broad St., Philadelphia, Pa.
Born: January 1, 1897, Budapest, Hungary. B.S., 1917, College of the City of New York. **Committees:** Paper Procurement, 1945–46.

**MARTIN, Daniel W. (M'50—SM'54—F'57),** Assistant Chief Engineer, The Baldwin Piano Company, 1801 Gilbert Ave., Cincinnati, Ohio.
Born: November, 1918, Georgetown, Ky. A.B., 1937, Georgetown College; M.S., 1939, Ph.D., 1941, University of Illinois. **Committees:** Editorial, 1951–60. **Sections:** Cincinnati, *secretary, 1952–53, vice-chairman, 1954–55, chairman, 1955–56.* **Professional Groups:** *Transactions on* Audio, *editor, 1953–55;* Audio, *chairman, 1956–57;* PGA Administrative Committee, 1954–57; PGA Awards Committee, *chairman, 1955.* **IRE Representative:** ASA Sectional Committee (S1) on Acoustics, 1958–60. **Awards:** Fellow, Acoustical Society of America; PGA Senior Award, 1958; PGA Achievement Award, 1959.

**MARVIN, Harry B. (M'31—SM'43—F'50),** Retired. 485 Buckingham Ave., Syracuse 10, N.Y.
Born: August, 1894, Charleston, Pa. B.S.(E.E.), 1915, M.S.(E.E.), 1925, Union College. **Committees:** Admissions, 1940; Awards, 1940; Frequency Modulation, 1940–46; Papers, 1940; Papers Procurement, 1946–50.

**MASON, Samuel J. (A'42—SM'52—F'59),** Associate Professor of Electrical Engineering, Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: June 16, 1921, New York, N.Y. B.Sc., 1942, Rutgers University; S.M., 1947, Sc.D., 1952, Massachusetts Institute of Technology. **Committees:** Circuits, *vice-chairman, 1953–60;* Editorial Reviewer, 1954.

**MASON, Warren P. (A'36—VA'39—F'41),** Head, Mechanics Research, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: September 28, 1900, Colorado Springs, Colo. B.S. (E.E.), 1921, University of Kansas; M.A., 1924, Ph.D., 1928, Columbia University. **Committees:** Editorial Reviewer, 1954–60; Papers Procurement, 1947–50; Papers Review, 1947–53; Piezoelectric and Ferroelectric Crystals, 1940–60, *vice-chairman, 1951–52, chairman, 1953–55;* Standards, 1953–55.

**MASSA, Frank (A'30—M'55—F'59),** President, Massa Division of Cohu Electronics, Inc.; 5 Fottler Road, Hingham, Mass.
Born: April 10, 1906, Boston, Mass. B.S.(E.E.), 1927, Swope Fellow, 1927–28, M.Sc., 1928, Massachusetts Institute of Technology. **Committees:** Awards, 1958; Handbook, 1945–58; Nominating, *chairman, 1955–56, 1957–59.* **Professional Groups:** Ultrasonics Engineering Administrative Committee, 1954–55. **Awards:** Fellow, Acoustical Society of America.

**MATHES, Richard E. (J'22—A'24—SM'46—F'57),** Manager, Engineering Services Division, Burroughs Research Center, Paoli, Pa.
Born: April, 1902, Minneapolis, Minn. B.S.(E.E.), 1924, University of Minnesota. **Committees:** Admissions, 1950–51; Facsimile, 1940–43, 1947–49; Papers Review, 1947–53.

**MATHIEU, Gaston A. (F'58),** Consultant, Industrial and Communication, Alldelphi & Elecktro Spezial GmbH, Hamburg, Germany.
Born: July 1, 1889, Namur, Belgium. **Awards:** Chevalier de l'Ordre Leopold, Belgium; Commandateur de l'Ordre de St Sylvestre, Vatican; Ufficiale della Corona d'Italia, Italy.

**MAUCHLY, John W. (A'42—M'56—F'57),** President, Mauchly Associates, Inc., 50 E. Butler Ave., Ambler, Pa.
Born: August 30, 1907, Cincinnati, Ohio. Ph.D.(Physics), 1932, The Johns Hopkins University. **Awards:** John H. Potts Medal, Franklin Institute, 1949.

**MAYER, Harry F. (A'36—SM'47—F'56),** Manager, Advanced Electronics Center, General Electric Company, Tompkins County Airport, Ithaca, N.Y.
Born: January 19, 1912, Indianapolis, Ind. B.S.(E.E.), 1932, M.S.(E.E.), 1933, Purdue University. **Committees:** Papers Review, 1946–51. **Sections:** Rome-Utica, *vice-chairman, 1954–55, chairman, 1955–56.* **Awards:** Certificate of Commendation, U. S. Navy, 1947.

**McARTHUR, Elmer D. (M'42—SM'43—F'45),** Manager, High-Frequency Electronics Section, General Electric Research Laboratory, P.O. Box 1088, Schenectady, N.Y.
Born: May 3, 1903, Salamanca, N.Y. B.S.(E.E.), 1925, M.S.(Physics), 1948, Union College. **Committees:** Awards, 1960; Board of Editors, 1945–53; Editorial Reviewer, 1954–60; Fellow, 1958–60. **Awards:** U. S. Navy Certificate of Commendation, 1947; National Electronics Conference Annual Papers Award, 1954.

***McCOY, David O. (A'46—SM'50—F'59),** Assistant Director of Research and Development, Collins Radio Company, 5225 'C' Ave., N.E., Cedar Rapids, Iowa.
Born: March 18, 1911, LaPorte City, Iowa. B.S.(M.E.), 1934, M.S.(Physics), 1936, Ph.D.(Applied Physics), 1938, Iowa State College. **Committees:** Circuits, 1948–50; Editorial Reviewer, 1954–59. **Sections:** Cedar Rapids, *vice-chairman, 1959.* **Awards:** U. S. Navy Meritorious Civilian Service Award, by The Naval Research Laboratory, 1945.

**McCOY, Rawley D. (A'40—M'55—SM'57—F'59),** Vice President, Engineering, Reeves Instrument Corporation, Roosevelt Field, Garden City, L.I., N.Y.
Born: December 21, 1914, Nutley, N.J. B.M.E., 1937, Stevens Institute of Technology.

**McCULLOUGH, Jack A. (A'39—SM'52—F'53),** Chairman of the Board, Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif.
Born: November 25, 1907, San Francisco, Calif. **Awards:** Civilian Distinguished Service Medal, U. S. Navy, 1950.

**McCUTCHEN, Brunson S. (A'21—M'26—F'32)(L),** 89 Olden Lane, Princeton, N.J.; Owner and President, Communication Measurements Laboratory, Inc.
Born: November 20, 1892, North Plainfield, N.J. Lit.B., 1915, E.E., 1917, Princeton University.

**McELRATH, George (M'29—SM'43—F'56),** Manager, Broadcast Central, National Broadcasting Company, 30 Rockefeller Plaza, New York 20, N.Y.
Born: January 23, 1899, Marlboro, N.Y. **Committees:** National Convention, 1947–48.

**McELROY, Paul K. (A'25—M'27—F'31),** Engineering Consultant, General Radio Company, 22 Baker Ave., West Concord, Mass.
Born: August 7, 1899, Toledo, Ohio. A.B., 1920, A.M., 1921, Harvard University. **Committees:** Membership, 1940. Professional Groups, 1960. **Professional Groups:** Reliability and Quality Control Administrative Committee, 1951–60; *vice-chairman, 1955–58; chairman, 1958–60; Editor* of *Transactions, 1952–58;* Component Parts Administrative Committee, 1957–60. **Sections:** Boston, *secretary, 1939–41.* **IRE Representative:** ASA Sectional Committee (C83) on Components for Electric Equipment, 1954–60.

**McFARLANE, Maynard D. (A'26—M'42—SM'43—F'56),** Research Scientist, Robertshaw-Fulton Controls Company, Santa Ana Freeway & Euclid Ave., Anaheim, Calif.
Born: August 12, 1895, London, England. **Professional Groups:** Military Electronics National Administrative Committee, 1956–58. **Sections:** Los Angeles, Executive Committee, 1960. **Awards:** Fellow, American Institute of Electrical Engineers; Fellow, American Association for the Advancement of Science; Certificate of Appreciation, U. S. Armed Forces.

* Deceased.

**McILWAIN, Knox (A'31—M'40—SM'43—F'48),** Manager, Great Valley Laboratory, Burroughs Research Center, Paoli, Pa.
Born: September 4, 1897, Philadelphia, Pa. B.S., 1918, Princeton University; B.S.(E.E.), 1921, E.E., 1930, University of Pennsylvania. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Admissions, 1944–45; Board of Editors, 1946–53; Circuits, 1944–45; Editorial Administrative, 1949–53; Editorial Reviewer, 1954–60; Education, 1945; Electroacoustics, 1936–46; Electronics, 1936–39; Fellow, 1959–60; Handbooks, 1945–48; Papers, 1942–45; Standards, 1945–46. **Sections:** Philadelphia, *chairman, 1935–36.* **IRE Representative:** National Television Systems Committee, Panel 8, 1940–43.

**McKINLEY, Donald W. R. (A'39—SM'46—F'48),** Assistant Director, Radio and Electrical Engineering Division, National Research Council, Ottawa, Ont., Canada.
Born: September 22, 1912, Shanghai, China. B.A., 1934, M.A., 1935, Ph.D., 1938, University of Toronto. **Committees:** Fellow, 1959–60. **Sections:** Ottawa-Ontario, *chairman, 1946–47.* **IRE Representative:** Canadian National Committee for URSI, *chairman, 1951–58.* **Awards:** Fellow, American Physical Society; Fellow, Royal Society of Canada; Order of the British Empire.

**McLENNAN, Miles A. (SM'54—F'60),** Chief, Bio-Electronics Section, Aerospace Medical Laboratory, Wright Air Development Division, USAF, Wright-Patterson Air Force Base, Ohio.
Born: November 11, 1902, Bay City, Mich. B.S.(E.E.), 1928, University of Michigan. **Sections:** Dayton, *secretary, 1953–54, vice-chairman, 1954–55, chairman, 1955–56.* **Awards:** U. S. Air Force Meritorious Civilian Service Award, 1956.

**McNALLY, James O. (J'24—A'26—SM'44—F'57),** Assistant Director of Development, Electron Tubes, Bell Telephone Laboratories, Inc., Mountain Ave., Murray Hill, N.J.
Born: July 1, 1903, Fredericton, N.B., Canada. B.S.(E.E.), 1924, University of New Brunswick.

***McRAE, James W. (A'37—F'47),** Vice President, American Telephone & Telegraph Company, New York, N.Y.
Born: October 25, 1910, Vancouver, B.C., Canada. B.S.(E.E.), 1933, University of British Columbia; M.S., 1934, Ph.D., 1937, California Institute of Technology. **IRE Offices:** President, 1953; Director, 1950–56. **Committees:** Appointments, 1950, *chairman, 1955;* Awards, 1948–50; Board of Editors, 1946–52; Editorial Board, 1954; Executive, 1950–54, *chairman, 1953;* Finance, 1952 (ex officio, 1953), 1954; Nominations, 1954–57, *chairman, 1955;* Policy Development, 1948; Tellers, *chairman, 1948.* **Sections:** New York, *chairman, 1948–50.* **Awards:** Eta Kappa Nu, Honorable Mention, 1943; Legion of Merit, War Department, 1945.

**MEACHAM, Larned A. (A'38—SM'45—F'48),** Station Development Engineer, Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y.
Born: September, 1908, Denver, Colo. B.S.(E.E.), 1929, University of Washington; Certificate of Research, 1930, Cambridge University. **Committees:** Board of Editors, 1946–52; Information Theory and Modulation Systems, 1952–59; Modulation Systems, 1949–52. **Awards:** Outstanding Young Electrical Engineer; Eta Kappa Nu, 1939.

**MERTZ, Pierre (SM'44—F'50),** Consultant, 66 Leamington St., Lido, Long Beach, L.I., N.Y.
Born: April, 1897, Paris, France. A.B., 1918, Ph.D., 1926, Cornell University. **Committees:** Editorial Reviewer, 1954–58; Facsimile, 1939–60, *vice-chairman, 1957–58, chairman, 1958–60;* Papers Procurement, 1945–50; Standards, 1959–60; Television Picture Element, 1954–60. **Awards:** Army-Navy Certificate of Appreciation, Department of Defense, 1948; Army Certificate of Appreciation, Technical Industrial Intelligence Committee, Joint Chiefs-of-Staff, 1951; Fellow, Society of Motion Picture and Television Engineers.

**METCALF, George F. (A'34—M'38—F'42),** Regional Vice President, Washington Defense Activities, General Electric Company, 777 14 St., N.W., Washington 5, D.C.

* Deceased.

Born: December 7, 1906, Milwaukee, Wis. B.S.(E.E.), 1928, Ph.D.(Eng.), 1956, Purdue University. **IRE Offices:** Associate Editor, 1926–28. **Committees:** Board of Editors, 1946–53; Editorial Administrative, 1949–50; Electronics, 1936–42; Papers Review, *chairman, 1949–53;* Professional Groups, 1953; Tellers, 1948–49, *chairman, 1949.*

**MIDDLETON, David (S'42—A'44—M'45—SM'53—F'59),** Consultant, 23 Park Lane, Concord, Mass.
Born: April 19, 1920, New York, N.Y. A.B., 1942, Harvard College; M.A., 1945, Ph.D., 1947, Harvard University. **Awards:** Fellow, American Physical Society, 1950; National Electronic Conference Award, 1956; Fellow, American Association for the Advancement of Science, 1959.

**MIEHER, Walter W. (A'40—M'44—SM'51—F'54),** Engineering Manager, Electronic Countermeasures Division, Sperry Gyroscope Company, Great Neck, L.I., N.Y.
Born: October 30, 1916, St. Louis, Mo. B.S., 1938, Washington University. **Committees:** Antennas, 1947–49, *alternate, 1947;* Antennas and Waveguides, 1947–50; Awards, 1957–58. **Sections:** Long Island, *vice-chairman, 1952–53.*

**MIESSNER, Benjamin F. (A'37—F'37),** President, Miessner Inventions, Inc., 680 N.E. 105 St., Miami Shores, Fla.
Born: July 27, 1890, Huntingburg, Ind. Attended United States Naval Electrical School, 1908–09; Attended Purdue University, 1913–16.

**MILLAR, Julian Z. (A'30—SM'45—F'56),** Assistant Vice President, Research and Engineering Department, Western Union Telegraph Company, 60 Hudson St., New York 13, N.Y.
Born: July 3, 1901, Mattoon, Ill. B.S.(E.E.), 1924, University of Illinois. **Committees:** Annual Review, *chairman, 1953–54;* IRE Convention Technical Program, *chairman, 1955;* Standards, 1953–54; Tellers, 1951–52, *chairman, 1952.* **Professional Groups:** Communications Systems, *chairman, 1954–55.*

**MILLER, Burton F. (J'24—A'26—SM'44—F'56),** Vice President, Advanced Technical Planning, Thompson Ramo Wooldridge Inc., 8433 Fallbrook Ave., Canoga Park, Calif.
Born: July, 1905, Milwaukee, Wis. B.S.(E.E.), 1926, M.S.(Physics), 1928, Ph.D. (Physics), 1929, University of Wisconsin. **Sections:** Los Angeles, Awards Committee, 1957–60, *chairman, 1959.* **Awards:** Two Technical Achievement Awards, Academy of Motion Picture Arts and Sciences, 1947.

**MILLER, John H. (A'19—M'25—SM'43—F'50)(L),** Retired. 205 Palmetto Lane, Harbor Bluffs, Largo, Fla.
Born: June 6, 1893, Oak Park, Ill. B.S.(E.E.), 1915, University of Illinois. **Committees:** Institute Sections, 1928; Sections, 1933–34, 1938–39, 1941–44, *chairman, 1940.* **Sections:** Chicago, *chairman, 1927–29, secretary, 1929–30.* **IRE Representative:** ASA Subcommittee (C42.6) on Electrical Instruments, 1948–51.

**MILLER, John M. (A'17—F'20)(L),** Retired. 2301 N.E. Second St., Apt. 6, Pompano Beach, Fla.
Born: June, 1882, Hanover, Pa. B.A., 1904, M.A., 1907, Ph.D., 1915, Yale University. **Awards:** Distinguished Civilian Service Award, United States Navy, 1945; IRE Medal of Honor, 1953.

**MILLER, Stewart E. (M'46—SM'53—F'58),** Director of Guided Wave Research, Bell Telephone Laboratories, Inc., P.O. Box 107, Red Bank, N.J.
Born: September 1, 1918, Milwaukee, Wis. B.S., 1941, M.Sc., 1941, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1954–60. **Awards:** U. S. Naval Ordnance Development Award, 1945.

**MILLMAN, Jacob (A'41—SM'49—F'58),** Professor of Electrical Engineering, Columbia University, 116 St. and Broadway, New York 27, N.Y.
Born: May 17, 1911, Russia. B.S., 1932, Ph.D., 1935, Massachusetts Institute of Technology. **Awards:** Fellow, American Physical Society, 1946.



**MILLMAN, Sidney (A'48—SM'48—F'59),** Director of Physical Research, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: March 15, 1908, Minsk, Russia. B.S., 1931, City College of New York; A.M., 1932, Ph.D., 1935, Columbia University.

**MIMNO, Harry R. (A'31—VA'39—M'55—F'58),** Gordon McKay Professor of Applied Physics, Harvard University, Cambridge, Mass.
Born: May 8, 1900, Chicago, Ill., E.E., Rensselaer Polytechnic Institute, 1921; A.M., 1926, Ph.D., 1932, Harvard University. **Committees:** Annual Review, 1949–50; Editorial Reviewer, 1954–60; Fellow, 1959–60, *chairman, 1960;* Navigation Aids, 1946–49; *vice-chairman, 1949–54, chairman, 1954–59;* Papers, 1939–45; Papers Review, 1946–53; Radio Wave Propagation, 1942–46; Standards, 1954–60, Member-at-large, 1957–58; Wave Propagation, 1927–42, 1956. **Awards:** Fellow, American Physical Society; Fellow, American Academy.

**MINNIUM, Byron B. (A'25—SM'50—F'59),** Vice President, Research and Engineering, Erie Resistor Corporation, 644 W. 12 St., Erie 6, Pa.
Born: November 11, 1896, Cairo, W.Va. E.E., 1922, University of Cincinnati. **Committees:** Membership, 1935; Sections, 1935. **Sections:** Chicago, *chairman, 1930–31;* Chicago Convention, *chairman, 1931.* **Awards:** U. S. Navy Certificate of Commendation, 1947.

**MITCHELL, Doren (SM'46—F'60),** Special Systems Engineer, Bell Telephone Laboratories, Inc., 463 West St., New York, N.Y.
Born: March 4, 1905, Columbus, Ohio, B.S., 1925, Princeton University.

**MITTELMANN, Eugene (A'38—SM'44—F'57),** Consulting Engineer, 549 W. Washington, Chicago 6, Ill.
Born: May 29, 1903, Pressburg, Hungary. E.E., 1927, Vienna Institute of Technology; Ph.D., 1931, University of Vienna. **Committees:** Industrial Electronics, 1946–60, *vice-chairman, 1951–58, chairman, 1958–60;* Instrumentation and Control, *chairman, 1955–58;* Methods of Measurements, *chairman, 1951–57;* Standards, 1959–60. **Professional Groups:** Industrial Electronics, Administrative Committee, 1950–59, *chairman, 1950–54.* **Awards:** Special Award, American Congress of Physical Therapy, 1940.

**MOE, Robert E. (S'33—A'35—SM'46—F'55),** Manager of Engineering, Receiving Tubes Department, Electronic Components Division, General Electric Company, Owensboro, Ky.
Born: April 2, 1912, Appleton, Wis. B.S.(E.E.), 1933, University of Wisconsin. **Committees:** Papers Review, 1946–49. **Sections:** Connecticut Valley, *secretary, 1943, chairman, 1944;* Syracuse, *secretary, 1947;* Evansville, Owensboro, *chairman, 1950;* 5th Region, *director, 1960–61.* **Awards:** U. S. Navy Certificate of Commendation, 1947.

**MOLLER, Rolf (SM'54—F'56),** c/o Fernseh GmbH, Darmstadt, Germany.
Born: July 25, 1906, Altona, Germany. Dr. rer. nat., 1930, Hamburg University. **Awards:** President, Fernseh-Technische Gesellschaft, 1953; Fellow, Television Society, England.

**MOLNAR, Julius P. (SM'53—F'60),** President, Sandia Corporation; Vice President, Western Electric Co., Inc., P.O. Box 5800, Albuquerque, N.M.
Born: February 23, 1916, Detroit, Mich. A.B., 1937, Oberlin College; Ph.D., 1940, Massachusetts Institute of Technology. **Committees:** Tellers, 1954.

**MONTGOMERY, Alexander W. (M'31—SM'43—F'54),** Director and Joint General Manager, Standard Telephones and Cables, Ltd., Connaught House, 63 Aldwych, London, W.C.2, England; Vice Chairman, Standard Telecommunication Laboratories, Ltd., Enfield, England; Director, International Marine Radio Co., Ltd., Croydon, England.
Born: December 14, 1896, Manchester, Lancashire, England. B.Sc., Tech., 1921 Manchester College of Technology. **Awards:** Order of the British Empire, 1945.

**MONTGOMERY, L. H., Jr. (A'45—SM'50—F'60),** Medical Electronics Consultant and Research Associate in Anatomy also Technical Staff WSM Radio Station, Vanderbilt University Medical School and WSM Radio Station, 21st and Edgehill, Nashville 5, Tenn.
Born: January, 1907, Nashville, Tenn. **Committees:** Medical Electronics, 1956–58, *chairman, 1958–60;* Standards, 1952–53, 1958–60. **Professional Groups:** Sponsor, Professional Group on Medical Electronics, 1951; Medical Electronics Administrative Committee, 1952–58. **IRE Representative:** I.E.C. Sec. 12–1, 65, 70, 1954; Joint Executive Committee on Medicine and Biology, IRE, AIEE, ISA, 1952–60, *chairman, 1954;* Program Committee IRE National Convention, 1953–54.

**MOORE, John B. (A'26—M'38—SM'43—F'60),** Staff Engineer, RCA Communications, Inc., 66 Broad St., New York 4, N.Y.
Born: October 13, 1900, Alden, N.Y. B.S.(E.E.), 1922, Carnegie Institute of Technology; Professional Engineer, 1941. **Committees:** U. S. Preparatory Committee for the C.C.I.R., 1949–52.

**MOORE, John R. (SM'52—F'58),** Vice President and General Manager, Autonetics, a Division of North American Aviation, Inc., 9150 E. Imperial Highway, Downey, Calif.
Born: July 5, 1916, St. Louis, Mo. B.Sc.(M.E.), 1937, Washington University.

**MOORE, Robert C. (F'55),** Senior Engineering Specialist, Philco Corporation, 4700 Wissahickon Ave., Philadelphia 44, Pa.
Born: January 3, 1912, Pontiac, Ill. B.S.(E.E.), 1933, University of North Dakota; M.S.(E.E.), 1934, Massachusetts Institute of Technology; B.A., 1936, Oxford University.

**MORENO, Theodore (S'41—A'44—M'55—F'60),** Manager, Research and Development, Tube Division, Varian Associates, 611 Hansen Way, Palo Alto, Calif.
Born: September 2, 1920, Palo Alto, Calif. A.B., 1941, A.M., 1942, Stanford University; Sc.D., 1949, Massachusetts Institute of Technology.

**MORGAN, Howard K. (A'27—M'41—SM'43—F'57),** Director of Commercial Aviation Systems, Bendix Corporation, Fisher Building, Detroit 2, Mich.
Born: February, 1906, New York, N.Y. B.S.(E.E.), 1929, University of California. **Committees:** Navigation Aids, 1947, 1950–51; Papers, 1941; Papers Procurement, 1942–43; Regular Papers, 1941. **Sections:** Kansas City, *chairman, 1941–43.* **Awards:** Radio Technical Commission for Aeronautics Citation.

**MORRIN, Thomas H. (M'48—SM'54—F'60),** Director of Engineering Research, Stanford Research Institute, 333 Ravenswood Ave., Menlo Park, Calif.
Born: November 24, 1914, Woodland, Calif. B.S.(E.E.), 1937, University of California. **Professional Groups:** Education Administrative Committee, 1959–62.

**MORRIS, Robert M. (A'26—M'42—SM'43—F'57),** Radio Facilities Engineer, American Broadcasting Company, 7 W. 66 St., New York 23, N.Y.
Born: January 18, 1902, Washington, D.C. **Committees:** Frequency Modulation, 1941–42; Meetings and Papers, 1930; Membership, 1936; Papers Review, 1947–48; Standardization, 1929–30; Standards, 1938–41; Video Techniques, 1951–57. **Awards:** Exceptional Merit Medal, War Department, 1945.

**MORRISON, John F. (A'29—M'36—SM'43—F'51),** Technical Staff, Bell Telephone Laboratories, Inc., Morristown Road, Whippany, N.J.
Born: March 14, 1906, Buffalo, N.Y. **Committees:** Annual Review, 1945–46; Antennas, 1944–45; Awards, 1951–54; Radio Transmitters, 1945–47, *chairman, 1945–46;* Standards, 1945–46; Transmitters, 1944–45; Transmitters and Antennas, 1938–44. **Pro-**

fessional Groups: Aeronautical and Navigational Electronics, *vice-chairman, 1955.* Sections: Northern New Jersey Subsection, *chairman, 1951.*

**MORTON, George A. (A'39—SM'46—F'51),** Associate Director, Physical-Chemical Laboratory, RCA Laboratories, Radio Corporation of America, Princeton, N.J.
Born: March 24, 1903, New Hartford, N.Y. B.S., 1926, M.S., 1928, Ph.D., 1932, Massachusetts Institute of Technology. **Committees:** Measurements and Instrumentation, 1950–60; Nuclear Studies, 1948–49; Nuclear Techniques, 1955–60, *chairman, 1955–58;* Standards, 1955–60. **IRE Representative:** ASA Planning Committee on Nuclear Standards, 1955–58; ASA Nuclear Standards Board, 1958–60. **Awards:** Certificates of Commendation, Bureau of Ships, National Defense Research Council, United States Air Force; Overseas Premium Award, Institute of Electrical Engineers, 1937–38.

**MORTON, Jack A. (A'36—SM'49—F'53),** Vice President, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: September 4, 1913, St. Louis, Mo. B.S., 1935, Wayne University; M.S., 1936, University of Michigan; D.Sc.(Honorary), 1954, Ohio State University; D.Sc.(Honorary), 1956, Wayne University. **Committees:** Electron Tubes, 1946–49; Electron Tubes and Solid State Devices, 1949–53; Electronics, 1943–46; Membership, 1943–44; Papers Review, 1953; Vacuum Tubes, 1945–46. **Awards:** Honorable Mention, Eta Kappa Nu, 1945; Alumni Award, Wayne University, 1951; University of Michigan Centennial Award, 1953.

**MORTON, Paul L. (A'43—SM'45—F'55),** Professor, Electrical Engineering Division, University of California, Berkeley 4, Calif.
Born: May 14, 1906, Silao, Guadalajara, Mexico. B.S.(E.E.), 1931, University of Washington; M.S.(E.E.), 1938, Massachusetts Institute of Technology; Ph.D., 1943, University of California.

**MOSELEY, Francis L. (A'33—SM'47—F'57),** President, F. L. Moseley Company, 409 N. Fair Oaks, Pasadena, Calif.
Born: August 2, 1908, St. Paul, Minn. **Committees:** Navigation Aids, 1948–49; Papers Review, 1946–48, 1950–52. **IRE Representative:** ANTC, 1948. **Sections:** Dayton, *vice-chairman, 1943;* Pasadena Subsection, *vice-chairman, 1955.* **Awards:** Flight Safety Foundation Award, 1955; Pioneer Award, Professional Group on Aeronautical and Navigational Electronics, 1959.

**MOUNTJOY, Garrard (A'37—M'40—SM'43—F'50),** Assistant to the Executive Vice President, A.R. & T. Electronics, Inc., 5 St. & Cornish, North Little Rock, Ark.
Born: October 21, 1905, Boscobel, Wis. B.S., 1929, Washington University. **Committees:** Awards, 1956; Papers Review, 1953; Receivers, 1942–58; Television, 1945–48. **Sections:** Rochester, *secretary, 1948–49, vice-chairman, 1950–51, chairman, 1952–53.* **IRE Representative:** ASA War Standards Committee on Methods of Measuring Radio Noise, 1945–48. **Awards:** Modern Pioneer Award, National Association of Manufacturers.

**MUELLER, Charles W. (S'35—A'36—SM'45—F'59),** RCA Laboratories, Princeton, N.J.
Born: February 12, 1912, New Athens, Ill. B.S., 1934, University of Notre Dame; M.S., 1936, Sc.D., 1942, Massachusetts Institute of Technology. **Committees:** Semiconductor Devices, 1956–60; Solid State Devices, 1954–58. **Sections:** Princeton Subsection, *chairman, 1946–47.*

**MULLIGAN, James H., Jr. (S'41—A'45—M'45—SM'54—F'59),** Professor of Electrical Engineering, Chairman of Department, College of Engineering, New York University, University Heights, New York 53, N.Y.
Born: October, 1920, Jersey City, N.J. B.E.E., 1943, E.E., 1947, Cooper Union School of Engineering; M.S., 1945, Stevens Institute of Technology; Ph.D., 1948, Columbia University. **Committees:** Fellow, 1960; Measurements and Instrumentation, *vice-chairman, 1954–57; chairman, 1957–60;* Standards, 1957–60; Television Systems, 1948–54; Tellers, 1953. **Professional Groups:** Circuit Theory, *secretary-treasurer, 1956–59, vice-chairman, 1959–60;* Circuit Theory Administrative Committee, 1958–61; Transistor and Solid State Circuits Conference, *general chairman, 1958.* **Sections:** New York, *vice-chairman, 1950–51, chairman, 1951–52.* **IRE Representative:** ASA Sectional Committee (C39) on Electrical Measuring Instruments, 1957–60.

**MUMFORD, William W. (A'30—SM'46—F'52),** Member, Technical Staff, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: June 17, 1905, Vancouver, Wash. B.A., 1930, Willamette University. **Committees:** National Convention Program, 1950–57; Professional Groups, 1956. **Professional Groups:** Microwave Theory and Technique Administrative Committee, *secretary, 1952, vice-chairman, 1953, chairman, 1954.* **Awards:** Burghart Prize, Willamette University, 1926.

**MURRAY, Albert F. (A'20—M'26—F'38),** Consulting Electronic and Television Engineer, 4900 Hillbrook Lane, N.W., Washington 16, D.C.
Born: June 22, 1894, Decatur, Ala. B.A., 1915, Maryville College; B.S., 1918, Harvard University; S.B., 1918, Massachusetts Institute of Technology; D.Sc., 1939, Maryville College. **IRE Offices:** Director, 1936–39. **Committees:** Awards, 1936; Electronics, 1937–41; Institute Sections, 1929–30, 1936; Membership, 1929–39; Papers, 1934–45; Papers Procurement, 1947–50; Papers Review, 1946–53; Television, 1939–46; Television and Facsimile, 1936–39; Television Systems, 1949–59. **Sections:** Philadelphia, *chairman, 1937–38.*

**NAMBA, Shogo (SM'58—F'60),** Doctor of Engineering, Director, The Kokusai Denshin Denwa Co., Ltd. (Japan's Overseas Radio and Cable System), No. 1–5, Otemachi, Chiyoda-ku, Tokyo, Japan.
Born: July 14, 1904, Kyoto, Japan. M., 1927, Dr., 1935, Kyoto University. **Awards:** Asano Award, Institute of Electrical Engineers of Japan, 1936; Distinguished Service Award, Institute of Communication Engineers of Japan, 1943.

**NERGAARD, Leon S. (A'29—M'38—SM'43—F'52),** Associate Director, Electronic Research Laboratory, RCA Laboratories Division, Princeton 5, N.J.
Born: September 2, 1905, Battle Lake, Minn. B.S.(E.E.), 1927, University of Minnesota; M.S.(E.E.), 1930, Union College; Ph.D.(Physics), 1935, University of Minnesota. **Committees:** Annual Review, 1948–50; Electron Devices, 1952–55; Electron Tubes, 1946–58, *vice-chairman, 1948–49;* Electron Tubes and Solid State Devices, 1949–52, *chairman, 1949–51;* Electronics, 1940–45; Measurements and Instrumentation, 1952–53; Standards, 1949–51; Vacuum Tubes, 1945–46. **Professional Groups:** Electron Devices, 1953–55, *vice-chairman, 1953, chairman, 1953–54.* **IRE Representative:** ASA Sectional Committee (C60) on Standardization of Electron Tubes, 1949–56; ASA Subcommittee (C42.14) on Electron Tubes, 1952–53.

**NEWHOUSE, Russell C. (A'30—M'39—SM'43—F'56),** Director of Missile Systems Development, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: December 17, 1906, Clyde, Ohio. B.E.E., 1929, M.Sc.(E.E.), 1930, Ohio State University. **Professional Groups:** Aeronautical and Navigational Electronics, *secretary-treasurer, 1956, vice-president, 1957.* **Awards:** Guggenheim Fellowship, Ohio State University, 1929; Lawrence Sperry Award, Institute of the Aeronautical Sciences, 1938; Distinguished Alumnus Award, Ohio State University, 1959.

**NICHOLS, Williams A. (A'29—M'42—SM'43—F'55),** Assistant Chief Engineer, Canadian Broadcasting Corporation, 5253 Decarie Blvd., Montreal, P.Q., Canada.
Born: November 14, 1903, Toronto, Ont., Canada, B.A.Sc., 1928, University of Toronto. **Committees:** Membership, 1940. **Sections:** Montreal, *secretary, 1939–42.*

**NIWA, Yasujiro (A'53—F'54),** President, Tokyo Electrical Engineering College, 2, 2-chome, Kanda-Nishikicho, Chiyoda-Ku, Tokyo, Japan.



Born: April 1, 1893, Matsusaka, Miye Prefecture, Japan. Doctor of Engineering, 1926, Tokyo University. **IRE Offices:** Vice President, 1957; Director, 1957. **Sections:** Tokyo, *vice-chairman, 1955–56, chairman, 1957–.* **Awards:** Asano Prize, Institute of Electrical Engineers of Japan, 1929; Imperial Prize, Japan Society of Invention, 1932; Imperial Prize, Japan Academy, 1937; Order of Rising Sun, Japanese Government, 1940; Medal of Merits, Institute of Communication Engineers of Japan, 1942; President, the Institute of Communication Engineers of Japan, 1942–43; President, Japan Radio Society, 1943–44; President, Institute of Electrical Engineers of Japan, 1950–51; President, Television Society of Japan, 1954–56; Medal of Cultural Merits, Japan Broadcasting Association, 1956; President, Acoustical Society of Japan, 1957.

**NOBLE, Daniel E. (A'25—SM'44—F'47),** Director and Executive Vice President in Charge of Industrial, Semiconductor and Military Electronic Divisions of Motorola, Inc., 4545 Augusta Blvd., Chicago, Ill.
Born: October 4, 1901, Naugatuck, Conn. B.S., 1929, University of Connecticut. D.Sc.(Honorary), 1957, Arizona State College. **IRE Offices:** Director, 1957–59. **Committees:** Annual Review, 1941–43, 1946–47; Appointments, 1958–59; Frequency Modulation, *chairman, 1940–43;* Mobile Communication Systems, 1950–56; Nominations, 1958–59; Papers Procurement, 1942–43, 1947, 1949–50; Policy Advisory, 1958–60; Railroad and Vehicular Communication, 1945–47, 1949–50, *chairman, 1945–48;* Regular Papers, 1941; Standards, 1940–43, 1946–47. **Sections:** Connecticut Valley, *chairman, 1938.*

**NOBLE, Harrell V. (A'34—M'35—SM'43—F'58),** Technical Director, Electronic Technology Laboratory, Wright Air Development Division, Air Research and Development Command, USAF, Wright-Patterson Air Force Base, Ohio.
Born: April, 1907: Noblesville, Ind. B.S.(E.E.), 1929, Purdue University.

**NOIZEUX, Pedro J. (A'30—F'47),** Assistant General Manager, Transradio Internacional, Compania Argentina de Telecomunicaciones, San Martin, 379, Buenos Aires 4, Argentina.
Born: 1900, France. **Sections:** Buenos Aires, *Founder,* 1939, *chairman, 1941–42.*

**NORTH, Dwight O. (A'35—M'38—SM'43—F'43),** Fellow, Technical Staff, RCA Laboratories Division, Radio Corporation of America, Princeton, N.J.
Born: September 28, 1909, Hartford, Conn. B.S., 1930, Wesleyan University; Ph.D., 1933, California Institute of Technology. **Committees:** Awards, 1948; Board of Editors, 1946–53; Editorial Reviewer, 1954–60; Papers, 1944–45.

**NORTH, Harper Q. (A'51—SM'51—F'57),** President, Pacific Semiconductors, Inc., 10451 W. Jefferson Blvd., Culver City, Calif.
Born: January 24, 1917, Los Angeles, Calif. B.S., 1938, California Institute of Technology; M.S., 1940, Ph.D., 1947, University of California at Los Angeles. **Committees:** Editorial Reviewer, 1954–60; Solid State Devices, 1955. **Professional Groups:** Electron Devices, *treasurer, 1952–53.* **IRE Representative:** Electron Devices, Pacific Coast IRE Convention, Long Beach, *program chairman, 1952;* Electron Devices, Los Angeles Chapter, *organizer* and *chairman, 1952;* Technical Papers Committee, Electron Devices, WESCON, Los Angeles, *chairman, 1954;* Session on Solid State Devices, WESCON, San Francisco, *chairman, 1955;* Papers Study and Procurement, Electron Devices, *co-chairman, 1955–56;* New York IRE National Convention, Transistor Session, *chairman, 1955;* IRE Winter Convention on Military Electronics, Advanced Components Session, *chairman;* Technical Program Committee WESCON, Los Angeles, *vice-chairman, 1960.* **Awards:** Fellow, American Physical Society.

**NORTON, Frank R. (A'31—M'40—SM'43—F'60),** Member, Senior Staff, Ramo Wooldridge, A Division of Thompson Ramo Wooldridge Inc., 8433 Fallbrook Ave., Canoga Park, Calif.
Born: August 30, 1904, near Gazelle, Calif. B.S.(Mech.), 1930, University of California; A.M.(Physics), 1935, Columbia University; E.E., 1937, University of California. **Committees:** Radio Receivers, 1955; Receivers, 1951–56. **Sections:** Denver, *secretary-treasurer, 1958–59, vice-chairman, 1959–60.* **Awards:** Color Television Standards Award, Radio Electronics Television Manufacturers Association, 1954.

**NORTON, Kenneth A. (A'29—M'38—SM'43—F'43),** Chief Radio Propagation Engineering Division, Central Radio Propagation Laboratory, National Bureau of Standards, Boulder, Colo.
Born: February 27, 1907, Rockwell City, Iowa. B.S., 1928, University of Chicago. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Awards, 1957–60; Board of Editors, 1951–53; Editorial Administrative, *alternate, 1949–50, 1951;* Editorial Reviewer, 1955–60; Fellow, 1958–59; Navigation Aids, 1950–54; Papers Procurement, 1949–50; Papers Review, 1946–51; Radio Wave Propagation, 1942–46; Radio Wave Propagation and Utilization, 1947–49; Wave Propagation, 1937–42, 1949–55. **Awards:** Stuart Ballantine Medal, Franklin Institute, 1954; IRE Harry Diamond Memorial Award, 1960; Fellow, American Physical Society; Fellow, American Association for the Advancement of Science; Fellow, American Institute of Electrical Engineers.

**NOTTINGHAM, Wayne B. (A'37—SM'46—F'56),** Professor of Physics, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: April, 1899, Tipton, Ind. B.S.(E.E.), 1920, M.A., 1926, Princeton University; E.E., 1929, Purdue University; Ph.D., 1929, Princeton University. **Committees:** Editorial Reviewer, 1954–59; Professional Groups, 1948. **Awards:** Louis E. Levy Medal, Franklin Institute, 1932.

**NYQUIST, Harry (A'39—SM'47—F'52),** Retired as Assistant Director of Systems Studies, Bell Telephone Laboratories, Inc., 463 West St., New York 14, N.Y.
Born: February 7, 1889, Nilsby, Sweden. B.S.(E.E.), 1914, M.S., 1915, University of North Dakota; Ph.D., 1917, Yale University. **Awards:** IRE Medal of Honor, 1960.

**ODARENKO, Todos M. (SM'45—F'59),** Scientific Consultant, U. S. Government, 2430 E St., N.W., Washington 25, D.C.
Born: January 28, 1900, Poltave, Ukraine, Russia. 1919–21, University of Kamenetz, Podolsk, Ukraine; E.E.-Postgraduate, 1921–28, Polytechnical Institute, Prague, Czechoslovakia. **Committees:** Papers Procurement, 1947–50. **Awards:** Distinguished Civilian Service Award, U. S. Navy, 1945.

**OHL, Russell S. (A'24—M'25—SM'43—F'55),** Consulting Engineer, P.O. Box 306, Cambria, Calif.
Born: January 31, 1898, Macungie, Pa. B.S. in Ech.E., 1918, Penn State University; Post Graduate, 1918, University of Maryland; Post Graduate, 1921–22, University of Colorado.

**OLIVE, Gordon W. (A'29—VA'39—F'51),** Retired as Director General of Engineering, Canadian Broadcasting Corporation, R.R. #2, Gananoque, Ont., Canada.
Born: March 18, 1898, Montreal, P.Q., Canada. Attended McGill University, 1919–22. **Committees:** Frequency Modulation, 1946–47; Modulation Systems, 1947–48.

**OLIVER, Bernard M. (A'40—M'46—SM'53—F'54),** Vice President, Research & Development, Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, Calif.
Born: May, 1916, Santa Cruz, Calif. B.S., 1935, Stanford University; M.S., 1936, Ph.D., 1940, California Institute of Technology. **IRE Offices:** Director, 1959–61. **Committees:** Appointments, 1959–60; Editorial Reviewer, 1954–60; Nominations, 1959–60. **Sections:** San Francisco, *treasurer, 1953–54, vice-chairman, 1954–55, chairman, 1955–56.* **IRE Representative:** Joint IRE-AIEE Committee on High Frequency Measurements, 1955–56; WESCON Board of Directors, 1956–59; Executive Committee, *chairman,* WESCON, 1959.

**OLLENDORFF, Franz (SM'52—F'60),** Research Professor, Technion-Israel Institute of Technology, Technion City, Haifa, Israel.

Born: March 15, 1900, Berlin, Germany. Dipl.Ing., 1921, Technische Hochschule, Berlin-Charlottenburg; Dr.Ing., 1922, Technische Hochschule, Danzig; Privat-Dofent, 1928, Berlin-Charlottenburg; Dr.Ing., Honors causa, Technische Universitat, Berlin, 1960.

**OLSON, Harry F. (A'37—VA'39—SM'48—F'49),** Director, Acoustical Laboratory, RCA Laboratories Division, Radio Corporation of America, Princeton, N.J.
Born: December, 1902, Mount Pleasant, Iowa. B.E., 1924, M.S., 1925, Ph.D., 1928, E.E., Professional, 1932, University of Iowa; D.Sc.(Honorary), Iowa Wesleyan. **IRE Offices:** Director, 1959–60. **Committees:** Annual Review, 1949–51; Audio and Electroacoustics, 1959–60; Board of Editors, 1940–53; Editorial Reviewer, 1954–60; Electroacoustics, 1932–58, *chairman, 1934–39;* Papers Procurement, 1943–47; Standards, 1934–39. **Professional Groups:** Audio, *chairman, 1957–58.* **IRE Representative:** ASA Sectional Committee on Acoustical Measurements and Terminology, 1940–51, *alternate, 1952–56;* ASA Sectional Committee on Graphical Symbols and Abbreviations for Use on Drawings, 1949–50. **Awards:** Fellow, American Physical Society; Fellow, Acoustical Society of America; Fellow, Audio Engineering Society; Fellow, Society of Motion Picture and Television Engineers; President, Acoustical Society of America, 1952–53; John H. Potts Medal, Audio Engineering Society, 1952; Samuel L. Warner Medal, Society of Motion Picture and Television Engineers, 1955; John Scott Medal of the City of Philadelphia, 1956; Achievement Award of the Professional Group on Audio of the Institute of Radio Engineers, 1956.

**OLSON, Robert W. (M'46—SM'53—F'59),** Vice President, Research and Engineering, Texas Instruments, Inc., 6000 Lemmon Ave., Dallas 9, Tex.
Born: February 17, 1915, Preston, Minn. B.S.(E.E.), 1938, University of Minnesota. **Committees:** Airborne Electronics, 1953. **Sections:** Houston, *secretary, 1955–56.*

**O'NEILL, George D. (A'28—SM'46—F'49),** Research Engineer, Sylvania Electric Products, Inc., Bayside, L.I., N.Y.
Born: July, 1900, Montclair, N.J. B.S., 1924, University of Michigan. **Committees:** Admissions, 1959–60; Board of Editors, 1952–53; Editorial Reviewer, 1954–60; Electron Devices, 1945–57, *vice-chairman, 1951–52, chairman, 1952–54;* Electron Tubes, 1946–49, 1955–57, 1959–60; Electronics, 1936–46; Standards, 1952–54; Vacuum Tubes, 1945–46. **Professional Groups:** Electron Devices, 1951–54, *chairman, 1951–52;* Membership, 1959. **IRE Representative:** ASA Subcommittee (C42.14) on Electron Tubes, 1954–55.

**ORDUNG, Philip F. (S'40—A'43—M'48—SM'49—F'59),** Professor of Electrical Engineering, Department of Electrical Engineering, Yale University, Dunham Laboratory, New Haven, Conn.
Born: August 12, 1919, Luverne, Minn. B.S., 1940, South Dakota State College; M.Eng., 1942, D.Eng., 1948, Yale University. **Committees:** Circuits, 1950–56; Editorial Reviewer, 1954–60; Education, 1958–60. **Sections:** Connecticut Valley, *secretary, 1953–54, vice-chairman, 1954–55; chairman, 1955–56;* Region I, *treasurer, 1958–60.* **Awards:** Award for the Advancement of Basic and Applied Science, Yale Engineering Association, 1953.

**OSBORNE, Harold S. (A'14—M'29—SM'43—F'45)(L),** Consulting Engineer, 379 Highland Ave., Upper Montclair, N.J.
Born: August 1, 1887, Fayetteville, N.Y. B.S., 1908, Eng.D., 1910, Massachusetts Institute of Technology. **Committees:** Standardization, 1926–29.

**OSWALD, Arthur A. (A'19—M'25—F'28)(L),** Retired from Bell Telephone Laboratories, Inc. Residence: 2 West Lane, Maplewood, N.J.
Born: March 3, 1891, Lake Linden, Mich. B.S.(E.E.), 1916, E.E., 1927, Illinois Institute of Technology. **Committees:** Papers Procurement, 1942–43; Regular Papers, 1941; Standardization, 1925–26.

**OUIMET, J. Alphonse (A'39—SM'44—F'52),** President, Canadian Broadcasting Corporation, P.O. Box 806, Ottawa, Ont., Canada.
Born: June 12, 1908, Montreal, P.Q., Canada. B.A., 1928, St. Mary's College; B.E.E., 1932, McGill University; D.Sc.(Honorary), 1958, University of Montreal. **Committees:** Education, 1944; Television, 1946–49; Television Systems, 1949–53. **Sections:** Montreal, *chairman, 1942–43.* **Awards:** Ross Medal, Engineering Institute of Canada, 1948.

**OXLEY, Allan B. (A'25—M'33—SM'46—F'53),** Reliability Coordinator, Special Weapons Division, Canadair, Ltd., P.O. Box 6087, Montreal, P.Q., Canada.
Born: July 7, 1901, London, England. **IRE Offices:** Director, 1951–52, 1957–58. **Committees:** Awards, 1953–56; Membership, 1953–56; Nominations, 1952–53; Policy Advisory, 1957–58. **Professional Groups:** Coordinator, 1959–60. **Sections:** Toronto, *chairman, 1934–35;* Montreal, *chairman, 1939–40, 1949–50;* Region #8, *director, 1958.* **Awards:** Member, Corporation of Professional Engineers of Quebec, Canada, 1953; Associate Fellow, Canadian Aeronautical Institute, 1959.

**PACKARD, David (S'34—A'41—SM'47—F'48),** President, Hewlett-Packard Company, 275 Page Mill Road., Palo Alto, Calif.
Born: September 7, 1912, Pueblo, Colo. A.B., 1934, E.E., 1939, Stanford University. **Committees:** Awards, 1949; Measurements and Instrumentation, 1949–50. **Sections:** San Francisco, *secretary, 1943–44, chairman, 1945–46.*

**PACKARD, Lucius E. (M'41—SM'43—F'57),** Chairman of the Board, Technology Instrument Corporation, 531 Main St., Acton, Mass.
Born: January 21, 1914, Somerville, Mass. B.S.(E.E.), Massachusetts Institute of Technology. **Committees:** Appointments, 1955; Sections, 1946–47. **Professional Groups:** New England Radio Engineering Meeting, *first chairman, 1947.* **Sections:** Chicago, *secretary, 1945–46;* Boston, *vice-chairman, 1950, chairman, 1951–52;* North Atlantic Region, *regional director, 1954.*

**PAGE, Chester H. (SM'48—F'56),** Consultant to Director, National Bureau of Standards, Washington 25, D.C.
Born: November 13, 1912, Providence, R.I., A.B., 1934, Sc.M., 1934, Brown University; Ph.D., 1937, Yale University. **Committees:** Circuits, 1949–60, *vice-chairman, 1950–51, chairman, 1951–54;* Editorial Reviewer, 1954–60; Electronic Computers, 1948–51; Papers Review, 1951–53; Professional Groups, 1957; Standards, 1951–60, *vice-chairman, 1957–59;* Definitions Coordinator, 1956–60. **Professional Groups:** Circuit Theory, *chairman, 1953–54.* **IRE Representative:** ASA Sectional Committee (C42) on Definitions of Electrical Terms; ASA Subcommittee (C42.13) on Communications, 1959–60; U. S. Study Group XIV of C.C.I.R., *chairman.* **Awards:** Certificate for Exceptional Service, Bureau of Ordnance; Gold Medal Award, Department of Commerce; Certificate of Appreciation, War Department, O.S.R.D.; Fellow, American Physical Society.

**PAGE, Robert M. (SM'45—F'47),** Director of Research, United States Naval Research Laboratory, Washington 25, D.C.
Born: June 2, 1903, St. Paul, Minn. B.Sc., 1927, Hamline University; M.S., 1932, George Washington University; D.Sc. (Honorary), 1943, Hamline University. **Committees:** Board of Editors, 1946–53; Editorial Reviewer, 1954–60. **Sections:** Washington, *treasurer, 1955–56, secretary, 1956–57, vice-chairman, 1957–58, chairman, 1958–59.* **Awards:** Distinguished Civilian Award, United States Navy, 1954; Citation O.S.R.D., 1946; Presidential Certificate of Merit, 1947; IRE Harry Diamond Memorial Award, 1953; Stuart Ballantine Medal, Franklin Institute, 1957; Captain Robert Dexter Conrad Award, 1959; Wheaton College Centennial Award, 1960.

**PALMER, Winslow (S'38—A'41—SM'50—F'56),** Engineering Section Head, Sperry Gyroscope Company, Great Neck, L.I., N.Y.
Born: July, 1912, New Brunswick, N.J. B.S., 1937, University of Hawaii; E.E., 1939, Stanford University. **Committees:** Modulation Systems, 1951–54. Naviagation Aids, 1951–58, *vice-chairman, 1954–56, chairman, 1957–59;* Standards, 1957–59. **Awards:** Certificate of Commendation, United States Navy, 1947.



**PAN, Wen Y. (A'41—SM'46—F'58),** Manager, Radio Corporation of America, Cherry Hill, Camden, N.J.
Born: July 15, 1912, Soochow, China. B.Sc., 1935, Chao-Tung University; E.E., 1939, Ph.D., 1940, Stanford University. **Awards:** Award of Merit by Ministry of Communications of the Chinese Government, 1937; Honorary Member, Veteran Wireless Operators Association, 1947.

**PARKER, Ralzemond D. (A'16—SM'45—F'59)(L),** Retired from Bell Telephone Laboratories; Consulting Engineer, 3606 Chesapeake St., N.W., Washington 8, D.C.
Born: December, 1881, Detroit, Mich. B.S.(E.E.), 1905, M.S., 1906, University of Michigan. **Awards:** Fellow, American Institute of Electrical Engineers; Distinguished Alumnus, University of Michigan.

**PATTERSON, George W. (J'31—A'49—SM'54—F'59),** Associate Professor and Head of Systems Logic Section, Moore School of Electrical Engineering and Graduate School of Arts and Sciences, University of Pennsylvania, 200 S. 33 St., Philadelphia, Pa.
Born: May 6, 1912, Rochester, N.Y. B.Sc.(E.E.), 1934, University of Vermont; M.A.(Physics), 1936, Columbia University; Ph.D.(Math.), 1958, University of Pennsylavnia. **Committees:** Electronic Computers, 1949–59; Definitions, 1951–60, *chairman, 1960–;* Digital Computer Logic and Block Diagram Symbols, Subcommittee, *chairman, 1955–.* Electronic Computers, 1949–, *vice-chairman, 1960–,* Symbols, 1953–56. **Professional Groups:** Electronic Computers Administrative Committee, 1955–56. **Sections:** Philadelphia Chapter, Electronic Computers Group, *chairman, 1955–56,* Executive Committee, 1955–56. **IRE Representative:** International Electrotechnical Commission, 1954. **Awards:** Certificate of Appreciation of Services, Office of Scientific Research and Development, National Defense Research Committee, 1945; Naval Ordnance Development Award, United States Navy, 1945; Fellow, American Association for the Advancement of Science.

**PAYNE, Leonard S. (M'16—SM'43—F'49)(L),** Retired. 104 Marine Parade, Worthing, West Sussex, England.
Born: February 28, 1886, London, England. Attended Faraday House Technical College, London. **Committees:** Canadian delegate to the CCIR meeting in London, 1953; Canadian Radio Technical Planning Board, Panel A, *chairman.*

**PETER, Rolf W. (A'47—SM'52—F'58),** Director, Physical and Chemical Research Laboratory, RCA Laboratories, Princeton, N.J.
Born: August 20, 1920, Zurich, Switzerland. Dipl. E.E., 1944, Ph.D., 1948, Swiss Federal Institute of Technology. **Committees:** Editorial Reviewer, 1954–58: Standards Subcommittee on Operating Measurements of Microwave Amplifier Tubes, 1953–55, 1959–60.

**PETERSON, Arnold P. G. (S'34—A'38—SM'46—F'58),** Engineer, General Radio Company; 22 Baker Ave., West Concord, Mass.
Born: August 7, 1914, DeKalb, Ill. B.Eng., 1934, University of Toledo; M.Sc., 1937, Dr.Sc., 1941, Massachusetts Institute of Technology. **Committees:** Awards, 1948; Editorial Reviewer, 1955; Measurements and Instrumentation, 1949–54; Papers Review, 1946–52; Recording and Reproducing, 1954–56; Sound Recording and Reproduction, 1950–53. **Awards:** Fellow, Acoustical Society of America, 1951.

**PETERSON, Eugene (M'30—SM'43—F'59),** Consultant, 25 E. 9 St., New York 3, N.Y.
Born: August 26, 1894, New York, N.Y. E.E., 1917, Polytechnic Institute of Brooklyn; M.A., 1923, Ph.D., 1926, Columbia University.

**PETERSON, Harold O. (A'22—M'31—F'41),** Associate Laboratory Director, RCA Laboratories Division, Radio Corporation of America, 140 Moriches Road, Riverhead, L.I., N.Y.
Born: November 3, 1899, Blair, Neb. B.Sc.(E.E.), 1921, D.Eng. (Honorary), 1951, University of Nebraska. **Committees:** Advisory Committee to the National Bureau of Standards, 1954–56; Aircraft Receivers, 1930–31; Board of Editors, 1944–53; Editorial Reviewer, 1954–60; Industrial Electronics, 1947–51; Measurements and Instrumentation, 1949–50; Papers, 1934–44; Papers Study and Procurement for the *Transactions of* PGCS, *chairman, 1958–59;* Radio Receivers, 1936–48; Radio Wave Propagation, 1942–45; Radio Wave Propagation and Utilization, 1945–49; Standards, 1934–35; Transmitters and Antennas, 1936–37; Wave Propagation, 1937–42, 1949–60. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

**PETRILLO, Salvatore E. (A'42—F'56),** Director of Engineering, U. S. Army Signal Research and Development Laboratory, Fort Monmouth, N.J.
Born: July, 1909, Waterbury, Conn. B.S.(E.E.), 1930, Yale University. **Sections:** Monmouth Subsection, *vice-chairman, 1948.* **Awards:** Legion of Merit, Department of the Army, 1945.

**PETTIT, Joseph M. (S'39—A'40—M'45—SM'46—F'54),** Dean of Engineering and Professor of Electrical Engineering, Stanford University, Stanford, Calif.
Born: July 15, 1916, Rochester, Minn. B.S., 1938, University of California; E.E., 1940, Ph.D., 1942, Stanford University. **IRE Offices:** Director, 1954–55. **Committees:** Editorial Reviewer, 1954–55; Education, 1949–60, *chairman, 1955–56;* Fellow, 1958–60; Policy Advisory, 1954–55; Radio Receivers, 1946–52. **Sections:** Palo Alto, *chairman, 1951–52.* **IRE Representative:** Stanford University, 1948–51. **Awards:** Presidential Certificate of Merit, U. S. Government, 1949; Electronics Achievement Award, Region 7, 1952.

**PICKERING, William H. (A'41—SM'49—F'55),** Director, Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive., Pasadena 3, Calif.
Born: December 24, 1910, Wellington, New Zealand. B.S., 1932, M.S., 1933, Ph.D., 1936, California Institute of Technology. **Committees:** Editorial Reviewer, 1954–60; Education, 1949–51; Papers Review, 1946–53. **IRE Representative:** California Institute of Technology, *alternate, 1941–42, 1950–52.* **Awards:** Commendation for Meritorious Civilian Service, U. S. Air Force; Fellow, American Rocket Society; James Wyld Award, American Rocket Society; Decoration for Distinguished Civilian Service, Department of the Army.

**PIERCE, John A. (SM'45—F'47),** Senior Research Fellow, Cruft Laboratory, Harvard University, Cambridge 38, Mass.
Born: December 11, 1907, Spokane, Wash. B.A., 1937, University of Maine. **Committees:** Annual Review, 1948–49; Editorial Reviewer, 1954–60; Navigation Aids, 1947–50 *chairman, 1948–50;* Radio Wave Propagation and Utilization, 1945–49; Standards, 1949; Wave Propagation, 1949–50, 1956–60. **Awards:** Thurlow Award, Institute of Navigation, 1947; President's Certificate of Merit, 1948; IRE Morris Liebmann Prize, 1953; Fellow, American Academy of Arts and Sciences; Fellow, American Association for the Advancement of Science.

**PIERCE, John R. (S'35—A'38—SM'46—F'48),** Director of Research, Communications Principles, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: March 27, 1910, Des Moines, Iowa, B.S., 1933, M.S., 1934, Ph.D., 1936, California Institute of Technology, **IRE Offices:** Editor, 1954–55; Director, 1954–55. **Committees:** Editorial Board, *chairman, 1954–55;* Executive, 1954–55; Papers Procurement, *second vice-chairman, 1943.* **Awards:** Outstanding Young Electrical Engineer, Eta Kappa Nu, 1942; IRE Morris Liebmann Memorial Prize, 1947.

**PIORE, Emanuel R. (A'38—M'42—SM'43—F'50),** Director of Research, International Business Machines Corporation, 590 Madison Ave., New York 22, N.Y.
Born: June 19, 1908, Wilno, Russia. B.A., 1930, Ph.D., 1935, University of Wisconsin. **IRE Offices:** Director, 1951. **Committees:** Awards, 1949. **Professional Groups:** Nuclear Science Administrative Committee, 1953, *vice-chairman, 1955.*

**PIPES, Louis A. (M'52—SM'54—F'58),** Professor of Engineering, University of California, Los Angeles 24, Calif.
Born: October 22, 1910, Mexico City, Mexico. B.S., 1933, M.Sc., 1934, Ph.D., 1936, California Institute of Technology.

**POCH, Waldemar J. (A'28—VA'39—SM'48—F'56),** Director, Product Development, RCA Laboratories, Princeton, N.J.
Born: July, 1905, London, England. B.S. (E.E.), 1928, University of Michigan; M.S., 1934, University of Pennsylvania. **Committees:** Annual Review, 1950–51; Audio and Video Techniques, 1948–49: Editorial Reviewer, 1954–60; Standards, 1951–56; Video Techniques, 1949–60, *vice-chairman, 1949–51, chairman, 1951–55.* **IRE Representative:** IRE-EIA-SMPTE-NARTB Committee for Inter-Society Coordination (Television), 1954–59.

**PODOLSKY, Leon (A'30—M'46—SM'53—F'57),** Consultant and Technical Assistant to the President, Sprague Electric Company, Marshall St., North Adams, Mass.
Born: November, 1910, Philadelphia, Pa. E.E., 1934, Drexel Institute of Technology. **Committees:** Activities, 1955–60; Professional Groups, 1955–60. **Professional Groups:** Administrative Committee, Component Parts; Scholarship Committee. **IRE Representative:** National Bureau of Standards, Technical Advisory Committee, 1959. **Awards:** ASA War Standards Award, 1946; Certificate of Commendation, United States Navy, 1947; IRE-RETMA Fall Meeting Award, 1956; Fellow, American Institute of Electrical Engineers, 1956.

**POLKINGHORN, Frank A. (A'25—F'38),** Technical Staff, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: July 23, 1897, Holbrook, Mass. B.S., 1922, University of California. **IRE Offices:** Director, 1957–58. **Committees:** Admissions, 1943–48, *vice-chairman, 1945–48;* High-Frequency Receivers, 1930–31; National Convention, 1948; Nominations, 1958; Policy Advisory, 1957–58; Radio Receivers, 1932–34; Sections, 1941–45. **Sections:** Northern New Jersey Subsection, *treasurer, 1952–53, vice-chairman, 1953–54;* Northern New Jersey Section, *chairman, 1954–55.* **IRE Representative:** ASA Sectional Committee on Radio, 1935–38. **Awards:** Honorary Member, Denki Tsushin Gakkai, Institute of Electrical Communication Engineers of Japan.

**PONTE, Maurice J. H. (SM'48—F'54),** Executive Vice President, Compagnie Générale de Télégraphie Sans Fil, 79 Boulevard Hausmann, Paris, France.
Born: April, 1902, Voiron, Isère, France. Sciences Doctorship, Ecole Normale Supérieure of Paris (Sciences Division). **IRE Offices:** Vice President, 1954; Director, 1954.

**POTE, Alfred J. (A'41—SM'48—F'59),** Executive Vice President and Director of Engineering, Hermes Electronics Co. (formerly Hycon Eastern, Inc.), 75 Cambridge Parkway, Cambridge 42, Mass.
Born: February, 1904, Boston, Mass. B.S.(E.E.), 1926, Massachusetts Institute of Technology; D.A.O. (Honorary), 1937, Staley College. **Committees:** Editorial Reviewer, 1954–60. **Sections:** Boston, *secretary, 1952; chairman, 1954.*

**POTTER, James L. (A'31—SM'44—F'57),** Professor and Chairman, Electrical Engineering Department, Rutgers State University, College of Engineering, New Brunswick, N.J.
Born: December 4, 1905, Carthage, Mo. B.S., 1928, M.S., 1930, E.E., 1939, Kansas State College. **Committees:** Education, 1955–57. **Sections:** Princeton, *secretary-treasurer, 1945–55, vice-chairman, 1955–56, chairman, 1956–57;* Education Subcommittee of Education Committee, *chairman, 1955–56.* **IRE Representative:** Rutgers University, 1941–54. **Awards:** First Prize Paper, Science Division, National American Institute of Electrical Engineers Winter Convention, 1954.

**POTTER, Ralph K. (A'25—M'26—F'41),** Retired. Dogwood Drive, Route No. 17, Morristown, N.J.
Born: October 1, 1894, Elgin, Ill. B.S., 1917, Whitman College; E.E., 1923, Columbia University. **Committees:** Awards, 1944; Papers, 1931–41.

**POUNSETT, Frank H. R. (A'26—SM'44—F'47),** Vice President, Engineering – Manufacturing Radio & Television Division, Philips Electronics Industries, Ltd., 116 Vanderhoof Ave., Toronto 17, Ont., Canada.
Born: September 12, 1904, London, England, B.A.Sc., 1928, University of Toronto. **IRE Offices:** Director, 1949–50. **Committees:** Awards, 1952; Canadian Building Fund and Auditor, 1945; Membership, 1951–52; Nominations, 1948–50, 1955–56; Radio Receivers, 1946–52. **Sections:** Toronto, *chairman, 1945–46.*

**PRATT, Haraden (A'14—M'17—F'29)(L),** Consultant, 2612 N.E. Seventh St., Pompano Beach, Fla.
Born: July 18, 1891, San Francisco, Calif. B.S., 1914, University of California. **IRE Offices:** President, 1938; Treasurer, 1941–42; Secretary, 1943–60; Director, 1935–60. **Committees:** Admissions, 1937; Annual Review, 1937; Appointments, *chairman, 1947;* Awards, 1937–41, 1944–45, 1948, *vice-chairman, 1945, chairman, 1939, 1948;* Board of Editors, 1941–53; Building Fund Administrator, 1947–48; Constitution and Laws, 1941, 1950–51, 1959, *chairman, 1941–42, secretary, 1943–60;* Finance, 1959–60; Fiscal, 1947–57, *chairman, 1947, 1955–57;* History, 1954–60, *chairman, 1959–60;* Investments, 1944–46; New York Program, 1933, 1935–37, *chairman, 1936–37;* Nominations, 1936, 1941–43, 1947–48, 1952–56, *chairman, 1943, 1947;* Office Quarters, 1947; Policy Development, 1950–51, *chairman, 1950;* Preparedness, *chairman, 1940–41;* Radio Transmitters and Antennas, 1930; Standardization, 1928–31; Standards, 1932, 1934–37, *chairman, 1934–35;* Tellers, *chairman, 1936.* **IRE Representative:** ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1936–46, 1949–55; ASA Sectional Committee on Definitions of Technical Terms, 1930; ASA Board of Directors, 1939–41; ASA Sectional Committee on Radio, 1936–48; Joint Technical Advisory Committee, 1948–51; Radio Technical Planning Board, 1944–48, *chairman, 1945–48.* **Awards:** IRE Medal of Honor, 1944; IRE Founders' Award, 1960.

**PREISMAN, Albert (M'38—SM'43—F'53),** Consulting Engineer, Staff, Electrical Engineering Department, Catholic University of America, Washington, D.C.
Born: February 8, 1901, New York, N.Y. A.B., 1922, E.E., 1924, Columbia University. **Committees:** Education, 1950–55; Membership, 1943–46; Papers Review, 1948–53. **Professional Groups:** Audio, *chairman, 1957–58.*

**PRESSLEY, Jackson H. (A'20—F'31),** Retired. 1036 San Diego Road, Santa Barbara, Calif.
Born: June 8, 1896, Rio Vista, Calif. B.S.(E.E.), 1920, University of California. **Committees:** Radio Receivers, 1933–34.

**PRICE, Lloyd M. (A'31—SM'46—F'49),** Sales Representative and Engineering Consultant, 185 Poplar Plains Road, Toronto 7, Ont., Canada.
Born: August, 1897, St. Thomas, Ont., Canada. B.A.Sc., 1923, University of Toronto. **Committees:** Electron Tubes, 1946–47. **Sections:** Toronto, *secretary, 1934–35, chairman, 1935–36.*

**PRIEST, Conan A. (A'24—M'38—SM'43—F'47),** Director, Electronics Division, Onondaga Pottery Company, Syracuse, N.Y.
Born: August 11, 1900, Solon, Me. B.S.(E.E.), 1922, E.E. Professional, 1925, University of Maine. **IRE Offices:** Director, 1953–54. **Committees:** Board of Editors, 1941–53. **Professional Groups:** Industrial Electronics, *secretary, 1954–58.* **Sections:** Syracuse, *chairman, 1947.*

**PRITCHARD, Robert L. (S'45—A'51—SM'55—F'60),** Manager, Device Electronics Branch, Research and Engineering Department, Semiconductor-Components Division, Texas Instruments, Inc., P.O. Box 312, Dallas, Tex.
Born: September, 1924, Irvington, N.J. B.S.(Eng.), 1946, Brown University; M.Sc.(Eng. Sci.), 1947, Ph.D.(Acoustics), 1950, Harvard University. **Committees:** Editorial Reviewer, 1954–60; Semiconductor Devices Subcommittee, 1953–60, *secretary, 1955–57;* Solid State Devices, 1955–60, *chairman, 1957–60;* Standards, 1957–60; Transistor Internal Parameters, *chairman, 1956–60.* **Professional Groups:** Technical Program Committee Second Annual Electron Devices Meeting, *chairman, 1956.* **IRE Representative:** ASA Sectional Committee (C94) on Semiconductor Electron Devices, 1959; ASA Sectional (C60) on Standardization on Electron Tubes, 1958.



**PUGSLEY, Donald W. (A'39—M'45—SM'46—F'52),** Manager, Information Display Department, Ramo Wooldridge Division of Thompson Ramo Wooldridge Inc., Los Angeles, Calif.
Born: December, 1912, Salt Lake City, Utah. B.S.(E.E.), 1935, University of Utah; M.S.(E.E.), 1954, Syracuse University. **Committees:** Radio Frequency Interference, 1956–58; Television, 1945–49; Television Systems, 1949–60. **Professional Groups:** Broadcast and Television Receivers, National Administrative Committee, 1958–60; Engineering Management, National Administrative Committee, 1958–60; Industrial Electronics; Medical Electronics. **Sections:** Syracuse Chapter, Professional Group on Engineering Management, *vice-chairman, 1955–56, chairman, 1956–57.* **Awards:** Outstanding Young Electrical Engineer (Honorary Mention), Eta Kappa Nu, 1944.

**PUNCHARD, John C. R. (A'37—SM'45—F'53),** Manager, Belleville Plant, Northern Electric Company, Ltd., 250 Sidney St., Belleville, Ont., Canada.
Born: April 13, 1911, Toronto, Ont., Canada. B.A.Sc., 1933, University of Toronto. **Committees:** Awards, 1957, 1960; Fellow, *chairman, 1958;* Radio Transmitters, 1947–51. **Sections:** Montreal, *secretary, 1941–44, chairman, 1946–47;* Canadian Council, IRE, *secretary, 1947–53;* Bay of Quinte, *chairman, 1955–56.*

**QUARLES, Lawrence R. (M'42—SM'43—F'52),** Dean of Engineering, Thornton Hall, University of Virginia, Charlottesville, Va.
Born: January 26, 1908, Charlottesville, Va. B.S.E., 1929, Ph.D. (Physics), 1935, University of Virginia. **Committees:** Awards, 1956; Education, 1949–56; Policy Development, 1948. **Sections:** North Carolina-Virginia, *chairman, 1946–47.* **IRE Representative:** University of Virginia, 1943–50.

**RABINOW, Jacob (SM'54—F'56),** President, Rabinow Engineering Company, 7212 New Hampshire Ave., Washington 12, D.C.
Born: January 8, 1910, Kharkov, Russia. B.E.(E.E.), 1933, E.E., 1934, College of the City of New York. **Awards:** Naval Ordnance Development Award, 1945; Certificate of Merit, 1948; Certificate of Appreciation, War Department, 1949; Exceptional Service Award, Department of Commerce, 1949; Certificate of Commendation, National Defense Research Council, 1954.

**RADFORD, William H. (A'41—SM'45—F'54),** Professor of Electrical Communications, Massachusetts Institute of Technology; Associate Director, Lincoln Laboratory, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge 39, Mass.
Born: May 20, 1909, Philadelphia, Pa. B.S., 1931, Drexel Institute of Technology; M.S., 1932, Massachusetts Institute of Technology; D.Eng. (Honorary), 1957, Drexel Institute of Technology. **Committees:** Editorial Reviewer, 1954–60; Education, 1945–48, *chairman, 1947–48;* Membership, 1947–48. **Professional Groups:** Joint Technical Advisory Committee, *vice-chairman, 1956, chairman, 1957–58.* **Sections:** Boston, *chairman, 1947.* **IRE Representative:** Massachusetts Institute of Technology, 1941–54; National Bureau of Standards—IRE Technical Advisory Committee, 1959–62.

**RAGAZZINI, John R. (A'41—M'46—SM'52—F'55),** Dean of the College of Engineering, Professor of Electrical Engineering, South Hall, New York University, New York 53, N.Y.
Born: January 3, 1912, New York, N.Y. B.S., 1932, E.E., 1933, College of the City of New York; M.A., 1938, Ph.D., 1941, Columbia University. **IRE Offices:** Director, 1953–54. **Committees:** Appointments, 1954; Audio and Video Techniques, 1948–49; Board of Editors, 1946–53; Editorial Administrative, 1948–50; Editorial Reviewer, 1954–60; Education, 1949–55; Modulation Systems, 1951–53; Nominations, 1953–54; Policy Advisory, 1954–55; Sound Recording, 1949–50. **Sections:** New York, *secretary, 1946–47, vice-chairman, 1948–49.* **IRE Representative:** Columbia University, 1945–52; ASA Subcommittee (Y10.14) on Nomenclature Feedback Control Systems, 1951–53.

**RAJCHMAN, Jan A. (SM'46—F'53),** Associate Director, Systems Research Laboratory, RCA Laboratories, Princeton, N.J.
Born: August 10, 1911, London, England. Dipl.E.E., 1935, Dr. Sc., 1938, Swiss Federal Institute of Technology. **Committees:** Editorial Reviewer, 1954–60; Electronic Computers, 1948–58; Papers Review, 1950–52, 1954–60. **Awards:** Levy Medal, Franklin Institute, 1948; IRE Morris Liebmann Memorial Prize, 1960.

**RAMBERG, Edward G. (M'53—SM'53—F'55),** Research Physicist, RCA Laboratories Division, Princeton, N.J.
Born: June 14, 1907, Florence, Italy. B.A., 1928, Cornell University; Ph.D., 1932, University of Munich, Germany.

**RAMBO, William R. (S'39—A'40—SM'46—F'59),** Director, Stanford Electronics Laboratories; Professor of Electrical Engineering, Stanford University, Stanford, Calif.
Born: September 3, 1916, San Jose, Calif. A.B., 1938, E.E., 1941, Stanford University.

**RAMEY, Robert A., Jr. (M'46—F'58),** Manager, New Products Engineering Department, Westinghouse Electric Corporation, P.O. Box 10596, Pittsburgh 35, Pa.
Born: December 14, 1918, Wayne, W.Va. B.S.(E.E.), 1943, M.Sc., 1945, Dr.Sc., 1948, University of Cincinnati. **Awards:** Basic Science Committee Best Paper Award, American Institute of Electrical Engineers, 1951.

**RAMO, Simon (A'38—SM'44—F'50),** Executive Vice President, Thompson Ramo Wooldridge Inc., 8433 Fallbrook Ave., Canoga Park, Calif.; Research Associate, California Institute of Technology, Pasadena, Calif.
Born: May, 1913, Salt Lake City, Utah. B.S., 1933, University of Utah; Ph.D., 1936, California Institute of Technology. **Committees:** Board of Editors, 1946–53; Editorial Reviewer, 1954–55; Papers, 1941–45. **Awards:** Honorable Mention, Eta Kappa Nu, 1941; Electronic Achievement Award, Pacific Region, IRE, 1953; Raymond E. Hackett Award, 1955; W. Rupert Turnbull Memorial Award, IAS 1956 International Meeting.

**RANGER, Richard H. (F'37)(L),** President, Rangertone, Inc., 73 Winthrop St., Newark 4, N.J.
Born: June 13, 1889, Indianapolis, Ind. B.S., 1911, Massachusetts Institute of Technology. **Committees:** Meetings and Papers, 1928–30; New York Program, *chairman, 1930–32;* Papers, 1931–33. **Sections:** Northern New Jersey, Membership Committee, *chairman, 1954–55,* Program Committee, *chairman, 1956–58,* Executive Committee, 1954–58, Member, 1959.

**RAPPAPORT, George (A'41—M'44—SM'46—F'56),** Vice President, Government Electronics Division, Emerson Radio and Phonograph Corporation, 1140 East West Highway, Silver Spring, Md.
Born: December 7, 1919, New York, N.Y. B.E.(E.E.), 1941, City College of New York; M.S.(E.E.), 1947, Ohio State University. **IRE Offices:** Director, 1954–56. **Committees:** Annual Review, 1948–52; Membership, 1954–56; Sections, 1950–51; Standards, 1949–52. **Professional Groups:** Aeronautical and Navigational Electronics, *chairman, 1952;* Airborne Electronics, *chairman, 1952.* **Sections:** Dayton, *secretary, 1947–48, chairman, 1948–49.*

**RATCLIFFE, John A. (M'29—A'32—F'53),** Director of the Radio Research Station, Department of Scientific and Industrial Research, Slough, England.
Born: December, 1902, Bacup, Lancashire, England. M.A., 1927, Cambridge. **IRE Offices:** Vice President, 1960. **Awards:** Fellow, The Royal Society.

**RAU, David S. (A'22—SM'45—F'60),** Vice President and Chief Engineer, RCA Communications, Inc., 66 Broad St., New York 4, N.Y.
Born: April 23, 1899, Little Egg Harbor Township, N.J. B.S., 1922, U. S. Naval Academy. **Committees:** Admissions, 1947–48; Convention Registration, 1953–55; Transmitters and Antennas, 1936–42. **Professional Groups:** Awards, 1959–60; Communications Systems, 1953–54; Communications Systems Administrative Committee, 1953–55; Membership, 1953–54; Nominations, 1959–60; Papers, 1955–56. **Awards:** Navy Commendation Ribbon, 1946.

**RAUCH, Lawrence L. (SM'52—F'60),** Professor, Instrumentation, University of Michigan, 1525 East Engineering, Ann Arbor, Mich.
Born: May, 1919, Los Angeles, Calif. A.B., 1941, University of Southern California; A.M., 1947, Ph.D., 1949, Princeton University. **Committees:** Awards, 1948. **Professional Groups:** Space Electronics and Telemetry Administrative Committee, 1957–60. **Awards:** Army and Navy Certificate of Appreciation for an Outstanding Contribution to the Work of the Office of Scientific Research and Development during World War II, 1947; Special Award for Contributions to Telemetry by IRE Professional Group on Telemetry and Remote Control, 1957.

**RAYMOND, Richard C. (SM'52—F'58),** Manager, Technical Military Planning Operation, General Electric Company, 735 State St., Santa Barbara, Calif.
Born: August, 1917, Spokane, Wash. B.S.(Physics), 1938, State College of Washington; Ph.D.(Physics), 1941, University of California.

**REED, Henry R. (SM'53—F'60),** Professor, Electrical Engineering, Engineering Consultant, University of Maryland, College Park, Md.
Born: February, 1904, Minneapolis, Minn. B.S.(E.E.), 1925, M.S. (E.E.), 1927, University of Minnesota; E.E., 1930, South Dakota State College; Ph.D., 1941, The State University of Iowa. **Awards:** National Prize Paper, American Institute of Electrical Engineers, 1937; Fellow, American Institute of Electrical Engineers, 1947.

**REICH, Herbert J. (A'26—M'41—SM'43—F'49),** Professor of Electrical Engineering, Dunham Laboratory, Yale University, New Haven, Conn.
Born: October, 1900. Staten Island, N.Y. M.E., 1924, Ph.D. (Physics), 1929, Cornell University. **IRE Offices:** Director, 1944, 1948–51. **Committees:** Admissions, 1944–46; Appointments, 1950; Awards, 1948; Board of Editors, 1943–53; Constitution and Laws, 1949–50; Education, 1945–53, *chairman, 1949–51;* Electron Tubes, 1946–49, 1956–60, *vice-chairman, 1959–60;* Electron Tubes and Solid State Devices, 1949–53; Electronics, 1941–46; Vacuum Tubes, 1945–46. **Professional Groups:** Electron Devices Administrative Committee, 1952. **IRE Representative:** University of Illinois, 1941–43; Yale University, 1948–50. **Awards:** Fellow, American Physical Society; Fellow, American Institute of Electrical Engineers.

**REID, John D. (A'41—M'44—SM'46—F'49),** Executive Vice President, A.R.&.T. Electronics, Inc., P.O. Box 627, Little Rock, Ark.
Born: March, 1907, Morristown, N.J. Attended University of Pennsylvania, 1925–28. **IRE Offices:** Director, 1950–51. **Committees:** Awards, 1951–54; Board of Editors, 1947–51; Editorial Administrative, 1949–50; Membership, 1949–50; Papers Procurement, 1945–49, *chairman, 1948–49;* Papers Review, 1946; Policy Development, 1950–51; Professional Groups, 1948, 1950; Receivers, 1946–59, *vice-chairman, 1950–56.* **Professional Groups:** Broadcast & Television Receivers Administrative Committee, 1951–60. **Sections:** Cincinnati, *chairman, 1946–47;* Little Rock, *chairman, 1957–58.* **IRE Representative:** National Electronics Conference, Board of Directors, 1950–51. **Awards:** Naval Ordnance Development Award, United States Navy, 1945; Presidential Certificate of Merit, 1948.

**REINARTZ, John L. (M'32—SM'43—F'58),** Captain, U.S.N.R., Retired.
Born: March 6, 1894, Crefeld, Germany. **Committees:** Membership, 1943–46. **Awards:** Silver Cup, Second District Radio Council, 1923.

**RETTENMEYER, Francis X. (A'26—M'29—SM'43—F'44),** Engineering Department, Philco Corporation, 4700 Wissahickon Ave., Philadelphia 44, Pa.
Born: July 27, 1904, Kendrick, Okla. B.S.(E.E.), 1925, University of Colorado. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Board of Editors, 1946–53; Editorial Administrative, 1951–53; Membership, 1938–40; Papers, 1942–45; Papers Procurement, 1947–49; Public Relations, 1941–42; Publicity, 1939; Radio Receivers, 1936–37; Radio Receivers and Parts, 1929–30; Sections, 1936.

**REUKEMA, Lester E. (A'30—SM'46—F'51),** Professor of Electrical Engineering, Emeritus, University of California, 123 Cory Hall, Berkeley, Calif.
Born: August 31, 1891, Chicago, Ill. B.S., 1922, M.S., 1924, Ph.D., 1926, University of California. **Sections:** San Francisco, *secretary, 1946–47, vice-chairman, 1947–48; chairman, 1948–49.* **Awards:** Fellow, American Institute of Electrical Engineers, 1946.

**RIBLET, Henry J. (A'45—M'55—F'58),** President, Microwave Development Laboratories, Inc., 92 Broad St., Wellesley 57, Mass.; Visiting Lecturer for the 1960 Spring Term at Harvard University, Cambridge, Mass.
Born: July 21, 1913, Calgary, Alberta, Canada. B.S., 1935; M.A., 1937; Ph.D., 1939, Yale University. **Committees:** Antennas and Waveguides, 1950–51; Editorial Reviewer, 1954–60. **Professional Groups:** Technical Program Committee, PGMTT National Symposium, *chairman, 1959.*

**RICE, Stephen O. (SM'47—F'53),** Member, Technical Staff, Bell Telephone Laboratories, Inc., 463 West St., New York, N.Y.
Born: November, 1907, Shedds, Ore. B.S., 1929, Oregon State College. **Committees:** Papers Review, 1947.

**RICHARDSON, Avery G. (A'25—M'29—SM'43—F'56),** Manager, Technical Services, ITT Laboratories, Inc., 500 Washington Ave., Nutley 10, N.J.
Born: March, 1901, Brooklyn, N.Y. E.E., 1924, Brooklyn Polytechnic Institute. **Committees:** Navigation Aids, 1954–60. **Sections:** Northern New Jersey Subsection, *secretary, 1950, chairman, 1952.* **Awards:** Certificate of Commendation, United States Navy; National Defense Research Council Award.

**RICHARDSON, William G. (A'36—SM'45—F'55),** Director of Engineering, Canadian Broadcasting Corporation, 140 Wellington St., Ottawa, Ont., Canada.
Born: December 5, 1903, Watford, Ont., Canada. B.S.(E.E.), 1926, Queens' University.

**RICHMOND, Harold B. (A'14—M'23—F'29)(L),** Retired as Chairman of the Board of General Radio Company. Residence: 100 Memorial Drive, Cambridge 42, Mass.
Born: March 22, 1892, Medford, Mass. S.B., 1914, Massachusetts Institute of Technology; D.Eng. (Honorary), 1947, Norwich University. **Committees:** Admissions, 1940; Nominations, 1940; Preparedness, 1940–41; Public Relations, 1947–48; Registration of Engineers, *chairman, 1940–43;* Standardization, 1928–31. **Awards:** Presidential Medal for Merit, Guided Missiles Development, 1947; Highest Honor Award, Scientific Apparatus Makers Association.

**RICHTER, Walther (SM'44—F'53),** Consulting Electrical Engineer, 8575 N. Hawthorne Road, Milwaukee 17, Wis.
Born: May 17, 1900, Heidelberg, Germany. B.S., 1923, Institute of Technology, Karlsruhe, Germany. **Committees:** Industrial Electronics, 1947–58; Papers Procurement, 1946. **Professional Groups:** Instrumentation Administrative Committee, 1954–55; Industrial Electronics Administrative Committee, 1952–55. **Awards:** Fellow, American Institute of Electrical Engineers, 1942.



**RIDEOUT, Vincent C. (M'44—SM'53—F'60),** Professor, Electrical Engineering Department, University of Wisconsin, Madison 6, Wis.
Born: May, 1914, Chinook, Alberta, Canada. B.Sc., 1938, University of Alberta; M.S., 1940, California Institute of Technology. **Committees:** Education, 1952–53, 1955, 1958–60.

**RINIA, Herre (SM'51—F'54),** Director of Research, Phillips Research Laboratories, Kastanjelaan, Eindhoven, Netherlands.
Born: March 30, 1905, Cornwerd, Friesland, Netherlands. M.A. (E.E.), 1928, Delft Institute of Technology. **IRE Offices:** Vice President, 1956; Director, 1956. **Awards:** Member, Koninklijke Nederlandse Akademie van Wetenschappen, 1947; Officer of the Order of Orange, Nassau, 1955.

**RIVES, Tom C. (SM'48—F'54),** Consultant, 2905 Sunset Way, Pass-A-Grille Beach, Fla.
Born: December 3, 1892, Montgomery, Ala. B.S.(E.E.), 1916, E.E., 1917, Alabama Polytechnic Institute; M.S. 1927, Sheffield Scientific School, Yale University. **Committees:** Professional Groups, 1958–60. **Professional Groups:** Engineering Management, 1951–54, *chairman, 1953–54;* Aeronautical and Navigational Electronics, *vice-chairman, 1956;* Administrative Committee, Military Electronics, 1957–58; Nominating Committee, Engineering Management, *chairman, 1957–58;* Awards Committee, PGANE, *chairman, 1959–60.*

**ROBERTS, Walter van B. (A'22—F'29)(L),** Retired. 155 Hodge Road, Princeton, N.J.
Born: November 13, 1893, Titusville, Pa. B.S., 1915, E.E., 1917, Ph.D., 1924, Princeton University. **Committees:** Use of the Transmission Unit, 1928–29.

**ROCHESTER, Nathaniel (S'41—A'43—M'46—SM'49—F'58),** Manager, Experimental Machines Research, International Business Machines Corporation, Research Laboratory, Yorktown, N.Y.
Born: January 14, 1919, Buffalo, N.Y. B.Sc.(E.E.), 1941, Massachusetts Institute of Technology. **Committees:** Annual Review, 1949–52; Standards, 1951–52; Subcommittee on Definitions, 1951–54, *chairman, 1952–54;* Task Group on Pulse Definitions, 1952; Technical Committee on Electronic Computers, 1948–55, *vice-chairman, 1950–51, chairman, 1951–52.* **Professional Groups:** Information Theory Editorial Advisory Committee, 1959. **IRE Representative:** Eastern Joint Computer Conference, *general chairman, 1960.*

**ROCKWELL, Ronald J. (A'25—M'31—SM'43—F'45),** Vice President in Charge-of-Engineering, Crosley Broadcasting Corporation, 140 W. 9 St., Cincinnati, Ohio.
Born: February 5, 1904, Omaha, Neb. B.S.(E.E.), 1927, Iowa State College; E.E. Professional, 1946. **Committees:** Electroacoustics, 1951–55; Sections, ex officio, 1938–39. **Sections:** Cincinnati, *chairman, 1938–39.*

**ROCKWOOD, Alan C. (A'25—M'30—SM'43—F'59),** Manager of Design, Development & Specifications, Receiving Tube Division, Raytheon Company, Center St., Quincy, Mass.
Born: May 15, 1901, Iowa City, Iowa. B.A., 1921, B.E.(E.E.), 1922, M.S., 1923, State University of Iowa. **Committees:** Electron Devices, 1952–56; Electron Tubes, 1946–49, 1955–58; Electron Tubes and Solid State Devices, 1949–52; Electronics, 1943–46; Vacuum Tubes, 1945–46. **Awards:** Naval Ordnance Development Award, 1945.

**ROETKEN, Alfred A. (A'29—M'40—SM'43—F'53),** Research Engineer, Bell Telephone Laboratories, Inc., Mountain Ave., Murray Hill, N.J.
Born: October, 1902, Covington, Ky. B.S.(E.E.), 1927, M.S., 1929, Ohio State University.

**ROGERS, Aldred W. (M'50—SM'56—F'60),** Assistant Chief and Technical Director of Research and Development, Office of the Chief Signal Officer, DA, Research and Development Division, The Pentagon, Washington 25, D.C.
Born: December 24, 1909, Laurel, Del. B.S.(E.E.), 1930, University of Delaware. **Professional Groups:** Components Parts Administrative Committee, *Founding Member, 1953, chairman, 1955–56, ex officio member, 1956–59.* **Awards:** Meritorious Service Award for Outstanding Service in Preparing Signal Corps Equipment for Use in the Tropics, U. S. Army, 1946.

**ROHDE, Lothar (M'55—F'56),** Owner and Technical Director, Rohde and Schwarz, 7 Tassiloplatz, Munich 9, Germany.
Born: October 4, 1906, Leverkusen, Germany. Ph.D., 1931, University of Jena; Dr.Ing. (Honorary), 1953, Technische Hochschule, Munich, Germany.

**ROSE, Albert (A'36—M'40—SM'43—F'48),** Fellow, RCA Laboratories, Princeton, N.J.
Born: March, 1910, New York, N.Y. A.B., 1931, Ph.D.(Physics), 1935, Cornell University. **Committees:** Editorial Reviewer, 1954. **Awards:** Television Broadcasters Association Award, 1945; Journal Award, Society of Motion Picture Engineers, 1946; IRE Morris Liebmann Memorial Prize, 1946; David Sarnoff Gold Medal, SMPTE, 1958.

**ROSE, George M., Jr. (A'31—M'38—SM'43—F'54),** Manager, Receiving Tube Advanced Development, Tube Division, Radio Corporation of America, 415 S. 5 St., Harrison, N.J.
Born: November 22, 1907, Nashville, Tenn. B.S.(E.E.), 1928, University of North Carolina. **Committees:** Admissions, 1954–60, *chairman, 1955–56.* **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

**ROTHE, Horst (M'48—SM'55—F'59),** Professor, Dr.Eng., Director of the Institute for High Frequency Technics and Physics, Technical University (Institute of Technology), Karlsruhe, Kaiserstr. 12, Karlsruhe, Germany.
Born: December, 1899, Hosterwitz/Dresden, Germany. Dipl. Eng., 1923, Dr.Eng., 1925, Technical University (Institute of Technology), Dresden, Germany. **Committees:** Electron Tubes, 1955–60.

**ROYDEN, George T. (A'19—M'27—F'33),** Retired. 912 West Linger Lane, Phoenix, Ariz.
Born: June 20, 1895, Fort Clark, Tex. A.B., 1917, Engineer, 1924, Stanford University. **IRE Offices:** Director, 1946. **Committees:** Admissions, 1941–48, *chairman, 1943–48;* Awards, 1946; Constitution and Laws, 1944, 1949–50; Convention Record, 1953–56; National Convention, 1946; New York Program, 1938–42; Professional Groups, 1952–53; Sections, 1941–45. **Professional Groups:** Communications Systems, *chairman, 1952–53,* Administrative Committee, 1952–55. **Sections:** San Francisco, *chairman, 1933–34;* Phoenix, 7th Region, *chairman, 1961.* **IRE Representative:** IRE Conference and Electronics Show, 1960–61.

**ROYS, Henry E. (A'27—SM'47—F'55),** Manager of Engineering, RCA Victor Record Division, Indianapolis, Ind.
Born: January 7, 1902, Beaver Falls, Pa. B.S.(E.E.), 1925, University of Colorado. **Committees:** Audio and Video Techniques, 1948–49; Editorial Reviewer, 1954–60; Papers Review, 1947–53; Sound Recording and Reproducing, 1949–56, *chairman, 1949–52;* Standards, 1950–52; Video Techniques, 1949–50. **IRE Representative:** ASA Sectional Committee (Z57) on Standards for Sound Recording, 1951–56, *chairman, 1957–60;* EIA Phonograph Combinations and Home Recordings (R7), *chairman, 1956–59;* EIA Sound System Components, P-8, *chairman, 1960.* **Awards:** Fellow, Audio Engineering Society, 1953; Fellow, Acoustical Society of America, 1954; IRE-PGA Achievement Award, 1956; The Emile Berliner Award, Audio Engineering Society, 1957.

**RUMSEY, Victor H. (SM'50—F'60),** Professor, University of California, Berkeley, Calif.
Born: November 22, 1919, Devizes, England. B.A.(Math.), 1941, Cambridge. **Committees:** Antennas and Waveguides, 1950–51; Editorial Reviewer, 1954–60. **Professional Groups:** Antennas and Propagation Administrative Committee, 1954–56; Antenna Papers Review, *chairman, 1955–59.*

**RUSSELL, John B. (A'36—SM'45—F'58),** Manager, Electronics Laboratory, General Electric Company, Syracuse, N.Y.
Born: March 10, 1907, Boston, Mass. B.S., 1928, M.Sc., 1931, D.Sc., 1950, Massachusetts Institute of Technology. **Committees:** Circuit Theory, 1944, 1947–51, *vice-chairman, 1948–49;* Electronics, 1943, 1954–56; Education, 1958–60. **Sections:** Syracuse, *chairman, 1957–58, vice-chairman, 1955–56; director,* Region 1, *1960–61.* **IRE Representative:** Columbia University, 1941–45. **Awards:** Fellow, American Institute of Electrical Engineers; Fellow, New York Academy of Sciences.

**RUST, William M., Jr. (SM'47—F'53),** Assistant Chief Geophysicist, Humble Oil & Refining Company, 1200 Main, Houston 2, Tex.
Born: January, 1907, Liberty, Tex. B.A., 1928, M.A., 1929, Ph.D., 1931, The Rice Institute. **IRE Offices:** Director, 1951–52. **Committees:** Awards, 1953–55, *chairman, 1954;* Awards Coordination, 1955–56, *chairman, 1956;* Constitution and Laws, 1958–60, *chairman, 1958–60;* Professional Groups, 1953—58. **Awards:** President, Society of Exploration Geophysics, 1945.

**RYAN, Francis M. (J'14—A'17—M'26—F'40),** Senior Staff Consultant, Page Communications Engineers, Inc., 2001 Wisconsin Ave., N.W., Washington, D.C.
Born: February 4, 1895, Seattle, Wash. B.S.(E.E.), 1919, University of Washington. **Committees:** Admissions, 1939; Meetings and Papers, 1930; New York Program, 1930; Papers, 1931–36; Railroad and Vehicular Communication, 1945–46; Tellers, 1938. **Professional Groups:** Communications Systems, *chairman, 1956.* **IRE Representative:** Aeronautic Radio Research, Department of Commerce, 1930; Liaison Committee on Aeronautic Radio Research, 1936, 1939–41.

**RYBNER, Jorgen C. F. (A'25—SM'47—F'53),** Professor, Ostervoldgade 10 G, Copenhagen K, Denmark.
Born: November 26, 1902, Frederiksburg, Denmark. M.S.(E.E.), 1926, Royal Technical University of Denmark. **IRE Offices:** Vice President, 1951. **IRE Representative:** Royal Technical University of Denmark, 1959–60. **Awards:** Member, Danish Academy of Technical Sciences, 1937; President, Danish National Committee of URSI, 1948.

**RYDER, John D. (A'29—SM'45—F'52),** Dean, College of Engineering, Michigan State University, East Lansing, Mich.
Born: May 8, 1907, Columbus, Ohio. B.E.E., 1928, M.S., 1929, Ohio State University; Ph.D., 1944, Iowa State College. **IRE Offices:** President, 1955; Director, 1952–59; Editor, 1958–59. **Committees:** Appointments, 1954–57, ex officio, 1955, *chairman, 1957;* Editorial Board, 1956, *chairman, 1958;* Editorial Reviewer, 1954–60; Education, 1945–46, 1949–60, *chairman, 1953–54;* Executive, 1954–60, *chairman, 1955;* Finance, 1954–57; Membership Relations Coordinator, 1954–57; Nominations, 1956–60, *chairman, 1957;* Papers Review, 1948–53; Policy Advisory, 1952–53, *chairman, 1953;* Professional Groups, 1956–57. **Professional Groups:** Education, *chairman, 1957–58.* **Sections:** Des Moines-Ames, *vice-chairman, 1948.* **IRE Representative:** IRE-AIEE Electron Tube Conference, *vice-chairman, 1951.*

**RYDER, Robert M. (SM'45—F'57),** Transistor Development Engineer, Bell Telephone Laboratories, Inc., Mountain Ave., Murray Hill, N.J.
Born: March, 1915, Yonkers, N.Y. B.S., 1937, Ph.D., 1940, Yale University. **Committees:** Admissions, 1960; Advanced Developments, 1944–46; Conference Committee on Electron Tube Research, 1948–50, *chairman, 1951;* Editorial Reviewer, 1954–60; Electron Devices, 1949–56, *vice-chairman, 1952–54;* Electron Tubes, 1948–49; Electron Tubes and Solid State Devices, 1949–52; Semiconductor Devices, *chairman, 1949–53;* Task Force on Unit Definitions and Tests, *chairman, 1947–51.* **IRE Representative:** IRE-AIEE Committee on Noise Definitions, 1951.

**SALINGER, Hans W. G. (A'37—SM'46—F'51),** Scientific Advisor, Components and Instrumentation Laboratory, International Telephone & Telegraph Laboratories, 3700 E. Pontiac St., Fort Wayne, Ind.
Born: April 1, 1891, Berlin, Germany. Ph.D., 1915, University of Berlin. **Committees:** Papers Procurement, 1947–50. **Sections:** Fort Wayne, *chairman, 1949–50.*

**SALISBURY, Winfield W. (SM'44—F'47),** Technical Director, Microwave Power Laboratory, Varo Manufacturing Co., Inc., 2201 Walnut St., Garland, Tex.
Born: December 27, 1903, Carthage, Ill. A.B., 1926, University of Iowa; D.S. (Honorary), 1950; Cornell College. **Committees:** Education, 1946; Nuclear Studies, 1948–50; Papers Review, 1946; Railroad and Vehicular Communications, 1945–48. **Sections:** East Bay Subsection, *chairman, 1953–54.*

**SALZBERG, Bernard (J'25—A'30—M'38—SM'43—F'52),** Chief Scientist, Research and Engineering Division, Airborne Instrument Laboratory, Inc., 160 Old Country Road, Mineola, L.I., N.Y.
Born: July 22, 1907, New York, N.Y. E.E., 1929, M.E.E., 1933, D.E.E., 1941, Polytechnic Institute of Brooklyn. **Committees:** Electronics, 1943–46; Membership, 1938–46. **Professional Groups:** Electron Devices, 1958–59; Military Electronics, 1958. **Awards:** IRE Harry Diamond Memorial Award, 1955.

**SAMUEL, Arthur L. (A'24—VA'39—SM'44—F'45),** Research Consultant, IBM Research Center, Yorktown Heights, N.Y.
Born: December 5, 1901, Emporia, Kan. A.B., 1923, College of Emporia; S.B., 1925, S.M., 1926, Massachusetts Institute of Technology; D.Sc. (Honorary), 1946, College of Emporia **Committees:** Annual Review, 1950–51; Editorial Reviewer, 1955–60; Electron Tubes, 1946–47; Electron Tubes and Solid State Devices, 1949–54, *vice-chairman, 1950–51, chairman, 1951–52;* Electronics, 1944–45; Papers Review, 1952–53; Research, 1949–50; Standards, 1951–52; Symbols, 1946–52; Vacuum Tubes, 1945. **Sections:** Mid-Hudson Subsection, *chairman, 1951–53.* **Awards:** Paper Award, 1937.

**SAMUELSON, Robert E. (SM'45—F'57),** Assistant General Manager for Research & Development, Motorola, Inc., Western Military Electronics Center, 8201 E. McDowell Road, Scottsdale, Ariz.
Born: February, 1911, St. Paul, Minn. B.Sc.M.E., 1933, University of Minnesota; M.S.(E.E.), 1947, Ph.D.(E.E.), 1949, Northwestern University. **Sections:** Phoenix, *chairman, 1952–53.*

**SANDRETTO, Peter C. (A'30—M'40—SM'43—F'54),** Deputy Executive, U. S. Defense Group, International Telephone and Telegraph Corporation, 500 Washington Ave., Nutley, N.J.; Bridgadier General, U. S. Air Force Reseve.
Born: April, 1907, Pont Canavese, Italy. Graduate, 1927, Joliet Junior College; B.S.(E.E.), 1930, E.E., 1938, Purdue University. **Committees:** Annual Review, 1950–51; Board of Editors, 1944–52; Industrial Electronics, 1947–48; Membership, 1940; Navigation Aids, 1946–55, *chairman, 1950–55;* Papers, 1942–44; Paper Procurement, 1942–43; Professional Groups, 1952–54; Regular Papers, 1941; Standards, 1950–54. **Professional Groups:** Aeronautical and Navigational Electronics, 1952–58, *vice-chairman, 1952–58.* **Sections:** Chicago, *secretary-treasurer, 1940–41.* **Awards:** Bronze Star, 1945.

**SARNOFF, David (A'12—M'14—F'17)(L),** Chairman of the Board and Chief Executive Officer, Radio Corporation of America, 30 Rockefeller Plaza, New York, N.Y.; Board Chairman, RCA Communications, Inc.; Director, National Broadcasting Co., Inc.
Born: February 27, 1891, Uzlian, Minsk, Russia. D.Sc. (Honorary), 1927, St. Lawrence University; D.Sc. (Honorary), 1935, Marietta College; D.Lit. (Honorary), 1935, Norwich University; D.C.S. (Honorary), 1938, Oglethorpe University; D.Sc. (Honorary), 1939, Suffolk University; LL.D. (Honorary), 1946, Jewish Theological Seminary; LL.D. (Honorary), 1946, Bethany College; D.C.S. (Honorary), 1948, Boston University; LL.D. (Honorary), 1950, John Carroll University; L.H.D. (Honorary), 1950, University of Louisville; D.Sc. (Honorary), 1952, Pennsylvania Military College; LL.D. (Honorary), 1952, University of Pennsylvania; LL.D. (Honorary), 1953, Fairleigh Dickinson University; D.Eng. (Honorary), 1953, Drexel Institute of Technology; LL.D. (Honorary), 1954, University of Southern California; LL.D. (Honorary), 1954, Pratt Institute; D.Sc. (Honorary), 1955, University of Notre Dame; LL.D. (Honorary), 1955, Fordham University; LL.D. (Honorary), Dropsie College, 1957; LL.D. (Honorary), University of Rhode Island, 1957; D.Sc. (Honorary), 1958, Temple University. **IRE Offices:** Secretary, 1915–17; Director, 1915–17; Manager, 1918–20. **Committees:** Constitutional Amendments, 1915; Financial Matters, 1915; Increase of Membership, 1916–18; Publicity, 1915–19, *chairman, 1916–19;* Wave Length Regulation, 1916–17. **Sections:** San Francisco, 1915. **Awards:** Peter Cooper Medal for Advancement of Science, 1949; Grand Medal of Association des Ingénieurs-Docteurs of France, 1950; National Chairman, 1951, Red Cross Fund Campaign; Honorary Life Member, Engineers Club of Philadelphia, 1952; Honorary Fellow, Weismann Institute of Science, Rehovoth, Israel, 1952; Appointed Brigadier General, Reserve Army of U. S., 1953; Member of Honor Société Française des Ingénieurs Téchniciens du Vide, 1953; IRE Founders' Award, 1953; First Keynoter Award, National Association of Radio-Television Broadcasters, 1953; Medal of Merit, Liaison Center, Professional Engineers and Inventors of France, 1954; Gold Medal, The Hundred Year Association of New York, 1955; James Forrestal Memorial Medal of National Security Industrial Association, 1956; U. S. Army Medal for Exceptional Civilian Service, 1956; Certificate of Appreciation, Illuminating Engineering Society, 1956; Gold Pin Award, Radio Pioneers, 1957; Life Member (Honorary), IRE, Australia, 1957.



**SCHADE, Otto H. (M'40—SM'43—F'51),** Staff Engineer, RCA Tube Department, Radio Corporation of America, 415 S. 5 St., Harrison, N.J.
Born: April 27, 1903, Schmalkalden, Germany. Attended Technische Hochschule, Berlin-Charlottenberg, 1922–24; D.E.E. (Honorary), 1953, Rensselaer Polytechnic Institute. **Committees:** Editorial Reviewer, 1954–60. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; RCA Victor Award of Merit, Radio Corporation of America, 1946; IRE Morris Liebmann Memorial Prize, 1950; David Sarnoff Gold Medal, 1951; Fellow, Society of Motion Picture and Television Engineers, 1951.

**SCHAIRER, Otto S. (M'43—SM'43—F'57),** Consultant, 89 Battle Road, Princeton, N.J.
Born: October 7, 1879, Saline, Mich. A.B., 1901, B.S.(E.E.), 1902, Dr.Eng. (Honorary), 1942, University of Michigan.

**SCHELDORF, Marvel W. (A'36—SM'45—F'58),** Research Engineer, Armour Research Foundation, 10 W. 35 St., Chicago 16, Ill.
Born: February 15, 1902, Westside, Iowa. B.Sc.(E.E.), 1923, Iowa State College. **Committees:** Antennas, 1946–50; Antennas and Waveguides, 1949–51; Papers Review, 1946–51.

**SCHELKUNOFF, Sergei A. (A'40—F'44),** Assistant Vice President, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: January 27, 1897, Samara, Russia. B.A., 1923, M.A., 1923, State College of Washington; Ph.D., 1928, Columbia University. **Committees:** Annual Review, 1947–48; Antennas, 1945–49; Antennas and Waveguides, 1949–51; Editorial Reviewer, 1954; Papers, 1942–45; Papers Review, 1946; Radio Wave Propagation and Utilization, 1945–48, *chairman, 1947–48;* Standards, 1947–48. **IRE Representative:** ASA Sectional Committee (C61) on Electric and Magnetic Magnitudes and Units, 1949–60. **Awards:** IRE Morris Liebmann Memorial Prize, 1942; Stuart Ballantine Medal, Franklin Institute, 1949.

**SCHELLENG, John C. (A'23—M'25—F'28)(L),** Retired as Director of Radio Research, Bell Telephone Laboratories, Inc., Holmdel, N.J.
Born: November 12, 1892, Freeport, Ill. A.B., 1915, Cornell University. **Committees:** Annual Review, 1937–38; Antennas, 1944–49; Antennas and Waveguides, 1949–50; Awards, 1943; Handbook, 1945–46; Methods of Testing Apparatus, Equipment and Devices, 1929–30, 1945–56; Radio Transmitters, 1945–48; Standardization, 1931–32; Standards, 1936–37; Transmitters, 1944–45; Transmitters and Antennas, 1936–45, *chairman, 1936–38.* **IRE Representative:** ASA Definitions Co-ordinating Committee, 1948; ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1948–50; ASA Subcommittee (C42.13) on Communications, 1948–59; Joint IRE-AIEE-ASA (C42) Definitions Co-ordinating Committee, 1949–51.

**SCHLEIMANN-JENSEN, Arne (A'45—SM'47—F'48),** Owner, Schleimann-Jensen Laboratoriet, Klingsta Skogsväg 26, Danderyd, Sweden.
Born: July 27, 1906, Randers, Denmark. Radio and Telephone Course, Royal Technical University of Denmark, 1925–31.

**SCHLESINGER, Kurt (A'41—SM'51—F'54),** Engineering Consultant, Cathode Ray Tube Department, General Electric Company, Syracuse, N.Y.
Born: April, 1906, Berlin, Germany. Dipl. Eng., 1928; Dr. Eng. (Physics), 1929, Technische Hochschule, Berlin. **Professional Groups:** Broadcast and Television Receivers Administrative Committee, 1953–55. **Sections:** Chicago, *vice-chairman, 1953–54.*

**SCHMIT, Dominic F. (A'25—M'38—SM'43—F'51),** Vice President, Product Engineering, Radio Corporation of America, Camden, N.J.
Born: August 30, 1902, Port Washington, Wis. B.S.(E.E.), 1923, University of Wisconsin.

**SCHMITT, Otto H. (SM'44—F'55),** Professor, Zoology and Physics (Biophysics), University of Minnesota, Minneapolis 14, Minn.
Born: April 6, 1913, St. Louis, Mo. B.A., 1934, Ph.D., 1937, Washington University. **Professional Groups:** Medical Electronics, *vice-chairman, 1954–55;* Joint Executive Committee on Medicine and Biology of IRE-AIEE-ISA, *chairman, 1958.* **Awards:** Sigma Xi Award, 1935; National Research Council Fellowship, 1937; Sir Halley Stewart Fellowship, 1938; Government Citation, 1950; Fellow, American Physical Society, 1953; Fellow, New York Academy of Sciences, 1959; Lovelace Award, 1960.

**SCHOLZ, Carl E. (M'26—SM'43—F'56),** Retired as Vice President and Chief Engineer, American Cable and Radio Corporation, 67 Broad St., New York 4, N.Y.
Born: November 29, 1894, Campbell, Calif. B.A.(M.E.), 1917, Stanford University. **Committees:** Admissions, 1939, 1944–47; Constitution and Laws, 1938–40; Membership, 1934–40, *chairman, 1938–39;* Sections, 1938–40; Standardization, 1928–29; Tellers, 1941–44, *chairman, 1943–44.* **Professional Groups:** National Administration Committee on Communications Systems, 1955–58, *vice-chairman, 1956.* **Awards:** Fellows, American Institute of Electrical Engineers, 1955.

**SCHOOLEY, Allen H. (A'35—SM'47—F'54),** Associate Director of Research for Electronics, Naval Research Laboratory, Washington 25, D.C. During 1956, Research Adviser, Ministerio da Marinha, Rio de Janeiro, Brazil.
Born: December, 1909, Terril, Iowa. B.S.(E.E.), 1931, Iowa State College; M.S.(E.E.), 1932, Purdue University. **Professional Groups:** Engineering Management, Washington, D.C. Chapter, *vice-chairman, 1953–54, chairman, 1954–55.* **Sections:** Washington, D.C., *secretary, 1955–56, vice-chairman, 1956–57, chairman, 1957–58;* Executive Committee, 1955–60; Awards Committee, 1959–60; Organizer of Rio de Janeiro, Brazil Section in 1956. **IRE Representative:** U.S.A. National Committee, URSI, 1958–60. **Awards:** Navy Distinguished Civilian Service Award, 1946; Fellow, AAAS, 1950.

**SCHRADER, Harold J. (A'31—M'38—SM'43—F'54),** Staff Engineer, Missile & Surface Radar, Defense Electronic Products, Radio Corporation of America, Moorestown, N.J.
Born: May 2, 1900, Schuyler, Neb. Attended University of Nebraska, 1919–23. **Sections:** Philadelphia, *chairman, 1938–39, secretary, 1942–44.*

**SCHREIBER, Ernst H. (A'28—M'32—SM'43—F'57),** Engineering Education Activities, The Pacific Telephone and Telegraph Company, 403 W. 8 St., Los Angeles 14, Calif.
Born: August 22, 1900, Chicago, Ill. A.B. (Physics), 1922, M.A. (Physics), 1923, University of California. **Sections:** Los Angeles, *chairman, 1932–33.*

**SCHRENK, Matthew H. (SM'46—F'57),** Research Coordinator, Department of the Navy, Office of Naval Research, 17 St. & Constitution Ave., Washington 25, D.C.
Born: September 6, 1902, Naperville, Ill. B.A., 1922, North Central College; M.A., 1926, Syracuse University; D.Sc. (Honorary), 1959, North Central College. **Professional Groups:** Administrative Committee, Military Electronics, 1957. **Sections:** Washington, *acting vice-chairman, 1952;* Membership Committee, *chairman, 1953.* **Awards:** Presidential Certificate of Merit, 1946; Fellow, American Physical Society, 1952.

**SCHROEDER, Alfred C. (A'38—SM'46—F'54),** Color Television Research Engineer, RCA Laboratories, Princeton, N.J.
Born: February 28, 1915, West New Brighton, N.Y. B.S., M.S., 1937, Massachusetts Institute of Technology. **Awards:** Radio Corporation of America Laboratory Awards, 1947, 1950, 1951, 1952, 1957.

**SCHUCK, O. Hugo (A'34—M'44—SM'49—F'57),** Director of Research, Military Products Group, Minneapolis-Honeywell Regulator Company, 2600 Ridgeway Road, Minneapolis 13, Minn.
Born: September 20, 1909, Philadelphia, Pa. B.S.(E.E.). 1931, M S (E E), 1932, Elect. Eng., 1938, University of Pennsylvania. **Professional Groups:** Administrative Committee on Automatic Control, 1954–. **Sections:** Twin Cities, *vice-chairman, 1947, chairman, 1948.* **Awards:** Certificate of Appreciation, United States Navy, Department of Defense, 1947.

**SCHULZ, Elmer H. (A'38—SM'46—F'58),** Vice President, Armour Research Foundation of Illinois Institute of Technology, 10 W. 35 St., Chicago 16, Ill.
Born: October, 1913, Lockhart, Tex. B.S.(E.E.), 1935, M.Sc. (E.E.), 1936, University of Texas; Ph.D., 1946, Illinois Institute of Technology. **IRE Offices:** Director, 1958–59. **Committees:** Appointments, 1959–60; Education, 1946–48; Industrial Electronics, 1949–56; Policy Advisory, 1959–60. **Professional Groups:** Industrial Electronics Administrative Committee, 1953–56. **Sections:** Chicago, *chairman, 1949–50;* Region #5, *director, 1958.* **IRE Representative:** National Electronics Conference, 1959. **Awards:** Fellow, AIEE, 1950; Fellow, AAS, 1959.

**SCHWAN, Herman P. (M'53—SM'55—F'59),** Professor of Electrical Engineering, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia 4, Pa.
Born: August 7, 1915, Aachen, Germany. Ph.D. (Physics & Biophysics), 1940, Dr. habil. (Biophysics), 1946, University of Frankfurt, Germany. **Professional Groups:** Executive Committee, Medical Electronics, 1955–58. **IRE Representative:** Joint Executive Committee Medical Electronics, IRE-AIEE-ISA, 1955–57. *vice-chairman, 1958, chairman, 1959.*

**SCHWARZ, Bertram A. (M'29—SM'43—F'55),** Technical Assistant to the General Manager, Delco Radio Division, General Motors Corporation, Kokomo, Ind.
Born: July 16, 1901, Cambridge, Mass.

**SCOTT, Hermon H. (M'35—SM'43—F'52),** President and Chairman of the Board, Scott, Inc., 111 Powdermill Road, Maynard; Mass.; Independent Consultant, Lincoln, Mass.; Trustee, Assabet Institution for Savings, Maynard, Mass.; Chairman of the Board, Institute of High Fidelity Manufacturers.
Born: March 28, 1909, Somerville, Mass. B.S., 1930, M.S., 1931, Massachusetts Institute of Technology. **Committees:** Audio Techniques, 1950–53, *vice-chairman, 1950–52;* Board of Editors, 1950–53; Editorial Reviewer, 1954; Electroacoustics, 1941–47. **Sections:** Boston, *vice-chairman, 1948–49, chairman, 1949–50;* Awards Committee, *chairman, 1960.* **Awards:** Fellow, Acoustical Society of America; Fellow, Audio Engineering Society; John H. Potts Memorial Medal, 1951.

**SCOTT, James C. W. (M'47—F'57),** Defense Research Member, Canadian Joint Staff, London, England.
Born: March 1, 1904, Havre, France. B.Sc., 1930, University of Washington. **Committees:** Wave Propagation, 1956–60. **Sections:** Ottawa, *chairman, 1951.* **IRE Representative:** Canadian National Committee for URSI, *secretary, 1951–53;* Canadian Commission on Ionosphere for URSI, *chairman, 1951–57.*

**SEDDON, J. Carl (A'41—SM'53—F'58),** Consultant, National Aeronautics Space Administration, Washington 25, D.C.
Born: December, 1911, Schenectady, N.Y. B.S.(E.E.), 1933, B.Sc. (Physics), 1934, Union College; M.A., 1936, University of Buffalo. **Awards:** RESA Award in Pure Research, 1955.

**SEELEY, Stuart W. (M'40—SM'43—F'43),** Administrator, Microwave Communications Projects for Senior Executive Vice President of Radio Corporation of America, 30 Rockefeller Plaza, New York 20, N.Y.
Born: June 23, 1901, Chicago, Ill. B.S.(E.E.), 1925, Michigan State College. **Committees:** Admissions, 1944–48; Awards, 1949; Board of Editors, 1947–53; Circuits, 1944–48; Editorial Reviewer, 1954–60; Modulation Systems, 1947–51; Professional Groups, 1948; Receivers, 1950–59. **Awards:** Modern Pioneers Award, 1940; War Department Citation, 1947; IRE Morris Liebmann Memorial Prize, 1948.

**SEELY, Samuel (A'39—SM'45—F'55),** Professor and Head, Department of Electrical Engineering, Case Institute of Technology, Cleveland 6, Ohio; Presently with the Department of Electrical Engineering, University of Athens, Athens, Greece.
Born: May 7, 1909, New York, N.Y. E.E., 1931, Polytechnic Institute of Brooklyn; M.S., 1932, Stevens Institute of Technology; Ph.D., 1936, Columbia University. **IRE Offices:** Director, 1957–59. **Committees:** Appointments, 1959–60; Editorial Reviewer, 1954–60; Education, 1955–60, *chairman, 1957–58;* Nominations, 1959–60; Papers Review, 1946–58; Policy Advisory, 1957–60. **Sections:** Syracuse, *secretary-treasurer, 1950, secretary, 1951, chairman, 1952.* **IRE Representative:** University of Syracuse, 1949; Joint AIEE-IRE Student Activities Coordination Committee, 1957. **Awards:** Army-Navy Certificate of Appreciation, 1947.

**SELSTED, Walter T. (SM'53—F'60),** Vice President, Research, AMPEX Corporation, 934 Charter St., Redwood City, Calif.
Born: December 17, 1921, Berkeley, Calif. B.S.(E.E.), 1944, University of California. **Awards:** Fellowship, Audio Engineering Society, 1959.

**SELVIDGE, Harner (A'31—M'40—SM'43—F'58),** Western Corporate Representative, Bendix Corporation, 117 E. Providencia St., Burbank, Calif.
Born: October 16, 1910, Columbia, Mo. B.S., 1932, M.Sc., 1933, Massachusetts Institute of Technology; S.M., 1934, S.D., 1937, Harvard University. **Committees:** Annual Review, 1949–50; Nuclear Studies, 1949–50; Papers Review, 1944–53; Professional Groups, 1951–54. **Professional Groups:** Nuclear Science, *chairman, 1950, secretary-treasurer, 1951–53.* **Awards:** Naval Ordnance Development Award, 1945, Navy Department, United States Navy.

**SENSIPER, Samuel (S'39—A'42—SM'47—F'60),** Senior Staff Consultant, Electron Dynamics Department, Research Laboratories, Hughes Aircraft Company, Culver City, Calif.
Born: April 26, 1919, Elmira, N.Y. S.B., 1939, Massachusetts Institute of Technology; E.E., 1941, Stanford University; Sc.D., 1951, Massachusetts Institute of Technology. **Committees:** Antennas, 1949–51; Antennas and Waveguides, 1949–51; Editorial Reviewer, 1954–60. **Sections:** West Coast Subcommittee, 1952. **IRE Representative:** IRE-AIEE Electron Tube Research Conference Committee, 1956–59, *chairman, 1959.* **Awards:** Certificate of Commendation, United States Navy, 1947; Industrial Electronics Fellow, Massachusetts Institute of Technology, 1947–48; Fellow, American Academy of Arts and Sciences, 1959.



**SHACKELFORD, Benjamin E. (A'23—M'26—F'38)(L),** 743 Mosswood Ave., Orange, N.J.
Born: August 12, 1891, Richmond, Mo. A.B., 1912, A.M., 1913, University of Missouri; Ph.D., 1916, University of Chicago. **IRE Offices:** President, 1948; Director, 1945–50, 1953–55. **Committees:** Appointments, 1948; Awards, 1941, 1943–44, 1950; Bibliography, 1930–31, *chairman, 1930;* Board of Editors, 1937–40; Building Fund, *chairman, 1944–45;* Constitution and Laws, 1946–47, *chairman, 1947;* Convention Policy, 1947–50; Education, 1949; Executive, 1948–49, *chairman, 1948;* Frequency Modulation, 1942–46; Institute Sections, 1929–34, *chairman, 1933;* Meetings and Papers, 1929; National Convention, 1947; New York Program, 1941–42; Nominations, 1949–50; Papers, 1932–36; Papers Procurement, 1942–43; Planning, 1947; Policy Development, 1949–50, *chairman, 1949;* Professional Groups, 1950; Sections, 1943–45, 1949–50; Special Papers, *chairman, 1940–41;* Special Publications Fund, 1947; Standardization, 1931–32; Standards, 1932–33; Winter Technical Meeting, *chairman, 1944.* **IRE Representative:** ASA Sectional Committee on Definition of Electrical Terms, Subcommittee on Vacuum Tubes, 1936, 1939–48; ASA Sectional Committee on Vacuum Tubes for Industrial Purposes, 1936, 1939–48.

**SHANK, Robert J. (S'37—A'39—SM'49—F'58),** President, American Systems, Inc., Inglewood, Calif.
Born: March 19, 1914, LaJunta, Colo. A.B., 1935, Goshen College; B.Sc.(E.E.), 1937, Purdue University. **Professional Groups:** Administrative Committee, Aeronautical and Navigational Electronics, 1956–58; Airborne Electronics, 1951–53. **Sections:** Dayton NCAE, *director, 1955–57.*

**SHANON, Claude E. (S'36—M'48—SM'49—F'50),** Research Mathematician Bell Telephone Laboratories, Inc., Murray Hill, N.J.; Visiting Professor, Massachusetts Institute of Technology, 1956.
Born: April, 1916, Petoskey, Mich. B.S.(E.E.), 1936, University of Michigan; S.M.(E.E.), 1940, Ph.D. (Mathematics), 1940, Massachusetts Institute of Technology. **IRE Representative:** IRE-AIEE Committee on Noise Definitions, 1949–51. **Awards:** Alfred Nobel Prize, American Institute of Electrical Engineers, 1940; IRE Morris Liebmann Memorial Prize, 1949; Stuart Ballantine Medal, Franklin Institute, 1955.

**SHARPLESS, William M. (A'28—M'38—SM'43—F'58),** Radio Research Engineer, Bell Telephone Laboratories, Inc., P.O. Box 107, Red Bank, N.J.
Born: September, 1904, Minneapolis, Minn. B.Sc.(E.E.), 1928, E.E., 1951, University of Minnesota. **Professional Groups:** Liaison for Antennas and Propagation, Microwave Theory and Techniques; National Symposium on Microwave Techniques, 1956. **Sections:** New York, Executive Committee, 1956–57; Monmouth Subsection, *vice-chairman, 1955–56, chairman, 1956–57.*

**SHAW, George R. (M'40—SM'43—F'54),** Chief Engineer, Tube Division, Radio Corporation of America, 415 S. 5 St., Harrison, N.J.
Born: December 13, 1895, Frederick, Md. A.B., 1915, M.A., 1916, Washington and Lee University; Ph.D., 1920, University of Wisconsin.

**SHAW, Henry S. (A'17—M'21—F'35)(L),** Retired. 3048 Renatta Drive, Largo, Fla.
Born: November 29, 1884, Boston, Mass. A.B., 1906, Harvard University.

**SHEA, Richard F. (A'29—M'32—SM'43—F'54),** Consulting Engineer, Electronics, Technical Operation, Knolls Atomic Power Laboratory, General Electric Company, Schenectady, N.Y.
Born: September 13, 1903, Boston, Mass. B.S., 1924, Massachusetts Institute of Technology. **Committees:** Admissions, 1947–48; Annual Review, 1950–51; Editorial Reviewer, 1954–60; Papers Review, 1953; Radio Frequency Interference, 1955; Radio Receivers, 1946–56, *vice-chairman, 1948–49, chairman, 1949–51;* Standards, 1949–60, *vice-chairman, 1954–56, chairman, 1957–60.* **Professional Groups:** Editor of PGNS *Transactions;* Nuclear Science Administrative Committee, 1959–60. **Sections:** Connecticut Valley, *secretary, 1943, vice-chairman, 1944, chairman, 1945;* Syracuse, *vice-chairman, 1952, chairman, 1953.* **IRE Representative:** ASA Committee (N-3), Nuclear Instrumentation, 1958–59; ASA Electrical Standards Board, 1958–59; U. S. National Committee, International Electrotechnical Commission, 1958–59.

**SHELDON, John L. (SM'53—F'56),** Staff Research Manager, Electrical Products Division, Corning Glass Works, Corning, N.Y.
Born: September, 1904, Battle Creek, Mich. B.S., 1935, Battle Creek College; M.S., 1938, Ph.D., 1940, University of Michigan. **Committees:** Admissions, 1955–56, *chairman, 1957–60.* **Sections:** Elmira-Corning, *vice-chairman, 1953–54, chairman, 1954–55.*

**SHEPHERD, James E. (A'36—SM'44—F'48),** General Manager, Sperry Rand Research Center, Great Neck, L.I., N.Y.
Born: May 29, 1910, Houston, Tex. A.B.(Physics, E.E.), 1932, M.A.(E.E.), 1933, University of Missouri; M.S., 1935, D.Sc. (Communication Engineering), 1940, Harvard University. **IRE Offices:** Director, 1948–50. **Committees:** Admissions, 1945; Awards, 1951–53; Constitution and Laws, *chairman, 1949–50;* Convention Policy, *chairman, 1947–50;* Membership, 1943; National Convention, 1947–48, *chairman, 1947;* Sections, 1946–52; Tellers, 1946–47; Winter Technical Meeting, *vice-chairman, 1945–46.* **Sections:** New York, *secretary-treasurer, 1943–44, vice-chairman, 1945–47, chairman, 1947–49.*

**SHEPHERD, William G. (A'42—SM'49—F'52),** Professor and Head, Electrical Engineering, University of Minnesota, Minneapolis 14, Minn.
Born: August 28, 1911, Fort William, Ont., Canada. B.S.(E.E.), 1933, Ph.D., 1937, University of Minnesota. **IRE Offices:** Director, 1960. **Committees:** Electron Devices, 1952–56, *vice-chairman, 1954–56;* Electron Tubes 1955–58; Electron Tubes and Solid State Devices, 1951–52; Fellow, 1959–60. **Professional Groups:** Electron Devices, Administrative Committee, 1955–58.

**SHOCKLEY, William (SM'51—F'55),** President, Shockley Transistor Corporation, Subsidiary of Beckman Instruments, Inc., Palo Alto, Calif.
Born: February 13, 1910, London, England, B.S., 1932, California Institute of Technology; Ph.D., 1936, Massachusetts Institute of Technology; D.Sc. (Honorary), 1955, University of Pennsylvania; D.Sc. (Honorary), 1956, Rutgers University. **Awards:** Medal of Merit, War Department, 1946; Citation of Honor, Air Force Association, 1951; IRE Morris Liebmann Award, 1952; Oliver E. Buckley Solid State Physics Prize, American Physical Society, 1953; Certificate of Appreciation, U. S. Army, 1953; Comstock Prize, National Academy of Sciences, 1954; Nobel Prize in Physics, 1956.

**SHOUPP, William E. (SM'45—F'51),** Technical Director, Westinghouse Atomic Power Department, P.O. Box 355, Pittsburgh, Pa.
Born: October 5, 1908, Troy, Ohio. B.A., 1931, Miami University; M.A., 1933, Ph.D., 1937, University of Illinois. **Committees:** Nuclear Studies, 1948–50; Papers Procurement, 1949–50; Professional Groups, 1955. **Professional Groups:** Nuclear Science, *chairman, 1956–57.* **Sections:** Pittsburgh, *chairman, 1946–47.* **IRE Representative:** ASA Nuclear Standards Board, *alternate, 1957–59.*

**SICHAK, William (M'46—SM'56—F'60),** Laboratory Director, ITT Laboratories, A Division of International Telephone and Telegraph Corporation, 500 Washington Ave., Nutley 10, N.J.
Born: January 7, 1916, Lyndora, Pa. B.A.(Physics), 1942, Allegheny College. **Committees:** Antennas & Waveguides, 1954–60; Papers Review; Subcommittee on Basic Waveguide Symbols, 1947. **Professional Groups:** Antennas & Propagation, 1954–56; Communications Systems, 1955–60; Microwave Theory & Techniques, 1956–60. **Sections:** Northern New Jersey Section, Program Committee, 1954–55; Northern New Jersey Section, Organizing Committee, 1954.

**SILING, Philip F. (M'40—SM'43—F'51),** Director, RCA Frequency Bureau, 30 Rockefeller Plaza, New York 20, N.Y. and 425 13 St., N.W., Washington 4, D.C.

Born: August 14, 1897, Oil City, Pa. Ph.B., 1917, Yale University. **Committees:** National Convention, *vice-chairman, 1947;* Nominations, 1946; Winter Technical Meeting, 1946. **IRE Representative:** Joint Technical Advisory Committee, 1948–58, *chairman, 1948, 1958.*

**SILVER, Samuel (M'46—SM'50—F'54),** Professor of Engineering Science, Department of Electrical Engineering and Director of the Space Sciences Laboratory, University of California, Berkeley 4, Calif.
Born: February, 1915, Philadelphia, Pa. A.B., 1935, M.A. 1937, Temple University; Ph.D.(Physics), 1940, Massachusetts Institute of Technology. **Professional Groups:** Commission on Radio Waves and Circuits, URSI, *president, 1954–60;* U.S.A. National Committee of URSI, *secretary, 1958–;* Member, PGAP and PGMTT. **Sections:** San Francisco, *director, 1956–58.* **Awards:** Guggenheim Fellowship, John Simon Guggenheim Memorial Foundation 1953–54.

**SILVERMAN, Daniel (A'42—SM'51—F'53),** Geophysical Research Director, Pan American Petroleum Corporation, P.O. Box 591, Tulsa, Okla.
Born: June 24, 1905, Montreal, P.Q., Canada. B.S., 1927, University of California; M.S., 1929, ScD., 1930, Massachusetts Institute of Technology. **Committees:** Fellow, 1959–60; Papers Procurement, 1947–50. **Sections:** Tulsa, *chairman, 1951–52.* **Awards:** Medalist, 1927; Heller Travelling Fellow, 1928–30, University of California.

**SIMON, Emil J. (IRE Charter Member)(M'12—F'15)(L),** Consulting Engineer, 50 Church St., New York 7, N.Y.
Born: October 25, 1888, New York, N.Y. Attended Columbia University, 1905–09; Licensed Professional Engineer; Professional Engineer, New York State Education Department. **IRE Offices:** Secretary, 1912–14; Director, 1912–14; Manager, 1915. **Committees:** Publicity, 1913, 1915; Specifications for Steamship Radio Equipment, 1914–15; Standardization, 1914–15. **Awards:** Marconi Medal for Service, Veteran Wireless Operators Association, 1958.

**SIMPSON, LeRoy C. (J'28—A'30—M'41—SM'43—F'59),** Manager, Communications Engineering, RCA International Division, Clark, N.J.
Born: April 24, 1908, Worcester, Mass. B.Sc., 1928, University of New Hampshire. **Sections:** Buenos Aires, *founding member, 1939, secretary-treasurer, 1941, vice-chairman, 1942–43, chairman, 1944.*

**SINCLAIR, Donald B. (J'30—A'33—M'38—SM'43—F'43),** Executive Vice President, General Radio Company, Baker Ave., West Concord, Mass.
Born: May 23, 1910, Winnipeg, Man., Canada. S.B., 1931, S.M., 1932, Sc.D., 1935, Massachusetts Institute of Technology. **IRE Offices:** Director, 1945–54, 1958–59; Treasurer, 1949–50; President, 1952; Vice President, 1959. **Committees:** Admission, 1948; Antennas, 1944–47; Appointments, 1958–60, *chairman, 1954;* Awards, 1951; Editorial Reviewer, 1955–60; Executive, 1948–50, 1952–53, 1959–60, *vice-chairman, 1949–50, chairman, 1952;* Finance, ex officio, 1949–50, 1952–53; Membership, 1947–48, 1953–56; National Convention, 1949; Nominations, 1948, 1953–54, *chairman, 1954;* Papers, 1941–45; Papers Procurement, 1945–46; Planning, 1947; Radio Transmitters, 1945–46; Special Publication Fund, 1947; Television, 1940–46; Transmitters, 1944; Transmitters and Antennas, 1941–44. **Professional Groups:** Administrative Committee, Engineering Management, 1957–59. **IRE Representative:** Radio Technical Planning Board, 1947–48, *alternate, 1945–46;* Joint IRE-AIEE Co-ordination Committee, ex officio, 1952. **Awards:** Fellow, American Institute of Electrical Engineers; President's Certificate of Merit, 1948.

**SINCLAIR, George (A'37—SM'46—F'54),** Professor, University of Toronto, Electrical Building, Toronto 12, Ont., Canada; President, Sinclair Radio Laboratories, Ltd.
Born: November, 1912, Hamilton, Ont., Canada. B.Sc., 1933, M.Sc., 1935, University of Alberta; Ph.D., 1946, Ohio State University. **IRE Offices:** Director, 1960–62. **Committees:** Antennas, 1945–49; Antennas and Waveguides, 1946–60; Awards, 1956–60; Editorial Reviewer, 1954–60; Education, 1951–60; Nominations and Appointments, 1960; Papers Review, 1951–53; Professional Groups, 1959–60; Wave Propagation, 1946–55; Wave Propagation and Utilization, 1946–49. **Professional Groups:** Antennas and Propagation, *chairman, 1951, 1959–60;* Administrative Committee, Microwave Techniques, 1957–60. **Sections:** Toronto, *vice-chairman, 1950, chairman, 1951.* **IRE Representative:** University of Toronto, 1948–58; Technical Program Committee, Canadian IRE Convention, *chairman, 1956–57;* Canadian IRE Convention, *general chairman, 1958;* Sub-Commission VI-3 URSI, *chairman, 1954–60.* **Awards:** U. S. War and Navy Departments, Certificate of Appreciation, 1948; Guggenheim Fellowship, 1958.

**SINK, Robert L. (S'37—A'41—SM'48—F'60),** Associate Director, Datalab Division, Consolidated Electrodynamics Corporation, 620 North Lake St., Pasadena, Calif.
Born: February 4, 1915, Terre Haute, Ind. A.B., 1936, E.E., 1938, Stanford University. **Professional Groups:** Instrumentation, *chairman, 1954–55, vice-chairman, 1953–54.* **Sections:** Los Angeles, *vice-chairman, 1949, chairman, 1950;* Regional Director, 1952–53.

**SINNETT, Chester M. (SM'52—F'55),** Manager, Advanced Development Engineering Section, RCA Victor Television Division, Camden 8, N.J.
Born: January 19, 1900, Livermore Falls, Me. B.S.(E.E.), 1924, University of Maine. **Sections:** Philadelphia, *secretary-treasurer, 1950, chairman, 1952.*

**SKELLETT, A. Melvin (M'44—SM'50—F'56),** Director of Research, Tung-Sol Electric, Inc., 200 Bloomfield Ave., Bloomfield, N.J.
Born: July 14, 1901, St. Louis, Mo. A.B., 1924, M.S., 1927, Washington University; Ph.D., 1933, Princeton University. **Committees:** Accounting, *chairman, 1949;* Awards, *chairman, 1950;* Membership, *chairman, 1949–50;* Papers Procurement, 1945. **Sections:** Northern New Jersey, *chairman, 1956–57.*

**SKIFTER, Hector R. (A'31—M'36—SM'43—F'51),** President, Airborne Instrument Laboratory, Division of Cutler-Hammer, Inc., Deer Park, L.I., N.Y.
Born: March 4, 1901, Austin, Minn. B.A., 1922, Sc.D., 1945, Saint Olaf College. **Committees:** Navigation Research and Development Board, *chairman, 1950–51.* **Sections:** New York Section for PGEM, *program chairman;* Member, Administrative Committee. **Awards:** Presidential Certificate of Merit, 1947.

**SLATTERY, John J. (J'29—A'30—SM'46—F'56),** General Manager, Electronics Division, Martin-Baltimore Division, The Martin Co., Baltimore 3, Md.
Born: August 2, 1909, East Orange, N.J. B.S.(E.E.), 1930, Villanova College; M.S.(Physics and Math.), 1949, Stevens Institute of Technology. **Professional Groups:** Engineering Management, *secretary, 1955–56;* Military Electronics; Medical Electronics. **Awards:** Legion of Merit, U. S. Army, 1945.

**SLEPIAN, Joseph (SM'45—F'45),** Retired. 1115 Lancaster St., Pittsburgh 18, Pa.
Born: February 11, 1891, Boston, Mass. A.B., 1911, A.M., 1912, Ph.D., 1913, Harvard University; Dr. Eng. (Honorary), 1949, Case Institute of Technology; Dr.Sc. (Honorary), 1955, University of Leeds. **Awards:** John Scott Medal, 1932; American Institute of Electrical Engineers Award, 1933; Benjamin Garver Lamme Medal, 1942, American Institute of Electrical Engineers; Edison Medal, 1948, American Institute of Electrical Engineers.

**SLOAN, David H. (A'27—SM'50—F'59),** Associate Professor, University of California, Berkeley 4, Calif.
Born: September 8, 1905, Lyman, Wash. B.S., 1928, M.S., 1929, Washington State College; Ph.D., 1941, University of California.

**SMALE, J. A. (F'58),** Retired as Engineer-in-Chief, Cable and Wireless Ltd., London, England; Technical Consultant, Marconi's Wireless Telegraph Co., Ltd., Chelmsford, England; Chairman, Cyprus Inland Telecommunications Authority.



Born: February 16, 1895, Lydney, England. B.Sc.(E.E.), 1914, Bristol University. **Awards:** Commander of the Order of the British Empire, 1953.

**SMITH, Carl E. (A'30—M'39—SM'43—F'55),** Proprietor, Carl E. Smith Consulting Radio Engineers; President, Smith Electronics, Inc., 8200 Snowville Road, Brecksville, Ohio; President, Cleveland Institute of Electronics, Inc., 4900 Euclid Ave., Cleveland 3, Ohio.
Born: November 18, 1906, Eldon, Iowa. B.S.(E.E.), 1930, Iowa State College; M.S.(E.E.), 1932, E.E., 1936, Ohio State University. **Committees:** Board of Editors, 1946–53; Editorial Reviewer, 1954–60; Industrial Electronics, 1956–58; Professional Groups, 1955. **Professional Groups:** Industrial Electronics Administrative Committee, 1950–60, *secretary, 1951–54, vice-chairman, 1954–56, chairman, 1956–57;* Broadcasting Administrative Committee, 1955–57. **Sections:** Cleveland, *chairman, 1940–41;* Summer Convention, *chairman, 1942.* **Awards:** War Department Commendation for Exceptional Civilian Service, 1946; Fellow, American Institute of Electrical Engineers, 1956.

**SMITH, David B. (A'35—SM'44—F'48),** Vice President, Philco Corporation, Tioga & C Sts., Philadelphia 34, Pa.
Born: December 3, 1911, Newton, N.J. S.B., 1933, S.M., 1934, Massachusetts Institute of Technology. **IRE Offices:** Director, 1947. **Committees:** Frequency Modulation, 1940–47; Membership, 1949–51; Public Relations, 1947–48; Special Publications Fund, 1947; Television, 1942–49; Television Systems, 1949–60. **Sections:** Philadelphia, *chairman, 1945–46.* **IRE Representative:** IRE-RMA Problem No. 2 Committee.

**SMITH, J. Ernest (A'37—SM'47—F'55),** Vice President and Director of Engineering, Datamatic Division, Minneapolis-Honeywell Regulator Company, 151 Needham St., Newton Highlands 61, Mass.
Born: July 9, 1908, Carrollton, Mo. B.A., 1932, Jamestown College; M.E.E., 1944, Polytechnic Institute of Brooklyn; D.Sc. (Honorary), 1959, Jamestown College. **Committees:** Annual Review, 1949–50; Fellow, 1960; Membership, 1929–35, 1937–40; Papers Procurement, 1947–48; Papers Review, 1949–53; Radio Transmitters, 1949–50; Space Electronics and Telemetry, 1959–.

**SMITH, Newbern (A'41—SM'46—F'52),** Professor of Electrical Engineering, University of Michigan, Ann Arbor, Mich.
Born: January 21, 1909, Philadelphia, Pa. B.S.(Eng.), 1930, M.S.(Eng.), 1931, Ph.D.(Physics), 1935, University of Pennsylvania. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Board of Editors, 1951–53; Editorial Administrative, 1949–51; Professional Groups, 1948; Standards, 1952–56; Wave Propagation, 1948–56, *chairman, 1952–55.* **Professional Groups:** Antennas and Propagation, *chairman, 1950;* Communications Systems. **Awards:** IRE Harry Diamond Memorial Award, 1952.

**SMITH, Otto J. M. (M'44—SM'51—F'59),** Professor, University of California, Berkeley 4, Calif.
Born: August, 1917, Urbana, Ill. B.S.(Chemistry), 1938, Oklahoma A and M College; B.S.(E.E.), 1938, University of Oklahoma; Ph.D.(E.E.), 1941, Stanford University. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Automatic Control Administrative Committee, 1958–59. **Sections:** San Francisco, *secretary, 1952, vice-chairman, 1953.* **Awards:** American Institute of Electrical Engineers First Prize, Technical Paper Contest, 1953; Fellow, American Association for the Advancement of Science, 1954; Guggenheim Fellow; Institut für Regelungstechnic, Technische Hochschule, Darmstadt, 1960.

**SMITH, Philip T. (A'38—SM'46—F'60),** Technical Director, C Stellarator Associates, P.O. Box 451, Princeton, N.J.
Born: September 2, 1902, St. Paul, Minn. B.A., 1927, Ph.D., 1931, University of Minnesota. **Committees:** Editorial Reviewer, 1954–55.

**SMITH, Phillip H. (A'34—SM'46—F'52),** Technical Staff, Bell Telephone Laboratories, Inc., Morristown Road, Whippany, N.J.

Born: April 29, 1905, Lexington, Mass. B.S.(E.E.), 1928, Tufts College. **Committees:** Antennas 1946–49; Antennas and Waveguides, 1949–60, *vice-chairman, 1953–54, chairman, 1954–56;* Subcommittee 2.6, *chairman, 1959–60;* Standards, 1954–56. **Professional Groups:** Antennas and Propagation, *secretary-treasurer, 1953–54;* Antennas and Propagation Anniversary Committee, *chairman, 1959–60.* **Sections:** Northern New Jersey Section, Awards, 1960.

**SMITH-ROSE, Reginald L. (SM'44—F'44),** Director of Radio Research, Department of Scientific and Industrial Research, Radio Research Station, Ditton Park, Slough, Buckinghamshire, England.
Born: April 2, 1894, London, England. B.Sc., 1914, M.Sc., 1922, Ph.D., 1923, D.Sc., 1926, Imperial College of Science and Technology. **IRE Offices:** Vice President, 1948; Director, 1948. **Committees:** Radio Wave Propagation, 1944–45; Radio Wave Propagation and Utilization, 1945–49; Wave Propagation, 1949–60. **IRE Representative:** IRE-IEE International Liaison Committee, 1955–59; Vice President, URSI, 1954–60. **Awards:** Student Premium, 1917; Wireless Premium, 1925, 1938, 1939; Duddell Premium, 1942, Institution of Electrical Engineers, London; Coronation Medal, 1937, 1953; United States Medal of Freedom with Silver Palm, 1947; Fellow, City and Guilds Institute, 1951; Commander of the Order of the British Empire, 1952.

**SMULLIN, Louis D. (S'39—A'40—SM'51—F'57),** Professor, Electrical Engineering, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge, Mass.
Born: February 5, 1916, Detroit, Mich. B.S.(E.E.), 1936, University of Michigan; M.S., 1939, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Electron Devices Administrative Committee, 1959–62. **Awards:** Army-Navy Certificate of Appreciation, 1948.

**SMYTH, John B. (SM'52—F'56),** Smyth Research Associates, 3555 Aero Court, San Diego 11, Calif.
Born: June 8, 1914, Pembroke, Ga. B.S., 1934, M.S., 1937, University of Georgia; Ph.D., 1942, Brown University. **Committees:** Wave Propagation, 1956–60. **Professional Groups:** Antennas and Propagation, Editor of *Transactions,* 1953–59; Administrative Committee, Antennas and Propagation, 1952–59. **Awards:** Electronics Achievement Award, Seventh Region, IRE, 1954.

**SNOW, Harold A. (A'24—VA'39—F'56),** Senior Scientist, ITT Laboratories, 500 Washington Ave., Nutley, N.J.
Born: October, 1898, Santa Barbara, Calif. B.S.(E.E.), 1921, George Washington University.

**SOMMER, Alfred H. (SM'54—F'60),** Research Engineer, RCA Laboratories, Inc., Princeton, N.J.
Born: November 19, 1909, Frankfurt, Germany. Ph.D., 1934, Berlin University, Germany. **Committees:** Editorial Reviewer, 1954–60; Electron Tubes, 1956–57.

**SORIA, Rodolfo M. (S'38—A'43—M'46—SM'49—F'58),** Vice President, Research & Engineering, Amphenol-Borg Electronics Corporation, 2801 S. 25 Ave., Broadview, Ill.
Born: May 16, 1917, Berlin, Germany. B.S.(E.E.), 1939, M.S. (E.E.), 1949, Massachusetts Institute of Technology; Ph.D. (E.E.), 1947, Illinois Institute of Technology. **Committees:** Antennas and Waveguides, 1950–51; Awards, 1958–59. **Professional Groups:** Component Parts Administrative Committee, 1955–60, *chairman, 1956–58;* Engineering Management Administrative Committee, 1959–62. **Sections:** Chicago, *treasurer, 1954–55, vice-chairman, 1955–56, chairman, 1956–57.* **IRE Representative:** Illinois Engineering Council, 1952–55; National Electronics Conference, 1952–54; International Electrotechnical Commission; U. S. Delegate on Radio Frequency Transmission Lines and their Accessories, Philadelphia, 1954; Ulm, Germany, 1959.

**SOUTHWORTH, George C. (M'26—F'41),** Technical Consultant, 19 Williams Road, Chatham, N.J.
Born: August 24, 1890, Little Cooley, Pa. B.S., 1914, Grove City College; Ph. D., 1923, Yale University; Sc.D. (Honorary), 1931,

Grove City College. **Committees:** Circuit Elements, 1928–29; Meetings and Papers, 1930; Papers, 1931–34; Standardization, 1928. **Awards:** IRE Morris Liebmann Memorial Prize, 1938; Louis Levy Medal, Franklin Institute, 1946; Stuart Ballantine Medal, Franklin Institute, 1947.

**SPANGENBERG, Karl R. (A'34—SM'45—F'49),** Engineering Consultant, 2100 Page Mill Road. Palo Alto, Calif.
Born: April, 1910, Cleveland, Ohio. B.S.(E.E.), 1932, M.S. (E.E.), 1933, Case Institute of Technology; Ph.D., 1937, Ohio State University. **Committees:** Awards, 1950; Education, 1946, 1949–51; Electron Tubes, 1955; Membership, 1941; Papers, 1943–45; Papers Procurement, 1942–43, 1945; Regular Papers, 1941. **Sections:** San Francisco, *secretary, 1940–43, chairman, 1943–44;* San Francisco Section Awards Committee, 1958–60; WESCON Technical Program Committee, *chairman, 1959.* **IRE Representative:** Stanford University, 1942–47.

**SPEAKMAN, Edwin A. (A'43—M'44—SM'48—F'54),** Vice President and General Manager, Fairchild Guided Missiles Division, Wyandanch, L.I., N.Y.; Manager, Electronic Intelligence, RCA Defense Electronic Products, Camden, N.J.
Born: August 14, 1909, Gratz, Pa. B.S., 1931, Haverford College. **Committees:** IRE Symposium on Components, Planning Committee, 1950. **Professional Groups:** Military Electronics, National Administrative Committee, 1955–59, *chairman, 1958–59.* **Awards:** Naval Civilian Service Award, 1947; Naval Citation, United States Navy, 1948; Associate Fellow, Institute of Aeronautical Sciences, 1953.

**SPENCER, Percy L. (A'53—SM'53—F'55),** Senior Vice President and Director, Raytheon Company, Waltham 54, Mass.
Born: July 9, 1894, Howland, Me. Sc.D. (Honorary), 1950, University of Massachusetts. **Awards:** Naval Ordnance Development Award, 1945; USN Certificate of Commendation, 1947; USN Distinguished Public Service, 1949; Fellow, American Academy of Arts and Sciences, 1955.

**SPENCER, Roy C. (M'46—SM'50—F'60),** Principal Staff Scientist, The Martin Company, Baltimore 3, Md.
Born: April 14, 1901, Pennellville, N.Y. A.B., 1922, Cornell University; Ph.D., 1932, Columbia University. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Antennas and Propagation, 1954–59. **Awards:** Delegate to International General Assemblies of URSI, 1952, 1954, 1957; Member, U. S. National Committee of Commission VI of URSI, 1952–; Fellow, American Association for the Advancement of Science, 1940; Fellow, American Physical Society, 1957.

**SPITZER, Edwin E. (A'28—M'38—SM'43—F'56),** Manager, Power Tube Operations, Industrial Tube Products, Radio Corporation of America, Lancaster, Pa.
Born: February, 1905, Fitchburg, Mass. B.S., 1926, M.S., 1927, Massachusetts Institute of Technology. **Committees:** Papers Review, 1946–52. **Sections:** Lancaster Subsection, *vice-chairman, 1950–51, chairman, 1951–52.*

**STEARNS, H. Myrl (S'39—A'40—SM'48—F'59),** President, Varian Associates, 611 Hansen Way, Palo Alto, Calif.
Born: April, 1916, Kiesling, Wash. B.S.(E.E.), 1937, University of Idaho; E.E., 1939, Stanford University. **Committees:** Frequency Modulation, 1946–47. **Sections:** Palo Alto Subsection, *secretary, 1951, chairman, 1953.* **Awards:** Certificate of Commendation, Secretary of Navy, 1946.

**STEEL, W. Arthur (M'19—SM'43—F'50)(L),** Director, Standard Telephones and Cables Manufacturing Company, Ltd., 9600 St. Lawrence Blvd., Montreal, P.Q., Canada.
Born: November, 1890, Castleton, Ont., Canada. B.A.Sc., 1915, Toronto University. **Committees:** Broadcast, 1936–37. **Sections:** Ottawa, *chairman, 1945–46.*

**STEEN, Jerome R. (A'36—M'36—SM'43—F'50),** Reliability Specialist, Sylvania Electric Products, Inc., 189 "B" St., Needham 94, Mass.
Born: June 29, 1901, West Bloomfield, N.Y. B.S.(E.E.), 1923, University of Wisconsin. **Committees:** Annual Review, 1948–49; Editorial Reviewer, 1954–60; Electron Tubes, 1946–47; Electronics, 1944–45; Measurements and Instrumentation, 1949–55; Papers Review, 1948–57; Professional Groups, 1950–52; Standards, 1948–51; Symbols, 1945–47; Vacuum Tubes, 1945–46. **IRE Representative:** ASA Sectional Committee (C67) on Standardization of Voltages—Preferred Voltages—100 Volts and Under, 1951–53 (No IRE Voting Representative; Liaison, 1954–59). **Awards:** Fellow, American Society for Quality Control; Fellow, Radio Club of America.

**STEVENS, Archie M. (A'12—M'25—F'31)(L),** Consulting Radio Engineer, 539 Prospect Ave., Mamaroneck, N.Y.
Born: September 22, 1887, Glidden, Iowa. A.B., 1909, Leland Stanford Junior University. **Sections:** Buenos Aires, *chairman, 1940.*

**STODDART, Richard R. (SM'45—F'58),** President, Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif.
Born: December 1, 1900, New York, N.Y.

**STONE, Ellery W. (A'14—M'16—F'24)(L),** Rear Admiral, United States Naval Reserve; Chairman of the Board, American Cable and Radio Corporation; Chairman of the Board, All America Cables and Radio, Inc.; Chairman of the Board, The Commercial Cable Company; Chairman of the Board, Mackay Radio and Telegraph Company; Vice President and Director, International Telephone and Telegraph Corporation; Director, International Marine Radio Company, Ltd. (England); Chairman of the Board, ITT Communication Systems; Director, International Electric Corporation; Director, Federal Electric Corporation, 67 Broad St., New York, N.Y.
Born: January 14, 1894, Oakland, Calif. **Committees:** Meetings and Papers, 1930; Membership, 1925. **Awards:** Grand Officer, Crown of Italy, 1944; United States Army Distinguished Service Medal, 1945; Knight Commander of the British Empire, 1945; Knight of Grand Cross of St. Maurice and St. Lazarus, Italian Government, 1945; Knight of Grand Cross, San Marino, 1946; United States Navy Distinguished Service Medal, 1946; Marconi Medal of Achievement, VWOA, 1953.

**STRAITON, Archie W. (M'47—SM'49—F'53),** Professor of Electrical Engineering and Director, Electrical Engineering Research Laboratory, Department of Electrical Engineering, University of Texas, Austin, Tex.
Born: August, 1907, Arlington, Tex. B.S.(E.E.), 1929, M.A., 1931, Ph.D., 1939, University of Texas. **IRE Offices:** Director, 1953–54. **Committees:** Appointments, 1954; Awards, 1956–58; Editorial Reviewer, 1955–60; Education, 1955–60; Nominations, 1953–54; Policy Advisory, 1953–54; Wave Propagation, 1949–60. **IRE Representative:** University of Texas, 1947–50.

**STRANDBERG, Malcom W. P. (A'42—SM'51—F'59),** Associate Professor of Physics, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: March 9, 1919, Box Elder, Mont. S.B., 1941, Harvard University; Ph.D., 1948 Massachusetts Institute of Technology.

**STRATTON, Julius A. (M'42—SM'43—F'45),** President, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: May 18, 1901, Seattle, Wash. S.B., 1923, S.M., 1925, Massachusetts Institute of Technology; Sc.D., 1927, Technische Hochschule, Zurich, Switzerland; D.Eng. (Honorary), 1955, New York University; D.Sc. (Honorary), 1957, St. Francis Xavier University; LL.D. (Honorary), 1957, Northeastern University; LL.D. (Honorary), 1958, Union College; LL.D. (Honorary), 1959, Harvard University; LL.D. (Honorary), 1959, Brandeis University. **IRE Offices:** Director, 1948–51, 1954. **Committees:** Annual Review, 1945–46; Appointments, 1948; Board of Editors, 1946–53; Editorial Board, 1954–55; Education, 1945; Membership, 1947–48; Policy Development, 1949–51; Professional Groups, 1954; Radio Wave Propagation and Utilization, 1945–48, *chairman, 1945–47;* Standards, 1945–46. **IRE Representative:** IEE International Liaison Committee, 1949, 1955–59. **Awards:** Presidential Medal for Merit, 1946; IRE Medal of Honor, 1957.



**STRONG, Charles E. (A'25—M'27—SM'43—F'49),** Manager, Radio Division, Standard Telephones and Cables, Ltd., Oakleigh Road, New Southgate, N. 11, London, England.
Born: November, 1898, Omagh, Tyrone County, Northern Ireland. B.A., 1922, Trinity College, Dublin; B.A.I., 1922, University of Dublin. **Awards:** Officer of the Order of the British Empire, 1947.

**STRUTT, Max J. O. (SM'46—F'56),** Professor, Director, Institute of Advanced Electrical Engineering, Dean of Electrical Engineering, Swiss Federal Institute of Technology, Zurich, Switzerland.
Born: October, 1903, Surakarta, Java, Indonesia. E.E., 1926, d.Tech.Sc., 1927, Institute of Technology, Delft, Holland; Doctor (honoris causa), Institute of Technology, Karlsruhe, Germany, 1950. **Awards:** Gauss Medal, Brunswick (Germany) Society of Sciences, 1954; Honorary Member, Brunswick Society of Sciences, 1955; Honorary Member, International Television Committee, 1956.

**SUITS, C. Guy (SM'55—F'56),** Vice President, Director of Research, General Electric Company, The Knolls, Schenectady, N.Y.
Born: March 12, 1905, Oshkosh, Wis. B.A., 1927, University of Wisconsin; D.Sc., 1929, Technische Hochschule, Zurich, Switzerland; D.Sc. (Honorary), 1944, Union College; D.Sc. (Honorary), 1946, Hamilton College; D.Eng. (Honorary), 1950, Rensselaer Polytechnic Institute; D.Sc. (Honorary), 1955, Drexel Institute of Technology; D.Sc. (Honorary), 1959, Marquette University. **Awards:** America's Young Men Award, 1940; His Majesty's Medal for Service in the Cause of Freedom, 1948; Medal for Merit, U. S. Government, 1948; Silliman Lecturer, Yale University, 1952; Proctor Prize Award, Scientific Research Society of America, 1958.

**SULZER, Peter G. (A'46—M'55—SM'56—F'58),** Consulting Engineer; President, Sulzer Laboratories, Inc., 5526 Dorsey Lane, Washington 16, D.C.
Born: August 3, 1922, Media, Pa. B.S.(E.E.), 1948, M.Sc.(E.E.), 1949, Pennsylvania State College.

**SUNSTEIN, David E. (M'44—SM'51—F'58),** President, General Atronics Corporation; Vice President Atronic Products, Inc., One Bala Ave., Bala-Cynwyd, Pa.; Director, Vanguard Air & Marine Corporation, Radnor, Pa.
Born: July 29, 1918, Pittsburgh, Pa. B.S.(E.E.), 1940, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1955–58. **Awards:** Army-Navy Individual Merit Certificate, United States Navy, 1945.

**SWINYARD, William O. (A'37—M'39—SM'43—F'45),** Vice President and Director, Hazeltine Research, Inc., 5445 W. Diversey Ave., Chicago 39, Ill.
Born: July 17, 1904, Logan, Utah. B.S., 1927, Utah State University. **IRE Offices:** Director, 1945–46. **Committees:** Annual Review, 1947–48; Education, 1945–48; National Convention, 1947; Radio Receivers, 1946–50, 1954–60, *chairman, 1946–48, vice-chairman, 1956–57;* Sections, 1945–50, *chairman, 1946–47;* Standards, 1947–48. **Professional Groups:** Broadcast and Television Receivers Administrative Committee, 1957, *vice-chairman, 1958, 1959–60.* **Sections:** Chicago, *secretary, 1943–44; chairman, 1944–45.* **IRE Representative:** National Electronics Conference, *president, 1946, chairman of the board, 1947, 1960;* TASO Panel 2, *chairman.* **Awards:** President, Radio Engineers Club of Chicago, 1945; Eta Kappa Nu (Professional Member); Fellow, Radio Club of America, 1956; Fellow, American Association for the Advancement of Science, 1958.

**SYKES, Roger A. (A'41—M'42—SM'43—F'57),** Transmission Apparatus Engineer, Bell Telephone Laboratories, Inc., North Andover, Mass.
Born: February 17, 1908, Windsor, Vt. B.S., 1929, M.S., 1930, Massachusetts Institute of Technology; 1930–34, Columbia University. **Committees:** Piezoelectric Crystals, 1945–59, *vice-chairman, 1948–51, chairman, 1951–57;* Piezoelectric and Ferroelectric Crystals, 1959–60; Standards, 1951–54.

**SZEGHO, Constantin S. (A'41—SM'51—F'52),** Vice President-in-Charge-of Research, The Rauland Corporation, 4245 N. Knox Ave., Chicago 41, Ill.
Born: March 15, 1905, Hungary. Dr. of Engineering, 1932, Institute of Technology, Aachen, Germany; E.E., 1928, Institute of Technology, Munich, Germany. **Committees:** Papers Review, 1952–53.

**SZIKLAI, George C. (A'41—M'43—SM'43—F'55),** Assistant to the Vice President, Engineering, Westinghouse Electric Corporation, Pittsburgh 30, Pa.
Born: July 9, 1909, Budapest, Hungary, Absolutorium, 1928, University of Budapest. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Board of Editors, 1951–53; Editorial Administrative, 1951–53; Editorial Reviewer, 1954–60; Papers Review, 1949–50. **Sections:** Princeton, *secretary-treasurer, 1953–54, vice-chairman, 1954–55, chairman, 1955–56.* **Awards:** Radio Corporation of America Laboratories Awards, 1947, 1951, 1952.

**TANK, Franz (A'31—F'49),** Professor, Retired. Frohburgstrasse 174, Zurich 57, Switzerland.
Born: March, 1890, Zurich, Switzerland. Ph.D., 1915, University of Zurich; Rector, Swiss Federal Institute of Technology, 1943–47; President, Swiss National Committee, URSI, 1950–57; President, Swiss Electrotechnical Institution, 1952–56. **IRE Offices:** Vice President, 1955; Director, 1955. **IRE Representative:** Swiss Federal Institute of Technology, 1959.

**TANNER, Robert H. (A'38—SM'48—F'58),** Manager, Electronics Development, Northern Electric Research & Development Laboratories, P.O. Box 400, Belleville, Ont., Canada.
Born: July 22, 1915 London, England. B.Sc., 1935, Imperial College of Science, University of London.

**TAYLOR, A. Hoyt (M'16—F'20)(L),** Retired. 691 W. 12 St., Claremont, Calif.
Born: January 1, 1879, Chicago, Ill. B.S., 1902, Northwestern University; Ph.D., 1909, University of Göttingen, Germany; D.Sc. (Honorary), 1953, University of North Dakota. **IRE Offices:** President, 1929; Director, 1929–31. **Committees:** Awards, 1928–31; Institute Sections, 1928; Meetings and Papers, 1928. **Sections:** Washington, *chairman, 1919–28.* **Awards:** IRE Morris Liebmann Memorial Prize, 1927; John Scott Medal and Premium, Board of City Trustees, Philadelphia, 1942; IRE Medal of Honor, 1942; Presidential Medal of Merit, 1944; Pioneer Award, Professional Group on Aeronautical and Navigational Electronics, 1952.

**TAYLOR, Charles H. (M'13—F'15)(L),** 390 Riverside Drive, New York 25, N.Y.
Born: August 22, 1875, Uxbridge, Middlesex, England. **Committees:** Antenna Terminology, *chairman, 1924–25;* Membership, 1925; Sections, 1925; Standardization, 1914–21, 1924–25.

**TEAL, Gordon K. (SM'53—F'56),** Assistant Vice President, Director of Research, Texas Instruments, Inc., P.O. Box 1079, Dallas 21, Tex.
Born: January 10, 1907, Dallas, Tex. A.B., 1927, Baylor University; Sc.M., 1928, Ph.D., 1931, Brown University. **IRE Offices:** Director, 1959. **Committees:** Editorial Board, 1958–60; Editorial Reviewer, 1955–60; Section Publications, *chairman, 1957–60;* Technical Program Committee, International IRE Convention, *chairman, 1960.* **Sections:** Dallas-Fort Worth, *secretary, 1953–54, vice-chairman, 1955–56;* Dallas, *chairman, 1956–57.* **IRE Representative:** Board of Directors SWIRECO, 1957–59; Southwestern IRE Conference and Electronics Show, *vice-chairman, 1959.* **Awards:** Fellow, American Association for the Advancement of Science.

**TEARE, Benjamin R., Jr. (A'41—SM'45—F'51),** Dean, College of Engineering and Science, Carnegie Institute of Technology, Pittsburgh, Pa.
Born: January, 1907, Menomonie, Wis. B.S.(E.E.), 1927, M.S., 1928, University of Wisconsin; D.Eng., 1937, Yale University. **Committees:** Education, 1944. **Sections:** Pittsburgh, *vice-chairman, 1942–43, chairman, 1943–44.* **IRE Representative:** Carnegie Institute of Technology, 1944–45. **Awards:** George Westinghouse Award, American Society for Engineering Education, 1947.

**TELLEGEN, B. D. H. (SM'52—F'55),** Scientific Advisor, Philips Research Laboratories, Eindhoven, Netherlands; Professor, Electrical Engineering, Technical University, Delft, Netherlands.
Born: June 24, 1900, Winschoten, Netherlands, E.E., 1923, Technical University, Delft, Netherlands. **Awards:** Honorary Member, Netherlands Radio Institution, 1951; Honorary Life Member, Institution of Radio Engineers, Australia 1953; Gold Research Medal, Royal Netherlands Institution of Engineers, 1954.

**TELLIER, Joseph C. (S'35—A'37—SM'45—F'59),** Manager, Circuit Research, Research Division, Philco Corporation, C & Tioga Sts., Philadelphia 34, Pa.
Born: June 24, 1914, Des Moines, Iowa. B.S.(E.E.), 1935, University of Pennsylvania. **Committees:** Editorial Reviewer, 1955–60. **Awards:** Certificate of Service, Office of Scientific Research and Development, 1943.

**TERMAN, Frederick E. (A'25—F'37),** Vice President and Provost, Stanford University, Stanford, Calif.
Born: June 7, 1900, English, Ind., A.B., 1920, Eng. 1922. Stanford University; Sc.D., 1924, Massachusetts Institute of Technology; Sc.D. (Honorary), 1945, Harvard University; Sc.D. (Honorary), 1950, University of British Columbia; 1955, Syracuse University. **IRE Offices:** President, 1941; Vice President, 1940; Director, 1949–43, 1948–49. **Committees:** Admissions, 1940: Annual Review, 1946–47; Appointments, 1949; Awards, 1940, 1942–43; Constitution and Laws, 1944–47; Education, 1949–50; Handbook, 1945–48; Membership, 1939–40, 1942, 1949–50, *chairman*, 1942; Nominations, 1943, 1948–49, 1951, 1953, 1955, *chairman*, 1951; Policy Development, 1948–50; Professional Groups, 1948; Research, *chairman, 1945–49;* Standards, 1934–41, 1946–47. **Sections:** San Francisco, *secretary, 1931–32, chairman, 1939–40.* **IRE Representative:** Stanford University, 1941; National Research Council, Division of Engineering and Research, 1943–46. **Awards:** IRE Medal of Honor, 1950.

**THAYER, Gordon N. (SM'47—F'51),** Vice President, Marketing, American Telephone and Telegraph Company, 195 Broadway, New York 7, N.Y.
Born: October 6, 1908, Delta, Colo. 1926–30, M.E., 1946, Stevens Institute of Technology.

**THOMAS, Henry P. (A'39—VA'39—M'44—SM'47—F'51),** Engineer, Communication Products Department, General Electric Company, Lynchburg, Va.
Born: May, 1904, Boston, Mass. B.A., 1925, M.S., 1927, Harvard University. **Committees:** Editorial Reviewer, 1954–60; Papers Review, 1946–53; Radio Wave Propagation, 1942–46; Wave Propagation, 1940–41. **Awards:** Charles A. Coffin Award, General Electric Company, 1948.

**THOMPSON, Leland E. (A'35—SM'44—F'57),** Engineer, Radio Corporation of America, Camden, N.J.
Born: September 18, 1905, Creighton, Neb. B.S.(E.E.), 1929, University of South Dakota.

**TINUS, William C. (A'31—M'36—SM'43—F'51),** Vice President, Bell Telephone Laboratories, Inc., Whippany, N.J.
Born: October 18, 1905, Chicago, Ill. B.S.(E.E.), 1928, Dr.Eng. (Honorary), 1954, Texas A and M College. **Committees:** Board of Editors, 1946–53.

**TOLLES, Walter E. (M'46—SM'56—F'60),** Head, Department of Medical and Biological Physics, Airborne Instrument Laboratory, A Division of Cutler-Hammer, Inc., Comac Road, Deer Park, L.I., N.Y.
Born: February, 1916, Moline, Ill. B.S.(Physics), 1939, Antioch College; M.S.(Physics), 1941, University of Minnesota. **Committees:** Medical Electronics, 1956, *chairman, 1957–58;* Professional Groups, 1960, Standards, 1956. **Professional Groups;** Medical Electronics, *secretary-treasurer, 1957, vice-chairman, 1958–59, chairman, 1959–60.* **Awards:** Fellow, American Association for Advancement of Science, 1947; Fellow, New York Academy of Science, 1957.

**TOLMIE, John R. (J'15—A'18—M'32—SM'43—F'55),** Retired as Staff Supervisor, Pacific Telephone & Telegraph Co. Residence: 1624 Boren Ave., Seattle, Wash.
Born: March 19, 1897, Seattle, Wash. B.S.(E.E.), 1919, M.S. (E.E.), 1923, University of Washington. **Sections:** Seattle, *secretary, 1919–20, chairman, 1923–24.*

**TOTH, Emerick (SM'48—F'58),** Head of Radio Techniques Branch, U. S. Naval Research Laboratory, Washington 25, D.C.
Born: June, 1905, New York, N.Y. B.S.(E.E.), 1927, Newark College of Engineering. **Professional Groups:** Communication Systems Administrative Committee. **Sections:** Washington Section Awards Committee; Washington Chapter, PGMIL, *vice-chairman.* **IRE Representative:** Member, U. S. Commission VI, URSI. **Awards:** Meritorious Civilian Service Award, United States Navy, 1946.

**TOWN, George R. (A'37—SM'44—F'50),** Dean of Engineering, Iowa State University, Ames, Iowa.
Born: May 26, 1905, Poultney, Vt. E.E., 1926, D.Eng., 1929, Rensselaer Polytechnic Institute. **IRE Offices:** Director, 1949–53. **Committees:** Appointments, 1952; Awards, 1948–49; Education, 1945–48; Frequency Modulation, 1946–47; Membership, 1953–55; Papers Procurement, 1947–50. **Professional Group:** Broadcasting Administrative Committee, 1957–60. **Sections:** Rochester, *secretary, 1942–44, chairman, 1944–46.* **Awards:** IRE Professional Group on Broadcast and Television Receivers, 1959.

**TOWNER, Orrin W. (A'24—M'29—SM'43—F'58),** Director of Engineering, WHAS, Inc., 525 W. Broadway, Louisville 2, Ky.
Born: March 29, 1903, Peterson, Iowa. A.A.(Eng.), 1924, Jr. College of Kansas City; B.Sc.(E.E.), 1927, E.E., 1933, University of Kansas. **Committees:** Broadcast Transmission Systems Group, *chairman, 1949.* **Sections:** Louisville, *chairman, 1947–49, 1956–57.* **Awards:** Presidential Certificate of Merit, 1948.

**TRAVIS, Irven (SM'46—F'53),** Vice President of Research and Engineering, Burroughs Corporation, 6071 Second Ave., Detroit 32, Mich.
Born: March, 1904, McConnellsville, Ohio. B.S.(E.E.), 1926, Drexel Institute of Technology; M.S.(E.E.), 1928, Sc.D.(E.E.), 1938, University of Pennsylvania. **Committees:** Awards, 1959–60, *chairman, 1960;* Fellow, 1958. **Sections:** Philadelphia, *vice-chairman, 1933–34.* **Awards:** Alumni Citation, Drexel Institute of Technology; Commendation, United States Navy, 1946.

**TREVOR, Bertram A. (A'29—M'38—SM'43—F'53),** Technical Administrator, Radio Corporation of America, Surface Communications Systems Laboratory, Box 5644, Tucson, Ariz.
Born: February, 1906, Ithaca, N.Y. E.E., 1928, Cornell University. **Committees:** Frequency Modulation, 1946–47; Membership, 1943–46; Modulation Systems, 1947–52, *vice-chairman, 1948–50, chairman, 1950–51;* Papers Review, 1946–53; Standards, 1950–51.

**TROLESE, Louis G. (A'42—SM'47—F'60),** Vice President, Smyth Research Associates, 355 Aero Court, San Diego, Calif.
Born: July 2, 1908, Sonora, Calif. B.S.(E.E.), 1930, University of California, Berkeley; Professional Engineer. **Committees:** Papers Procurement, 1947–50. **Sections:** San Diego, *chairman, 1949–50.* **IRE Representative:** Seventh Region Technical Conference and Trade Show, *chairman, 1957;* Member, U.S.A. Commission II of the URSI.



**TRUXAL, John G. (S'47—A'48—SM'54—F'59),** Head, Electrical Engineering Department, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn, N.Y.
Born: February 19, 1924, Lancaster, Pa. A.B., 1944, Dartmouth College; B.S., 1947, Sc.D., 1950, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1954–60.

**TUPPER, Bertram R. (A'36—SM'46—F'54),** Chief Engineer of the British Columbia Telephone Company, 768 Seymour St., Vancouver 2, B.C., Canada.
Born: April 15, 1906, Vancouver, B.C., Canada. B.S., 1928, University of British Columbia. **Sections:** Vancouver, *chairman, 1959.*

**TURNER, George S. (A'22—M'28—SM'43—F'57),** Chief, Field Engineering and Monitoring Bureau, Federal Communications Commission, Washington 25, D.C.
Born: June 25, 1900, Independence, Mo. LL.M., 1939, Atlanta Law School. **Committees:** Membership, 1927; Standardization, 1926–27. **Sections:** Atlanta, *secretary, 1938–39, vice-chairman, 1940.*

**TURNER, Hubert M. (A'14—M'30—F'37)(L),** Associate Professor, Emeritus, Electrical Engineering, Yale University, New Haven, Conn.
Born: July 20, 1882, Hillsboro, Ill. B.S., 1910, M.S., 1915, University of Illinois. **IRE Offices:** President, 1944; Director, 1933–46. **Committees:** Admission, 1936, 1939–43, *chairman, 1941–42;* Annual Review, 1937–40, 1943–44; Awards, 1934, 1938–41, *chairman, 1934, 1940;* Bibliography, 1930–31; Circuit Elements, *chairman, 1927–28;* Constitution and Laws, 1936–43, *chairman, 1936–40;* Executive, *chairman, 1944;* Investments, 1944–46; Meetings and Papers, 1929; Nominations, 1938, 1941, 1945, *vice-chairman, 1945;* Papers, 1932–44; Papers Procurement, 1942–43; Preparedness, 1940–41; Regular Papers, 1941; Sections, 1952; Standardization, 1926–32; Standards, 1932–38, 1940–48; Symbols, 1940–49, *chairman, 1940–45;* Tellers, 1940. **IRE Representative:** Yale University, 1941–47; ASA Subcommittee on Letter Symbols for Radio, 1936–54; ASA Electrical Standards Committee, 1939–46; ASA Sectional Committee (C-18) on Specifications for Dry Cells and Batteries, 1936–51; ASA Subcommittee on Communication Symbols of Sectional Committee on Graphical Symbols and Abbreviations for Use on Drawings, 1939–48; ASA Sectional Committee (Y-10) on Letter Symbols, *chairman, 1940–58;* United States National Committee of the International Electrotechnical Commission, 1944–48; Technical Advisor, U. S. National Committee, International Electrotechnical Commission, Letter Symbols, 1946–58; Chief Delegate, United States National Committee on Letter Symbols for Electrical Quantities, International Electrotechnical Commission, Paris, France, 1950; Philadelphia, 1954; Stockholm, 1958; United States Paper Committee, World Power Conference, London, 1950; Member, Examining Committee for the Connecticut Board of Registration for Professional Engineers, 1942–59, *chairman, 1957–.*

**TUSKA, Clarence D. (A'14—M'41—SM'43—F'57),** Staff Consultant, Patents, Radio Corporation of America, David Sarnoff Research Center, Princeton, N.J.
Born: August 15, 1896, New York, N.Y. B.S., 1919, Trinity College; LL.B., 1934, La Salle Extension University.

**TUTTLE, David F., Jr. (S'34—A'39—M'47—SM'54—F'60),** Professor of Electrical Engineering, Electrical Engineering Department, Stanford University, Stanford, Calif.
Born: July 5, 1915, Briarcliff Manor, N.Y. B.A., 1934, Amherst College; S.B., S.M., 1938, Sc.D., 1948, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1955–60. **Awards:** Fellow, American Institute of Electrical Engineers, 1960.

**TUTTLE, W. Norris (A'26—SM'46—F'49),** Engineering Consultant, General Radio Company, 22 Baker Ave., West Concord, Mass.
Born: March 29, 1902, Croton-on-Hudson, N.Y. A.B., 1924, S.M. (Electrical Communication Engineering), 1926, Ph.D.(Physics), 1929, Harvard University. **Committees:** Annual Review, 1949–51; Circuits, 1944–60, *chairman, 1949–51;* Editorial Board, 1954–58; Education, 1953–60; Papers Review, 1948–52; Policy Development, 1948–50; Standards, 1949–51. **Awards:** Medal of Freedom, War Department, 1946.

**TUVE, Merle A. (A'45—F'45),** Director, Department of Terrestrial Magnetism, Carnegie Institution of Washington, 5241 Broad Branch Road, N.W., Washington 15, D.C.
Born: June 27, 1901, Canton, S.D. B.S., 1922, A.M., 1923, University of Minnesota; Ph.D., 1926, The Johns Hopkins University; D.Sc., 1948, Case Institute; D.Sc., 1949, Kenyon College; D.Sc., 1949, Williams College; D.Sc., 1950, The Johns Hopkins University; D.Sc., 1953, University of Alaska. **Awards:** Fellow, American Physical Society; American Academy of Arts and Sciences; National Academy of Sciences; American Philosophical Society; American Association for the Advancement of Science Prize, 1931; Presidential Medal for Merit, 1946; Research Corporation Award, 1947; John Scott Award, 1948; Comstock Prize, 1949; Commander of the Order of the British Empire, 1949; Howard N. Potts Medal, Franklin Institute, 1950; Outstanding Achievement Medal, University of Minnesota, 1950.

**TYSON, Benjamin F. (S'36—A'39—VA'39—SM'49—F'58),** Engineering Manager, General Telephone & Electronics Laboratories, Inc., 208–20 Willets Point Blvd., Bayside, L.I., N.Y.
Born: November 18, 1913, Chatham, N.J. M.E., 1935, M.Sc., 1937, Stevens Institute of Technology. **Committees:** Admissions, 1960; Tellers, 1954–56, *chairman, 1955;* Video Techniques, 1951–55. **Sections:** Long Island Subsection, *secretary, 1952.* **Awards:** Certificate of Commendation, Bureau of Ships, United States Navy, 1947.

**ULLRICH, Edward H. (M'26—F'39),** Standard Telephones and Cables, Ltd., Connaught House, Aldwych, London, W.C.2, England.
Born: December 8, 1894, Cardiff, Wales. Mechanical Sciences Tripos, 1921, Christ's College, Cambridge, England. **Committees:** Membership, 1927. **Awards:** Institution Premium, Institution of Electrical Engineers, 1936; Ex Gratia Joint Award by Royal Commission on Awards to Inventors for Invention, 1941.

**ULREY, Dayton (A'28—M'40—SM'43—F'50),** Consultant, 324 Suwanee Ave., Ballantine Manor, Sarasota, Fla.
Born: September, 1884, North Manchester, Ind. B.A., 1911, M.A., 1912, Indiana University; Ph.D., 1917, Stanford University. **Committees:** Electronics, 1936–37; Papers, 1940–45; Papers Review, 1946–52.

**VALLEY, George E., Jr. (SM'55—F'60),** Professor of Physics, Massachusetts Institute of Technology, Cambridge 39, Mass.
Born: September 5, 1913, New York, N.Y. S.B., 1935, Massachusetts Institute of Technology; Ph.D., 1939, University of Rochester. **Awards:** U. S. Army Letter of Appreciation, 1945; President's Certificate of Merit, 1948; Air Force Association Distinguished Service Award, 1951; Exceptional Civilian Service Medal, 1956, 1958; Fellow, American Physical Society.

**VAN ALLEN, James A. (SM'59—F'60),** Professor of Physics and Head of Department of Physics and Astronomy, State University of Iowa, Iowa City, Iowa.
Born: September 7, 1914, Mount Pleasant, Iowa. B.S.(Physics), 1935, Iowa Wesleyan College; M.S.(Physics), 1936, Ph.D. (Physics), 1939, State University of Iowa; Sc.D. (Honorary), 1951, Iowa Wesleyan College; Sc.D. (Honorary), 1957, Grinnell College; Sc.D. (Honorary), 1958, Coe College; Sc.D. (Honorary), 1959, Cornell College. **Awards:** C. N. Hickman Medal of American Rocket Society for Development of the Aerobee, 1949; Physics Award of the Washington Academy of Sciences, 1949; Space Flight Award, American Astronautical Society, 1958; Distinguished Civilian Service Medal, U. S. Army, 1959; Fellow, American Physical Society; Fellow, American Astronautical Society; Fellow, American Rocket Society.

**VAN ATTA, Lester C. (M'42—SM'43—F'52),** Director, Technical Information and Education, Hughes Aircraft Company, Culver City, Calif.

Born: April 18, 1905, Portland, Ore. B.A., 1927, Reed College; M.S., 1929, Ph.D., 1931, Washington University. **Committees:** Antennas, 1945–48, *vice-chairman, 1948–49;* Antennas and Waveguides, 1949–51, *chairman, 1949–50, 1950–51;* Awards, 1953; Editorial Reviewer, 1954–60; Membership, 1953; Papers Review, 1951–53; Professional Groups, 1951–60, *vice-chairman, 1953;* Research, 1946–47, 1949–51; Standards, 1949–51. **Professional Groups:** Antennas and Propagation Administrative Committee, 1951–55, *chairman, 1949–50.* **Sections:** Los Angeles, *chairman, 1958–59.*

***VAN DER POL, Balthasar (M'20—M'29)(L),** Director, International Radio Consultative Committee (C.C.I.R.), Palais Wilson, Geneva, Switzerland, Retired. 10 Zydeweg, Wassenaar, Netherlands.
Born: January 27, 1889. D.Sc., 1919, Utrecht. **IRE Offices:** Vice President, 1934; Director, 1945. **Committees:** Electronics, 1936–41; Meetings and Papers, 1929; Wave Propagation, 1937–40. **Awards:** Honorary Member, Netherlands Radio Society, 1920; Knight, Order of the Orange Nassau, 1927; IRE Medal of Honor, 1935; Knight, Order of the Netherlands Lion, 1946; Member, Dutch Royal Society, 1946; Honorary President, Union Radio-Scientifique Internationale (U.R.S.I.), 1952; Valdemar Poulsen Gold Medal, Danish Academy of Technical Sciences, 1953; Doctor (honoris causa), Technical University, Warsaw, 1956; Corresponding member of the French Academy of Sciences, 1957; Honorary Doctorate of University of Geneva, Switzerland, 1959.

**VAN DER ZIEL, Aldert (SM'49—F'56),** Professor of Electrical Engineering, University of Minnesota, Minneapolis 14, Minn.
Born: December 12, 1910, Zandeweer, Groningen, Netherlands. B.A.(Physics and Math.), 1930, M.A.(Physics and Math.), 1933, Ph.D.(Physics and Math.), 1934, University of Groningen.

**VAN DEUSEN, George L. (SM'46—F'58),** Major General, U. S. Army, Retired. Consultant, RCA Institutes, Inc., 350 W. 4 St., New York 14, N.Y.
Born: February 10, 1888, Passaic, N.J. B.Sc., 1909, United States Military Academy; M.Sc., 1921, Yale University. **Committees:** Annual Review, 1950–52; Public Relations, 1951. **Awards:** Distinguished Service Medal, U. S. Army, 1946.

**VAN DYCK, Arthur F. (IRE Charter Member)(A'12—M'18—F'25)(L),** Retired. 516 Bougainvillea Lane, Vero Beach, Fla.
Born: May 20, 1891, Stuyvesant Falls, N.Y. Ph.B., 1911, Yale University. **IRE Offices:** President, 1942; Manager, 1930–32; Director, 1932–35, 1939–44. **Committees:** Admissions, 1930–34; 1937–40, 1943, *chairman, 1932–33, 1940, 1943;* Annual Review, 1937–40, 1943–44, *chairman, 1937–40;* Awards, 1934, 1940, 1952–53; Bibliography, 1930–32; Constitution and Laws, 1933–34, 1943; Executive, 1942–43, *chairman, 1942;* History, 1960; New York Program, 1934–35, 1939–40, *chairman, 1934;* Nominations, 1932, 1951; Papers, 1940; Papers Procurement, 1942–43; Public Relations, 1940–41, 1943–46, *chairman, 1941;* Registration of Engineers, 1940; Regular Papers, 1941; Research, 1946–47; Standards, 1933–36; Tellers, 1932–33, 1935, *chairman, 1935.* **IRE Representative:** ASA Sectional Committee (Z17) on Preferred Numbers, 1936, 1939–55; ASA Sectional Committee (Z67) on Standardization of Voltage—Preferred Voltages 100 Volts and Under, 1949–50. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940; Legion of Merit, 1946.

**VAN DYKE, Karl S. (A'15—M'26—SM'43—F'44)(L),** Professor of Physics, Wesleyan University, Scott Laboratory, Middletown, Conn.
Born: December 8, 1892, Brooklyn, N.Y. B.S., 1916, M.S., 1917, Wesleyan University; Ph.D., 1921, University of Chicago. **Committees:** Admissions, 1929; Annual Review, 1941, 1949–51; Board of Editors, 1933–40, 1947–53; Editorial Reviewer, 1957–60; Meetings and Papers, 1929–31, *chairman, 1929;* Membership, 1942–47; Papers, 1932–33, 1944–45; Papers Procurement, 1945–48; Papers Review, 1946; Piezoelectric Crystals, 1940–43, 1945–59, *chairman, 1940–42, 1949–51;* Piezoelectric and Ferroelectric Crystals, 1959–60; Standards, 1941, 1949–51. **Sections:** Connecticut Valley, *secretary-treasurer, 1927, chairman, 1934–35.* **IRE Representative:** Wesleyan University, 1955–57.

**VARIAN, Russell H. (A'40—SM'51—F'52),** Chairman, Board of Directors, Varian Associates, 611 Hansen Way, Palo Alto, Calif.
Born: April 24, 1898, Washington, D.C. A.B., 1925, M.A., 1927, Stanford University; Dr.Eng. (Honorary), 1943, Polytechnic Institute of Brooklyn. **Awards:** Fellow, American Physical Society; John Price Wetherill Medal, Franklin Institute, 1950.

**VILLARD, Oswald G., Jr. (S'38—A'41—SM'51—F'57),** Professor, Electrical Engineering, Stanford University, Stanford, Calif.
Born: September 17, 1916, Dobbs Ferry, N.Y. B.A., 1938, Yale University; E.E., 1943, Ph.D., 1949, Stanford University. **Committees:** Editorial Reviewer, 1955–60; Wave Propagation, 1959. **Sections:** Palo Alto Subsection, *chairman, 1952.* **Awards:** Outstanding Young Bay Area Engineer, Bay Area Engineers' Week Committee, 1955; IRE Morris Liebmann Memorial Prize, 1957.

**VOGELMAN, Joseph H. (M'46—SM'49—F'59),** Director of Research and Development, Capehart Corporation, 87-46 123 St., Richmond Hill, L.I., N.Y.
Born: August 18, 1920, New York, N.Y. B.S., 1940, City College of New York; M.(E.E.), 1948, D.(E.E.), 1957, Polytechnic Institute of Brooklyn. **Committees:** Admissions, 1954. **Professional Groups:** Communications Systems Papers Study and Procurement Committees, 3 years; Communications Systems Awards Committee. **Sections:** Rome, Subsection, *chairman, 1953;* Rome-Utica, *chairman, 1954;* 3rd, 4th and 5th National Communication Symposium, Utica; Guest Speakers *chairman, 1957;* Scholarship Fund, *chairman, 1958–59.*

**VOLLUM, Howard (SM'50—F'55),** President, Tektronix, Inc., P.O. Box 831, Portland 7, Ore.
Born: May 31, 1913, Portland, Ore. B.A., 1936, Reed College; Sc.D. (Honorary), 1953, Portland University. **IRE Offices:** Director, 1955. **Sections:** Portland, *chairman, 1954–55.* **Awards:** Legion of Merit, 1945; Oak Leaf Cluster, 1946.

**vonBAEYER, Hans J. (SM'53—F'59),** Dr.Phil., RCAF Telecommunications, Systems Engineer in Chief, Department of National Defense, Canada, RCAF Headquarters, Ottawa, Ont., Canada.
Born: August, 1912. Munich, Germany. Dr.Phil., 1935, University of Heidelberg, Germany.

**WAIDELICH, Donald L. (S'37—A'39—SM'44—F'58),** Professor of Electrical Engineering, University of Missouri, Columbia, Mo.
Born: May 3, 1915, Allentown, Pa. B.Sc.(E.E.), 1936, M.Sc., 1938, Lehigh University; Ph.D., 1946, Iowa State College. **Committees:** Education, 1952–57. **IRE Representative:** University of Missouri, 1946–50. **Awards:** Eta Kappa Nu Honorable Mention Award, 1946; Fulbright Award, U. S. Government, 1951–52; Fellow, American Institute of Electrical Engineers.

**WALKER, Eric A. (M'47—F'60),** President, The Pennsylvania State University, University Park, Pa.
Born: April, 1910, Long Eaton, England. B.S., 1932, M.S., 1933, Sc.D., 1935, Harvard University. **Awards:** Presidential Certificate of Merit for Service to Armed Forces for Development of Acoustic Torpedo, 1948; Paper "An Electroacoustical System," First Prize, Communication Group, 1950, Paper "A Polar Vector Indicator," Second Prize, Science and Electronics Group, 1950, American Institute of Electrical Engineers; Navy Distinguished Public Service Award, 1958; Tasker H. Bliss Award, 1959, American Society of Military Engineers; Fellow, American Acoustical Society; Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society.

**WALLACE, James D. (A'29—SM'44—F'59),** Section Head, Communication Systems Section, Radio Division, Naval Research Laboratory, Washington 25, D.C.

* Deceased.



Born: March 6, 1904, Gloster, Miss. B.A., 1925, M.A., 1927, University of Mississippi, **Professional Groups:** Chapter Activities Committee, *chairman, 1957–58;* Communication Systems Administrative Committee, 1957–60. **Sections:** Washington, *secretary, 1942; chairman, 1944.*

**WALLACE, Robert L., Jr. (SM'53—F'56),** Director of Solid State Electronics Research, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: February 21, 1916, Coolidge, Tex. B.A. (Physics), 1936, M.A. (Physics), 1939, University of Texas. **Committees:** Editorial Reviewer, 1954–60.

**WANG, Chao Chen (A'43—SM'49—F'57),** Department Head, Microwave Tube Research, Sperry Gyroscope Company, Great Neck L.I., N.Y.
Born: October 20, 1914, Changchow, Kiangsu, China. B.S., 1936, Chiao-Tung University, Shanghai; S.M., 1938, Sc.D., 1940, Harvard University. **Committees:** Editorial Reviewer, 1955–60. **Awards:** Victor Emanuel Distinguished Professorship, 1960, Cornell University.

**WARNECKE, Robert R. (SM'48—F'50),** Director, Centre de Physique Electronique et Corpusculaire, Manager of and/Division Tubes Electroniques, Compagnie Générale de Telegraphie Sans Fil, Domaine de Corbeville, B.P. N° 10, Orsay, Seine et Oise, France.
Born: November, 1906, Tours, France. Doctor, 1933, University of Paris; D.Eng. (Honorary), 1958, Polytechnic Institute of Brooklyn. **Committees:** Electron Tubes, 1955–56, 1959–60. **Professional Groups:** *President, 1958,* Societe Française des Ingenieurs et Techniciens du Vide. **Awards:** Ancel Prize, French Society of Electricians, 1943; Henri Becquerel Prize, Academy of Sciences of Paris, 1945; Blondel Medal, 1951; d'Aumale Prize, Academy of Sciences of Paris, 1952; IRE Morris Liebmann Memorial Prize, 1954; Member, French Society of Physics; French Society of Electricians; Society of Radioelectricians (President of the "Microwaves Section," 1953–58).

**WATANBEE, Yasushi Y. W. (SM'57—F'59),** Doctor of Engineering, Department of Electrical Engineering, Tohoku University, 5 Sakurakoju, Sendai, Japan.
Born: November 15, 1896, Kuji-machi, Hitachi, Ibaraki Pref., Japan. B.S., 1921, University of Tokyo; D.Eng., 1926, Tohoku University. **Awards:** Asano Memorial Prize, Institution of Electrical Engineers of Japan, 1939; Prize Medal, Institution of Communication Engineers of Japan, 1941.

**WATKINS, Dean A. (A'47—M'48—S'49—A'51—SM'55—F'58),** Professor, Stanford University, Stanford, Calif.; President, Watkins-Johnson Company, Palo Alto, Calif.
Born: October 23, 1922, Omaha, Neb. B.S., 1944, Iowa State College; M.Sc., 1947, California Institute of Technology; Ph.D., 1951, Stanford University. **Committees:** Editorial Reviewer, 1955–60; Electron Tube Research Conference; Technical Program Committee, 1955–57. **Professional Groups:** Electron Devices Administrative Committee, 1958–. **Awards:** IRE Seventh Region Achievement Award, 1957.

**WATSON-WATT, Sir Robert (SM'46—F'47),** Governing Director, Sir Robert Watson-Watt and Partners, Ltd., London, W. 1, England; Residence: Maple Brook, Sterling Forest, Tuxedo, N.Y.
Born: April 13, 1892, United Kingdom. C.B., D.Sc., LL.D. **IRE Offices:** Vice President, 1950; Director, 1950. **Awards:** Presidential Medal for Merit, U. S., 1946; Valdemar Poulsen Gold Medal, Danish Academy of Technical Sciences, 1947; Hughes Medal of the Royal Society of London, 1948; Elliott Cresson Medal of the Franklin Institute, 1957; Fellow, Royal Society.

**WAYNICK, Arthur H. (A'43—SM'46—F'57),** Professor and Head, Electrical Engineering Department; Director, Ionosphere Research Laboratory, Pennsylvania State University, University Park, Pa.
Born: November 9, 1905. B.S., 1935, M.S., 1936, Wayne University; 1937–39, University of Michigan Electronics Institute and Cambridge University, England; Sc.D., 1943, Harvard University. **IRE Offices:** Director, 1959–60. **Committees:** Editorial Board, *vice-chairman, 1959–60;* Nominations, 1959–60; Policy Study, 1960; Professional Groups, 1954; Wave Propagation, 1949–60. **Professional Groups:** Antennas and Propagation, *chairman, 1952.* **IRE Representative:** National Bureau of Standard Technical Advisory Committee, 1957–59; U.S.A. Technical Program Committee, XII URSI General Assembly, *chairman;* U.S.A. National Committee of URSI, *past chairman;* U.S.A. National Committee of URSI, *treasurer;* Journal of Geophysical Research, *associate editor.* **Awards:** Navy Ordnance Development Award, 1945; Office of Scientific Research and Development Award, 1945; Guggenheim Fellow, Cambridge University, England, 1954–55; Distinguished Alumni Award, Wayne State University, 1957.

**WEBB, Richard C. (A'41—M'46—SM'56—F'58),** President, Colorado Research Corporation, Broomfield, Colo.
Born: September 2, 1915, Omaha, Neb. B.Sc.(E.E.), 1937, University of Denver; M.Sc.(E.E.), 1944, Ph.D., 1951, Purdue University. **Committees:** Editorial Reviewer, 1953–54; Papers Review, 1953. **Sections:** Denver, *vice-chairman, 1955–56, chairman, 1956–57.* **IRE Representative:** Denver University, 1953–55. **Awards:** RCA Laboratories Awards, 1947, 1949.

**WEBBER, Stanley E. (S'42—A'43—SM'49—F'59),** Manager, High Power Traveling Wave Tube Section, General Electric Microwave Laboratory, 601 California Ave., Palo Alto, Calif.
Born: June 8, 1919, Boston, Mass. B.S.(E.E.), 1941, M.S.(E.E.), 1942, Massachusetts Institute of Technology. **Committees:** Editorial Reviewer, 1955–60; Electron Tubes, 1956–60; Microwave Tube Subcommittee, 1950–56; Tube Research Conference Committee, 1953–56.

**WEBER, Ernst (M'41—SM'43—F'51),** President, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn 1, N.Y.; President, Polytechnic Research & Development Company, Inc., 202 Tillary St., Brooklyn 1, N.Y.
Born: September 6, 1901, Vienna, Austria. Dipl. Eng.(E.E.), 1924, Technical University, Vienna; Ph.D., 1926, University of Vienna; Sc.D., 1927, Technical University. **IRE Offices:** Director, 1952–60; Board of Directors, Chairman, 1959; President, 1959. **Committees:** Administrative Committee of Board of Editors, 1951; Annual Review, 1950–51; Appointments, 1959–60; Awards, 1952–54, *chairman, 1953–54;* Awards Coordination, 1958; Board of Editors, 1949–53; Circuits, 1949–53; Editorial Administrative, 1949–51; Education, 1944–51; Executive, 1957–60, *chairman, 1959–60;* Finance, 1952, 1959–60; Measurements and Instrumentation, *chairman, 1945–55;* Instruments and Measurements, 1948–52, *chairman, 1949–51;* Membership, 1941–48; National Convention, 1947, 1951; Nominations, 1959–60; Policy Advisory, 1952, 1956, *chairman, 1960;* Policy Study, *chairman, 1960;* Professional Groups, 1951–60, *vice-chairman, 1954–55, 1956,* Eastern Division, *vice-chairman, 1957–59, chairman, 1960;* Standards, 1949–60, *vice-chairman, 1951–54, chairman, 1954–56, ex-officio, 1957–59.* **Professional Groups:** Measurements and Instrumentation, *chairman, 1950–52.* **IRE Representative:** ASA Standards Council, 1952–60; ASA Electrical Standards Board, 1955–60; ASA Acoustical Standards Board, 1958–60; ASA Sectional Committee (C16) on Radio, 1954–55, *chairman, 1957–60;* ASA Subcommittee (C42.6) on Electrical Instruments, 1952–55; C.C.I.R., Executive Committee on U. S. Delegation, 1958–60; National Academy of Sciences-National Research Council, Advisory Board of the Office of Critical Tables, 1959–60; United States National Committee, International Electrotechnical Commission, Adviser on Electrical Measuring Instruments, *alternate, 1952, 1958–59;* United States National Committee, URSI, 1956–60; Joint Technical Advisory Committee, *vice-chairman, 1955–56, chairman, 1956–57;* ASA Sectional Committee (C42) on Definition of Electrical Terms, 1955; International Radio Consultative Committee, Executive Committee of U. S. Delegation, 1955–57; International Scientific Radio Union, URSI, Executive Committee, *alternate, 1955–56;* U. S. National Committee of the International Electrotechnical Commission, 1955–59. **Awards:** Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society; Presidential Certificate of Merit, 1948.

**WEBER, Joseph (S'44—M'46—SM'53—F'58),** Professor of Electrical Engineering and Physics, University of Maryland, College Park, Md.
Born: May 17, 1919, Paterson, N.J. B.S., 1940, U. S. Naval Academy; Ph.D.(Physics), 1951, Catholic University of America. **Awards:** Scientific Achievement, Washington Academy of Sciences, 1958.

**WEBSTER, Edward M. (A'30—M'38—SM'43—F'44),** Telecommunications Consultant, 9518 E. Stanhope Road, Kensington, Md.; Commodore, U. S. Coast Guard, Retired. Formerly, Commissioner, Federal Communications Commission.
Born: February 28, 1889, Washington, D.C. **IRE Offices:** Director, 1946. **Committees:** Membership, 1940; Public Relations, 1945–46. **Sections:** Washington, *secretary, 1940, chairman, 1942.* **Awards:** Legion of Merit, Marconi Memorial Medal, VWCA, 1950; Distinguished Service Award, Washington Section IRE, 1956.

**WEBSTER, William M. (A'48—SM'54—F'60),** Director, Electronic Research Laboratory, RCA Laboratories, Inc., Princeton, N.J.
Born: June 13, 1925, Warsaw, N.Y., 1942–43, Renssalaer Polytechnic Institute, B.S. (Physics), 1943–45, Union College; Ph.D., 1954, Princeton University. **Committees:** Editorial Reviewer, 1954–58; Professional Groups, 1960; Solid State Devices, 1956–60, *vice-chairman, 1957–59.* **Professional Groups:** Electron Devices, *chairman, 1959–60.* **Awards:** IRE Editor's Award.

**WEEKS, Paul T. (A'19—M'28—SM'43—F'54)(L),** Engineer, Receiving and Cathode Ray Tube Operations, Raytheon Company, 148 California St., Newton, Mass.
Born: November, 1890, Clarksfield, Ohio. A.B., 1913, Oberlin College; Ph.D., 1917, Cornell University. **Committees:** Annual Review, 1938–42; Electronics, 1936–42, *chairman, 1938–42;* Meetings and Papers, 1927–29; Papers, 1938–41; Regular Papers, 1941; Standards, 1938–42. **Awards:** Fellow, American Association for the Advancement of Science; Naval Ordnance Development Award, 1945.

**WEIHE, Vernon I. (SM'45—F'58),** Director, Air Traffic Navigation Control Programs, General Precision, Inc., 777 14 St., N.W., Washington 5, D.C.
Born: March 3, 1909, Louisville, Ky. B.Sc.(E.E.), 1931, Speed Scientific School, University of Louisville. **Professional Groups:** Administrative Committee, Aeronautical and Navigational Electronics, 1956–57. **Awards:** Collier Trophy, Award for Civilian Achievement, 1948.

**WEIL, Joseph (M'37—SM'43—F'57),** Dean, College of Engineering; Director, Engineering and Industrial Experiment Station; Professor, Electrical Engineering, University of Florida, Gainesville, Fla.
Born: July 19, 1897, Baltimore, Md. 1911–15, Baltimore Polytechnic Institute; B.S.E., 1918, The Johns Hopkins University: M.S., 1926, University of Pittsburgh. **Committees:** Awards, 1960; Fellow, 1958–60. **IRE Representative:** University of Florida, 1941–42. **Awards:** Presidential Medal, Florida Engineering Society, 1940; Honorable Mention, Florida Engineering Society, 1944; Certificate of Service, Office of Scientific Research and Development, 1945; Naval Ordnance Department Award, 1946; Honorable Membership, Southeastern Metermen's Association, 1948; Distinguished Service Certificate, National Council of State Boards of Engineers, 1955; Outstanding Service Award, Florida Engineering Society, 1956.

**WEIMER, Paul K. (A'43—SM'51—F'55),** Research Engineer, RCA Laboratories Division, Princeton, N.J.
Born: November 5, 1914, Wabash, Ind. B.A., 1936, Manchester College; M.A., 1938, University of Kansas; Ph.D., 1942, Ohio State University. **Committees:** Editorial Reviewer, 1954–60. **Sections:** Princeton, *secretary, 1956, vice-chairman, 1957, chairman, 1958.* **Awards:** Television Broadcasters Association Award, 1946; IRE Vladimir K. Zworykin Television Prize, 1959.

**WEINBERG, Louis (M'52—SM'56—F'60),** Head, Communications and Networks Research Section, Hughes Research Laboratories, Florence & Teale Sts., Culver City, Calif.
Born: July, 1919, Brooklyn, N.Y. A.B., 1941, Brooklyn College; M.S., 1947, Harvard University; Sc.D., 1951, Massachusetts Institute of Technology. **Committees:** Circuits, 1954–60; Editorial Reviewer, 1954–58; Linear Lumped-Constant Passive Circuits Subcommittee, *chairman, 1954–60;* Transistor Circuitry Subcommittee, 1953–56. **Professional Groups:** Circuit Theory Administrative Committee, 1959–60. **Sections:** Guest Editor of WESCON papers, March, 1955 issue on Transactions on Circuit Theory; Papers Selection Committee for Circuit Theory Sessions, WESCON, 1953–54; Los Angeles Chapter, *first chairman, 1952–53,* on Circuit Theory. **IRE Representative:** Circuit Theory for International Symposium on Circuit and Information Theory, 1959.

**WEINBERGER, Julius (A'13—F'25)(L),** Retired as Consulting Engineer, 6 Carrington Drive, East Northport, N.Y.
Born: July 22, 1893, New York, N.Y. B.S., 1913, College of the City of New York. **Committees:** Industrial Electronics, 1946–58; Meetings and Papers, 1929; Research, 1946–48. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1940.

**WEIR, Irvin Reed (A'25—M'41—SM'43—F'49),** Engineering Administration, Heavy Military Electronics, G.E. Department, General Electric Company, Syracuse, N.Y.
Born: September, 1897, Prairie Creek, Ind. B.S., 1921, E.E., 1932, Rose Polytechnic Institute. **Committees:** Annual Review, 1950–51; Antennas, 1944–45; Radio Transmitters, 1945–60; Transmitters, 1944–45.

**WELCH, H. William, Jr. (A'47—SM'52—F'58),** Director of Research and Development, Military Electronics Division; Manager, Solid State Electronics Department, Motorola, Inc., 8201 E. McDowell Road, Scottsdale, Ariz.
Born: October 21, 1920, Beardstown, Ill. B.A. (Physics), 1942, DePauw University; M.Sc.(Physics), 1949, Ph.D.(E.E.), 1952, University of Michigan. **Awards:** IRE Browder J. Thompson Memorial Prize, 1952.

**WELDON, James O. (A'26—SM'46—F'54),** President, Continental Electronics Manufacturing Company, 4212 S. Buckner Blvd., Dallas 27, Tex.
Born: March 15, 1905, Canton, Mo. **Committees:** Editorial Reviewer, 1955–60.

**WELLS, Frank H. (A'39—SM'48—F'58),** Principal Scientific Officer, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment. Harwell, Berkshire, England.
Born: March, 1915, London, England. B.Sc.(Eng.), 1935, M.Sc. (Eng.), 1936, Imperial College of Science and Technology.

**WELLS, Harry W. (M'36—SM'43—F'53),** Scientific Attaché, U. S. Embassy, Rio de Janeiro and Chairman, on leave, Upper Atmosphere Section, Carnegie Institution of Washington, Department of Terrestrial Magnetism, 5241 Broad Branch Road, Washington 15, D.C.
Born: January 13, 1907, Washington, D.C. B.S.(E.E.), 1928, E.E., 1937, University of Maryland. **IRE Offices:** Director, 1954–55. **Committees:** Annual Review, 1950–51; Awards, 1953, 1956–58; Nominations, 1955–57; Policy Advisory, 1955; Radio Wave Propagation and Utilization, 1945–48; Wave Propagation, *vice-chairman, 1949–52.* **Professional Groups:** Antennas and Propagation, *Editor, 1951–52.* **Sections:** Washington, *secretary, 1948, vice-chairman, 1949–50, chairman, 1949–50.* **IRE Representative:** National Research Council, Division of Engineering and Industrial Research, 1957–60; Member, U.S.A. National Committee for International Geophysical Year, ex officio; National Bureau of Standards Technical Advisory Committee, 1957–59. United States National Committee, URSI, *chairman.* **Awards:** Scientific Achievement, Washington Academy of Sciences, 1947.

**WENDELL, Edward N. (A'26—M'33—SM'43—F'47),** Retired. Marmion Way, Rockport, Mass.



Born: August 11, 1903, Rockport, Mass. B.Sc., 1925, Massachusetts Institute of Technology.

**WENDT, Karl R. (A'36—SM'46—F'54),** Manager of Research, Colorado Research Corporation, Broomfield, Colo.
Born: January, 1906, Coshocton, Ohio. **Committees:** Papers Review, 1951–53. **Sections:** Buffalo-Niagara, *secretary-treasurer, 1949–50, chairman, 1950–51.* **Awards:** Radio Corporation of America Laboratories Award, 1947.

**WHEELER, Harold A. (A'27—M'28—F'35),** President, Wheeler Laboratories, Inc., 122 Cutter Mill Road, Great Neck, L.I., N.Y.; Vice President, Hazeltine Corporation, Little Neck, L.I., N.Y.
Born: May 10, 1903, St. Paul, Minn. B.S.(Physics), 1925, George Washington University. **IRE Offices:** Director, 1934, 1940–45. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Annual Review, 1937, 1940–48; Awards, 1942–44, *chairman, 1943;* Bibliography, 1930–32; Board of Editors, 1940–53; Broadcast, 1935–38; Circuits, 1944–47; Editorial Administrative, 1949–53; Editorial Reviewer, 1954–60; Executive, 1943–44; Handbook, *chairman, 1945–48;* Meetings and Papers, 1929–30; Membership, 1941–42; New York Program, 1931; Nominations, 1948; Papers, 1931–33, 1935–39; Papers Procurement, 1942–44; Public Relations, 1940; Radio Receivers, 1936–37, *chairman, 1937–38;* Regular Papers, 1941; Special Papers, 1940–41; Standardization, 1931–32; Standards, 1932–33, 1936–49, *chairman, 1940–45;* Symbols, 1946–47. **Special Committees:** Professional Recognition, 1947. **Sections:** Long Island Subsection, *chairman, 1948–49.* **IRE Representative:** ASA Sectional Committee (C42) on Definitions of Electrical Terms, 1948, 1950–51; National Television Systems Committee, *alternate, 1940–43.* **Awards:** Fellow, American Institute of Electrical Engineers; Fellow, Radio Club of America; Modern Pioneer Award, National Association of Manufacturers, 1940; IRE Morris Liebmann Memorial Prize, 1940; United States Navy Certificate of Commendation, 1947.

**WHINNERY, John R. (A'41—SM'44—F'52),** Professor and Dean, College of Engineering, University of California, Berkeley 4, Calif.
Born: July 26, 1916, Read, Delta County, Colo. B.S., 1937, Ph.D., 1948, University of California. **IRE Offices:** Director, 1956–58. **Committees:** Antennas, 1948–49; Appointments, 1957; Awards, 1952; Board of Editors, 1946–53; Editorial Reviewer, 1954–60; Education, 1956–58; Handbook, 1945–48; Nominations, 1957–58; Papers, 1944–45; Papers Procurement, 1947–50; Policy Advisory, 1958; Professional Groups, 1960. **Sections:** San Francisco, *secretary-treasurer, 1949–50, vice-chairman, 1950–51, chairman, 1953–54.*

**WHITE, Edwin L. (A'24—M'31—SM'43—F'55),** Colonel, United States Air Force, Retired. Consulting Engineer, 460 Coffee Pot Riviera, St. Petersburg 4, Fla.
Born: July 5, 1896, Valley City, N.D. B.A., 1922, M.S., 1925, George Washington University. **Professional Groups:** Administrative Committee, Vehicular Communications, 1950–56. **Sections:** Florida West Coast, *chairman, 1956–57.* **Awards:** Bronze Star; Fellow, American Institute of Electrical Engineers, 1947.

**WHITE, Warren D. (A'47—SM'48—F'57),** Engineering Consultant, Airborne Instrument Laboratory, Walt Whitman Road, Melville, L.I., N.Y.
Born: July 7, 1915, Springfield, Mo. B.S., 1936, Drury College; B.S.(E.E.), 1938, Missouri School of Mines and Metallurgy. **Committees:** Editorial Reviewer, 1954–60; Frequency Modulation, 1942–46; Information Theory and Modulation Systems, 1959–60; Radio Wave Propagation, 1942–46; Transmitters and Antennas, 1942–45. **Professional Groups:** Information Theory Administrative Committee, 1952–57.

**WHITE, William C. (A'15—M'25—F'40)(L),** Retired. 1422 Lowell Road, Schenectady 8, N.Y.
Born: March 24, 1890, Brooklyn, N.Y. E.E., 1912, Columbia University. **IRE Offices:** Treasurer, 1946; Director, 1943–47. **Committees:** Awards, 1944–46, *chairman, 1945;* Bibliography, 1930–32; Board of Editors, 1930, 1944, 1946–53; Education, 1945–46; Executive, *vice-chairman, 1946;* Investments, *chairman, 1946;* Meetings and Papers, 1928–30; Membership, 1947, 1949–54, *chairman, 1953–54;* Nominations, 1933, 1940, 1944–46; Office Practices, 1947; Papers, 1931–44; Papers Procurement, 1944–50; Professional Recognition, *chairman, 1947;* Standardization, 1925–26, 1929–30; Vacuum Tubes, 1927–28. **Special Committees:** Professional Recognition, *chairman, 1947.* **IRE Representative:** National Electronics Conference Board of Directors, 1947–50.

**WHITTEMORE, Laurens E. (A'16—M'25—F'27)(L),** 31 Martindale Road, Short Hills, N.J.
Born: August 20, 1892, Topeka, Kan. A.B., 1914, Washburn, College; M.A., 1915, University of Kansas. **IRE Offices:** Vice President, 1928; Manager, 1926–27, 1929; Director, 1928, 1935–37. **Committees:** Administrative Committee of the Board of Editors, 1951–53; Annual Review, 1927–53, *chairman, 1940–53;* Awards, 1937, 1948; Bibliography, 1930–32; Board of Editors, 1929–53; Broadcast, 1933–34, 1953; Direction Finding Terminology, *chairman, 1924–25;* Editorial Administrative, 1946–53; Electroacoustic Devices, 1927–28; History, 1956–60; Institute Sections, *chairman, 1926;* Meetings and Papers, 1929; Membership, *chairman, 1925;* Standardization, 1920–32, *chairman, 1926–29;* Standards, 1932–36, 1944–52; Symbols, *chairman, 1944–45;* Tellers, 1934. **IRE Representative:** ASA Sectional Committee on Graphical Symbols and Abbreviations for Use on Drawings, 1939; ASA Sectional Committee on Radio, 1930, 1936, 1939–48; ASA Sectional Committee on Radio Electrical Co-ordination, 1936, 1939–46; ASA Sectional Committee on Standards for Drawings and Drafting Room Practices, 1930, 1936, 1939; ASA Subcommittee on Electrical Abbreviations, Including Radio, 1930; United States National Committee—Advisors on Symbols, 1936, 1939–51.

**WIESNER, Jerome B. (S'36—A'40—SM'48—F'52),** Professor and Director, Research Laboratory of Electronics, Massachusetts Institute of Technology, 77 Massachusetts Ave., Cambridge 39, Mass.
Born: May 30, 1915, Detroit, Mich. B.S., 1937, M.S., 1938, Ph.D., 1950, University of Michigan. **Committees:** Awards, 1954–55; Board of Editors, 1949–53; Editorial Reviewer, 1954–60; Modulation Systems, 1949–50; Nuclear Studies, 1948–49; Professional Groups, 1955; Research, 1949–50. **IRE Representative:** National Bureau of Standards Technical Advisory Committee, 1958–60.

**WILKINS, Arnold F. (A'30—SM'48—F'58),** Senior Principal Scientific Officer, Department of Scientific and Industrial Research, Radio Research Station, Ditton Park, Slough, Buckinghamshire, England.
Born: February 20, 1907, Manchester, England. M.Sc.(Tech.), 1928, University of Manchester. **Awards:** Officer of the Order of the British Empire, 1942.

**WILLIAMS, Albert J., Jr. (A'30—VA'39—SM'49—F'55),** Science Advisor, Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia 44, Pa.
Born: February 28, 1903, Media, Pa. B.A.(E.E.), 1924, Swarthmore College. **Awards:** John Price Wetherill Medal, Franklin Institute, 1952.

**WILLIAMS, Charles E. (J'15—A'17—M'24—SM'43—F'52),** Retired. 2207 Broadway N., Seattle 2, Wash.
Born: March 15, 1896, Seattle, Wash. **Committees:** Sections, 1925; Standardization, 1929–30. **Sections:** Seattle, *secretary, 1920–24, 1935–36, chairman, 1925–26.*

**WILLIAMS, Everard M. (S'36—A'41—SM'44—F'54),** Professor and Head, Electrical Engineering, Carnegie Institute of Technology, Schenley Park, Pittsburgh 13, Pa.
Born: February 2, 1915, New Haven, Conn. B.E., 1936, Ph.D., 1939, Yale University. **Committees:** Awards, 1956–57, *chairman, 1958;* Awards Coordination, 1959–60; Sections, 1947–48. **Sections:** Pittsburgh, *chairman, 1947.* **IRE Representative:** Carnegie Institute of Technology, 1946–51. **Awards:** Presidential Certificate of Merit for Outstanding Civilian Service in World War II; Eta Kappa Nu Award, 1946.

**WILLIAMS, Frederic C. (SM'54—F'57),** Edward Stocks Massey Professor, Electrical Engineering, University of Manchester, Sandy Lane, Romiley, Cheshire, England.
Born: June, 1911, Romiley, Cheshire, England. B.Sc., 1932, M.Sc., 1933, D.Sc., 1939, Manchester University, England; D.Phil., 1936, Oxford University. **Awards:** Order of the British Empire, 1945; Fellow, The Royal Society, England, 1950; Benjamin Franklin Medal, 1957.

**WILLIAMS, Samuel B. (A'47—SM'53—F'57),** Consulting Electrical Engineer, 3701 Taylor St., Chevy Chase 15, Md.
Born: May 26, 1881, Dayton, Ohio. M.E.(E.E.), 1905, Ohio State University. **Committees:** Feedback Control Systems, 1959–60.

**WILLIAMSON, Raymond H. (A'31—M'44—SM'46—F'51),** Manager, Engineering Administration, Communication Products Department, General Electric Company, Lynchburg, Va.
Born: April 6, 1907, Eagle Grove, Iowa. B.S.(E.E.), 1928, Iowa State College; M.S.(E.E.), 1935, Union College. **Committees:** Membership, 1945–56; Papers Procurement, 1947–50. **Sections:** Syracuse, *vice-chairman, 1948–49, chairman, 1949–50.*

**WILMOTTE, Raymond M. (M'29—F'38),** Radio Corporation of America Advanced Military Systems, Princton, N.J.
Born: August 13, 1901, Paris, France. M.A., 1921, Sc.D., 1958, Cambridge University, England. **Committees:** Handbook, 1945–48; Industrial Electronics, 1947–48; New York Program, 1933; Papers, 1932–33; Papers Review, 1946–52; Radio Receivers, 1940–47; Radio Transmitters and Antennas, 1929–30; Sections, 1932; Standardization, 1931–32; Standards, 1931–32. **Awards:** Premium for Research, Institution of Electrical Engineers, 1930; Bureau of Ordnance Development Award, 1945.

**WILSON, James R. (M'31—SM'43—F'54),** 25 Moraga Via, Orinda, Calif.
Born: December 17, 1894, Spokane, Wash. B.A., 1919, Reed College; M.S. 1920, California Institute of Technology; M.S., 1923, Columbia University. **Committees:** Electronics, 1939–46. **Professional Groups:** Electron Devices, Reliability and Quality Control.

**WING, Arthur K., Jr. (J'28—A'30—M'40—SM'43—F'57),** Director, Electron Tube Laboratory, International Telephone & Telegraph Laboratories, 500 Washington Ave., Nutley 10, N.J.
Born: July 1, 1908, New York, N.Y. B.S.(E.E.), 1930, Yale University; M.S.(E.E.), 1931, Massachusetts Institute of Technology. **Committees:** 7.1 Subcommittee on Tubes in Which Transit-Time is Not Essential; Tellers, 1953. **Professional Groups:** New York, *chairman,* Electron Devices, *1955–56;* General Committee, 2nd Annual Technical Meeting, Electron Devices, *secretary, 1956;* General Committee, 3rd Annual Technical Meeting, Electron Devices, *chairman, 1957;* Administrative Committee, 1955–58, 1959–61; Administrative Committee, *secretary-treasurer, 1958–59;* Administrative Committee, *vice-chairman, 1959–60.*

**WINTRINGHAM, William T. (A'26—SM'45—F'51),** Engineer-in-Charge of Visual Systems Research, Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Born: January 18, 1904, Brooklyn, N.Y. B.S.(E.C.E.), 1924, Harvard University. **Committees:** Papers Review, 1948–49; Standards, 1957–60; Television Systems, 1953–60, *vice-chairman, 1954–55, chairman, 1955–57.* **Sections:** New York, *treasurer, 1949–50.*

**WOLCOTT, C. Frederick, Jr. (J'26—A'28—M'36—SM'43—F'57),** Technical Consultant, Gilfillan Bros., Inc., 1815 Venice Blvd., Los Angeles 6, Calif.
Born: January 11, 1907, Anderson, Ind. Northwestern University. **IRE Offices:** Director, 1956–57. **Committees:** Appointments, 1957–58; Nominations, 1956; Policy Advisory, 1956, *chairman, 1957;* Receivers, 1946–49. **Professional Groups:** Liaison Officer, IRE-WEMA WESCON, 1948; WESCON Registration, *chairman, 1950;* WESCON Advisory Group, *chairman, 1953;* WESCON Convention, *vice-chairman, 1954;* WESCON Board of Directors, *chairman, 1956.* **Sections:** Los Angeles, *secretary, 1941, chairman, 1942;* Nominating Committee, 1960, *chairman, 1951;* Sections, Relations Committee, *chairman, 1954–56;* Fellow Nominating Committee, 1960, *chairman, 1958.* West Coast Convention, 1950; Advisory Group, WESCON, *chairman, 1953;* WESCON Convention, *vice-chairman, 1954;* WESCON Board of Directors, *chairman, 1956.*

**WOLFF, Irving G. (A'27—VA'39—F'42),** Consultant, Chairman, RCA Education Committee, 111 Red Hill Road, Princeton, N.J.
Born: July, 1894, New York, N.Y. B.S., 1916, Dartmouth College; Ph.D., 1923, Cornell University. **IRE Offices:** Director, 1952–53. **Committees:** Appointments, 1952; Awards, 1954–56; *chairman, 1955;* Awards Coordination, 1958–59; Board of Editors, 1946–53; Editorial Reviewer, 1954–60; Education, 1945–46, 1948–52; Electroacoustic Devices, 1920–30; Electronics, 1943–46; Meetings and Papers, 1928–30; Nominations, 1952–54; Papers, 1931–45; Sections, 1937, *chairman, 1953;* Standardization, 1927–30; Use of Transmission Unit, 1928-29. **Sections:** Philadelphia, *chairman, 1936–37.* **IRE Representative:** ASA Sectional Committee on Acoustical Measurements and Terminology, 1936, 1939. **Awards:** Distinguished Public Service Award, United States Navy, 1949; Cresson Medal, Franklin Institute, 1959.

**WOOLDRIDGE, Dean E. (SM'50—F'54).** President, Thompson Ramo Wooldridge Inc., 8433 Fallbrook Ave., Canoga Park, Calif.
Born: May 30, 1913, Chickasha, Okla. B.A., 1932, M.S., 1933, University of Oklahoma; Ph.D.(Physics), 1936, California Institute of Technology. **Awards:** National Research Fellowship, California Institute of Technology, 1936; Citation of Honor Award for Outstanding Achievements in Field of Electronic Research and Development, Air Force Association, 1950; Raymond E. Hackett Award, 1955.

**WOOLVERTON, Robert B. (A'13—M'13—F'15)(L),** Colonel, United States Army, Retired. 654 12 Ave., San Francisco 18, Calif.
Born: September 22, 1884, Greensboro, Pa. B.S., 1912, Harvard University. **Committees:** Increase of Membership, 1914; Papers, 1915; Publicity, 1915–19. **Sections:** San Francisco, *chairman, 1915.*

**WOONTON, Garnet A. (A'40—SM'44—F'51),** Macdonald Professor of Physics; Director, Eaton Electronics Research Laboratory; Chairman, Department of Physics, McGill University, Montreal, P.Q., Canada.
Born: July, 1906, London, Ont., Canada. B.A., 1925, M.A., 1931, D.Sc., 1955, University of Western Ontario. **Committees:** Education, 1945–46. **Sections:** London, *chairman, 1945.* **IRE Representative:** International Vice President, URSI; University of Western Ontario, 1941–47. **Awards:** Fellow, Royal Society of Canada.

**WRIGHT, Jay W. (A'42—SM'44—F'58),** President, Radio Service Corporation of Utah, Station KSL-KSL-TV, 145 Social Hall Ave., Salt Lake City 11, Utah.
Born: November, 1909, Salt Lake City, Utah. A.B.(Physics), 1935, M.Sc.(Physics), 1936, University of Utah. **Committees:** Antennas, 1946–49; Constitution and Laws, 1940–41; Frequency Modulation, 1946–47; Modulation Systems, 1947–48; Papers, 1942–45; Papers Review, 1946–50; Radio Wave Propagation and Utilization, 1946–49; Wave Propagation, 1949–56. **Awards:** Navy Department Certificate of Appreciation, War Department, 1948.

**WYCKOFF, Ralph D. (M'29—SM'43—F'55),** Director, Instrument Development Division, Gulf Research & Development Company, P.O. Box 2038, Pittsburgh 30, Pa.
Born: December 10, 1897, Jacobsville, Mich. B.S.(E.E.), 1920, Michigan State. **Sections:** Pittsburgh, *chairman, 1935–36.* **Awards:** OSRD Certificate of Appreciation, 1945; War and Navy Departments' OSRD Certificates of Appreciation, 1946.

**YAGI, Hidetsugu (F'53),** President, Musashi College of Technology, Todoroki 1, Setagayaku, Tokyo, Japan.
Born: January 28, 1886, Osaka, Japan. M.Eng., 1909, Tokyo University; Dr.Eng., 1919, Tohoku University. **Committees:** Meetings and Papers, 1929; Standardization, 1927–31. **Sections:** Tokyo, *chairman, 1956.*



**YOUNG, Charles J. (A'35—SM'45—F'53),** Associate Laboratory Director, RCA Laboratories Division, Radio Corporation of America, Princeton, N.J.
Born: December 17, 1899, Cambridge, Mass. B.A., 1921, Harvard University. **Committees:** Annual Review, 1944–47; Board of Editors, 1941–46; Facsimile, 1939–56, *chairman, 1944–47, vice-chairman, 1948–51;* Papers Procurement, 1947; Standards, 1944–47; Television and Facsimile, 1936–39. **Awards:** Modern Pioneer Award, National Association of Manufacturers, 1946.

**YOUNG, Leo C. (A'19—M'29—SM'43—F'43)(L),** Consultant, Naval Research Laboratory, Washington 25, D.C.
Born: January 12, 1891, Danville, Ill. **Sections:** Washington, *secretary, 1938–39, chairman, 1940.* **Awards:** Presidential Certificate of Merit, 1946; Stuart Ballentine Medal, 1957; Distinguished Civilian Service, 1958.

**ZADEH, Lotfi A. (S'45—A'47—M'50—SM'56—F'58),** Professor of Electrical Engineering, University of California, Berkeley 4, Calif.
Born: February 4, 1921, Baku, Russia. B.S., 1942, University of Teheran; M.S., 1946, Massachusetts Institute of Technology; Ph.D., 1949, Columbia University. **Committees:** Editorial Reviewer, 1954–60. **Professional Groups:** Administrative Committee, Circuit Theory, 1954–57; Administrative Committee, Information Theory, 1958–.

**ZAHL, Harold A. (A'39—SM'46—F'50),** Director of Research, U. S. Army Signal Research & Development Laboratory, Fort Monmouth, N.J.
Born: August, 1904, Chatsworth, Ill. A.B., 1927, North Central College; M.S., 1929, Ph.D., 1931, State University of Iowa. **IRE Offices:** Director, 1949. **Committees:** Administrative Committee on the Board of Editors, 1951–53; Awards, 1956–58; Awards Coordination, *chairman, 1959;* Board of Editors, 1951–53; Editorial Administrative, 1949–53; Electroacoustics, 1936–37; Electronics, 1943–44. **Awards:** Legion of Merit, Department of the Army, 1945; IRE Harry Diamond Memorial Award, 1954.

***ZENNECK, Jonathan A. W. (F'48)(L),** Professor, Retired. Althegnenberg,Uber Mering 13B, Germany.
Born: April 15, 1871, Ruppertshofen, Wuerttemberg, Germany. D.Sc., 1894, University of Tuebingen, Germany; Dr.Ing. (Honorary), Institute of Technology, Dresden, 1928. **IRE Offices:** Vice President, 1933, Director, 1933. **Committees:** Standardization, 1915–18, 1927–28. **Awards:** Member, Bavarian Academy of Science, 1917; Gold Medal, Heinrich Hertz Gesellschaft, 1926; Medal of Honor, 1928; Goethe Medal for Art and Science, German Government, 1932; Gauss-Weber Medal, University of Goettingen, 1933; Member, German Aeronautical Academy, 1938; Honorary Member, German Physical Society, 1941; Honorary Member, German Society for Applied Physics, 1941; Corresponding Member, Academy of Science, Goettingen, 1941; Siemens-Stephan Memorial Plate, German Society of Electrical Engineers, 1943; Gold Medal, The City of Munich, 1946; Grashof Medal, Society of German Engineers, 1949; President, Union of German Physical Societies, 1950; Honorary Citizen, Institute of Technology, Stuttgart and Karlsruhe, 1951; Grosses Verdienstkreuz des deutschen Verdienstordens, 1952; Honorary President, Deutsches Museum, 1953; Ehrenkunde des Verbands deutschen Elektrotechniker, 1954.

* Deceased.

**ZOTTU, Paul D. (A'31—M'38—SM'43—F'44),** President, Consulting Engineer, Industron Corporation, 55 Needham St., Newton Highlands 61, Mass.
Born: March 22, 1906, Bucharest, Roumania. B.A., 1931, Wesleyan University. **Committees:** Annual Review, 1945–46; Board of Editors, 1943; Industrial Electronics, 1945–47, *chairman, 1945–46;* Membership, 1947–48; Papers Procurement, 1946; Standards, 1945–46. **Awards:** Hyat Award, Plastics Industry.

**ZWORYKIN, Vladimir K. (M'30—F'38),** Honorary Vice President, Radio Corporation of America; Technical Consultant, RCA Laboratories, David Sarnoff Research Center, Radio Corporation of America, Princeton, N.J.
Born: July, 1889, Mourom, Russia. E.E., 1912, Petrograd Institute of Technology; Student Coll. de France, Paris, 1912–14; Ph.D., 1926, University of Pittsburgh; D.Sc., 1938, Polytechnic Institute of Brooklyn. **Committees:** Board of Editors, 1944–53. **Professional Groups:** Medical Electronics, 1955–56. **Awards:** IRE Morris Liebmann Memorial Prize, 1934; Overseas Award, British Institution of Electrical Engineers, 1939; Modern Pioneer Award, National Association of Manufacturers, 1940; Rumford Medal, American Academy of Arts and Sciences, 1941; War Department Certificate of Appreciation, 1945; Howard N. Potts Medal, Franklin Institute, 1947; United States Navy Certificate of Commendation, 1947; Presidential Certificate of Merit, 1948; Lamme Award, 1948; Gold Medal of Achievement, Poor Richard Club, 1949; IRE Medal of Honor, 1951; Society of Motion Picture and Television Engineer Progress Medal Award, 1951; AIEE Edison Medal, 1952; Trasenster Award, University of Liege, 1959; Cristoforo Columbo Award, 1959; Fellow, American Institute of Electrical Engineers; Fellow, American Physical Society; Fellow, American Association for the Advancement of Science; Charter Member, Electron Microscope Society of America; Fellow, National Academy of Sciences of U.S.A.; Fellow, American Philosophical Society; Chevalier Cross, French Legion of Honor; Officer of the Academy, French Ministry of Education; New York Academy of Sciences; Affiliate Member of The Rockefeller Institute.

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# GEOGRAPHICAL LISTING OF MEMBERSHIP

The names of all members as of May 31, 1960, except those of student grade, are listed below according to Proceedings mailing address. Following the name of each city is an abbreviation and a number indicating the IRE Section and Region, respectively, in which it is located. The Sections are abbreviated as follows:

AK4—Akron
AL.A6—Alamogordo-Holloman
AL7—Albuquerque-Los Alamos
ANC7—Anchorage
AT3—Atlanta
BA—Buenos Aires
BAL3—Baltimore
BAY8—Bay of Quinte
BI1—Binghamton
BN1—Buffalo-Niagara
BOS1—Boston
BP6—Beaumont-Port Arthur
CF6—Central Florida
CH15—Chicago
CIN4—Cincinnati
CL4—Cleveland
CL7—China Lake
CO—Colombia
COL4—Columbus
CP4—Central Pennsylvania
CR5—Cedar Rapids
CV1—Connecticut Valley
DAL6—Dallas
DAY1—Dayton
DEN6—Denver
DET4—Detroit
EC1—Elmira-Corning
EG—Egypt
EMP4—Emporium
EO5—Evansville-Owensboro
EP6—El Paso
ER1—Erie
FTH7—Fort Huachuca
FW5—Fort Wayne
FW6—Fort Worth
GA3—Gainesville
HAM8—Hamilton
HAW7—Hawaii
HOU6—Houston
HUN3—Huntsville
IA—India
IND5—Indianapolis
IS—Israel
ITH1—Ithaca
KC6—Kansas City
KW8—Kitchener-Waterloo
LA7—Los Angeles
LI2—Long Island
LON8—London
LOU5—Louisville
LR6—Little Rock
LUB6—Lubbock
LV7—Las Vegas
MI3—Miami
MIL5—Milwaukee
MON8—Montreal
NAL8—North Alberta
NC3—North Carolina
NFL—Newfoundland
NNJ2—Northern New Jersey
NO6—New Orleans
NWF3—Northwest Florida
NY2—New York
OC6—Oklahoma City
OL5—Omaha-Lincoln
ORL3—Orlando
OT8—Ottawa
PHI3—Philadelphia
PHO7—Phoenix
PIT4—Pittsburgh
POR7—Portland
PR12—Princeton
QUE8—Quebec
REG8—Regina
ROC1—Rochester
RU1—Rome-Utica
SA6—San Antonio
SAC7—Sacramento
SAL8—South Alberta
SBM5—South Bend-Mishawaka
SC3—South Carolina
SCH1—Schenectady
SD7—San Diego
SEA7—Seattle
SF7—San Francisco
SHR6—Shreveport
SL6—Saint Louis
SLC7—Salt Lake City
SY1—Syracuse
TC5—Twin Cities
TOK—Tokyo
TOL4—Toledo
TOR8—Toronto
TUC7—Tucson
TUL6—Tulsa
VA3—Virginia
VAN8—Vancouver
WA3—Washington, D.C.
WIL4—Williamsport
WIN8—Winnipeg
WMA1—Western Massachusetts
WMI4—Western Michigan

## UNITED STATES

### ALABAMA

Anniston (HUN-3)
Boeckman, J. F. (M)
Dickinson, E. H. (A)
Mayer, G. J. (M)
Wood, C. H. (M)

Arab (HUN-3)
Leonard, W. L. (A)

Athens (HUN-3)
Sanders, J. F. (A)

Atmore (ATL-3)
Hataway, W. T. (M)
Wright, R. B. (A)

Auburn (ATL-3)
Feaster, W. M. (M)
Gillmore, W. F., Jr. (M)
Golden, W. H. (M)
Graf, E. R. (M)
Honnell, M.A. (SM)
Murphy, G. L. (M)
Phillips, C. L. (M)
Shiff, M. B. (M)
Smith, C. E. (M)
Summer, H. M. (M)

Birmingham (HUN-3)
Bradley, B. C. (M)
Campbell, E. E. (M)
Carl, H. D. (A)
Carter, R. M. (M)
Chapman, J. E. (M)
Crim, H. E. (M)
Davenport, G. M. (A)
Davis, H. G., Jr. (M)
Denton, D. E. Jr. (M)
Emens, F. H. (M)
Evans, B. D. (M)
Fleck, K. A. (M)
Gray, C. M. (M)
Holmes, G. F., Jr. (M)
Humphreys, T. G., Jr. (M)
Malone, A. (M)
Norton, M. L. (M)
Patton, R. S. (M)
Rogers, C. L. (M)
Sartain, A. (M)
Walters, R. J. (A)
Whitaker, W. H., Jr. (M)

Boaz (HUN-3)
Hamby, H. W. (M)
Noel, J. E. (M)

Chickasaw (ATL-3)
Hrabe, C. F., Jr. (M)

Decatur (HUN-3)
Carl, W. L. (M)
Frisbee, F. W. (A)
Hogston, C. R. (A)
McDaniel, J. L. (SM)
Roberts, R. P., Jr. (A)
Woodbery, H. S. (A)

Dothan (ATL-3)
Sessions, W. B. (M)

Elberta (ATL-3)
Hance, L. V. (A)

Fairfield (HUN-3)
Clements, C. C. (M)

Falkville (HUN-3)
Howard, J. R. (M)

Gadsen (HUN-3)
Weston, J. B. (A)

Guntersville (HUN-3)
Elder, L. D. (M)

Hartselle (HUN-3)
Brown, R. M. (A)
Self, F. J. (M)

Harvest (HUN-3)
Parnell, C. C. Jr. (A)

Horton (HUN-3)
Morgan, A. O. (A)

Huntsville (HUN-3)
Allaback, W. (M)
Allen, W. S. (A)
Angele, W. (A)
Bailey, R. M. (A)
Barr, T. A. (A)
Barron, T. C. (M)
Black, A. M. (M)
Blanton, J. E. (M)
Bratcher, A. L. (SM)
Brock, C. O. (M)
Bull, J. T. (M)
Butler, J. P. (M)
Butler, P. H. (M)
Cantrell, E. R. (M)
Casey, C. W. (M)
Cook, W. H., Jr. (M)
Copeland, D. E. (M)
Cornutt, H. D. (M)
Culver, W. N. (A)
Daly, J. A., Jr. (A)
Daniel, A. C. (M)
Daniels, L. H. (M)
Davis, A. J. (M)
Derington, J. C. (M)
Douma, J. E. (A)
Dyess, C. H. (A)
Edwards, R. L. (M)
Eichelberger, R. P. (M)
Eubanks, J. E., Jr. (M)
Farmer, R. H. (M)
Fogle, V. (M)
Fray, C. R. (M)
French, D. E. (SM)
Frey, P., Jr. (M)
Frost, W. O. (SM)
Garrison, J. P. (M)
Gassen, J. A. (M)
Gibson, C. (M)
Graham, A. S. (A)
Gravlee, G. P. (M)
Green, O. C. (M)
Greenwood, T. L. (SM)
Grivet, P. E. (M)
Guzinsky, L. (M)
Hallowes, J. P., Jr. (M)
Hammond, R. L. (A)
Haraway, R. C. (M)
Hardy, T. L. (A)
Harper, A. Y. (M)
Harper, J. W. (M)
Harris, D. S. (M)
Harris, G. G., Jr. (M)
Hart, B. G. (A)
Haughey, J. W. (A)
Hirschler, O. H. (M)
Hoberg, O. A. (SM)
Hogg, F. G. (SM)
Holeman, J. L. (M)
Horn, N. J. (M)
Hosenthien, H. H. (M)
Howell, J. E., Jr. (A)
Huff, W. A. (M)
Jackson, C. M. (M)
Jeffcoat, T. D. (M)
Jennings, R. B. (M)
Johnson, V. W. (M)
Johnston, S. L. (SM)
Jones, C. H. (M)
Justus, J. R. (A)
Katter, O. E., Jr. (M)
Keefe, T. A. (M)
King, J. J. (M)
King, O. B. (M)
Lacker, H. F. (M)
Lakebrink, R. T. (M)
Landwehr, G. O. (M)
Lee, C. E. (M)
Lee, R. H. (M)
Lindberg, W. J. (M)
Loeb, W. S. (M)
Lowery, H. R. (M)
Malcolm, W. W. (M)
McGrede, A. D. (M)
McLemore, B. B. (M)
Miller, P. T. (SM)
Moore, R. L. (M)
Morris, J. K. (M)
Muse, A. W., Jr. (M)
Norman, J. E. (SM)
Otto, W. F. (M)
Pakulski, F. J. (M)
Parker, C. W. (M)
Pass, J. H. (M)
Paul, C. H. (A)
Peigler, F. K. (A)
Perry, H. T. (SM)
Reid, H. (M)
Reinbolt, E. J. (M)
Ritterhouse, C. L. (M)
Robinson, W. J., Jr. (M)
Roth, P. A. (M)
Ruge, H. C. (A)
Russell, C. H. (M)
Sachen, R. J. (M)
Salonimer, D. J. (M)
Sanderlin, J. C. (M)
Saunders, G. H. (SM)
Scalf, P. L. (M)
Schack, R. H. (M)
Scheer, A. W., Jr. (A)
Schultz, D. N. (M)
Schwinghamer, R. J. (M)
Sedlazek, M. F. (M)
Shaver, F. T. (M)
Smith, A. G. (A)
Smith, C. R. (M)
Smith, E. F. (M)
Smollen, J. W. III (M)
Standish, M. M. (M)
Steinberg, A. (M)
Siluka, E. F. (M)
Swindall, P. M. (M)
Taylor, H. M., Jr. (M)
Thomas, J. R. (M)
Thomas, L. J. (M)
Thornthwaite, W. L. (M)
Threlkeld, W. B., Jr. (M)
Unger, J. H. W. (M)
Vallely, D. P. (M)
Vernon, J. A. (M)
Vincent, H. F. (SM)
Wallace, R. E. (M)
Welmer, J. W. (M)
Wells, E. H. (SM)
Weyler, G. M., Jr. (M)
White, P. R. (M)
Williams, V. B. (M)
Willing, W. R. (M)
Wilson, M. L. (M)
Yoakum, W. E. (M)

Irondale (HUN-3)
Cordero, F. (A)

Lanett (ATL-3)
Stancel, A. L., Jr. (M)

Madison (HUN-3)
Calvert, R. D. (M)
Meador, D. X. (M)

Maxwell AFB (ATL-3)
Campbell, D. L. (A)
Lyle, W. H. (SM)

Meridianville (HUN-3)
Scofield, H. N. (M)

Mobile (NO-6)
Baucum, P. G. (M)
Burhans, V. (M)
Burnett, T. H., Jr. (SM)
Chapin, J. H. (M)
Davis, M. H. (M)
Diamond, J. R. (M)
Dodd, A. W. (M)
Frekot, J. J. (M)
Gobel, L. J. (A)
Gunthorpe, G. F. (M)
Harbin, T. F. (M)
Hicks, C. R. (M)
Jacobson, E. H. (M)
Kelly, B. S. (M)
Kempson, A. Jr. (M)
Mahan, O. C. (M)
Molyneux, M., Jr. (M)
O'Brien, D. J. (M)
Odom, T. O. (M)
Parish, J. P. (M)
Rabon, W. R. (M)
Roberts, C. E. (A)
Rountree, J. W. (M)
Schone, E. G. (M)
Seid, H. R. (M)
Smith, D. M. (M)
Wallis, C. L. (A)
Watson, D. G. (M)

Montgomery (ATL-3)
Bridge, H. P. (M)
Briggs, N. W. (A)
Carr, C. E. (A)
Cude, H. H. (A)
Giara, E. J., Jr. (M)
Hargreaves, L. D. (A)
Hayward, R. M. (A)
Herman, H. (SM)
Hill, B. M. (A)
Holliday, E. M. (M)
Holman, W. S. (M)
Jones, N. T. (M)
Kester, W. C. (M)
Lyons, E. C., Jr. (M)
McLeod, M. G. (M)
Steigerwald, J. W. (M)
Sturm, F. L. (A)
Wilson, R. P. (A)

Muscle Shoals (HUN-3)
Wilson, R. B. (M)

Opelika (ATL-3)
Leslie, J. M., Jr. (SM)

Ozark (ATL-3)
Tallet, J. E. (M)

Redstone Arsenal (HUN-3)
Barclay, J. A. (SM)
Barr, B. J. (A)
Burr, P. T. (M)
Chasteen, P. C. (M)
Davitt, J. H. (SM)
Gentry, E. B. (M)
Harrison, C. E. (M)
Jackson, D. L. (M)
Kimura, A. M. (M)
Maguire, K. J. (M)
Seashore, C. R. (M)
Smith, C. N. (M)

Repton (ATL-3)
Brantley, L. W. (M)

Saraland (NO-6)
Rawls, M. L. (M)

Shelfield (ATL-3)
Sparkman, R. W. (M)

Silverhill (NWF-3)
Lacey, H. L. (M)

Theodore (NO-6)
Givens, V. Y. (M)

Thomasville (ATL-3)
Conner, B. C. (M)
Dovey, H. N. (M)

Toxey (ATL-3)
Roberts, S. E. (M)

Tuscaloosa (HUN-3)
Littlefield, J. T. (A)
Ryan, P. J. (A)

University (HUN-3)
McDuff, O. P. (M)
Whitehurst, R. N. (M)

Wetumpka (ATL-3)
Johnson, V. H. (M)
Thomas, E. C. (M)

### ALASKA

Anchorage (ANC-7)
Bacon, R. A. (M)
Baker, H. O., Jr. (A)
Brazil, H. D. (M)
Cochran, U. E. (M)
Darrah, G. L. (A)
De Lung, D. O. (A)
De Voe, H. D. (SM)
Duncan, J. C. (M)
Eder, J. J. (A)
Ellis, J. V. (M)
Fulton, D. A. (M)
Gray, C. M. (A)
Grob, L. W. (A)
Hager, K. F. (SM)
Hannon, G. A. (M)
Hitchen, H. W. (A)
Honea, L. W. (M)
Hutchinson, R. E. (A)
Jekic, W. W. (M)
Johnson, C. A. (M)
Johnson, R. L. (A)
Joss, J. W. (A)
Knox, W. E., Jr. (A)
Lee, W. (M)
Mann, W. W. (A)
Martone, F. P. (A)
McKee, W. H. (M)
McLaughlin, R. B. (M)
Middebrath, E. R. (M)
Moore, E. J. (M)
Patterson, G. B. (A)
Parker, C. V. III (A)
Pauley, T. N. (A)
Rohrer, F. D. (M)
Silven, J. W. (M)
Smith, C. H. (M)
Snyder, K. O. D. (M)
Svarczkopf, G. J. (A)
Svetc, D. L. (A)
Tvrdy, J. J. (M)
Vrooman, J. R. (M)
Walden, J. M. (SM)
Walker, R. E. (M)
Wayer, C. F., Jr. (M)
West, G. A. (SM)
Wheaton, T. H. (A)
Whittaker, G. A. (A)
Wilson, L. S. (M)
Woolsey, R. A. (M)

Annette (ANC-7)
Jensen, V. C. (A)

Big Mountain (ANC-7)
Scott, R. C. (A)

College (ANC-7)
Chowdhury, M. R. (M)
Hodges, J. C. (M)
Hunsocker, R. D. (M)
Leinbach, H. (M)
Leonard, R. S. (M)
Merritt, R. P. (M)
Owren, L. (M)
Parthasarathy, R. (SM)
Rumi, G. C. (M)
Stanley, G. M. (M)
Stiltner, E. (M)
Tryon, J. G. (M)
Warman, N. E. (A)

Fairbanks (ANC-7)
Edens, J. A. (A)
Herrmann, P. A. (A)

Hauck, R. A. (A)
Lagerman, A. J. (A)
Mazoonin, G. V. (A)
Roady, A. O. (A)
Rouke, K. J. (M)
Southall, A. M. (A)
Sturge, C. R. (A)

Juneau (ANC-7)
Campbell, G. R. (A)

Kalakaket Creek (ANC-7)
Dotson, A. L. (A)

Kenai (ANC-7)
Carruthers, C. M. (A)
Lancaster, T. W. (A)

Kodiak (ANC-7)
Brazeal, R. H., Jr. (M)

Middleton Island (ANC-7)
Weatherly, M. R. (M)

Mt. Edgecumbe (ANC-7)
Long, J. E. (A)

Mountain View (ANC-7)
Tradup, R. H. (M)

Nome (ANC-7)
Sundstrom, L. C. (A)

Petersburg (ANC-7)
Pierce, E. R. (M)

Soldotna (ANC-7)
Miller, K. E. (M)

Spenard (ANC-7)
Browne, C. W. (M)
Clark, T. D. (A)
Grau, L. J., Jr. (M)
Little, J. T. (M)
Roberson, F. E. (M)
Wright, M. E. (M)

Unalakleet (ANC-7)
Childress, J. C., Jr. (A)

ARIZONA

Benson (FT-H-7)
Blom, B. V. (SM)
Bundy, R. C. (SM)
Campbell, R. E. (M)
Ehler, W. M. (M)
Johnson, H. G. (A)
Johnson, W. I. (M)
Spittle, S. E. (M)

Bisbee (FT-H-7)
Candiello, V. S. (M)
Diehl, F. A. (M)
Homsy, J. H. (SM)
Knowles, E. R. (M)

Cave Creek (PHO-7)
Cockburn, C. D. (M)

Flagstaff (PHO-7)
Phillippi, E. C. (M)
Rice, L. S. (A)

Fort Huachuca (FT-H-7)
Albee, M. M. (SM)
Bass, J. G. (M)
Betts, R. W. (A)
Bogue, R. A. (M)
Boyd, A. H. (M)
Brock, R. E., Jr. (M)
Brown, G. J. (M)
Bundick, W. T. (M)
Campton, L. J. (SM)
Catlett, G. F. (M)
Crawford, G. A. (M)
Cronin, W. M. (SM)
Dickinson, A. F. (A)
Dillingham, J. H. (M)
Dominque, J. C. (SM)
Dyer, S. M. (M)
Eto, H. S. (M)
Fink, M. J. (M)
Flahe, T. J. (M)
Frese, R. E. (SM)
Garcia, V. A. (SM)
Giorgi, C. M. (M)
Hanson, J. C. (M)
Hart, B. H. (SM)
Heinsen, D. E. (M)
Hulit, C. E. (M)
Ide, H. A. (SM)
Johnson, R. M. (M)
Keller, H. A. (SM)
Knight, L. J. (M)
Lew, F. J. (M)
Lininger, T. C. (M)
Lotz, W. E., Jr. (SM)
Lyman, R. P. (SM)
Marvin, C. E. (M)
Moynahan, G. F., Jr. (SM)
Mudgett, A. H. (SM)
Muller, M. T. (M)
Oliver, J. K. (SM)
Reid, J. G., Jr. (SM)
Renwick, G. J. (M)
Richards, E. D. (M)
Risser, A. K. (M)
Shelton, W. C. (SM)
Stone, E. P. (M)
Storck, H. C. (SM)
Straughen, G. A. (A)
Strawn, G. M. (M)
Trezise, E. A. (A)
Uhrhane, F. F. (SM)
Upton, F. R., Jr. (A)
Virden, J. W. (SM)
Wilcox, C. S. (M)

Glendale (PHO-7)
Bliss, W. P. (M)
Bochem, H. P. (M)
Cappon, A. M. (M)
Chauvin, D. M. (M)
Cooper, G. P. (M)
Corwin, M. H. (M)
Eaton, A. W. (M)
Edwards, M. J. (M)
Kelly, K. O. (M)
King, C. G., Jr. (M)
Lamb, W. G. (M)
Levine, D. (SM)
Macmillan, R. R. (M)
Martin, G. L. (M)
McCreary, W. J. (M)
McNemar, C. W. (A)
Milford, R. E. (M)
Morgan, H. L. (M)
Murray, P. W. (M)
Nygard, C. A. (A)
Shaffer, W. H. (M)
Sirrine, E. B. (M)
Thatcher, C. D. (M)

Globe (PHO-7)
Briggs, G. U. (M)

Goodyear (PHO-7)
Ash, H. Q. (M)
Blount, E. M. (M)
Wood, B. G. (M)

Hereford (FT-H-7)
Foley, W. R. (SM)
Webster, R. G. (SM)

Huachuca City (FT-H-7)
Graham, R. W. (SM)
Jantz, M. A. (M)
Pritchard, C. A. (M)
Stiles, M. G. (M)
Walther, G. P. (M)

Laveen (PHO-7)
Jones, E. R. (M)

Litchfield Park (PHO-7)
Belanger, F. (M)
Robertson, S. D. (SM)
Sherwood, J. N. (M)

Maricopa (PHO-7)
Howe, R. B. (A)
Locke, R. B. (M)
Yuricic, J. F. (M)

Mesa (PHO-7)
Forrester, R. E. (M)
Olson, D. E. (M)
Sabin, W. D. (M)
Smith, D. A. (SM)
Wisseman, L. (M)

Miami (PHO-7)
Herrera, E. A. (M)

Phoenix (PHO-7)
Adams, G. E. (M)
Adams, W. L. (A)
Aden, A. L. (SM)
Adley, D. L. (M)
Allard, G. A. (M)
Ammerman, D. W. (SM)
Andeen, R. E. (M)
Anderson, W. J. (A)
Baeuchler, E. W. (A)
Barnett, W. C. (M)
Baroch, G. F. (M)
Barth, J. A. (M)
Baum, R. H. (M)
Baum, R. V. (M)
Benham, M. J. (M)
Benson, R. A. (A)
Bentivegna, M. J. (M)
Bettis, L. W. (M)
Betz, R. R. (M)
Biggs, E. M., Jr. (M)
Bitter, C. R., Jr. (M)
Black, J. R. (M)
Blackert, R. O. (M)
Blair, L. R. (M)
Blatchford, R. C. (M)
Boat, R. W. (M)
Botwinick, E. (M)
Brewer, S. (A)
Bricker, N. P. (A)
Bridge, W. H. (M)
Brown, W. R. (A)
Brubaker, R. J. (M)
Burnett, K. N. (M)
Burns, C. L. (M)
Butcher, R. J. (M)
Cacheris, J. C. (SM)
Campbell, R. L. (M)
Carden, M. W., Jr. (M)
Carter, D. F. (M)
Cavalier, P. E. (M)
Chadek, T. J. (M)
Chambers, J. A. (F)
Chapin, D. W. (M)
Clar, P. L. (M)
Clark, C. J. (M)
Clark, G. F. (M)
Cleary, E. P. (M)
Cook, M. F. (M)
Cothran, G. W. (M)
Craig, T. A. (M)
Crain, N. R. (M)
Crawlis, E. D., Jr. (SM)
Cronshey, R. W. (M)
Cubbage, J. F. (M)
Culver, J. E. (M)
Cummings, K. C. (SM)
Darter, C. U. (M)
Davisson, R. R. (A)
Dickson, D. C., Jr. (M)
Dreste, F. E. (SM)
Drilling, R. E. (M)
Dwork, L. E. (SM)
Eberhard, E. (SM)
Echols, R. A. (A)
Eckstein, R. J. (M)
Edson, G. L. (SM)
Elbinger, L. P. (SM)
Ellstrom, R. V. (A)
Eme, K. J. (M)
Emmett, J. T. (A)
Engelbardt, R. M. (M)
Esher, M. (A)
Estlan, E. F. (M)
Falk, D. B. (M)
Fischer, D. H. (M)
Fontenot, J. A. (M)
Fraser, D. E. (M)
Frazee, O. P. (M)
Freeman, G. H. (M)
Fujii, S. (M)
Fussell, L. B. (A)
Gaines, W. M. (SM)
Gamble, G. W. (M)
Gaylor, R. (M)
Gerould, L. D. (M)
Glass, T. J. (M)
Gleichauf, T. J. (M)
Goldstein, R. (M)
Goodman, R. G. (M)
Gorham, D. H. (M)
Gotch, C. N. (M)
Graham, L. C. (M)
Grainer, E. E., Jr. (M)
Greenburg, A. R. (M)
Greer, P. H. (M)
Grimaila, A. G. (M)
Gundry, J. C. (A)
Gustis, D. A. (M)
Hall, C. A. (M)
Hall, R. M. (M)
Ham, N. C. (M)
Hammond, J. R. (A)
Hanks, J. R. (A)
Hansen, R. O. (M)
Harris, F. L. (M)
Harris, T. L. (M)
Hartig, E. O. (SM)
Havens, R. C. (M)
Helmick, R. B. (M)
Hembree, P. M. (A)
Hopper, B. (M)
Hostetter, J. M. (M)
Houston, W. B. (M)
Hronek, J. W. (M)
Huggins, L. L. (M)
Hulet, J. F. (M)
Hunte, A. S. (SM)
Hunnels, D. R. (A)
Huntington, R. C. (M)
Hyder, H. R. III (SM)
Hempel, R. A. (A)
Hickman, J. E. (M)
Hill, R. S. (M)
Hittel, L. A., Jr. (M)
Hocker, D. E. (M)
Hodson, R. B. (A)
Hofferber, H. E. (M)
Hoffman, R. Y., Jr. (M)
Hogan, A. W. (M)
Hogan, C. L. (F)
Itzenbach, L. J., Jr. (M)
Jacobsen, A. B. (SM)
Jarrad, D. S. (A)
Jensen, C. E. K. (M)
Jensen, R. E. (M)
Johnson, R. R. (M)
Jude, G. F. (SM)
Kaiper, L. T. (M)
Keller, H. M. (M)
Kemmeries, F. D. (SM)
Kenrich, C. M. (A)
Kerr, J. L. (M)
Kettlety, R. W. (M)
Kidwell, W. M. (SM)
Kittredge, P. E. (M)
Kleykamp, G. C., Jr. (M)
Kline, A. J., Jr. (M)
Klontz, W. C. (M)
Knight, W. H. (M)
Knowles, W. N. (M)
Koch, F. L. (SM)
Koster, C. A. (M)
Krasin, E. (M)
Kulesza, G. G. (SM)
LaPrade, G. L. (M)
Lasher, C. C. (SM)
Leo, R. E. (M)
Lightcap, J. L. (M)
Lindsay, J. D. G. (M)
Loonam, J. R. (M)
Love, A. W. (M)
Lowenstein, J. F. (SM)
MacMillam, T. S. (M)
Madland, G. R. (M)
Majorowicz, G. A. (M)
Manning, K. P. (M)
Mastava, S. J. (M)
Mattausch, A. J. (M)
Mayes, T. L., Jr. (M)
Maynard, F. B. (SM)
McAvey, J. L. (M)
McCary, R. O. (M)
McClanathan, G. L. (M)
McCoy, E. C. (A)
McCrary, D. E. (A)
McElroy, G. E. (SM)
McKeever, B. T. (M)
McShane, J. P. (M)
Miller, L. E. (A)
Mills, T. L. (M)
Montgomery, E. B. (M)
Morrison, F. (M)
Moss, C. H., Jr. (A)
Muschinske, J. E. (M)
Myers, P. B. (M)
Naas, H. M. (M)
Nelson, J. L. (M)
Newton, S. B. (M)
Nichols, N. F. (A)
Nielson, L. C. (M)
Noble, D. E. (F)
Nofrey, L. C. (M)
Norde, L. (SM)
Nystwander, R. E. (M)
Osder, S. S. (M)
O'Sullivan, M. J. (M)
Pallais, J. C. (M)
Palmerson, P. J. (M)
Peabody, S. J. (M)
Peek, J. E. (M)
Penner, W. D. (M)
Peters, H. L. (A)
Petersen, C. C. (M)
Peterson, R. K. (SM)
Peterson, V. E. (A)
Phillips, T. E. (M)
Phipps, J. P. (M)
Plotkin, L. E. (SM)
Porter, K. W. (M)
Prator, J. C., Jr. (M)
Pringle, D. L. (M)
Propst, B. D. (A)
Propster, C. H., Jr. (M)
Proskauer, S. P. (A)
Radtke, R. K. (M)
Ranck, C. A. (A)
Reak, D. L. (M)
Reece, O. A. (M)
Regue, S. G. (M)
Reynolds, K. A. (M)
Robinson, R. D. (SM)
Romans, C. (M)
Rook, C. W. (M)
Ross, J. M. (SM)
Rowbotham, J. R. (M)
Royden, G. T. (F)
Rudolph, R. H. (M)
Russell, J. A. (A)
Russell, W. F. (M)
Rutherford, R. R. (M)
Sabel, A. R. (M)
St. Thomas, G. F. (M)
Sakiotis, N. G. (M)
Samuelson, R. E. (F)
Sanders, C. H. (M)
Saxon, W. R. (M)
Schaefer, O. L. (M)
Schaffner, G. (M)
Schauer, H. L. (M)
Schoephoerster, D. J. (M)
Schulte, F. E. (M)
Schwartz, J. W. (A)
Shaner, J. R. (M)
Sheffield, W. B. (SM)
Shepard, E. S., Sr. (SM)
Shuck, L. M. (M)
Simpson, E. J. (A)
Skoral, E. N. (SM)
Smith, A. L. (M)
Smith, L. R. (M)
Snavely, J. D. (M)
Sokoloff, P. W. (SM)
Solem, R. J. (M)
Sorenson, E. D. (M)
Staats, R. L. (M)
Staats, R. U. (A)
Sterner, E. L. (A)
Stevens, C. R. (M)
Stites, R. S. (A)
Stone, R. F. (M)
Stotz, C. C. (M)
Streye, R. J. (A)
Strong, D. E. (A)
Struble, L. G. (A)
Stubbe, L. H. (A)
Sutter, C. G. (M)
Takesuye, J. S. (M)
Thibodeau, L. E. (M)
Thoennes, E. O. (M)
Thomson, M. E. (M)
Tillman, W. F. (M)
Toberman, A. J. (SM)
Torfeh, M. A. (A)
Trego, D. G. (SM)
Troupe, D. C. (M)
Trull, D. L. (M)
Vandiveer, P. R. (M)
Van Ness, B. O. (M)
Van Poppelen, F. J. (A)
Vecchio, E. A. (M)
Veir, R. E. (A)
Voigts, W. H. (A)
Waldvogel, J. (M)
Wallace, R. A. (M)
Warner, R. M., Jr. (SM)
Washburn, R. P. (SM)
Weiler, J. H. (M)
Welch, H. W., Jr. (F)
Wexler, J. M. (M)
White, E. A. (M)
Wilcox, F. P. (M)
Wiley, C. A. (M)
Wilhelm, R. L. (A)
Williams, D. J. (M)
Winkler, M. R. (SM)
Wittenburg, C. W. (M)
Wood, M. E. (M)
Woodside, W. J. (M)
Woody, W. C. (M)
Wooley, R. L. (SM)
Wooten, J. R. (M)
Wunderlich, L. J. (M)
Zusman, D. (M)

Prescott (PHO-7)
Hargrove, B. E. (SM)
Henson, H. W. (M)

Safford (PHO-7)
Shaver, F. W. (M)

Scottsdale (PHO-7)
Attwood, S. W. (M)
Bailey, D. C. (A)
Bairkmo, H. O. (M)
Barrow, D. M. (M)
Behringer, N. C. (M)
Berck, H. S. (M)
Berens, G. F. (SM)
Bielek, A. D. (M)
Blixt, R. E. (M)
Boothe, A. M. (SM)
Boyd, P. C. Jr. (M)
Bracken, W. H. (M)
Braman, M. D. (M)
Brenmer, R. A. (M)
Brown, F. R. (M)
Burdoin, R. B. (M)
Campbell, N. L. (M)
Carter, P. M. (M)
Celsi, C. J. (M)
Chittenden, W. R. (A)
Christman, J. (A)
Cook, G. W. (M)
Coppock, R. A. (M)
Corby, R. B. (M)
Cranston, H. J., Jr. (M)
Cuckler, V. A. (M)
Cusack, J. A. (M)
Dahl, W. E. (M)
Da Prato, B. F. (M)
De Baryshe, B. D. (M)
Deerhake, F. M. (SM)
Dimucci, V. A. (M)
Diven, L. (SM)
Edwards, E. D. (M)
Elliott, R. W. (M)
Elsner, R. W. (SM)
Estes, C. L. (A)
Fleming, I. A. (A)
Flickinger, W. J. (M)
Gabrielsen, F. T. (M)
Gabrielson, R. G. (M)
Gaunt, A. E. (M)
Gazin, H. E. (M)
Gibson, J. G. (M)
Gosswiller, R. O. (M)
Greeb, M. E. (M)
Green, H. H. (M)
Groth, E. J., Jr. (SM)
Haenichen, J. C. (A)
Hagler, L. H. (A)
Hale, R. E. (M)
Hall, T. G. (A)
Hartman, C. E. (M)
Helber, C. (M)
Helms, G. W. (M)
Herring, R. H. (M)
Hinkelman, T. D. (A)
Hinsdale, J. G. (SM)
Holzer, W. A. (M)
Jones, A. C. (A)
Kelting, W. M., Jr. (A)
Kneale, A. T. (M)
Knowles, C. H. (M)
Koch, J. G. (M)
Kret, D. B. (M)
Krohn, C. A. (M)
Krueger, E. C. (M)
Kulb, B. A. (M)
La Vance, C. N. (M)
Le Gendre, H. P. (M)
Lehner, L. L. (M)
Lundy, D. S. (M)
Lynch, P. D. (M)
McKee, R. M. (A)
Mihalick, L. P. (M)
Moffat, D. (M)
Moore, W. C. (SM)
Moyer, H. L. (M)
Muller, T. A. (M)
Oates, H. W. (M)
Oliver, D. S. (M)
Pennington, R. J. (M)
Peverill, W. L. R. (M)
Phillips, A. B. (M)
Pine, C. C. (M)
Pursel, H. H., Jr. (M)
Putman, W. G. (A)
Quinn, T. J. Jr. (M)
Radcliffe, J. C. (SM)
Ralle, J. D. (M)
Reynolds, R. H., Jr. (SM)
Riall, R. T. (M)
Rice, C. T. (SM)
Richman, M. A. (M)
Robbins, E. R. (A)
Roberts, R. E. (M)
Roehr, W. D. (M)
Ross, H. M. (M)
Sanneman, R. W. (M)
Scott, D. E. (A)
Severns, R. A. (M)
Shaffer, D. K. (M)



Shannon, C. V. (M)
Shapiro, M. D. (M)
Stearns, W. P. (A)
Steele, R. B. (M)
Tinsley, C. G. (M)
Tomas, S. M. (M)
Tribken, E. R. (SM)
Vanhorn, H. E. (A)
Waller, K. L. (M)
Watkins, H. E. (M)
Weiss, H. (M)
West, H. B., Jr. (M)
West, R. G. (M)
Wheeler, W. S. (M)
Whitworth, W. C. (M)
Williams, C. R. (M)
Winlund, E. S. (M)
Woodka, C. J. (M)
Wurzburger, R. R. (M)
Yost, R. R., Jr. (M)

Sierra Vista (FT-H-7)
Bethke, G. M. (M)
Blatchley, C. M. (M)
Buscall, D. C., Jr. (M)
Cork, L. E. (M)
Gibbings, J. F. (M)
Grady, G. E. (A)
Gregg, R. C. (M)
Hess, H. J. (M)
Inman, F. W. (M)
Johnson, R. D. (A)
Lamb, J. J. (F)
Llewellyn, J. R. (SM)
McClellan, J. P. (M)
Montasser, A. S. (M)
Perry, W. S., Jr. (M)
Pethel, F. C. (M)
Rivera, E. V. (M)
Sherbundy, C. D. (A)
Ternow, H. G. (M)
Utman, R. E. (M)
Vidlak, L. (M)

Sunnyslope (PHO-7)
Bundy, E. R. (A)

Tempe (PHO-7)
Allen, D. E. (M)
Ax, L. S. (SM)
Barkson, J. A. (SM)
Board, C. Z. (M)
Busler, J. C. (M)
Cachelin, D. B. (A)
Casillas, F. C. (M)
Caine, N. B., Jr. (M)
Dryer, L. E. (M)
Gleason, D. B. (M)
Goldman, W. W. (M)
Hausman, D. I. (A)
Manhart, R. A. (SM)
Miraclia, J. F. (A)
Morton, D. E. (M)
Risk, W. P., Jr. (M)
Russell, F. D. (M)
Smith, J. W. (M)
Steinmann, W. La M. (SM)
Thompson, T. B. (SM)
Voorhaar, F. R., Jr. (M)
Wallace, R. W. (M)
Worcester, K. P. (SM)
Zimmer, C. R. (M)

Tolleson (PHO-7)
Wood, A. E. (A)

Tucson (TUC-7)
Ajeman, M. S. (M)
Aldrich, J. L. (A)
Anderson, M. A. (M)
Andres, W. F. (M)
Armstrong, A. C. (A)
Baldwin, H. A. (M)
Balk, S. (M)
Bard, W. E. (A)
Barker, B. A. (M)
Bastian, W. M. (M)
Battistelli, J. J. (M)
Bayless, C. R. (M)
Becker, C. L. (M)
Becker, S. (SM)
Bellee, E. C. (M)
Bersbach, A. J. (SM)
Bialkowski, M. (M)
Blanchard, J. W. (M)
Bouchard, E. N. (A)
Boulay, P. F. (M)
Boutin, C. U. (M)
Breeding, C. S. (SM)
Brown, H. R., Jr. (M)
Burdick, E. J. (M)
Brukett, F. T. (M)
Bushroe, R. G. (M)
Card, C. D. (M)
Carnevale, A. D. (A)
Carrick, G. R. (M)
Chinnock, R. S. (M)
Christofk, R. R. (SM)
Cinquemani, A. P. (M)
Clark, H. L. (SM)
Clinton, A. B. (M)
Cole, J. E. (M)
Collins, H. C. (M)
Conrad, D. A. (M)
Cooper, R. N. (M)
Creighton, A. M., Jr. (SM)
Crone, R. L. (SM)
Cronk, T. G. (A)
Daly, W. E. (M)
DeBolt, A. L. (M)
Dejka, W. J. (M)
DeLong, H. (A)
Diehl, H. A. (M)
Dlouhy, F. W. (M)
Donaldson, J. W. (M)
Donath, D. A. (M)
Douglas, H. T. (M)
Duggan, C. R. (M)
Dunn, E. J. (M)
Dusterdick, H. G. E. (M)
Eddy, R. C. (M)
Estes, E. M., Jr. (M)
Featherston, J. R. (A)
Fessler, A. L. (M)
Fish, W. Y. (M)
Flagg, J. M. (A)
Flodman, L. J. (SM)
Foiles, C. L. (M)
Forcier, R. A. (SM)
Ford, J. W. (M)
Fraser, D. W. (SM)
Friedman, M. F. (M)
Gaines, J. C. (M)
Gardiner, A. J. (M)
Gerdes, R. C. (A)
Gharis, W. J. (A)
Giles, D. L. (M)
Gillespie, C. M., Jr. (M)
Gimbel, J. O. (M)
Glaesser, E. (M)
Gravell, A. J. (M)
Griggs, W. M. (M)
Hamilton, D. J. (M)
Hansell, G. E. (SM)
Hansen, R. L. (M)
Harber, E. E., Jr. (M)
Hausenbauer, C. R. (M)
Hessemer, R. A., Jr. (M)
Hoehn, A. J., Jr. (SM)
Howland, R. L. (A)
Huddleston, R. R. (M)
Hudgings, D. W. (SM)
Humble, A. B. (M)
Jackson, J. J. (M)
Jaxel, A. R. (M)
Johnson, J. C. (SM)
Jorden, B. W., Jr. (M)
Kachnic, J. E. (M)
Kasten, J. W. (M)
Kees, H. (SM)
Kenna, L. A. (M)
Kennedy, B. M. (SM)
Kernkamp, C. F. (A)
Kerr, W. W. (M)
Knickerbocker, J. L. (M)
Koenig, W. A. (SM)
Koerner, H. (M)
Krieger, H. C. (M)
Larson, R. D. (M)
Latham, D. C. (M)
Lenzner, E. (SM)
Little, D. E. (M)
Livingston, W. C. (A)
Lockwood, V. M. (M)
Lynn, R. B. (A)
Malmberg, J. E. (M)
Marston, E. J. (M)
Martin, L. C. (M)
Martin, R. E. (SM)
Martin, T. L., Jr. (M)
McCandless, S. W. (M)
McCoy, L. E. (M)
McIntyre, M. V. (M)
Mearls, W. J. (M)
Metzger, J. A. (M)
Meyer, H. E. (SM)
Meyer, R. J. (M)
Michalk, E. R. (M)
Miller, F. G. (SM)
Moore, T. C. (M)
Morgan, E. J. (M)
Morrison, E. L., Jr. (M)
Nabours, R. E. (M)
Nielson, R. M. (M)
Noorland, M. (SM)
Odorizzi, D. J. (A)
Oliver, J. K. (M)
Pascoe, D. (M)
Patterson, R. L. (M)
Perkins, B. M. (A)
Pepper, L. (SM)
Pestell, G. A. (SM)
Peterson, G. R. (M)
Pettingill, D. P. (M)
Philp, J. L. (M)
Pierce, E. P., Jr. (M)
Pilling, L. H. (M)
Powell, D. S. (SM)
Reeves, D. B. (SM)
Richards, D. W. (A)
Roe, K. B. (M)
Ross, B. R. (M)
Rudolph, J. D. (M)
Russell, G. M. (SM)
Russell, P. E. (SM)
Shaver, H. N. (M)
Shipman, C. N. (A)
Sipes, R. G. (A)
Skinner, B. S., Jr. (M)
Smith, J. (A)
Sorkin, I. J. (M)
Spogen, L. R., Jr. (M)
Stewart, H. E. (SM)
Stewart, J. L. (SM)
Stinson, D. C. (M)
Stith, G. A. (M)
Stock, G. B. (A)
Storie, D. E. (M)
Stucki, A. B. (M)
Stultz, L. R. (M)
Svien, A. J. (SM)
Swafford, J. E. (M)
Swartz, A. (A)
Terrazas, C. (M)
Theiss, J. B. (M)
Tinkan, G. (M)
Trevor, B. (F)
Wade, J. A. (M)
Walker, G. A. (SM)
Walker, R. L. (M)
Walsh, L. R. (M)
Ware, H. W., Jr. (SM)
Whatley, W. W. (A)
Whiteman, C. O. (M)
Wilde, N. (SM)
Williamson, A. K. (A)
Wilson, L. A., Jr. (M)
Wipff, F. P. (M)
Wozniak, J. R. (A)

Warren (FT-H-7)
Clark, R. N. (M)
Harris, J. R. (A)

Winslow (PHO-7)
Hart, P. C. (A)

Yuma (PHO-7)
Kundel, K. K. (M)
Lundy, W. D. (M)
Palmer, D. R. (M)
Powell, D. R. (M)
Selenius, O. E. (M)

ARKANSAS

Arkadelphia (LR-6)
Sandlin, G. L. (M)

El Dorado (LR-6)
Bellew, R. W. (A)
Sorrells, W. E. (M)

Emmet (LR-6)
Reyenga, T. S. (M)

England (LR-6)
McClanahan, W. J. (A)

Fayetteville (LR-6)
Birkemeier, W. P. (M)
Cannon, W. W. (M)
Canty, E. K. (M)
Esposito, R. (A)
Fox, D. N. (M)
Gosnell, D. G. (A)
Green, J. W., Jr. (SM)
Lewis, F. W. (M)
Price, L. E. (M)
Purdy, J. A. (A)
Thompson, P. H. (A)
Totty, R. E. (M)
Walton, W. T. (M)

Fort Smith (LR-6)
Duvall, G. (M)

Gravette (LR-6)
Durkee, J. D. (M)

Hope (LR-6)
Klipsch, P. W. (SM)

Horatio (LR-6)
McNully, J. L. (M)

Jacksonville (LR-6)
Moyers, R. K. (M)

Little Rock (LR-6)
Gandler, B. R. (M)
Allsopp, W. C., Jr. (A)
Anders, R. V. (SM)
Chappell, B. L. (A)
Dillapfain, V. L. (SM)
Dodson, J. B. (A)
Ellefson, G. E., Jr. (M)
Foley, N. D. (SM)
Hammil, R. B. (M)
Hardy, L. H. (M)
Hegar, E. A. (SM)
McDonald, A. E. (M)
Miller, C. H., Jr. (M)
Mountjoy, G. (F)
Packard, A. (SM)
Raible, R. W. (M)
Reid, J. D. (F)
Warren, D. (A)
Wilson, F. J. (M)
Winn, D. L. (SM)

Magnolia (LR-6)
Cordrey, E. E. (SM)

Malvern (LR-6)
Beem, R. M. (SM)

Mena (LR-6)
Darr, J. J. (M)

North Little Rock (LR-6)
Lowery, H. J. (M)
Meyer, J. A. (A)
Noll, R. A. (A)

Pine Bluff (LR-6)
Basinger, E. G. (M)

Pollard (LR-6)
Sevener, F. D, (M)

Prairie Grove (LR-6)
Schraer, L. J. (M)

Quitman (LR-6)
Tarver, A. (M)

Scott (LR-6)
McRae, J. P. (M)

Searcy (LR-6)
Bennett, H. W. (M)

Siloam Springs (LR-6)
Smith, C. E. (M)

Springdale (LR-6)
Anderson, M. K. (M)

Stuttgart (LR-6)
Burrow, W. R. (M)

Texarkana (SHR-6)
Beall, L. S. (A)

Wynne (LR-6)
Dallas, D. M. (M)

CALIFORNIA

Agoura (LA-7)
Bradley, G. A. (M)

Alameda (SF-EB-7)
Colvin, L. D. (M)
Hall, T. D. (M)
Hansen, H. M. (M)
Luckey, O. E. (A)
McNulty, J. W. (M)

Alamo (SF-EB-7)
Bundrick, R. J. (A)
Stripeika, A. J. (SM)

Albany (SF-EB-7)
Andresen, J. S. (M)
Bailey, G. L. (M)
Herendeen, C. E. (M)
Wing, C. (M)

Alhambra (LA-P-7)
Bunker, E. R., Jr. (M)
Gum, J. D. (M)
Hitchcock, E. T. (A)
Hoffman, T. S. (A)
Howk, R. J. (M)
Horton, D. K. (M)
Jones, C. E. (M)
Ludenkens, L. E. (M)
Mack, D. R. (M)
Miller, W. A. (SM)
O'Neill, F. G. (M)
Rousseve, C. J. (M)
Seidner, O. R. (M)
Weeks, A. D. (M)
Whitacre, D. P., Sr. (SM)

Alondra (LA-7)
Cornell, J. R. (M)

Altadena (LA-P-7)
Acord, J. D. (M)
Alrich, J. C. (M)
Atwood, J. R. (M)
Bagley, G. D. (SM)
Biedebach, M. C. (M)
Black, L. (M)
Braun, T. H. (M)
Breckenridge, W. G., Jr. (M)
Bruns, R. A. (M)
Cox, W. F. (A)
Davis, F. W. (M)
Downs, G. W., Jr. (SM)
Easterling, M. F. (M)
Eichwald, W. F. (M)
Fearman, E. L. (A)
Flanders, R. N. (M)
Gilchriest, C. E. (M)
Gossland, J. K. (SM)
Gregory, W. W., Jr. (A)
Hare, G. H. (M)
Hartig, D. E. (M)
Heacock, R. L. (A)
Hedden, G. A., Jr. (A)
Holmes, K. G. (M)
Jacobson, A. D. (M)
Jones, A. V. (A)
Kalbach, J. F. (SM)
Kawafuchi, P. M. (M)
Kennedy, C. J. (SM)
Kimmel, R. O. (M)
Kirk, C. E., Jr. (M)
Kowallis, O. K. (A)
Lane, J. H. (M)
Laub, J. L. (M)
Leflang, W. G. (M)
Lewis, R. S. (A)
Linnes, K. W. (M)
Locanthi, B. N. (M)
Lolass, A., Jr. (M)
Malling, L. R. (M)
Mathison, R. P. (M)
Mauk, L. H. (M)
McCarthy, E. R. (A)
Morris, R. V. (M)
Pedigo, J. Y. (M)
Purdy, W. E. (A)
Ramstedt, C. F. (M)
Riedel, J. C. (M)
Ross, I. (A)
Schuster, D. (M)
Selvidge, H. (F)
Small, R. H. (M)
Szirmay, S. Z. (M)
Tehan, M. F. (A)
Thurman, R. V. (M)
Vincent, D. A. A. (M)
Watkins, K. S. (A)
West, L. E. (SM)
Westlake, P. R. (M)
Whitney, M. G. (M)
Worlock, R. M. (M)

Alta Loma (LA-OB-7)
Shappel, J. J. (A)

Anaheim (LA-SA-7)
Acker, W. W. (M)
Akers, R. C. (A)
Alderete, C. T. (M)
Anderson, P. R. (M)
Andrews, R. C. (M)
Armonton, R. A. (A)
Bailey, B. G. (A)
Beck, L. (M)
Beckman, W. R. (M)
Bills, G. W. (M)
Boutwell, E. O., Jr. (M)
Boykin, J. L. (M)
Brewer, H. E. (M)
Butler, D. S. (M)
Caglia, A. J. (A)
Carnon, C. D. (M)
Chadburn, W. J. (A)
Chapin, L. W. (M)
Chavannes, T. E. (M)
Childers, D. G. (M)
Cole, C. E. (A)
Collins, J. W. (A)
Combs, M. E. (A)
Conrad, E. (SM)
Cooney, K. B. (M)
Copper, G. L. (M)
Crandon, L. H. (SM)
Cranston, E. M. (A)
Curry, W. S., Jr. (M)
Deaver, J. M. (A)
De Cristoforo, E. J. (A)
Dempster, R. J. (M)
De Witt, W. H. (A)
Dhanjal, K. S. (M)
Diedrich, W. A. (M)
Dixon, R. G. (M)
Doss, R. F. (M)
Doty, R. L. (SM)
Ducoff, G. (M)
Edds, J. D. (M)
English, D. L. (A)
Eskridge, T. P. (M)
Evinger, H. W. (M)
Ewing, D. L. (M)
Fairley, D. O. (M)
Filkoff, H. L. (SM)
Finley, W. S. (M)
Fitzpatrick, G. B. (M)
Fleming, R. W. (M)
Flock, D. C. (M)
Fuemica, J. (A)
Foster, H. B. (M)
Foster, M. M. (A)
Friest, D. T. (M)
Galindo, V. (M)
Geiger, A. E. (M)
Gibbs, V. E. (M)
Glowacki, W. V., Jr. (SM)
Glowalla, J. (M)
Graham, H. E. (A)
Hall, R. E. (M)
Halverson, P. C. (M)
Haynes, J. (M)
Hendrickson, H. C. (M)
Heelein, R. F. (M)
Hinrichs, K. (SM)
Hirdler, R. D. (SM)
Hobart, H. H. (A)
Hobbs, W. D., Jr. (A)
Hoffman, M. (SM)
Horning, J. F. (M)
Horwitz, L. B. (SM)
Houck, R. D. (M)
Hunter, O. E. (A)
Jacobs, J. C. (M)
James, E. A. (M)
Jenkins, J. F., Jr. (SM)
Jeschke, A. W. (M)
Jessen, D. (M)
Johnson, M. H. (M)
Johnson, R. W. (SM)
Katz, L. (SM)
Keifer, L. F., Jr. (M)
Kersch, C. J. (M)
Kidd, R. A. (A)
Kingsbury, D. D. (M)
Klein, W. J. J. (M)
Klimowski, F., Jr. (SM)
Knepper, R. C. (M)
Lane, W. G. (M)
Leifeste, K. W. (M)
Levin, H. M. (M)
Lewis, J. D. (M)
Lewis, K. E. (M)
Lewis, P. H. (M)
Lindenmeyer, J. C. (M)
Lopez, R. L. (M)
Lordan, T. G. (M)
Love, R. R. (M)
Lulofs, J. R. (M)
Lynch, F. W. (SM)
Maisch, G. (M)
Malik, O. J. (A)
Marable, W. T., Jr. (M)
Masenten, W. K. (M)
Masin, G. F. (SM)
McAteer, J. E. (M)
McCoig, K. W. (A)
McCollough, D. G. (M)
McCone, G. L. (M)
McFarlane, M. D. (F)
Medak, M. M. (M)
Mellas, A. (M)
Miller, R. D. (M)
Miller, R. J. (SM)

Milligan, H. I. (M)
Modiano, V. J. (M)
Morton, W. B., Jr. (M)
Myers, O. D. (A)
Nealey, C. C. (M)
Neff, R. W. (M)
Nicholson, W. Q. (M)
Nielsen, C. L. (SM)
Ogata, A. I. (M)
Olson, C. P., Jr. (M)
Orelup, J. L. (M)
Paschal, E. A. (M)
Pariser, J. J. (M)
Payne, D. W. (M)
Perkel, D. (M)
Peterson, C. A. (M)
Peterson, H. C. (A)
Phelps, J. F., Jr. (M)
Pierce, C. G. (SM)
Pinson, J. C. (M)
Porter, R. G. (A)
Potwardowski, B. (M)
Pride, E. W. (SM)
Ramont, R. L. (A)
Ramsay, S. P. (SM)
Ranalli, R. (M)
Rassler, D. B. (M)
Reamer, E. D. (M)
Redden, E. T. (A)
Reichenthal, A. (M)
Reid, H. J. (M)
Reinhard, C. J. (M)
Rhoad, J. J. (SM)
Richmond, R. C. (M)
Robinson, D. E. (A)
Rogeness, G. G. (M)
Rumble, B. E. (M)
Sargeant, H. I. (SM)
Sawyers, J. H. (M)
Schalk, N. (M)
Schenck, S. R. (A)
Schmidt, R. E. (SM)
Schmit, D. E. (M)
Schmitz, J. F. (M)
Schonholtz, J. L. (A)
Secor, B. K. (M)
Seemann, K. J. (M)
Shapin, T., Jr. (M)
Shapiro, H. (M)
Silverman, D. (A)
Sisco, W. B. (M)
Smith, H. O. (M)
Smith, S. L. (M)
Snook, M. E. (M)
Spencer, G. W. (M)
Squires, J. R. (M)
Stanton, W. A. (M)
Stephens, E. J. (A)
Stone, J. A. (A)
Storch, H. (SM)
Thompson, M. W. (M)
Tillens, G. C. (M)
Van Wechel, R. J. (M)
Votrian, E. R. (M)
Wack, C. B. (M)
Waggoner, B. A. (A)
Webster, G. C. (M)
Wendt, J. R. (M)
Wenick, R. L. (A)
Wilbur, D. I. (SM)
Wiley, D. V. (M)
Williamson, R. J. (M)
Wilson, S. L., Jr. (M)
Winter, J. A. (M)
Yerdon, G. W. (SM)
Yingst, H. E. (M)
Yowell, C. O. (A)
Zike, W. L. (A)

Angwin (SF-7)
Neilsen, I. R. (M)

Apple Valley (LA-7)
Ball, L. G. (A)
Neumann, J. W. (A)
White, J. L. (M)

Aptos (SF-7)
Reinartz, J. L. (F)

Arcadia (LA-P-7)
Anderson, R. I. (A)
Askren, P. S. (A)
Babeaux, A. G. (A)
Backus, R. A. (A)
Beatty, C. G. (M)
Chess, R. B. (SM)
Cramer, P. W., Jr. (A)
Crisp, R. F. (SM)
Croy, J. E. (M)
Eland, R. C. A. (SM)
Fiske, J. J. (M)
Foster, J. F. (M)
Fritz, W. (M)
Galavan, T. P. (A)
Gehring, D. E. (M)
Goodman, H. D. (M)
Griep, D. J. (M)
Grobecker, A. J. (M)
Hadady, R. E. (M)
Haubrichs, F. P. (SM)
Horton, E. J. (M)
Johnson, R. E. (M)
Keig, M. W. (A)
Lang, D. W. (A)
Leach, D. P. (M)
Le Vay, T. C. (M)
Martin, G. M., Jr. (M)
Maxwell, G. D. (M)
Meyer, R. G. H. (SM)
Mullin, J. H. (M)
Neumeyer, B. W. (M)
Nielsen, J. J., Jr. (SM)
Nienstedt, D. A. (M)
Nininger, N. V., Jr. (SM)
Orr, R. A. (M)
Page, F., Jr. (M)
Paquin, J. H. (SM)
Patterson, A. R. (M)
Pitzer, R. L. (M)
Potter, P. D. (M)
Schindler, R. A. (M)
Shaw, W. C., Jr. (M)
Schenkel, L. F. (M)
Schwarzmann, W. A. (SM)
Seiler, R. C. (SM)
Show, L. A. (A)
Sorge, B. W. (SM)
Speck, G. (M)
Swan, M. L. (SM)
Waldschmidt, N. E. (M)
Walp, R. M. (M)
Wood, A. M. (A)

Arleta (LA-SF-7)
Kleitsch, J. C. (M)
McDonald, R. D. (M)
McKee, R. W. (M)

Arlington, (LA-OB-7)
Albertson, R. E. (M)
Besel, H. W. (M)
Boque, H. (A)
Bradford, W. C. (A)
Bradshaw, S. R. (SM)
Campbell, F. D. (M)
Daniel, D. D. (A)
Espeland, R. H. (M)
Frederiksen, T. M. (M)
Galbraith, H. J. (M)
Garrison, G. W. (M)
Grinius, L. L. (SM)
Heywood, N. A. (M)
Kaloi, C. M. (M)
Kolden, J. R. (M)
Lawlor, K. A. (M)
Lott, L. R. (A)
MaCafee, J. W. (M)
Makinson, F. H. (M)
Pierce, C. C. (M)
Rafatos, P. A. (M)
Risely, R. E. (M)
Smith, P. R. (M)
Strief, M. J. (M)
Todd, B. J. (M)
Weiss, J. G. (M)

Arroyo Grande (LA-SB-7)
Hilliard, D. R. (M)

Artesia (LA-SA-7)
De Jong, R. H. (M)
Seldeen, D. J. (M)

Atherton (SF-7)
Allison, J. E. (M)
Beeson, R. H. (M)
Bell, D. T., Jr. (M)
Blanchard, H. P. (M)
Borden, H. C. Jr. (M)
Byrne, P. F. (SM)
Cameron, E. G. (SM)
Chaskin, W. S. (A)
Crapuchettes, P. W. (F)
Johnson, J. B. IV. (M)
Jones, R. M. (SM)
Kane, R. W. (M)
Maravich, R. (A)
Merz, R. A. (M)
Moore, N. H. (SM)
Rist, A. E. (SM)
Ross, D. H. (M)
Scofield, P. F. (SM)
Walters, G. A (SM)
Welling, C. G. (A)
Wilder, K. T. (M)

Auburn (SAC-7)
Chesney, A. P. (SM)
Moquin, A. E. (A)

Azusa (LA-OB-7)
Clark, P. A. (M)
Clark, W. L. (M)
Hopkins, C. L. (M)
Jankowski, J., Jr. (M)
Morris, K. R. (A)
Peck, J. W. (A)
Rahll, J. P. (A)

Bakersfield (LA-7)
Andress, E. A. (M)
Hoffman, R. D. (A)
Mead, J. A. (M)
Overton, W. F. (A)
Spencer, K. R., Jr. (M)
Welsh, N. R. (M)
Westall, C. L. (M)
Whiting, W. E. (M)

Balboa (LA-SA-7)
Gardner, R. S. (SM)

Balboa Island (LA-SA-7)
Barlett, F. R. (A)
Hansen, E. H. (F)
Wright, W. A. (A)

Baldwin Park (LA-OB-7)
Michie, C. G. (M)

Barstow (LA-OB-7)
Chase, H. E. (M)
Olsen, H. G. (M)

Beaumont (LA-7)
Hotine, W. (M)

Bell (LA-7)
Scott, G. D. (M)
Zelenay, J. (A)

Bellflower (LA-SA-7)
Aukland, J. C. (M)
Bailey, E. L. (M)
Berti, R. J. (M)
Brannian, W. R. (M)
Brunmond, B. R. (M)
Christopher, L. J. (M)
Cone, R. D. (M)
Creswell, J. C. (M)
Emery, W. S. (M)
Hendrix, L. A. (M)
Hohenhaus, H. A. (M)
Hosoda, J. (A)
Lou, C. B. (M)
Louie, W. (A)
Manganaro, E. S. (M)
Mielke, J. J. (M)
Noar, R. (A)
Pierce, K. W. (M)
Podrup, H. (A)
Rogers, W. J. (M)
Sakai, P. R. (M)
Slattery, M. C. (M)
Thoennes, W. P. (A)
Thompson, M. F. (SM)
Weiderhaft, C. E. (M)

Bell Gardens (LA-7)
Adams, R. L. (A)
Rickard, L. D. (A)
Roper, M. M. (M)

Belmont (SF-7)
Carter, J. M. (SM)
Damonte, J. B. (M)
Eakin, J. H. (SM)
Ellison, T. A. (M)
Ferris, W. C., Jr. (M)
Gates, W. F. (M)
Hack, W. L. (A)
Holaday, R. E. (A)
Huebler, M. A. (SM)
Hyne, A. D. (SM)
Johnstone, F. C. (M)
Koloboff, G. J. (M)
Lee, S. (M)
Pekarek, K. L. (M)
Renton, W. L. (M)
Ruth, R. L. (M)
Stark, R. D. (M)
Towne, A. E. (M)
Zellmer, N. A. (M)

Belvedere-Tiburon (SF-7)
Harbidge, E. A. (A)
McFadden, R. R. (M)

Ben Lomond (SF-7)
Cottrell, W. C. (M)
Fulmer, R. F. (A)

Berkeley (SF-EB-7)
Acker, R. C. (SM)
Angelakos, D. J. (SM)
Anger, H. O. (M)
August, G. (M)
Bently, D. E. (M)
Bergen, A. R. (M)
Berkley, J. B. (SM)
Birdsall, C. K. (SM)
Bonner, H. W. (M)
Bourne, H. C., Jr. (SM)
Breeding, C. R. (A)
Brown, L. E. (M)
Brown, M. (M)
Bruun, G. (SM)
Bryson, J. D. (M)
Buffum, J. H. (A)
Bulow, A. A. (M)
Carlile, R. N. (M)
Carlyle, J. W. (M)
Carter, L. J., Jr. (A)
Chen, Y. M. (M)
Chernoff, R. C. (M)
Clapp, F. D. (SM)
Corey, V. B. (M)
Dannenbrink, H. A., Jr. (M)
Davis, D. D. (M)
Desoer, C. A. (SM)
Douglas, E. S. (M)
Evans, F. (SM)
Evenhart, T. E. (M)
Eykhoff, P. (M)
Farly, G. M. (SM)
Freeman, E. D. (M)
George, A. J. (M)
Gill, A. (M)
Goldsmith, E. (M)
Grasselli, A. (A)
Guffin, R. M. (A)
Harris, B. J. (M)
Harvey, M. J. (M)
Heard, H. G. (M)
Hill, L. D. (M)
Hopkin, A. M. (A)
Hunter, J. (A)
Huskey, H. D. (M)
Jenkins, K. D. (M)
Johnson, B. M. (A)
Jorge, C. D. (A)
Jury, E. I. (SM)
Kemanis, G. (M)
Kirkpatrick, T. I. (M)
Kuh, E. S. (M)
Kumagai, N. (M)
Leong, L. L. F. (A)
Linder, I. W. (M)
Lipman, J. F. (M)
Lutz, I. C. (SM)
Mack, D. A. (SM)
Manabe, S. K. (M)
McClure, D. E. (M)
McVey, B. D. (SM)
Melvin, R. M. (A)
Morris, R. J. (M)
Morton, P. L. (F)
Mueller, R. A. (A)
Nakamura, M. (M)
Nelson, W. H. (SM)
Nishizaki, R. (M)
Noller, W. E. (SM)
Pederson, D. O. (M)
Reukema, L. E. (F)
Rosenthal, J. A. (M)
Rumsey, V. H. (F)
Russell, J. A. G. (M)
Schoenemann, P. T. (M)
Scott, D. A. (A)
Scott, H. J. (SM)
Shephard, R. W. (SM)
Shiu, P. D. C. (A)
Silver, S. (F)
Singer, J. R. (SM)
Sloan, D. H. (F)
Smith, B. H. (SM)
Smith, O. J. M. (F)
Soule, W. J., Jr. (A)
Spitzer, N. S. (A)
Stout, G. H. (A)
Strothman, R. A. (M)
Susskind, C. (SM)
Taskett, D. A. (M)
Thomasian, A. J. (M)
Thornton, D. D. (M)
Trivelpiece, A. W. (M)
Turner, S. E. (A)
Wang, S. (M)
Weir, W. B. (M)
Welch, W. J. (M)
Westwick, O. B. (M)
Whinnery, J. R. (F)
Williams, C. S. (A)
Williams, D. R. W. (M)
Windsor, A. A. (M)
Wong, R. B. (M)
Woodyard, J. R. (M)
Yee, P. K. (M)
Zadeh, L. A. (F)

Beverly Hills (LA-7)
Albin, F. G. (A)
Anderson, H. L. (M)
Atkinson, J. M. (M)
Austrian, R. B. (SM)
Beamish, J. G. (M)
Bell, H., Jr. (A)
Beveridge, R. W., Jr. (A)
Brady, R. E. (SM)
Cannon, H. L. (M)
Cheatham, T. P., Jr. (SM)
Cohen, L. B. (M)
Cropsey, D. V. (M)
Edelson, R. H. (M)
Fielding, J. C. (M)
Fisch, M. W. (A)
Floyd, G. W. (M)
Frank, M. E. (M)
Green, D. J. (SM)
Gruber, K. (M)
Harmon, W. S. (SM)
Harczo, E. (A)
Hatch, M. M. (M)
Helt, C. P. (M)
Hirsch, S. L. (M)
Holmen, R. E. (M)
Jacobson, R. E. (M)
Krack, J. J. (A)
Lichterman, G. (M)
Magnuson, R. W. (M)
McCauley, D. D. (M)
McWaid, J. A. (A)
Mullin, J. T. (M)
Nutt, J. H. (A)
Pederson, W. O. (M)
Perry, R. H. (M)
Phillips, H. D. (M)
Rutherford, C. E. (SM)
Sachar, H. N. (M)
Schott, W. L. (SM)
Stannard, R. E. (A)
Stout, T. M. (SM)
Terry, L. R. (SM)
Warren, J. R. (M)
Wilson, T. A. (SM)
Winchell, R. W. (M)
Wise, J. A. (M)
Wolcott, C. F. (F)

Big Bear Lake (LA-OB-7)
Black, J. M. (M)

Bishop (CL-7)
Rudolph, E. (A)

Blisthi (LA-OB-7)
Dawson, J. E. (M)

Boron AFB (CL-7)
Davidson, R. L. (A)
Johnson, C. C. (M)

Boulder Creek (SF-7)
Goldman, R. E. (M)

Bradbury (LA-P-7)
Ranck, J. C. (A)

Brawley, (SD-7)
Korbe, A. J. (M)

Brea (LA-SF-7)
Donner, W. (M)
Kirk, R. J. (M)
Kiyan, N. R. (M)
Kreider, P. A. (M)
Moore, C. W. (M)
Schmidt, L. O. (M)
Wolking, D. H. (SM)

Broderick (SAC-7)
Lebel, A. E. (A)

Burlingame (SF-7)
Boss, L. J. (M)
Haines, W. D. (M)
Helseth, R. S. (M)
Newman, H. L. (M)
Odell, W. D. (M)
Peck, C. D. (SM)
Robinson, W. H. (M)
Roth, W. E. (M)
Turkot, A. (A)

Buena Park (LA-SA-7)
Algeo, J. A. (M)
Armstrong, T. J. (A)
Benedetti, F. J., Jr. (M)
Bunnell, C. D. (M)
Burns, S. S. (M)
Chapman, D. M. (M)
Cornelius, W. B. (A)
Colla, C. P. (M)
Cuningham, G. W. (A)
Dampier, W. P. (M)
Demeter, J. P., Jr. (M)
Ferwalt, W. H. (A)
Gray, B. C. (M)
Greenfield, A. R. (M)
Hershey, L. M. (SM)
Holm, F. E. (M)
Hovda, R. E. (M)
Humphreys, T. I. (SM)
Johnson, T. W. (M)
Kemper, D. M. (A)
Koepel, J. S. (A)
Lowry, R. C. (A)
Metzner, H. E. (M)
Monsees, L. R. (M)
Moynihan, P. A. (M)
Nichols, R. A. (M)
Owca, A. E. (M)
Richion, E. S. (M)
Roark, G. L. (SM)
Prince, L. E. (M)
Purvis, R. L. (M)
Schiavoni, D. W. (M)
Smith, B. E. (M)
Sperling, R. W. (M)
Stack, T. K. (M)
Strain, D. A. (M)
Vincent, W. K. (M)
Ware, D. R. (M)
Webb, J. O. (M)
Widdoss, M. G. (M)
Williford, J. G. (M)

Burbank (LA-SF-7)
Askins, J. J., Jr. (M)
Baker, J. D. (M)
Bates, G. A. (M)
Bawarouski, J. (A)
Bequette, J. N. (M)
Blackburn, W. E. (M)
Bolton, M. W. (A)
Bosen, L. R. (M)
Braun, M. F. (M)
Brockway, D. C. (M)
Brown, C. W. (M)
Bruce, J. P. (M)
Brudevold, L. P. (M)
Bukhdud, J. (A)
Bunce, J. W. (M)
Bush, L. A. (M)
Call, U. R. (M)
Campbell, D. E. (SM)
Chang, W. H. K. (M)
Chrupcala, W. J. (SM)
Clabaugh, R. G. (M)
Clarke, F. H., Jr. (SM)
Coco, A. J., Jr. (M)
Coggshall, J. (M)
Cordon, W. R. (M)
Davis, J. P. (M)
Edgerton, A. K. (M)
Everett, F. A. M. (M)
Fawcett, K. D., Jr. (A)
Flint, L. B. (M)
Foster, D. H. (M)
Fox, C. W. (M)
Ganzenhuber, J. H. (SM)
Giesecke, H. W. (M)
Gilbert, E. M. (SM)
Girouard, L. O., Jr. (M)
Goldman, R. F. (SM)
Goodale, D. M. (M)
Grayson, G. K. (M)
Grillot, R. E. (M)
Hancock, T. W. (SM)
Hanifan, D. T. (M)
Hathaway, J. C. (SM)
Henning, E. S. (A)
Hoff, K. (SM)
Hunt, J. H., Jr. (SM)
Hutchinson, W. M. (M)
Itani, F. S. (M)
Johnson, L. Z. (M)
Jones, R. C., Jr. (M)
Jones, W. F. (M)
Kaatz, F. P. (M)
Lawton, E. F. (M)
Lekven, C. M. (M)
Levitt, L. (M)
Light, S. K. (A)
Markley, J. E., Jr. (A)
Matthews, C. (SM)
McAdam, J. C. (M)
McMullen, P. L. (M)
Miller, W. G. (M)
Mintz, F. (M)
Mitchell, J. A. (M)
Monfort, R. A. (SM)



Mont, C. H. (M)
Moses, A. J. (M)
Mosier, R. R. (SM)
Moss, A. R. (M)
Motley, D. M. (M)
Mullin, J. L. (A)
Muret, R. N. (M)
Naatz, R. C. (M)
Nicol, R. A. (M)
Norris, J. M. (M)
Okonski, C. B. (M)
Ortiz, R. J. (M)
Perlman, D. (M)
Powell, L. A. (M)
Primozich, F. G. (M)
Quist, R. C. (M)
Ricketts, M. V. (SM)
Roiz, E. F. (M)
Romandia, R. R. (A)
Saiers, J. L. (M)
Scherer, E. H. (M)
Schneider, W. J., Jr. (M)
Schwartz, N. A. (M)
Seitz, F. R. (M)
Shahan, O. (M)
Slife, J. F. (A)
Slingerland, K. D. (M)
Smith, C. A., Jr. (A)
Smith, S. R. (SM)
Staats, A. A. (SM)
Starr, A. R. (A)
Stewart, E. W. (M)
Stimson, R. L. (SM)
Stoy, W. R. (A)
Taylor, V. L. (M)
Vinton, B. W. (M)
Wainscott, D. M. (A)
Walker, H. L. (M)
Warrington, W., Jr. (A)
Weatherford, R. V. (A)
Woodard, T. C. (M)
Woodring, R. L. (M)
Yap, D. W. S. (M)
Zilm, C. F. (M)

Calabasas (LA-SF-7)
Batt, K. E. (SM)
Bryson, H. C., Jr. (SM)
Chandler, C. W. (M)
Clavin, A. (SM)
Elliott, R. S. (SM)
Hobbs, L. C. (M)
King, W. J. (M)
Krausz, R. (SM)
Martin, W. R. (M)
Moyer, J. N. (SM)
Rosen, S. A. (M)
Schetne, H. A. (M)
Snyder, W. A. (SM)

Calexico (SD-7)
Aquitar, A. (A)
Bezies-Skewes, E. (M)
Lacarra, A. A. (A)

Camarillo (LA-B-7)
Brown, F. W. (M)
Dame, R. O. (M)
Hamilton, W. T. (M)
Harvey, J. P. (M)
Jennett, N. E., Jr. (M)
Keigher, J. P. (M)
Keller, E. G. (A)
Lund, F. H. (M)
Ogden, D. E. (M)
Osborn, A. (M)
Wood, L. E. (SM)

Cambria (LA-SB-7)
Ohl, R. S. (F)

Camino (SAC-7)
Ozment, W. L. (M)

Campbell (SF-7)
Allen, F. K. (M)
Daniels, T. M. (M)
Dye, R. E. (M)
Fredman, N. E. (M)
Gorman, E. B. (A)
Higuchi, M. (M)
Kahn, H. (M)
Latham, R. A. (M)
Shuster, J. W. (M)
Thompson, A. J. (M)
Tidball, R. M. (SM)
Weckter, G. P. (M)
Went, R. M. (M)
Wiley, J. L. (A)
Yamagami, Y. (M)

Camp Pendelton (SD-7)
Selby, D. F. (M)

Canoga Park (LA-SF-7)
Albin, N. E. (A)
Alden, J. R. (M)
Angle, S. L. (M)
Apa, F. E. (A)
Apple, J. S. (M)
Axsom, L. E. (M)
Babin, R. S. (SM)
Baker, B. W. (M)
Barton, R. L. (A)
Bauer, W. F. (A)
Bauman, V. R. (A)
Bemis, P. S. (M)
Benning, F. N. (M)
Benson, C. E. (M)
Bertucci, J. F. H. (M)
Boekelheide, A. W. (M)
Bohl, R. J. (M)
Bressler, S. (M)
Brockett, D. L. (M)
Bruecker, G. A. (M)
Buchholz, C. W. (M)
Burd, E. M. (M)
Burdett, D. F. (M)
Burke, F. P., Jr. (M)
Cervini, R. A. (A)
Chaba, P. (M)
Chapman, H. R. (A)
Checketts, D. A. (M)
Clausen, H. (M)
Clock, H. D. (A)
Collmer, R. C. (M)
Compton, R. L. (M)
Conway, J. P. (M)
Cooper, D. L. (M)
Cooper, H. V. (M)
Corbell, R. C. (M)
Corr, J. J. (M)
Crawford, D. B. (A)
Crook, G. M. (SM)
Cutler, W. D. (M)
Danner, D. H. (M)
Davis, M. G., Jr. (M)
Day, J. M. (M)
De Florio, G. P. (A)
Deuser, D. A. (M)
De Vittier, J. (M)
Dorrell, V. A., Jr. (M)
Doyle, P. A., Jr. (M)
Doyle, W. P. (M)
Dunwell, R. D. (M)
Eaton, H., Jr. (M)
Eby, J. A. (M)
Ervin, H. D. (M)
Ess, A. J. (M)
Fabian, S. H. (M)
Felerbacher, J. J. (M)
Finchum, W. A. (M)
Fleer, R. P. (M)
Flint, J. C. (M)
Ford, J. P. (SM)
Foxman E. (M)
Frame, J. L. (M)
Frankos, D. T. (M)
Franzen, C. H. D. (A)
Freed, R. S. (M)
Friend, P. A. (M)
Geary, L. W. F. (SM)
Gebel, J. L. (A)
Gehrke, R. A. (M)
Georges, L. (A)
Gilliam, T. J. (M)
Gladser, L. (M)
Gleason, M. J. (M)
Gleerup, R. E. (M)
Graham, R. F. (M)
Graham, W. (M)
Grant, P. M. (M)
Gray, R. K. (M)
Greenberg, R. B. (M)
Gregory, G. D. (M)
Gribben, R. L. (SM)
Griffin, E. F. (A)
Griffin, R. G. (M)
Haining, L. E. (M)
Hale, J. R. (M)
Hall, J. R. (M)
Hamilton, L. E. (M)
Hart, J. P. (M)
Hartmann, S. (M)
Henderson, M. C. (M)
Henrikson, A. E. (M)
Hesse, V. L. (M)
Heyne, M. W. (M)
Hoefener, C. E. (A)
Hoff, R. G. (M)
Hom, F. M. (SM)
Homer, E. G. (M)
Horning, T. D. (A)
Horton, B. W. (M)
Howard, C. T. (A)
Hund, E. (M)
Hunter, D. R. (M)
Ives, G. M. (SM)
Jacobsen, D. W. (A)
Jacques, G. E. (SM)
Johnson, M. G. (M)
Jones, L. E. (M)
Judge, H. (M)
Kelt, H. A. (M)
Kellogg, C. H. (M)
Kiesel, R. H. (M)
Kime, K. L. (M)
King, J. E. (M)
Klein, G. H. (A)
Kline, K. H. (SM)
Knapp, R. E. (M)
Kom, I. I. (M)
Koster, R. A. (M)
Kroeckel, C. H. (M)
Landwald, A. (M)
Leach, H. L. (M)
Lee, E. C. F. (M)
Lee, J. H. (M)
Lewis, H. O. (M)
Lezak, M. S. (M)
Lieberman, J. L. (A)
Littlefield, K. E. (M)
Longmire, R. M. (M)
Lushinsky, G. A. (A)
Maldoon, L. M. (M)
Marsh, W. A. (A)
Martin, H. C. (M)
Matonak, S. A. (M)
Maughmer, R. W. (M)
Mawby, W. C. (M)
McCaskey, S. D. (M)
McCreary, H. J. (SM)
McDermid, F. A., Jr. (M)
Merchant, S. A., Jr. (M)
Meredith, C. M. (M)
Milham, R. F., Jr. (M)
Moody, R. D. (M)
Morais, B. G. (M)
Morgan, T. M., Jr. (M)
Morris, R. J. (M)
Motlsher, L. R. (A)
Nakano, O. (A)
Neal, R. B. (M)
Neudorfer, W. L. (M)
Nishimura, R. K. (M)
Nissim, S. (M)
Norsell, H. C. (M)
O'Grady, J. J. (M)
Olson, J. B. (M)
Ordahl, C. A. (M)
Orr, W. D. (M)
Paullus, R. L. (A)
Perry, J. L. (M)
Pinckney, K. R. (A)
Porst, H. B. (M)
Porter, R. L. (M)
Pratt, J. W., Jr. (M)
Priest, E. J. (M)
Ramo, S. (F)
Reed, D. S. (M)
Reitz, G. (M)
Rice, S. M. (M)
Richards, R. E. (M)
Riekeman, E. C. (M)
Robertson, R. G. (M)
Rodgers, J. W., Jr. (A)
Rogers, N. A. (A)
Ross, H. H., Jr. (M)
Ross, W. E. (M)
Schneberger, E. J. (M)
Schiowitz, H. H. (M)
Silverstein, M. M. (M)
Sisson, A. R. (SM)
Slocum, J. D. (M)
Smith, B. A. (M)
Smith, L. D. (SM)
Snider, R. C. (M)
Spadaro, F. G. (M)
Stearns, G. W. (M)
Steavenson, C. C. (M)
Stuckelman R. M. (M)
Sutton, W. R. (M)
Taylor, J. R. (A)
Tenney, J. E. (M)
Thomas, R. (M)
Thornburg, R. O. (M)
Thorne, M. F. (A)
Trenholm, R. B. (M)
Tucker, A. E. (M)
Ulrich, D. A. (M)
Van Velzer, V. C. (M)
Walker, V. M. (M)
Waltmire, W. A. (A)
Ward, W. E. (M)
Warren, C. S. (M)
Weatherford, A. V. (M)
Webb, C. A. (M)
Weber, D. R. (M)
Weinhouse, N. P. (SM)
Westcott, E. J. (M)
Wieman, E. T. (M)
Wilcox, R. C. (SM)
Wilson, F. V. (M)
Wooldridge, D. E. (F)
Woolever, H. S. (M)
York, R. L. (M)
Zamites, C. J. (M)
Zellman, J. R. (A)

Capitola (SF-7)
Clark, C. K. (M)

Cardiff-by-the-Sea (SD-7)
Graham, J. P. (A)

Carlsbad (SD-7)
Murdock, C. E. (M)

Carmel (SF-7)
Brown, C. M. (SM)
Neill, G. M. (M)
Pastel, M. P. (M)

Carmichael (SAC-7)
Ashley, A. B. (M)
Ballard, R. B. (M)
Kelliher, J. E. (M)
McKinney, R. L. (M)
Ursery, W. G. (M)
Wilson, J. T. R. (M)

Carpinteria (LA-SB-7)
Scholz, P. A. (SM)

Castro Valley (SF-EB-7)
Browning, G. D. (M)
Dean, M. H. (A)
Kippenhan, D. O. (M)
Roulette, R. E. (M)
Rufer, R. P. (M)
Sorensen, R. W. (M)

Central Valley (SAC-7)
Maki, P. J. (A)

Chatsworth (LA-SF-7)
Babbe, E. L. (M)
Benson, S. A. (A)
Bowers, E. O. (M)
Burbridge, H. K. (M)
Butler, J. E. (A)
Chesnut, M. G. (A)
Cooper, J. A. (M)
Cowden, L. F. (M)
Gage, N. C. (M)
Gunnarson, L. P. (M)
Haas, R. W. (A)
Harper, R. B. (M)
Hassencahl, L. J. (M)
Isbell, C. H. (M)
Jones, V. E., Jr. (A)
Kroemer, J. R. (A)
McInnis, J. H., Jr. (M)
McVey, I. M. (M)
Merritt, P. R. (M)
Moore, W. L. (M)
Murphy, J. J. (M)
Paulson, E. T. (SM)
Rodine, J. C. (M)
Schaefer, J. H. (M)
Shlonsky, L. P. (A)
Smith, J. D. (M)
Szyska, E. J. (M)
Toman, J. R. (M)
Tondreau, H. J. (M)
Weems, S. (M)
Wise, C. C. (A)

Chico (SAC-7)
Clausnitzer, F. W. (A)
Cordray, R. E. (M)

China Lake (CL-7)
Afendykiw, M. (M)
Arnold, P. G. (M)
Ashbrook, F. M. (SM)
Atkinson, R. E. (M)
Beresford, D. R. (M)
Berryman, A. R. (A)
Blanc, C. D. (M)
Boyd, R. V. (M)
Boyle, J. M. (M)
Breitenstein, R. E. (M)
Bryant, L. D. (M)
Burkey, C. E., Jr. (M)
Carlisle, F. L. (M)
Crawford, J. A. (M)
Creusere, M. C. (M)
Davis, G. W. (M)
De Groot, N. F. (M)
Devoe, D. C. (M)
Dull, M. J. (M)
Everett, J. A. (A)
Farrington, H. W. (A)
Ferris, A. B. (A)
Field, W. A. (M)
Foster, F. N. (M)
Freeman, C. F. (M)
Gates, D. E. (M)
Glatt, B. (M)
Gregory, J. H. (SM)
Harris, J. F. (A)
Hechtel, J. R. (SM)
Heeke, G. D. (M)
Hendrix, C. E. (SM)
Ikendyama, F. K. (M)
Iwamura, D. C. (M)
Jeung, J. L. (M)
Johanboeke, R. B. (M)
Johnson, J. M., Jr. (M)
Kermode, D. W. (M)
Kim, P. K. S. (M)
Lawrence, R. E. (M)
Loper, W. E. (M)
Lowe, N. (M)
McLane, J. L. (M)
McLean, W. B. (SM)
Merriam, R. T. (SM)
Mosko, J. A. (M)
Neal, C. L. (M)
Nickell, T. W. (M)
Obinger, G. H., Jr. (A)
Ostenso, A. S. (M)
Phillips, M. L. (M)
Rand, R. L. (M)
Reuben, E. M. (M)
Rockwell, R. E. (A)
Ronning, H. N. (A)
Rosenberg, H. W. (M)
Ross, M. E. (M)
Rountree, W. R. (A)
Ruggieri, F. A. (M)
Selbold, J. M. (M)
Sewell, R. G. S. (SM)
Stevenson, D. D. (M)
Taylor, J. C. (M)
Topham, J. W. (M)
Trent, J. H. (A)
Trimble, J. (M)
Valdivia, S. G. (M)
Vore, W. E. (M)
Weber, J. E. (M)
Weimholt, J. E. (M)
Whitaker, R. M. (M)
Wickenden, R. C. (M)
Wong, T. (M)
Zellmer, W. G. (M)

Chino (LA-OB-7)
Cantero F. A. (A)
Gatlin, B. R. (M)
McKoy G. C. (M)
Van Dyken, G. A. (M)
Warren, J. R. (M)

Chula Vista (SD-7)
Chiles, J. R., Jr. (A)
Courtright, J. A. (M)
Crane, J. D. (M)
Creel, J. W. (A)
Daniel, W. A. (M)
Dixon, F. C. (A)
Hart, J. M. (M)
Hauk, G. L. (A)
Patterson, W. T. (M)
Rockwood J. B. (M)
Senn, J. C. (M)
Surowiec, D. S. (M)
Varian, R. H. (A)
Wilson, W. R. (M)

Citrus Heights (SAC-7)
Croker, K. S. (M)
Hartman, K. L. (M)

Claremont (LA-OB-7)
Agerholm, M. (M)
Andrew, V. J. (F)
Angle, D. R. (A)
Antut, J. J. (SM)
Block, K. A. (M)
Carroll, L. R. (M)
Chrystie, H. (M)
Coulombe, R. A. (SM)
Culver, C. A. (F)
Doshay, I. (SM)
Easton, J. D. (A)
Focke, A. B. (SM)
Gaddis, L. W. (M)
Gibbons, T. J. (SM)
Girvin, R. A. (M)
Groszewski, D. J. (M)
Grumbein, P., Jr. (M)
Guay, J. F. (A)
Harry, H. E. (SM)
Heaviside, M. G. (SM)
Holtum, A. G., Jr. (SM)
Hostetler, R. R. (M)
Irvine, R. G. (M)
Jacobson, O. M. (M)
Keith, I. W. (M)
Kuntz, G. L. (M)
Lambert, J. (M)
Lindquist, J. R. (A)
Lloyd, A. T. (SM)
Martin, R. L. (M)
McDowell, D. E. (M)
Michaels, E. L. (SM)
Moore, D. H. (M)
Newbold, R. F. (M)
Pile, D. H. (SM)
Porter, J. W. (A)
Pribble, H. A., Jr. (M)
Romeo, D. J. (M)
Schock, J. O. (SM)
Sell, W. B. (SM)
Sivatka, W. E. (M)
Siy, W. G. (M)
Smith, R. E. (M)
Taylor, A. H. (F)
Thompson, R. J. (M)
Treves, D. (M)
Weltino, R. L. (A)
Wildman, R. C. (SM)
Willsey, R. H. (M)
Woods, W. A. (M)
Young, C. W. (SM)

Colton (LA-OB-7)
Anglin, C. D. (A)
Hollinrake, J. M. (M)

Colusa (SAC-7)
Pickles, S. (SM)

Compton (LA-7)
Ahrens, N. P. (M)
Brown, D. W. (M)
Duarte, S. R. (M)
Isaacs, J. P. (M)
McElroy, C. M. (M)
Pritchette, T. J. (A)
Russell, A. W. (SM)
Schneider, R. L. (M)
Smyth, L. E. (A)
Steele, R. W. (M)
Willcocks, S. J. (A)

Concord (SF-EB-7)
Armstrong, R. S. (M)
Billinghurst, L. M. (M)
Bogdanoff, A. G. (M)
Carter, C. R., Jr. (M)
Castanera, T. E. (M)
Clemens, G. W., Jr. (M)
Hopkins, D. B. (M)
Hyde, W. E., Jr. (M)
Landeck, D. (A)
Mancuso, W. (M)
Sansum, V. H. (A)
Thomas, C. L. (A)
Wymond, W. H. (A)

Corona (LA-OB-7)
Adrian, D. J. (M)
Alday, J. R. (M)
Bastedo, G. R. (SM)
Batchelder, D. D. (M)
Bell, D. L. (SM)
Berry, J. J. (M)
Blank, S. (M)
Dealy, M. E. (A)
Dorn, C. G. (SM)
Emerson, R. R. (M)
Freydl, E. J., Jr. (M)
Ganahl, P. J. (SM)
Hamilton, R. E. (M)
Harris, E. A., Jr. (M)
Husten, B. F. (SM)
Johnson, H. A., Jr. (M)
Kimball, F. L. (M)
La Bahn, R. W. (M)
McCroskey, A. A. (SM)
Megoers, W. F., Jr. (SM)
Miyatake, T. (M)
Munn, R. E. (M)
Nichols, R. L. (M)
Nordseth, M. P. (M)
Perringer, P. (M)
Sakamoto, R. (M)

Scharp, G. A. (A)
Scheets, D. F. (SM)
Strother, C., Jr. (M)
Talbot, R. V. (SM)
Thomas, M. G. (M)
Viglietta, A. P. (SM)
Weiss, R. E. (M)
Whiteley, T. B. (M)
Wieder, H. H. (M)
Wood, B. C. (M)

Corona Del Mar (LA-SA-7)
Cooke, W. A. (M)
Goodwin, P. H., Jr. (M)
Harrowby, T. E. (M)
Hoskins, E. E. (SM)
Kerfoot, B. P., Jr. (SM)
Linebarger, P. J. (A)
Lusk, J. R. (M)
Messenger, G. C. (SM)
Muehldorf, E. I. (M)
Pastor, G. J. (M)
Reese, R. F. (SM)
Reynolds, G. W. (SM)
Secard, E. L. (M)
Stockett, T. E. (M)
Straw, L. J. (M)
Suthers, B. H., Jr. (M)
Waniek, R. W. (SM)

Coronado (SD-7)
Curtis, G. D. (M)
Franks, B. W. (M)
Held, R. W. (M)
Holmes, W. R. (M)
King, L. E. (SM)
Leavenworth, R. A. (M)
Mathews, A. E. (A)
Swallow, C. E. (A)

Corte Madera (SF-7)
Pradenas, F. (M)
Seielstad, H. D. (SM)

Costa Mesa (LA-SA-7)
Akers, R. (M)
Barber, W. S. (M)
Barfield, R. O. (M)
Bobitch, B. F. (M)
Braden, J. R. (M)
Carroll, R. V. (M)
Clark, E. C. (M)
Coffman, V. C. (A)
Cory, R. W. (A)
Danroth, J. F. (M)
Davies, J. B. (M)
De Sa E. Silva, C. (M)
Dill, H. G. (M)
Edmonds, A. (M)
Edwards, E. H. (M)
Eng, S. T. (M)
Enz, R. E. (M)
Fawcett, D. G. (M)
Gale, F. C. (M)
Galopin, A. (M)
Godwin, P. F., Jr. (M)
Goodman, K. (M)
Grossman, J. J. (M)
Hall, R. T. (M)
Hawkins, J. K. (M)
Heathcote, B. G. (A)
Helper, R. E. (M)
Hood, H. L. (A)
Howard, D. W. (A)
Howard, R. C. (SM)
Joujon-Roche, P. J. (M)
Kaluger, M. M. (M)
Knox, R. M. (M)
Larson, J. C. (SM)
Laskin, R. S. (M)
Martin, K. W. (M)
McClay, M. (M)
Mehl, N. R. (M)
Munsey, C. J. (M)
Ochi, S. (SM)
O'Donoghue, H. J., Jr. (M)
Oslake, J. J. (M)
Patterson, A. C. (A)
Prouty, T. P. (SM)
Reed, R. C. (A)
Robinett, D. B. (A)
Rueffer, H. F. (M)
Schneider, S. (A)
Schupak, L. (M)
Smith, J. D. (M)
Stopek, S. (M)
Theis, D. J. (M)
Todd, C. D. (M)
Trammell, F. S., Jr. (M)
Tucker, C. T. (M)
Wetzel, G. N. (M)
Wilcox, W. R. (M)
Worden, D. M. (M)
Wright, D. (M)
Zlenkosky, J. E. (A)
Zuleeg, R. (M)

Covina (LA-OB-7)
Anderson, R. W. (M)
Bazard, R. J. (M)
Bertness, P. N. (A)
Bewley, L. L. (A)
Carlson, H. (A)
Carpenter, H. C. (A)
Gilliam, D. (M)
Hansen, R. J. (M)
Henson, M. J. (M)
Johnson, C. W. (M)
Johnston, D. L. (A)
Jones, E. L. (M)
Joyce, J. H. (M)
Kennerknecht, R. J. (M)
Little, B. W. (M)
Lord, D. S. (SM)
Lowe, M. E. (M)
Lucas, F. G. (M)
Luty, R. C., Jr. (A)
MacDonald, D. A. (M)
McAllister, M. W., Jr. (A)
Mleczko, E. L. (M)
Moore, T. O. (SM)
Paterno, P. M. (M)
Powers, K. G. (M)
Richmond, C. D. (M)
Stoltz, J. J. (A)
Sundberg, G. G. (M)
Sylvester, G. E. (M)
Toomey, G. H., Jr. (SM)
Terakowski, E. A. (M)
Thomas, R. L. (M)
Weatherall, T. Q. (M)

Crannell (SF-7)
Kidder, R. T. (A)

Culver City (LA-7)
Adcock, M. D. (SM)
Adomian, G. (SM)
Althaus, E. J. (M)
Armstrong, J. L. (M)
Asendorf, R. H. (M)
Bailey, J. C. (M)
Baldwin, L. W. (SM)
Bartow, D. S. (SM)
Barnes, S. H. (M)
Barry, T. S. (M)
Bateman, L. J. (M)
Bates, D. J. (SM)
Beneteau, B. A. (M)
Bemath, J. (A)
Bimbaum, G. (M)
Blair, G. R. (M)
Buchman, W. W. (M)
Bylington, P. W. (SM)
Byrd, D. J. P. (SM)
Campbell, G. (M)
Campbell, R. A. (SM)
Clark, M. A. (SM)
Craven, W. A., Jr. (SM)
Currie, M. R. (SM)
Day, R. A. (A)
Dean, C. F. (M)
Deyo, R. J. (A)
Dibos, R. A. (M)
Dickey, D. R. (M)
Dimbath, P. H. (M)
Doig, A., Jr. (SM)
Douglas, L., Jr. (M)
Dunn, R. A. (M)
Epstein, R. A. (M)
Euler, K. C. (A)
Fafaman, A. (M)
Feiburg, W. F. (M)
Field, L. M. (F)
Friebertshauser, P. E. (M)
Fujitsubo, W. S. (M)
Glaser, P. S. (M)
Godley, T. J. (M)
Gold, A. R. (M)
Goldman, S. J. (M)
Gould, E. B., III (M)
Gould, L. M. (SM)
Greenberg, E. L. (M)
Grunsky, C. E. (SM)
Guerilli, H. R. (A)
Hall, N. I. (F)
Hansen, J. M. (SM)
Heffner, E. K. (A)
Hermfeld, F. P. (SM)
Hersh, M. (M)
Hiehle, M. E. (SM)
Hirshson, R. M. (M)
Hyland, L. A. (F)
Jameson, D. C. (SM)
Jensen, R. D. (M)
Jeremy, A. S. (SM)
Johnson, D. H. (SM)
Johnston, W. R. (M)
Julian, R. S. (SM)
Kanawyer, W. N. (M)
Kapp, E. (M)
Kazan, B. (SM)
Keller, B. W. (M)
King, T. F. (M)
Klein, E. A. (M)
Klein, S. I. (M)
Kleslack, B. (SM)
Knechtli, R. C. (M)
Knowlton, C. S. (M)
Kogle, G. G. (M)
Kslenski, A. (M)
Lambert, N. E. (M)
Leibman, M. H. (M)
Levin, S. (SM)
Lew, C. (SM)
Limberg, A. C. (M)
Livesay, M. A. (SM)
Lorenz, R. (A)
Lotterman, C. (A)
Lunn, W. B. (A)
Lym, V. W. (M)
Mackey, J. E. (M)
Malden, C. E. (M)
Majane, J. A. (M)
Maxfield, R. C. (M)
Mayper, V., Jr. (M)
Maxey, T. J. (SM)
McKinney, D. J. (M)
Medow, A. (M)
Mendel, J. T. (M)
Metcalf, D. E. (M)
Miya, K. (A)
Moreau, A. (M)
Morita, J. T. (M)
Munushian, J. (M)
Nelson, J. S., Jr. (A)
Nevins, J. E., Jr. (SM)
North, H. Q. (F)
Nusbaum, R. E. (M)
Parode, L. C. (SM)
Partridge, A. B. (M)
Plummer, D. (SM)
Possner, L. (M)
Poulos, P. S. (SM)
Price, O. R. (SM)
Proud, W. H. (M)
Ranhl, R. M. (SM)
Regal, W. J. (A)
Reschetar, F. M. (M)
Rice, R. P. (M)
Richie, W. C., Jr. (M)
Riley, R. L. (M)
Rosien, R. A. (M)
Savo, T. A. (M)
Schemmer, D. L. (M)
Schmidt, R. D. (M)
Schnepple, W. F. (M)
Scholnik, S. A. (M)
Schontau, F. K. (M)
Schwartz, E. V. (M)
Shamban, W. S. (A)
Shein, S. (A)
Shelton, R. E. (M)
Skene, R. A. (M)
Skinner, D. M. (M)
Sklar, S. (SM)
Skoubo, L. A. (M)
Steplan, P. (SM)
Smith, H. M. (SM)
Solta, A. F. (M)
Stauss, E. G. (M)
Stein, R. L. (M)
Stevens, S. (M)
Stitch, M. L. (SM)
Stone, E. S. (M)
Straus, T. M. (M)
Swanson, G. W. (A)
Talcott, G. P. (SM)
Tate, W. R. (M)
Tauber, R. W. (M)
Thompson, B. V. (SM)
Todd, E. G. (M)
Trapeur, R. E. (SM)
Trowbridge, L. M. (M)
Villeneuve, A. T. (M)
Vulliet, P. O. (M)
Wager, M. C. (M)
Warfield, C. N. (SM)
Watanabe, E. (M)
Weber, G. J. (M)
Weber, R. F. (M)
Wegman, R. S. (SM)
Weiss, M. T. (SM)
Wendahl, R. E. (A)
Wolfson, H. (M)
Woolley, R. L. (M)
Wong, K. L. (M)
Woodruff, M. J. (M)
Young, G. O. (SM)
Zelin, E. M. (M)
Zussman, A. L. (M)

Cupertino (SF-7)
Abbott, C. C. (M)
Barnes, J. W. (M)
Barranger, B. J. (A)
Bennett, C. L. (M)
Bettendorff, O. A. (M)
Blessing, R. L., Jr. (M)
Brennan, R. D. (M)
Burnside, C. J. (SM)
Dudley, R. L. (M)
Fleming, H. A. (M)
Forge, C. O. (M)
Garcia, G. F. (M)
Gillmeister, F. W. (M)
Gilman, V. V. (M)
Hashiouchi, M. (M)
Hawkins, S. R. (M)
Henry, E. W. (M)
Henry, R. A. (M)
Le Vezu, C. G. (M)
Mac Kerrow, D. E. (M)
Martin, C. E. (SM)
Milner, L. L. (A)
Noon, J. R. (M)
Norans, M. (M)
Patmore, R. A. (M)
Patterson, K. P. (SM)
Perry, R. L. (M)
Reinecke, B. E. (SM)
Snyder, C. K. (M)
Theisner, W. G. (M)
Weiner, A. (M)

Dagoett (LA-OB-7)
Hoskins, R. E. (A)

Daly City (SF-7)
Moreno, R. W. (A)
Stewis, J. B. (A)
Tudor, B. J. (A)

Danville (SF-EB-7)
Barlow, O. M. (M)
Bunn, H. L. (SM)
Kestell, D. L. (M)
Laine, E. F. (SM)
Nish, J. G. (SM)
Norris, N. J. (A)
Thompson, F. C. (M)

Davis (SAC-7)
Jacob, F. C. (M)
Keeney, R. B. (M)
Davis Creek (SAC-7)
Dolan, R. P. (M)

Del Mar (SD-7)
Benton, L. A. (M)
Boelens, J. (A)
Firle, T. E. (M)
Jones, W. C. (M)
Scanlan, T. J. (A)
Widenmann, J. A. (M)

Del Paso Heights (SAC-7)
Pehrson, C. R. (A)

Denair (SAC-7)
Sayre, M. B. (M)

Diablo (SF-EB-7)
Gallaher, J. F. (SM)

Diamond Bar (SAC-7)
Lank, G. W. (M)

Diruba (SF-7)
Walston, A. G. (M)

Downey (LA-SA-7)
Agalsoff, J. (A)
Altman, G. G. (M)
Anderl, D. J. (M)
Auday, W. S. (M)
Azama, J. T. (M)
Bower, J. L. (SM)
Bunker, R. S. (M)
Butenbaugh, J. N. (M)
Butler, A. G. (M)
Campbell, A. T. (M)
Chambers, G. P. (M)
Clements, Z. S. (A)
Cliffgard, A. (M)
Collins, J. L. (A)
Comyns, L. S. (M)
Courtler, J. D. (M)
Cox, D. N. (M)
Dalke, D. D. (M)
Danna, D. (M)
Decker, D. T. (A)
Deegan, E. T. (M)
Dell'Amico, J. D. (M)
Deutsch, W. F. (M)
Dudler, D. R. (M)
Epstein, H. C. (M)
Goldstein, A. (M)
Green, R. F. (M)
Gruber, W. C. (M)
Hailey, R. D. (A)
Hall, G. E. (M)
Harper, C. E. (A)
Henry, J. L., Jr. (SM)
Hochwald, W. (SM)
Hodson, W. G. (SM)
Hoecker, N. L. (M)
Hoogeveen, A. (M)
Hoskins, H. T. (M)
Jackson, C. H. (SM)
Jackson, R. H. (M)
Jeschonek, A. A. (A)
Johnson, M. W. (M)
Kennel, J. M. (SM)
Kilroy, J. J. (SM)
Kingston, L. L. (M)
Lambert, R. F. (M)
Larsen, H. F. (M)
Leary, R. W. (M)
Leicester, J. F., III (M)
Levy, W. L. (M)
Lockhart, C. T. (M)
Lorenzen, D. R. (M)
Lynch, J. F. (M)
Marosz, M. J. (M)
Marshall, R. L. (M)
Maticich, J. R. (M)
Maturszewski, H. E. (M)
Mayfield, W. H. (M)
McDonald, C. E. (A)
Minami, R. Y. (M)
Morgan, V. T. (M)
Nameth, J. F. (A)
Nellly, L. C. (A)
Nelson, R. A. (M)
Newcomb, P. F. (M)
Nieckula, E. W. (A)
Nilson, M. A. (A)
Nishioka, N. S. (A)
Palmer, W. E. (M)
Paynter, E. J. (SM)
Pierson, D. N. (M)
Pollack, M. (SM)
Pope, W. S. (M)
Poop, D. R. (A)
Porter, B. W. (M)
Raines, R. F. (M)
Rasmussen, C. F. (M)
Ritter, H. F. (M)
Sandberg, G. L. (M)
Sandusky, Z. A. (M)
Scheffler, H. S. (M)
Schmid, J. G. (A)
Schmick, F. N. (M)
Shelley, N. G. (SM)
Sherman, J. D. (M)
Smyth, R. K. (M)
Souza, L. L. (M)
Stember, L. H., Jr. (M)
Stephens, R. C. (M)
Stomberg, G. W. (M)
Stroud, J. C. (A)
Stull, R. J. (SM)
Swanson, H. (M)
Szabo, J. E. (A)
Thoms, C. W. (M)
Trousdale, R. B. (M)
Tuggy, R. J. (M)
Varanay, C. J. (M)
Watanabe, A. S. (M)
Weber, R. L. (M)
Weido, V. C. (A)
Weiss, C. F. (M)
Williams, N. (M)
Wixtrom, L. A. (M)
Woo, B. B. (M)

Duarte (LA-P-7)
Bain, M. B. (M)
Bradley, E. J. (A)
Braun, V. J. (SM)
Canova, G. M. (M)
Hooper, P. B. (A)
Rodriguez, P. T. (M)
Sear, A. W. (SM)
Sitler, G. W. (A)
Tong, S. R. (M)
Ullrich, W. J. (A)
Williams, G. E. (A)

East Palo Alto (SF-7)
Greener, A. E. (M)
Hatt, H. J. (A)
Henderson, K. W. (M)
Hubbard, A. L. (SM)
Iseri, C. H. (A)
Kanbergs, J. V. (SM)
Leamard, H. P. (A)
Morgan, D. E. (M)
Reif, P. A. (M)
Rierson, J. W. (M)
Schmitt, D. E. (M)
Scott, F. I., Jr. (M)

East View (LA-7)
Evans, N. T. (M)
Huffman, J. L. (M)
Rash, K. H. (M)
Swisher, P. E. (SM)
Weisz, P. H. (M)

East Whittier (LA-SA-7)
Sanders, L. L. (M)
Sorensen, E. G. (M)

East Woodland Hills (LA-SF-7)
Hughes, W. A. (SM)

Edwards AFB (CL-7)
Borek, R. W. (M)
Brandt, R. D. (M)
Clark, R. E. (M)
Collins, L. N. (M)
Cox, F. B., Jr. (M)
Davis, J. E. (M)
Fine, T. H. (M)
Head, N. M., Jr. (M)
Heidrich, A. J. (M)
Lathrop, R. C. (M)
Luisi, J. A. (M)
Porter, L. K. (M)
Richardson, P. W. (M)
Riess, D. A. (A)
Young, D. D. (M)

El Cajon (SD-7)
Bayley, L. B., Jr. (A)
Blalock, J. N. (A)
Burton, K. M. (A)
Cunningham, E. E. (M)
Dana, J. J. (M)
Denny, F. J. (M)
Essen, O. E. (M)
Foster, C. B. (M)
Goulart, S. J. (A)
Gramman, E. C. (M)
Hardy, W. G. (M)
Harris, R. C. (M)
Howell, J. F. (M)
Jacobson, R. (SM)
Mason, J. R. (M)
Mayekawa, M. (A)
Meierbachtol, C. J. (M)
Moore, J. E. (A)
Oliver, E. F. (M)
Petersen, V. W. (M)
Pitkin, R. S. (M)
Pitt, C. J. (M)
Quintana, I. M. (M)
Redman, J. P. (M)
Rees, B. A. (M)
Sherburne, C. J. (M)
Soltesz, E. S. (M)
Steiner, F. A. (M)
Turner, P. M. (M)
Wells, T. C. (M)

El Centro (SD-7)
Hesse, J. F. (M)
Roswurm, R. C. (M)

El Cerrito (SF-EB-7)
Banchero, P. G. (A)
Bean, D. A. (M)
Binnall, E. P. (M)
Dimmick, R. R. (M)
Gray, H. F., Jr. (SM)
Lavrischeff, J. T. (M)
Lawrence, M. J. (M)
McClard, H. H. (A)
Patterson, S. J. (A)
Scott, N. B. (A)
Spiegel, L. (M)
Veburg, J. C. (M)
Veltfort, T. E., Jr. (A)
Vogelsberg, F. E. (A)

El Granada (SF-7)
Underwood, W. B. (M)



El Monte (LA-P-7)
Alsip, E. B. (M)
Atherton, C. A. (A)
Golden, N. J. (SM)
Kaye, S. (M)
Maurer, R. A. (M)
Prince, M. B. (SM)
Smith, A. J. (M)
Swanstrom, R. S. (M)
Upadhyaya, S. P. (M)
Wolf, M. (SM)

El Segundo (LA-7)
Arsenault, W. R. (M)
Bernstein, P. P. (SM)
Black, J. (M)
Brendecke, W. H., Jr. (A)
Buczek, C. J. (M)
Butterworth, J. E. (M)
Clapp, G. V., Jr. (M)
De La Garrigue, J. E., Jr. (M)
Diamond, P. (SM)
Garon, R. J. (M)
Gould, G. P. (M)
Harris, D. C. (M)
Jarvis, J. W. (A)
Johnson, T. G. (A)
Kanthak, B. G. (M)
Lauric, W. H. (M)
Linquist, W. I. (A)
McClung, J. W. (M)
Mesak, C. (M)
Mondy, H. C. (SM)
Mousel, G. W. (A)
Pedersen, R. J. (M)
Pelzman, G. P. (M)
Petersen, L. D. (M)
Rainey, R. O. (SM)
Retzlaff, E. E. (A)
Rhodes, J. P. (M)
Rutherford, D. H. (M)
Severs, W. W. (A)
Shafer, C. R. (A)
Sodaro, J. A. (A)
Tompkins, D. N., Jr. (M)
Toppen, H. J. (M)
Walent, P. M. (M)
Watson, A. R. (M)
Yarosh, N. P. (SM)

El Sobrante (SF-EB-7)
Corl, J. L. (SM)
Weinstein, D. A. (M)

El Toro (LA-SA-7)
Mongan, A. J. (M)

Emeryville (SF-EB-7)
Cowley, P. E. A. (M)

Encinitas (SD-7)
Ward, T. C. (A)

Encino (LA-SF-7)
Ake, T. E. (M)
Anderson, E. E. (A)
Berwin, T. W. (M)
Brown, B. J. (M)
Cain, G. A. (M)
Carroll, C. T. (M)
Catlett, L. E. (M)
Clark, F. J. (M)
Clark, T. C. (SM)
Cohill, G. L. (M)
Dessau, H. R. (M)
Domike, D. A. (SM)
Ferber, D. (M)
Fifield, R. K. (M)
Garcia, E. M. (M)
Gilder, G. (M)
Glaser, P. F. (M)
Goldstick, G. H. (M)
Grossman, R. (M)
Hadden, F. A. (M)
Hall, R. D. (M)
Harris, K. W. (A)
Hepperle, C. M. (SM)
Hoover, J. R. (A)
Jur, C. J. (A)
Kajiwara, Y. (M)
Kesselman, M. S. (A)
Lacy, R. R. W. (M)
Lathbury, C. W. (M)
Leahy, T. D. (M)
Mann, A. (A)
Marsh, J. A. (SM)
McCann, J. G. (SM)
McFadden, B. W. (M)
Meyer, H. F. (SM)
Mintz, E. (M)
Murphy, M. H. (SM)
Niemoller, J. F. (M)
Nibbe, G. H. (SM)
O'Halloran, J. F. (SM)
Paine, N. W. (M)
Perrine, C. D., Jr. (A)
Pfeffer, I. (M)
Pilcicki, J. W. (M)
Sabaroff, S. (M)
Sarture, C. W. (M)
Schroder, R. D. (SM)
Scott, H. A. (SM)
Seltzer, L. J. (A)
Senf, H. R. (SM)
Sharpe, L. E. (A)
Stewart, R. M. (SM)
Swift, C. W. (A)
Von Buelow, R. (SM)
Widell, C. D. (M)
Wilhoim, W. A. (M)
Zukin, A. S. (M)

Escondido (SD-7)
Althouse, J. E. (M)
Barber, G. D. (A)
Franevsky, M. (M)
Hall, J. T. (M)
Haney, D. W. (M)
Hitney, C. J. (M)
Hoerl, B. H. (M)
Peek, G. E. (A)
Sandberg, J. W. (A)
Seabaugh, D. A. (M)
Sims, J. C. (M)
Steinhardt, L. R. (M)

Eureka (SF-7)
Hickerson, R. L. (M)
Joyner, W. B. (M)
Olson, A. E. (A)
Smullin, W. B. (A)

Fairfax (SF-7)
Gray, G. P. (M)

Fairfield (SF-7)
Walsh, J. F. (A)
Yaeger, T. E. (M)

Fair Oaks (SAC-7)
Beeman, J. L. (M)
Bissett, J. C. (M)
Eanes, R. M. (M)
Hartman, W. H. (M)

Fallbrook (SD-7)
Clark, J. H. (SM)

Farmersville (SF-7)
Waddle, C. D. (A)

Felton (SF-7)
Morris, G. H. (A)
Thomas, A. H. (M)

Fillmore (LA-B-7)
Alker, C. A. (A)

Folsom (SAC-7)
Walter, R. L. (M)

Fontana (LA-OB-7)
Hill, H. K. (A)
Riggins, M. R. (A)
Saez, R. G. (M)
Zinn, S. D. (M)

Fort Jones (SAC-7)
Fowler, J. A. B. (M)

Fort Ord (SF-7)
Melnik, R. P. (M)

Fremont (SF-EB-7)
Easterday, R. B. (A)
Jensen, P. W. (M)
Leach, R. E. (A)
Weed, N. M. (M)
White, J. (M)
Yarborough, J. R. (M)

Fresno (SF-7)
Clark, J. F., III (M)
Foin, O. F., Jr. (SM)
Foreman, R. E. (A)
Hancock, J. B. (A)
Lamkin, K. R. (A)
Mealey, K. L. (M)
Morey, J. A. (M)
Whitby, E. R. (M)

Fullerton (LA-SA-7)
Adamson, P. A. (SM)
Afonsky, D. D. (M)
Andersen, E. A. (M)
Asher, R. W. (M)
Autrey, S. W. (A)
Averill, R. J. (M)
Baker, D. L. (M)
Baker, R. L. (M)
Barr, L. V. (M)
Barry, R. L. (A)
Barter, L. D. (A)
Becker, D. R. (M)
Begovich, N. A. (M)
Berger, J. E. (M)
Billington, C. H. (M)
Bishop, J. F. (M)
Blum, L. M. (M)
Brunn, K. R. (M)
Burch, E. C. (M)
Cannon, D. R. (M)
Carlson, R. L. (M)
Cartwright, V. F. (M)
Chambers, W. A. (A)
Chang, Y. N. (M)
Chapman, C. W. (SM)
Christensen, M. M. (SM)
Clanton, R. A. (M)
Clark, C. M. (M)
Cole, E. J. (SM)
Cother, R. H. (A)
Counts, D. C. (M)
Davis, J. C. (M)
Davis, T. F. (M)
Derby, R. J. (M)
Dolezal, R. T. (A)
Doucette, L. J. (M)
Dufault, D. J. (M)
Du Fort, E. C. (M)
Eliades J. (M)
Elias J. (M)
Ennis, F. L. (M)
Eschner, A., Jr. (SM)
Fischer, J. J. (M)
Fischer, P. F. (SM)
Flatten, D. H. (M)
Fletcher, T. C. (M)
Ford, J. R. (M)
Foster, H. E. (M)
Foster, R. A. (M)
Fursa, A. (M)
Gade, D. W. (SM)
Gaines, B. R. (SM)
Garcia, E. E. (M)
Gayton, C. F., Jr. (M)
Geipel, D. H. (A)
Golden, E. R. (M)
Gray, R. W. (SM)
Green, R. J. (M)
Green, V. H. (M)
Grossfield, S. (SM)
Grumich, J. (SM)
Gunning W. F. (M)
Hansell, G. E. (A)
Harrington, V. L. (M)
Hayes, M. H., Jr. (SM)
Hearne, J., Jr. (M)
Heaton, E. C. (SM)
Heeiser, D. R. (M)
Henderson, F. B. (M)
Herold, H. L. (M)
Hollander, G. L. (SM)
Horrocks, S. W. (M)
Hough, W. E. (M)
Hughes, R. A. (M)
Hules, J. C. (M)
Hunt, E. B. (M)
Hyneman, R. F. (M)
Israel, J. D. (M)
Janeway, R. K. (M)
Jans, J. T. (M)
Joerger, J. O. (M)
Kalson, N. H. (SM)
Karaglanis, L. G. (M)
Kazebee, C. R. (SM)
Kerber, S. M. (SM)
Kerr, A. (M)
King, S. (SM)
Klein, W. W., Jr. (M)
Knipe, W. M. (A)
Kohlenberger, C. W. (M)
Komosky, G. L. (M)
Kramer, R. F. (M)
Kumann, C. A. (M)
Kirkjian, L. H. (M)
Lanctot, R. B. (M)
Lappi, U. T. (M)
Leisz, G. W. (SM)
Lessley, T. D. (M)
Lewis, B. G. (M)
Lewis, H. F. (M)
Lillie, G. L. (M)
Lo Cascio, R. J. (M)
Lubell, A. H. (M)
Madsen, R. L. (M)
Manklnen, E. J. (A)
Manning, R. E. (M)
Marshall, B. (M)
Matson, D. L. (M)
Mayor, W. G. (A)
McClellan, D. H. (A)
McKinster, R. C. (M)
Meyer, A. W. (M)
Milter, W. L. (M)
Montgomery, W. C. (M)
Moore, J. R. (F)
Morgan, R. C. (SM)
Neben, D. F. (M)
Oatt, R. L., Jr. (M)
Pease, N. H. (SM)
Redlich, H. S. (M)
Reed, R. H. (M)
Richter, E. M., Jr. (M)
Roe, G. F., Jr. (M)
Rogers, J. G. (M)
Romanelli, J. (M)
Samoson, H. I. (A)
Savage, W. R. (M)
Schmidt, B. F. (M)
Shohara, S. (M)
Silva, L. M. (M)
Smedley, J. A. (A)
Snyder, E. H. (M)
Snyder, R. L. (SM)
Snyder, R. M. (M)
Soltenberger, T. E. (SM)
Soules, F. B., Jr. (SM)
Stameson, S. A. (M)
Stark, L. (M)
Starrec, F. J. (M)
Sullivan, S. J. (M)
Sutherland, C. W. (M)
Tang, R. (M)
Thomas, D. L. (M)
Topp, H. A., Jr. (M)
Tracey, J. R. (M)
Vahlstrom, R. E. (M)
Valentine, R. H. (M)
Vincent, G. A. (M)
Vogel, D. F., Jr. (SM)
Vogel, V. H. (M)
Walters, W. H. (M)
Way, G. B. (M)
Weber, W. R. (M)
Weir, W, R. (M)
White, L. A. (M)
Wiggins, D. E. (M)
Williams, A. S. (M)
Wipson, J. W. (M)
Witteis, I. M. (M)
Woods, L. A. (M)
Yaru, N. (SM)
Young, C. E. (SM)
Young, H. M. (M)

Gardena (LA-7)
Andrews, L. J. (M)
Atkinson, W. R. (M)
Aungst, J. D. (M)
Baker, F. A. (M)
Beihl, P. A. (M)
Bernard, R. H. (M)
Berry, D. C. (A)
Boe, D. P. (M)
Boscia, A. F. (SM)
Boyd, A. F. (M)
Britt, C. F. (A)
Brown, W. A. (M)
Buzzelli, T. S. (A)
Campbell, D. A. (SM)
Carroll, J. D. (M)
Cassidy, L. D. (M)
Cook, W. E. (M)
Currie, D. E. (M)
Determan, J. D. (M)
Dichter, H. S. (SM)
Dillon, M. M. (M)
Dillon, R. S. (M)
Doyle, R. E. (M)
Durrett, R. L. (M)
Du Vall, W. E. (M)
Eick, M. K. (A)
Evans, G. L. (M)
Field, J. O. (M)
Fine, E. (M)
Fleeman, P. J. (M)
Fujimoto, T. Y. (M)
Giese, C. (M)
Ginsburg, S. (M)
Grier, M. B. (SM)
Grimmett, C. A. (SM)
Grossman, M. A. (A)
Hack, N. (M)
Halliday, R. G. (M)
Hans, E. (A)
Hargrove, R. O. (M)
Harkins, S. F. (A)
Harrington, L. M. (M)
Harris, A. W. (M)
Hayes, J. E. (M)
Honda, F. S. (M)
Horyczka, J. (M)
Hruby, R. J. (M)
Inouye, G. T. (M)
Jonasen, R. W. (A)
Kawahara, M. (M)
Kelly, K. C. (M)
Kennann, J. E. (M)
Kerster, G. (M)
King, H. E. (SM)
Knopp, G. L. (M)
Komatsu, G. A. (A)
Krumreich, W. A. (M)
Lachenmeier, G. E. (A)
Leatherman, R. H. (M)
Lee, D. N. (A)
Lee, H. (M)
Leuschner, R. H. (M)
Lowe, J. R. (M)
Lower, D. H. (M)
Lutze, D. L. (M)
Magnuson, V. P. (M)
Manells, R. E. (M)
Mankiewicz, E. J. (A)
Martin, A. P. (M)
Marson, S. H. (M)
Maxson, V. C. (M)
McGhee, R. B. (M)
McGregor, G. L. (M)
McKenzie, J. N. (M)
Middleton, B. A. (M)
Minka, G. F. (M)
Moller, R. T. (M)
Motoike, S. (A)
Nakatsukasa, F. Y. (M)
Nakayama, H. (M)
Nelson, C. E. (SM)
Nishball, J. L. (M)
Nishime, F. S. (M)
Nissim, W. (M)
Olsen, L. V. (M)
Pinsky, D. D. (A)
Quick, T. C. (M)
Reading, J. (M)
Reynolds, T. S. (M)
Rivera, E. (M)
Romine, J. R. (M)
Rose, D. J. (M)
Rothwell, T. L., Jr. (M)
Row, R. J. (A)
Ruhl, W. T., Jr. (M)
Sandberg, A. J., Jr. (M)
Schroeder, W. (M)
Scott, A. W. (M)
Seehof, J. M. (SM)
Sheppard, A. S. (M)
Silva, B., Jr. (M)
Skinner, M. R. (M)
Slaughter, R. G. (A)
Smith, J. R. (M)
Sumida, W. S. (M)
Taber, J. E. (M)
Thompson, W. C., Jr. (M)
Tong, K. C. (A)
Walsh, J. F. (M)
Webb, J. R. (A)
Wizelman, A. (M)
Worrall, J. W. (M)
Yonemoto, N. (M)
Young, G. L. (M)

Garden Grove (LA-SA-7)
Aaron, R. J. (M)
Allbaugh, J. D. (M)
Ames, M. D. (M)
Anton, F. C. (A)
Baxter, W. A. (A)
Bertrem, C. J. (M)
Bishop, R. I. (M)
Bonem, E. J. (M)
Bruemmer, R. K. (M)
Cherney, J. F. (M)
Clithero, W. H., Jr. (M)
Connell, A. D. (A)
Connell, M. E. (M)
Cresap, W. A. (SM)
Del Duca, A. (M)
Delbit, R. J., Jr. (M)
Dierken, K. C. (M)
Dunklee, L. H. (M)
Enz, R. F. (M)
Farenklen, E. (M)
Fraley, J. L. (M)
Freeman, R. E. (M)
Fukuda, S. I. (M)
Gebhardt, C. C. (M)
George, R. E. (M)
Gillings, J. W. (M)
Guthrie, J. W. (A)
Hendrick, J., Jr. (M)
Henry, H. E. (M)
Hickman, W. L., Jr. (M)
Hoyt, E. P. (M)
Jacklin, E. M. (A)
Jones, R. W. (M)
Junoclas, L. E., Jr. (M)
Kasten, C. L. (M)
Katayama, T. T. (A)
Katzenberger, H. S. (M)
Klinger, I. C. (M)
Knecht, R. O. (M)
Lind, W. P. N. (M)
Lindley, C. J. (A)
Lindquist, C. A., Jr. (SM)
Linton, T. B. (M)
Lum, M. A. (M)
Martin, R. F. (M)
Meyers, L. J. (M)
Ostrem, R. E. (A)
Packard, D. F. (SM)
Patterson, G. D. (A)
Perkins, W. E. (M)
Prather, R. D. (M)
Rabbin, I. G. (M)
Reeves, J. J. (SM)
Reimherr, R. N. (A)
Rhoades, W. T. (M)
Richards, E. S. (M)
Robinson, E. P. (M)
Robinson, L. M. (M)
Rosenbaum, A. (A)
Schnitger, A. W. (M)
Suit, C. D. (M)
Swenson, R. L. (A)
White, J. W. (M)
Wyatt, W. C. (A)
Zeitlin, A. L. (M)

George AFB (LA-OB-7)
Fair, E. G. (A)

Glendale (LA-SF-7)
Abrahamson, G. D. (M)
Assal, E. J. (M)
Atherton, T. L., Jr. (M)
Auerbach, M. (A)
Bertolet, E. C. (SM)
Bible, R. E. (M)
Bird, R. M. (M)
Blitch, M. G. (M)
Bridges, R. L. (M)
Brouillette, D. A. (M)
Buchanan, H. K. (M)
Clark, J. E. (M)
Collins, D. L. (M)
Collins, F. C. (M)
Curran, G. W. (SM)
Davis, J. S. (A)
Deen, J. R. (M)
De Witz, G. H. (SM)
Dixon, A. M. (M)
Drucker, S. (M)
English, R. B. (M)
Ericson, R. L. (A)
Euwer, H. G. (A)
Feland, R. F., Jr. (A)
Foodim, C. (SM)
Foster, D. E. (F)
Fredendall, B. F. (M)
Fung, L. E. (A)
Gates, H. A. (SM)
Gaunt, R. P. (SM)
Geist, W. K. (M)
Ghose, R. N. (SM)
Glassford, H. A. (A)
Glaze, R. H. (A)
Griffing, W. R. (A)
Grill, F. J. (A)
Gritton, D. G. (M)
Haddon, M. C. (M)
Hamilton, H. J. (SM)
Hand, F. W., Jr. (M)
Harbaugh, A. W. (M)
Hartwick, A. J. (M)
Hunnicutt, D. N. (M)
Ingall, W. E. (M)
Insalaco, J. J. (M)
Kilpatrick, H. N. (M)
Kiser, A. J. (M)
Krill, C. K. (SM)
Ladine, D. A. (M)
Larter, T. C. (SM)
Lashier, H. M. (M)
Lehan, F. W. (SM)
Lienhard, J. T. (M)
Lyons, L. H. (M)
Masline, E. J. (M)
Meersman, R. J. (M)
Mertz, H. R. (M)
Michael, C. (A)
Newberry, A. W. (SM)
Newcomb, R. (SM)

Nurnberger, W. H. (M)
Nuxt, A. (M)
Ockene, N. J. (M)
Ohlson, G. A. (M)
Parzl, R. C. (M)
Paul, F. A. (SM)
Perrin, C. A. (M)
Pope, G. S. (M)
Prout, D. B. (M)
Pyle, F. J. (M)
Rado, L. G. (SM)
Roberts, D. G. (M)
Royer, R. N. (M)
Sanders, R. W. (SM)
Satinsky, S. (M)
Schmidt, L. M. (SM)
Scott, W. F. (M)
Scoville, R. R. (SM)
Selzer, R. H. (M)
Simpson, B. L. (M)
Slack, C. B. (M)
Snell, J. L. (M)
Spencer, R. L. (A)
Spray, W. D. (M)
Steele, E. E. (M)
Stefanov, B. (M)
Stokes, I. (SM)
Swenson, A. N., Jr. (M)
Swygard, G. F. (M)
Tamminga, E. D. (A)
Trostrud, A. T., Jr. (M)
Tzschentke, H. A. (M)
Valiquette, D. J. (M)
Vallar, T. F. (M)
Webb, A. W. (M)
Williams, R. W. (M)
Wong, D. S. (M)

Glendora (LA-OB-7)
Bennett, J. R. (M)
Bezold, F. L. (M)
Burk, P. O. (M)
Dean, E. K. (A)
Doeleman, H. (SM)
Friend, J. Q. (SM)
Gehring, J. E. (M)
Given, R. L. (M)
Grinnell, A. L. (M)
Hartke, D. H. (M)
Hintz, W. F. (M)
Hodder, W. K. (M)
Jones, J. G. (M)
Kneen, W. (SM)
Kreager, N. L. (SM)
Kreuder, N. L. (SM)
Kuwahara, D. J. (M)
McDonald, J. J. (A)
McElwee, J. F. (M)
McGee, H. A. (SM)
Peters, W. F., Jr. (M)
Petry, C. B. (SM)
Pohlman, D. W. (M)
Reilly, M. (M)
Sandberg, H. L. (M)
Schultz, R. T. (M)
Spurling, W. N. (M)
Stack, G. C. (M)
Tallman, C. R. (M)
Waltz, D. M. (M)
Wardein, H. E. (M)
Whistler, W. J. (M)
Wolfe, C. M. (M)
Worthy, N. M. (SM)

Goleta (LA-SB-7)
Ainsworth, M. J. (SM)
Bode, D. E. (SM)
Bradley, D. K. (M)
Brown, W. P. (M)
Cohan, L. M. (M)
Crane, S. D. (SM)
Frasure, L. R. (M)
Glancy, D. R. (SM)
Hanson, O. W. (M)
Karlson, A. T. (M)
Koenitzer, R. D. (M)
Larsen, R. A., Jr. (M)
Layson, W. L. (A)
Liechty, W. (M)
Loomis, R. H. (M)
McBurney, M. D. (M)
McVay, F. C. (M)
Miller, C. E., Jr. (M)
Paden, A. R. (M)
Paul, A. D. (M)
Quam, W. M. (M)
Rabinowitz, A. A. (M)
Robbins, W. M., Jr. (A)
Roberts, L. L. (M)
Strauss, L. (M)
Taylor, D. H. (M)
Wanless, C. B. (M)
White, R. L. (M)
Wilkerson, C. E. (M)
Wolthausen, L. H. (A)

Granada Hills (LA-SF-7)
Absher, G. E. (M)
Aleshire, T. S. (M)
Allen, R. J. (M)
Alpine, P. E. (SM)
Astelle, G. E. (M)
Baker, C. R. (M)
Bartman, R., Jr. (SM)
Batson, D. D. (M)
Bellman, H. C. (M)
Bertrand, W. T. (M)
Borofka, R. P. (M)
Brown, J. L. (M)
Buckley, J. R. (M)
Canfield, L. D. (M)
Carl, R. J. (M)
Chang, B. (M)
Clark, D. B. (M)
Clark, R. W., Jr. (M)
Conant, J. A. (M)
Dalton, R. A. (M)
Davis, W. K. (M)
Deaux, F. J. (M)
Dell, B. H. (M)
Dishl, R. T. (A)
Eckel, K. G. (M)
Edwards, R. O. (A)
Felthousen, A. Q. (SM)
Fletcher, F. L. (M)
Foster, J. R. (A)
Foy, S. (A)
Franks, T. A. (M)
Freed, A. J. (M)
Fujimoto, K. K. (A)
Fuller, F. J. (SM)
Galati, V. J. (M)
Gaukney, L. (A)
Gillespie, E. S. (M)
Goda, O. S. (A)
Greear, D. W. (M)
Hoyle, J. (M)
Jackson, R. O. (M)
Kalayjian, J., Jr. (M)
Katz, J. (A)
Keiser, J. A. (A)
Kendle, J. P. (M)
Kerins, D. J. (M)
Kornacker, J. M. (M)
Kramer, R. G. (M)
Kreinheder, D. E. (M)
Lauritzen, L. (M)
Lawrence, D. H. (M)
Levine, S. E. (M)
Logee, D. B. (M)
Lombardo, C. P. (A)
Loveless, R. M. (M)
Mac Coll, J. B. (A)
Machlis, J. (M)
Marcille, R. E. (SM)
Martin, D. R. (M)
Martin, R. W. (M)
McConnell, W. E. (M)
McDougle, R. H. (M)
Mentzer, S. C. (SM)
Meyer, D. R. (M)
Midcalf, W. A. (A)
Mooney, G. F. (A)
Moriarty, J. J. (M)
Morioka, F. K. (A)
Morrow, H. W. (M)
Nelson, G. A. (M)
Olson, O. P. (M)
Patterson, M. A. (SM)
Peirce, R. J. (M)
Pekrul, P. J. (M)
Perlman, M. (M)
Phillips, G. A. (M)
Plaut, A. S. (A)
Price, J. F. (M)
Rigg, G. L. (SM)
Robertson, D. C. (SM)
Roehrman, K. E. (M)
Rudy, E. W. (A)
Schulte, R. W. (A)
Seldon, M. (M)
Sherman, M. (M)
Sherman, R. W. (A)
Sigler, H. K., Jr. (SM)
Smeester, R. J. (M)
Smith, S. W. (A)
Soper, G. T. (SM)
Sorensen, C. A. (M)
Spears, R. W. (M)
Strohm, R. B. (M)
Thomson, B., Jr. (M)
Troutman, A. F. (M)
Ulrick, S. G. (M)
Valery, N. A. (A)
Vargo, A., Jr. (M)
Walsh, B. L. (M)
Ward, B. M., Jr. (M)
Welch, W. E. (SM)
Williams, W. E. (M)
Wittels, J. R. (M)
Yackey, C. H., Jr. (M)
Yost, E. A., Jr. (M)
Zieper, H. S. (M)

Grass Valley (SAC-7)
Litton, C. V. (F)

Grossmont (SD-7)
Applin, R. H. (M)

Hamilton AFB (SF-7)
Firth, J. H. (M)
Parrott, J. H., Jr. (M)
Richter, W. C. (A)
Voight, D. A. (M)

Harbor City (LA-7)
Hamilton, W. J. (A)

Hawthorne (LA-7)
Abascal, M. (M)
Abouresh, W. (A)
Agarwal, R. K. (M)
Arciuch, J. P. (M)
Baker, R. G. (M)
Beck, A. B. (A)
Bloom, L. (M)
Brunswick, H. D. (M)
Bryan, D. H. (A)
Carr, D. E. (M)
Cavanagh, J. R. (SM)
Childs, H. W. (M)
Christensen, A. V. (M)
Clark, G. L. (M)
Cole, W. R. (M)
Cunningham, O. J. (M)
Dao, T. T. (A)
Drake, R. L. (M)
Erznoznik, F., Jr. (SM)
Evans, B. H. (A)
Finstuen, R. E. (M)
Fort, J. E. (M)
Galle, H. P. (A)
Gee, L. C. (M)
Geisert, W. O. (M)
George, R. D. (M)
Gillespie, D. P. (A)
Griffin, J. W. (A)
Griswold, T. W. (M)
Groves, C. R. (M)
Haefer, J. A. (A)
Hagerty, R. J. (M)
Hwang, C. (M)
Ingram, R. G. (M)
Johnson, D. G. (A)
Jugend, H. E. (M)
Kazakevicius, A. H. (A)
Kincaid, N. L. (A)
Klammer, R. W. (M)
Knoll, D. W. (M)
Langdon, J. G. (M)
Lodge, H. L. (M)
Loynes, O. H. (M)
Mac Garvey, E. R. (M)
Mak, S. (M)
Martes, G. E. (M)
McCann, F. A. (M)
McNeely, T. L. (M)
Mikkelson, M. E. (M)
Miller, B. C. (M)
Moorhouse, D. M. (M)
Nelson, F. E. (M)
Osborn, C. R. (SM)
Paschke, M. J. (M)
Pearlston, C. B., Jr. (M)
Pfeiffer, W. G. (M)
Pipher, R. W. (SM)
Popovich, S. S. (M)
Porter, S. N. (A)
Proctor, C. A., Jr. (A)
Rich, S. F. (M)
Rufus, D. (M)
Sagey, W. E. (M)
St. John, E. E. (SM)
Savant, C. J., Jr. (M)
Simpson, J. H. (A)
Sirbola, G. (M)
Smith, E. A. (A)
Stager, D. N. (M)
Stein, S. (M)
Stuart, A. R. (M)
Tang, T. T. (M)
Tucknott, T. P. (M)
Twohig, P. E. (A)
Valentine, S. L. (M)
Van Winkle, D. M. (SM)
Venator, T. J. (M)
Warn, K. L. (M)
Weber, J. W. (M)
Wendel, D. R. (M)
Wilkinson, J. H. (M)
Williams, H. N., Jr. (M)
Willis, M. R. (M)
Winslow, L. M. (M)
Winters, L. L. (A)
Woerdemann, H. H. (SM)
Yahiro, R. K. (M)
Young, J. W., Jr. (A)

Hayward (SF-EB-7)
Brenkwitz, J. M. (M)
Brown, A. E. (A)
Cook, R. A. (M)
Floyd, J. M. (M)
Fort, J. R. (A)
Gausmann, W. H. (A)
Jensen, H. J. (M)
Kees, A. A. (M)
Kiyoi, G. T. (M)
Leavitt, G. A. (M)
Prosser, T. F. (M)
Ream, A. K. (A)
Rudkin, R. L. (M)
Ruzic, J. (A)
Smith, E. E. (A)

Hermosa Beach (LA-7)
Akin, P. A. (M)
Anderson, R. W. (M)
Austin, T. V. (M)
Brandi, E. (M)
Choumard, R. J. (A)
Cleary, J. D. (A)
Dennis, P. A. (M)
Donnelly, J. E. (A)
Drucker, A. N. (M)
Hope, H. R. (SM)
Lane, W. L. (M)
Lentz, T. (A)
Pateuk, C. J. (M)
Pierson, J. E. (M)
Rousseau, A. L. (M)
Russell, W. J. (M)
Schulz, D. P. (M)
Slagle, W. R. (M)
Sullivan, J. W. (M)
Swarts, L. E., Jr. (SM)
Wiley, C. A. (M)

Hesperia (LA-OB-7)
Poulson, W. A. (M)

Hillsborrough (SF-7)
Bullock, J. B. (A)
Hellman, C. G. (M)
Ogilvie, A. R. (SM)

Hollydale (LA-SA-7)
Brown, B. L. (A)
Hesgard, N. A. (M)
Stone, L. M. (M)

Hollywood (LA-7)
Aronowitz, A. (M)
Benham, E. E. (SM)
Benson, A. L. (M)
Binkey, R. A. (M)
Birbilis, N. (A)
Braddy, J. A. (A)
Bryant, H. L. (A)
Carne, G. G. (SM)
Chamberlain, A. T. (M)
Davis, A. (SM)
Denechaud, R. G. (M)
Denney, B. H. (A)
Ehrlich, J. (A)
Estkowski, M. H. (M)
Farel, V. M. (SM)
Foster, D. (M)
Fugate, K. O. (M)
Garabedian, A. (M)
Glass, W. G. (M)
Glaze, G. O. (M)
Goostree, F. T., Jr. (M)
Grenier, T. B. (M)
Grove, H. G. (A)
Habra, J. (M)
Hughey, A. H. (M)
Knoch, G. E. (SM)
Kruger, B. E. (M)
Kurek, N. B. (M)
Kurn, H. C. (A)
Lacey, M. R. (M)
Lach, W. J. (A)
Langecker, H. G. F. (M)
Lubcke, H. R. (F)
Meissner, K. H. (SM)
Miller, A. H. (M)
Moody, R. C. (SM)
Olson, D. A. (M)
Regan, E. D. (M)
Reimann, W. G. (M)
Riek, F. O., Jr. (A)
Sandy, R. J. (A)
Schroter, R. E. (A)
Schwartz, N. (M)
Small, J. N. (A)
Smith, L. S. (M)
Solomon, B. D. (M)
Solow, B. (M)
Stafford, J. W. (M)
Stearn, J. H. (M)
Stern, D. (A)
Stoddart, R. R. (F)
Swanson, E. R. (SM)
Tasker, H. G. (SM)
Taylor, W. U. (M)
Templin, E. W. (SM)
Terry, R. E. (M)
Thatcher, R. (M)
Uecke, E. H. (A)
Urey, G. M. (M)
Watson, G. G. (M)
Wills, C. F. (M)
Woltiz, R. L. (A)
Zanella, F. H. (M)

Huntington Beach (LA-SA-7)
Guffey, W. B. (M)

Huntington Park (LA-7)
Allen, R. M. (A)
Balluff, R. L. (M)
Dowers, A. A. (M)
Norris, P. P., Jr. (A)

Imperial Beach (SD-7)
Hodges, P. (M)
Trenholm, K. S. (A)

Indio (LA-7)
Johnson, R. L. (M)
Tilley, G. R. (A)

Inglewood (LA-7)
Anderson, A. T. (M)
Arand, E. M. (M)
Athan, S. (M)
Barker, R. D. (M)
Baron, R. L. (M)
Barrett, C. W. (M)
Beleskas, S. M. (A)
Berling, G. P. (A)
Bernstein, H. L. (M)
Berry, G. L. (A)
Best, W. D. (M)
Borsch, K. S. (SM)
Brands, C. W. (M)
Brown, G. W. (A)
Burns, B. E. (A)
Carmel, H. H. (M)
Chapp, J. M. (M)
Christner, W. G. (M)
Colby, F. K. (M)
Cole, G. (M)
Crickmay, C. J. (M)
Critton, M. L. (M)
Culver, W. L. (A)
Danta, R. C. (M)
Deininger, C. F. (M)
Dempsey, A. D. (M)
Dewhirst, D. R. (M)
Ducker, P. G. (M)
Durand, T. S. (M)
Dwyer, R. E. (M)
Easley, C. R. (M)
Ellison, M., Jr. (M)
Fields, H. R. (M)
Fisher, R. C. (M)
Fitzsimmons, C. K. (A)
Floeder, T. O. (M)
Galles, C. E. (M)
Garland, W. J. (A)
Gaspard, L. J. (M)
Gillmer, A. H. (SM)
Goodman, R. L. (M)
Graham, J. D. (M)
Gregory, C. N., Jr. (M)
Hall, G. D. (M)
Helm, E. M. (M)
Holley, H. G., Jr. (M)
Holloway, V. C. (SM)
Holm, W. E. (M)
Holt, A. R. (M)
Holthenrichs, P. D. (M)
Honda, J. S. (M)
Howe, W. H. T. (M)
Howes, R. E. (M)
Hughes, H. M. (M)
Ivanoff, R. G. (M)
Jemielity, H. F. (M)
Johnson, D. C. (M)
Johnson, W. A. (M)
Kayner, H. J. (SM)
Keenan, O. B. (M)
Keskeys, G. N. (M)
Kilpinen, R. M. (M)
Kirchoff, W. L. (M)
Koeneker, D. B. (A)
Kono, G. (M)
Kollarsi, J. R. (M)
Kuefler, P. M. (M)
Kuniyuki, R. M. (M)
La Frentz, P. H. (A)
Latimer, D. W. T., Jr. (M)
Lawrence, A. F., III, (M)
Lee, H. E. (M)
Lemestre, R. (M)
Leventis, G. T. (M)
Lewis, H. V., Jr. (M)
Llas, R. B. (SM)
Lorentz, N. A., Sr. (M)
Luce, R. W. (M)
Luck, R. (M)
Lynch, N. F. (M)
MacKenzie, L. G. (A)
Malone, H. L. (A)
Manly, R. (A)
Marable, H. E. (M)
Mayberry, L. A. (SM)
Mayo, J. J., Jr. (M)
McKechnie, R. M. (M)
McMullin, E. K. (SM)
McRuer, D. T. (SM)
Meier, J. (M)
Merles, I. B. (M)
Monos, S. (M)
Murakami, Y. (M)
Nestor, J. J. (A)
Noland, J. W. (M)
O'Neil, W. F. (M)
Patrusky, N. (SM)
Pelline, P. E. (M)
Peterson, L. A. (A)
Pol, W. F. (M)
Pomeroy, I. D. (A)
Quan, N. (M)
Raybin, M. W. (SM)
Reid, C. T. (M)
Rihaczek, A. W. (M)
Robinson, J. A. (M)
Roland, L. F. (A)
Rush, T. D. (M)
Ryan, L. E. (M)
Sambuco, A. J. (M)
Schlewe, A. J. (M)
Schnurr, M. J. (SM)
Schwab, B. B. (M)
Seid, E. (M)
Seigenthaler, R. F. (M)
Shank, R. J. (F)
Shumate, M. S. (M)
Silva, W. (M)
Squire, G. K. (M)
Stacey, J. M. (M)
Stackhouse, A. (M)
Stevens, J. E. (M)
Switzer, O. J. (M)
Taylor, E. N. (M)
Trainer, R. E. (M)
Urban, L. R. (M)
Webster, S. L. (M)
Wedin, A. G. (SM)
Widenhoefer, J. G. (A)
Wiggins, D. G. (M)
Williams, J. F. (M)
Wilmanns, I. G. (M)
Wright, H. B. (A)
Wylie, J. A. (M)
Wylie, P. A., Jr. (M)
York, J. M. (M)
Young, R. A. (M)
Zabriskie, W. G. (M)

Inverness (SF-7)
Reid, I. H. (M)
Thompson, H. K. (M)

Irvington (SF-EB-7)
Bender, R. G. (A)
Bennett, R. D. (F)

Jackson (SAC-7)
Van Thiel, J. (M)

Joshua Tree (LA-OB-7)
Easter, W. A. (M)

Kentfield (SF-7)
Conrad, R. C. (M)



Kenwood (SF-7)
Hosmer, E. A. (SM)

Kerman (SF-7)
Anson, C. T. (M)

Kingsburg (SF-7)
Kidd, T. L. (M)

La Canada (LA-P-7)
Barnes, R. B. (M)
Benioff, H. (M)
Brewer, D. R. (SM)
Brewer, M. S. (M)
Broman, P. R. (A)
Brown, W. E., Jr. (M)
Bullock, R. E. (M)
Cane, M. P. (A)
Comer, F. E. (SM)
Conklin, E. H. (SM)
Curtis, H. A. (M)
Faris, E. M. (M)
Gangi, A. F. (M)
Goodwin, P. S. (SM)
Henry, D. S. (A)
Herron, J. R. (SM)
Higgins, S. F. (M)
Kenkel, H. H. (SM)
Keyser, J. H., Jr. (SM)
Koerner, T. W. (M)
Levy, G. S. (M)
Macmillan, R. S. (M)
Malthonis, W. C. (A)
McFadden, W. C. (M)
Parks, R. J. (M)
Peoples, J. E. (A)
Read, G. W. (M)
Rhoads, J. A. (SM)
Rodine, R. R. (M)
Schor, F. W. (SM)
Seeley, W. M., Jr. (A)
Seufret, F. J., Jr. (SM)
Shadle, P. W. (SM)
Sirri, N. (M)
Varian, S. B. (SM)
Weil, F. M. (SM)
Werst, H. J. (M)
Whistler, W. B. (M)
Wieland, C. W. (M)
Wolfe, H. (M)
Younger, U. E. (M)
Zottarelli, L. J. (M)

La Crescenta (LA-P-7)
Boensel, D. W. (M)
Duran, S. (M)
Geib, G. D. (M)
Holt, D. E. (A)
Honey, F. J. (M)
Hughes, D. W. (M)
Kindt, D. H. (M)
Lange, G. E. (A)
Linsley, A. O. (M)
Lorens, C. S. (M)
Mallon, T. A. (A)
Meyer, H. (M)
Morecroft, J. H., Jr. (SM)
Nardoni, E. N. (M)
Noland, A. R. (M)
O'Neil, W. T. (M)
Pinsuntan, M. A. (M)
Reinholtz, W. H. (M)
Stagnaro, J. A. (SM)
Thompson, R. W. (M)
Yule, J. E. (SM)

Lafayette (SF-EB-7)
Keller, J. E. (M)
Kirsten, F. A. (M)
Kortegaard, B. L. (M)
Krueger, R. E. (M)
Lothrop, F. H. G. (M)
Martin, W. L. (M)
Montalbano, M. (M)
Morrison, G. E. (M)
Morrison, K. G. (M)
Norton, J. S. (SM)
Smith, L. C. (M)
Steed, W. P. (A)
Waddell, J. F. (SM)

Laguna Beach (LA-SA-7)
Capobianco, J. A. (M)
Flackbert, C. (SM)
Holmes, P. J. (A)
Teller, J. M. B. (M)

La Habra (LA-SA-7)
Antista, B. A. (M)
Beau, J. F. (M)
Bechtold, I. C. (SM)
Chester, M. E. (M)
Clark, A. R. (M)
Clarke, J. K. (M)
Creager, F. L. (M)
Davies, C. L. (M)
D'Evelyn, R. P. (M)
Dolce, S. L. (M)
Downey, W. F. (M)
Grontund, R. A. (M)
Hawkins, W. J. (M)
Himler, G. (SM)
Hindi, M. (M)
Husman, P. A. (A)
Knobbe, L. J. (M)
Knox, R. V. (M)
Knudsen, A. C. (M)
Knudson, R. G. (M)
Koltmeier, F. A. (M)
Kowalsky, M. (M)
Laird, R. R. (M)
Linder, C. O. (M)
Low, L. L. (A)
Nelson, K. M. (M)
Polhemus, J. T. (M)
Propster, J. A. (M)
Rollins, R. C. (M)
Shade, R. R. (M)
Steisslinger, H. R. (A)
Struve, L. M. (M)
Tilley, A. E. (M)
Trorey, A. W. (A)
Unterberger, R. R. (M)

La Jolla (SD-7)
Alexander, W. G. (SM)
Allen, W., Jr. (M)
Bartelme, R. (M)
Bentley, A. W. (M)
Bidwell, G. E. (A)
Bishop, H. (SM)
Bramhall, E. H. (SM)
Burgar, D. G. (A)
Chadbourne, H. L. (M)
Cotcher, A. L. (SM)
Erickson, W. A. (M)
Flarity, W. H. (M)
Garvin, J. A. (M)
Giddings, K. L. (M)
Godfrey, W. C. (M)
Hafstrom, J. R. (SM)
Halstenberg, R. V. (M)
Hamann, O. F. (A)
Herreshoff, J. B. (M)
Ikerd, H. M. (SM)
Jensen, R. O. (SM)
Jones, C. E. (M)
Langston, J. F. (M)
Liddard, G. E. (M)
Madsen, R. G. (M)
Markle, R. L. (M)
Maynard, J. H. (M)
McLeod, J. H., Jr. (A)
Michael, F. J. (M)
Miller, P. C. (M)
Murray, W. M. (M)
Naive, J. A. (M)
Norris, B. J. (M)
O'Neal, K. R. (M)
Otis, E. J. (M)
Patten, S. F. (SM)
Petrini, A. A. (A)
Ringland, R. F. (M)
Ritchart, R. C. (M)
Robbins, D. L. (A)
Sadler, E. J. (M)
Schupp, A. A., Jr. (M)
Slagle, W. C. (M)
Theobald, D. J. (M)
Tucker, D. P. (SM)
Vasques, H. A. (M)
Von Peccoz, S. G. W. B. (M)

Lakeside (SD-7)
Rogers, T. E. (M)
Smith, W. R. (A)

Lakewood (LA-SA-7)
Beard, G. W. (M)
Beers, K. H. (SM)
Cain, C. H., Jr. (M)
Crane, H. (M)
Dahlin, R. K. (A)
Ekparian, J. (M)
Fonda-Bonardi, G. (SM)
Francis, T. F. (A)
Frankiewich, C. (M)
Gerhard, F. H. (M)
Guggenheim, R. W. (M)
Hayman, W. H. (M)
Lee, R. E. (A)
McKown, J. J. (M)
Oehlke, A. E. (M)
Overmier, C. S. (A)
Page, R. K. (M)
Ross, T. A. (M)
Sampson, A. A. (M)
Schrader, G. F. (M)
Tanner, L. M. (M)

La Mesa (SD-7)
Ackerman, S. L. (SM)
Ball, N. E. (M)
Carberry, J. F. (M)
Cippo, E. B. (M)
De Mers, E. F. (SM)
Derenthal, R. J. (M)
Dickinson, J. D. (A)
Evey, R. R. (M)
Fisher, H. G. (A)
Hill, D. M. (M)
Huckle, D. R. (M)
Hulbert, S. G. (M)
Lingenfelder, C. C. (M)
Lovelberg, A. G., Jr. (M)
Lowe, D. M. (M)
Madsen, E. C. (M)
Masterman, H. W. (M)
Mathisen, W. D. (A)
McGinley G. W. (M)
Miller, R. H., Jr. (SM)
Moody, D. G. (M)
Moore, W. E. (M)
Olesen, C. E. (M)
Raper, A. J. (A)
Ratkevich, A. E. (M)
Runyan, T. W. (A)
Schatt, W. J. (A)
Schmidt, M. A. (M)
Smith, D. I. (M)
Smyth, J. B. (F)
Torribie, A. W. (A)
Trolese, L. G. (F)
Tweed, G. C., Jr. (M)
Walker, W. D. (A)
Welch, O. R. (M)
Whitaker, J. L. (M)
Williams, A. A. (A)
Wingfield, E. A. (M)
Youngberg, B. E. (M)

La Mirada (LA-SA-7)
Aifrey, P. R. (M)
Barlow, K. (M)
Benjamin, F. (M)
Bennett, J. L. (M)
Bruder, R. M. (M)
Cain, E. L. (M)
Carlson, R. S. (M)
Chemey, R. W. (M)
Davis, K. J. (M)
Dawirs, N. L. (M)
Eisner, W. (M)
Gaston, J. B. (M)
Gilmore, D. A. (M)
Gordon, A. I. (M)
Grieve, W. R. (M)
Haughawout, J. H. (M)
Holt, W. L. (A)
James, B. B. (A)
Jasper, J. D. (M)
King, D. L. (M)
Kleyn, P. A. (M)
Kraemer, W. H. (M)
Kreager, P. C. (A)
Kruger, F. W. (M)
Lawson, M. W. (A)
Leever, W. E. (M)
Loop, D. M. (SM)
Marsh, S. V. (SM)
McClure, D. H. (M)
Molloy, J. M. (M)
Myers, W. A. (M)
Nicolaides, M. E. (M)
Olson, W. J. (M)
Padgett, C. W. (M)
Parsons, J. H. (M)
Peterson, W. R. (SM)
Price, H. J. (SM)
Robertson, S. D. (M)
Sandoval, F. O. (M)
Scofield, B. L. (A)
Simmons, D. M. (M)
Simmons, J. W., III (M)
Smith, E. C., Jr. (M)
Smith, G. C. (M)
Stodala, R. A. (A)
Stone, R. J. (M)
Sward, W. O. (M)
Thomsen, G. A. (M)
Westwick, J. (A)
White, S. A. (M)
Wolfe, G., Jr. (A)

Lancaster (LA-7)
Applegate, B. E. (M)
Archer, J. E. (M)
Barbour, L. D. (M)
Barry, R. N. (M)
Belcher, A. C. (A)
Bryant, J. E. (M)
Christianson, W. O. (A)
Connerley, T. J. (A)
Durham, S. C. (M)
Eckard, P. E. (A)
Eisenman, T. W. (M)
Finney, B. W. (A)
Ganowsky, W. B. (M)
Green, F. W. (M)
Inskeep, J. Z. (M)
Levick, J. K. (M)
Maguire, J. P. (M)
Milewski, J. A. (A)
Miller, J. R. (A)
Mintz, R. M. (M)
Nelson, C. E. (M)
Nyder, R. C. (M)
Osborn, R. H. (A)
Patterson, G. E. (A)
Ramos, A. A. (M)
Rea, W. P., Jr. (M)
Sapolnglon, H. M. (M)
Sehnert, P. J. (M)
Shumate, C. L. (M)
Steinbrenner, E. W. (A)
Sweeley, G. K. (A)
Walters, G. E. (A)
Wolfe, A. E., Jr. (SM)
Woodcock, C. A. (M)

La Puente (LA-OB-7)
Airhart, R. V. (M)
Arnett, J. D. (M)
Berkley, W. H. (A)
Dyment, R. F. (M)
Gerlach, A. B. (A)
Griffin, D. J., Jr. (M)
Kizer, D. E. (M)
Lewis, W. A. (M)
McIntosh, D. (M)
McMahon, J. E. (M)
Pluth, J., Jr. (M)
Poirier, G. R. (M)
Shearer, G. W. (M)
Thomas, J. B. (M)
Yamashiro, J. M. (A)

Larkspur (SF-7)
Douglass, R. E. (M)

La Verne (LA-OB-7)
Buehler, M. E. (A)
Crofts, G. B. (M)
Gott, A. H. (M)
Moss, J. F., Jr. (A)
Ilgenfritz, N. H. (M)
Resnik, A. E. (M)
Riley, O. V. (M)
Schertz, C. W. (A)
Trueman, J. A. (M)

Lawndale (LA-7)
Acton, D. J. (M)
Ahlberg, W. E. (A)
Alvarez, A. R. (M)
Eyraud, J. P. (M)
Frederick, J. W. (M)
Gerson, H. (M)
Hollingsworth, V. N. (A)
Lambert, T. C. (M)
Lee, L. E. (M)
Mann, G. A. (M)
Naborowski, J. G. (M)
Neff, E. D. (M)
Parker, H. F. (M)
Pearson, R. E. (M)
Sur, J. (M)
Swan, R. L. (M)
Wood, R. M. (A)
Zobel, E. R. (M)

Lemon Grove (SD-7)
Grigg, R. W. (M)
Kogan, J. C. (A)
Leitner, P. R. (M)
Nunn, M. E. (M)

Littlerock (LA-7)
Power, R. L. (M)

Livermore (SF-EB-7)
Aaland, K. (M)
Aas, E. A. (SM)
Alander, N. E. (A)
Anderson, J. S. (M)
Bandtel, K. C. (M)
Barham, J. F. (M)
Bostwick, W. E. (M)
Branum, D. R. (SM)
Brown, D. W. (A)
Cameron, D. L. (M)
Carstensen, H. K. (M)
Commons, D. W. (A)
Compton, P. D., Jr. (M)
Cummings, D. B. (SM)
Dean, D. K. (M)
Downing, W. G., Jr. (M)
Epps, R. C. (M)
Facer, R. F. (M)
Finnigan, R. E. (SM)
Francis, H. D., Jr. (SM)
Furnberg, C. M. (M)
Gregson, D. E. (M)
Greilich, A. L. (M)
Hamm, T., Jr. (M)
Hymer, R. L. (M)
Ijams, R. K. (M)
Inami, F. K. (SM)
Ingledue, E. F. (M)
Jones, E. D. (SM)
Kaifer, R. C. (SM)
Kalibjian, R. (M)
Katz, J. E. (M)
Krause, O. H. (SM)
Laudeman, J. A. (M)
Long, W. R. (M)
Loth, B. M. (M)
Lux, P. A. (M)
Mangelsdorf, R. F. (M)
Martin, B. J. (M)
Martinell, R. E. (M)
McDonald, H. C., Jr. (SM)
McFarlane, H. B. (SM)
McMaster, W. J. (A)
Mitchell, K. A. (M)
Molzahn, D. W. (M)
Moore, J. M. (M)
Nelson, G. G. (M)
Nugent, T. J., Jr. (M)
Olken, H. (SM)
O'Neal, W. C. (M)
Owren, H. M. (A)
Pafford, W. B. (M)
Peschel, D. J. (M)
Peters, D. C. (M)
Peterson, L. A. (M)
Pettigrew, J. L. (M)
Phelps, P. L., Jr. (M)
Potthoff, C. M. (M)
Price, W. C. (M)
Purcell, W. R. (M)
Ray, W. B., Jr. (M)
Reeser, G. A. (M)
Sage, G. E. (M)
Scharff, J. H. (M)
Schreiber, O. W. (M)
Short, H. G. (M)
Sikorsky, E. (A)
Skinner, F. L. (M)
Skinrood, D. A. (SM)
Smith, V. L. (SM)
Sorensen, H. D. (A)
Spinella, J. D. (M)
Stiles, D. H. (A)
Stuehl, G. E. (SM)
Tanner, D. N. (M)
Thomas, S. W. (M)
Tockey, R. J. (M)
Walker, H. C. (M)
Whitten, C. L. (SM)
Willows, J. L., Jr. (M)
Wright, J. B. (M)

Lodi (SAC-7)
Reimche, W. E. (M)

Loma Linda (LA-OB-7)
Woods, R. W. (SM)
Loma Mar (SF-7)
Bennion, D. R. (M)

Lomita (LA-7)
Cheshire, F. C., Jr. (M)
Frazier, R. E. (SM)
McWald, F. H. (M)
Roper, W. J. (M)

Lompoc (LA-SB-7)
Aronson, J. W. (M)
Black, F. H. (M)
Brillhart, M. F. (M)
Burnett, W. B. (A)
Cameron, T. J. (SM)
Corvese, R. D. (M)
Dear, J. E. (A)
Dennis, A. R. (M)
Eckmeier, W. L. (M)
Elgin, J. H. (M)
Heam, O. (SM)
Hocker, J. H. (M)
Hughes, D. D. (A)
Jenkins, D. E. (M)
Keup, R. L. (A)
Kucera, A. T. (M)
Mangino, J. M. (A)
Morris, R. E. (A)
Olson, C. E. (A)
Organ, W. H. (SM)
Rice, R. E. (A)
Ricker, J. A. (M)
Westbury, R. (M)
Womom, R. G., Jr. (M)

Long Beach (LA-7)
Alexander, P. A. (M)
Andreosky, E. (M)
Ashcraft, A. E., Jr. (M)
Ashcraft, W. D. (M)
Avery, E. V., Jr. (M)
Beamsley, G. V. (M)
Bement, W. A. (M)
Blakely, L. (A)
Blough, A. K., Jr. (A)
Boennighausen, T. L. (M)
Brandes, R. E. (M)
Bretherton, S. E. (M)
Brown, K. H. (M)
Browne, K. R. (M)
Burns, J. J., Jr. (M)
Burr, K. L. (A)
Campora, M. T. (M)
Carey, G. D. (M)
Chambers, D. A. (M)
Chavarria, J. N. (SM)
Christensen, G. S. (M)
Cole, B. T. (M)
Conrad, E. G. (A)
Curran, T. F. (M)
Dale, E. E. (M)
Deight, L. (M)
Drake, W. H. (M)
Duffy, B. A. (M)
Elliott, J. D. (M)
Emery, S. (A)
Enholm, E. C. (M)
Farrand, C. E. (M)
Ferreira, R. (A)
Feiber, W. B. (A)
Filopoin, J. B. (M)
Frieberg, M. (A)
Gall, C. E. (M)
Gardner, F. H. (SM)
Goering, I. G. (M)
Grammes, E. G., Jr. (A)
Greaney, E. J. (M)
Gregerson, G. A. (M)
Hajnik, A. T. (A)
Hayden, R. J. (A)
Hellinger, F. J. (M)
Heyman, E. R. (A)
Howard, R. D. (A)
Humphries, D. H. (M)
Hutcherson, J. V. (M)
Isear, J. A. (M)
Jenkins, A. F., Jr. (A)
Jimenez, J. W. (M)
Katzman, H. J. (M)
Keppel, R. A. (SM)
Kollanse, D. C. (M)
Kubo, E. Y. (M)
Landis, V., Jr. (M)
Lanning, W. C. (M)
Littenberg, W. (M)
Loewenstein, C. N. (M)
Luttrell, J. A., Jr. (M)
Mackey, E. F. (M)
Maher, R. C. (A)
McGee, G. C. (M)
McKelvey, E. J. (M)
McLeod, B. C. (M)
Miller, H. (A)
Mines, R. E. (M)
Mitnick, S. (M)
Mitsutomi, T. (A)
Morgan, R. M. (M)
Muhlestein, R. W. (M)
Murad, E. M. (M)
Nicholas, R. V., Jr. (SM)
Nickel, P. W. (M)
Nold, J. M. (A)
Pelc, T. (SM)
Petteson, F. M. (M)
Petersen, E. L. (M)
Ramer, F. H., Jr. (M)
Roberts, H. M., Jr. (M)
Rohland, A. E. (M)
Rumsey, W. E., Jr. (M)
Rupert, M. J. (M)
Sakai, R. Y. (M)
Salisbury, D. L. (M)

Samuelian, B. (M)
Schultz, B. G. (M)
Schwab, A. H. (M)
Schwartz, M. J. (M)
Scott, E. W. (A)
Siegel, J. C. (M)
Sims, J. L. (M)
Skorheim, R. D. (M)
Smith, J. E. (M)
Smith, R. G. (A)
Souter, R. E. (M)
Specht, W. A., Jr. (M)
Stearns, W. R. (M)
Stephens, H. M. (A)
Sternke, E. C. (SM)
Stoll, P. J. (M)
Strasburger, T. J. (M)
Sutherland, J. E. (A)
Tapp, J. E. (M)
Teasley, C. J., Jr. (M)
Thresh, J. L. (A)
Titcomb, R. D. (M)
Tondl, B. J. (M)
Tripodi, C. (M)
Uebele, G. S. (M)
Ulrich, R. J. (M)
Underwood, L. A. (M)
Wakamiya, Y. (M)
Wells, D. R. (M)
Wells, W. W. (SM)
Wiley, F. L. (M)
Yee, G. (M)
Young, J. A. (M)
Zappulla, D. (M)

Los Alamitos (LA-SA-7)
Anderson, F. A. (M)
Appleton, D. T. (M)
Beall, A. (M)
Douglas, D. L. (SM)
Greer, J. G. (M)
Kirk, R. A. (M)
Moorhouse, T. R. (A)
Moulton, J. A. (M)
Romano, A. J. (M)
Rostund, T. A., Jr. (M)
Schandl, E. (M)
Stretow, R. E. (SM)
Swain, P. F. (SM)
White, R. L. (A)

Los Altos (SF-7)
Aboussleman, W. (SM)
Adams, M. B. (SM)
Aiken, W. R. (M)
Alberding, R. C. (A)
Alfano, W. A. (M)
Allen, T. L., Jr. (M)
Angst, D. C. (M)
Atherstone, T. E. (SM)
Austin, G. E. (M)
Avis, A. J. A. (SM)
Ayres, W. P. (M)
Bagley, A. S. (SM)
Baird, H. S. (M)
Baker, J. C. (SM)
Baldwin, E. M. (M)
Barchenger, B. W. (A)
Barstow, W. R. (M)
Bean, T. C. (M)
Beckwith, J. R. (SM)
Bellamy, J. L. (SM)
Bendz, W. I. (M)
Bergman, R. S. (M)
Berte, D. W. (M)
Biasi, E. A. (SM)
Blight, A. F., Jr. (M)
Blumberg, M. (M)
Boswau, H. P. (SM)
Bourquin, K. R. (M)
Burpess, J. E. (M)
Burkhard, F. J. (M)
Butterfield, F. E. (M)
Cage, J. M. (SM)
Carlyle, J. K. (SM)
Caryotakis, G. (M)
Christensen, B. (M)
Christensen, W. V. (M)
Cockrill, J. T. (M)
Cogswell, W. P. (SM)
Corduan, A. E. (SM)
Corson, D. K. (A)
Cox, J. E. (M)
Dahl, J. D. (M)
Damron, S. S. (M)
Decker, H. J., Jr. (M)
Densmore, M. E. (SM)
De Young, M. W. (M)
Doersam, P. D. (SM)
Dunwoodie, D. E. (A)
Earle, D. H. (M)
Edberg, E. B. (M)
Ehret, R. J. (SM)
Eibinger, B. (M)
Eldredge, E. E. (SM)
Ellis, A. R. (SM)
Elpel, E. A. (M)
Elster, S. (M)
Elwell, C. F. (F)
Everson, C. T. (A)
Farina, D. E. (M)
Farrior, J. S. (SM)
Ferguson, S. A. (SM)
Ferri, G. (M)
Fitzgerald, P. M. (M)
Flugge-Lotz, I. (M)
Fowler, B. V. (M)
Freeman, G. V. H. (A)
Freise, W. H. (A)
Frohman, R. (M)
Gamara, N. J. (M)
Gardner, B. C. (SM)

Gillett, G. D. (F)
Ginsburg, C. P. (SM)
Giulie, J. D. (M)
Good, D. C. (SM)
Gunnell, G. T. (M)
Hackley, G. E. (SM)
Hagopian, R. H. (M)
Hall, S. C. (A)
Haolsch, W. R. (M)
Hanson, R. A. (M)
Harper, P. T. (M)
Harrison, H. W. (M)
Hathaway, E. C. (M)
Heintz, R. M., Jr. (M)
Helwig, N. C. (M)
Hiestand, N. P. (M)
Hilbiber, D. F. (M)
Hill, C. M. (M)
Hill, O. R. (M)
Hilton, E. A. (SM)
Hix, R. C. (M)
Hockett, S. W. (M)
Hodges, E. B. (M)
Hogg, J. E. (M)
Holly, J. A. (M)
Holmes, D. K. (A)
Humfeld, J. B. (SM)
Hunter, P. B. (SM)
Hussey, J. G. (M)
Irick, J. (SM)
Jensen, P. A., Jr. (M)
Jipp, J. (M)
Johannesen, O. M. (SM)
Johnson, G. L. (M)
Johnson, L. W. (M)
Johnson, P. M. (M)
Johnson, R. T. (M)
Justice, R. (SM)
Kellogg, H. A. (M)
Kendall, J. W., Jr. (M)
Kent, R. C. (SM)
Keyes, J. C. (SM)
Kinaman, E. W. (M)
Koehler, L. K. (M)
Knudson, B. C. (M)
Kunnes, H. (M)
Kyle, W. F., Jr. (M)
Larse, G. L. (M)
La Rue, A. D. (SM)
La Tourrette, P. M. (M)
Lauer, L. J. (M)
Leake, C. E. (SM)
Leurgans, R. W. (M)
Lindseth, C. O. (M)
Lipanovich, M. I. (M)
MacKenzie, R. P. (M)
Maninger, R. C. (M)
Marietta, R. A. (M)
Marshall, N. K. (SM)
Masher, D. P. (M)
Matschke, A. M. (M)
Maximoff, B. S. (M)
May, B. B. (M)
May, R. W. (M)
Mayerhofer, S. R. (M)
McConnell, R. A. (M)
McCullough, J. A. (F)
McGuigan, W. D. (SM)
McKee, L. H. (M)
McMahoney, J. H. (M)
Melchor, J. L. (SM)
Meyer, C. F., Jr. (SM)
Meyer, J. C. (M)
Miller, H. C. (M)
Mills, M. E. (M)
Moreno, T. (F)
Morris, F. W., Jr. (SM)
Morris, G. R. (SM)
Murphy, E. J. (SM)
Myers, W. D. (SM)
Nagler, C. J. (SM)
Nawrocki, J. T. (SM)
Nelson, B. E. (M)
Nelson, F. R. (A)
Nikonenko, P. V. (SM)
Norgaard, D. E. (SM)
Norris, C. B. (M)
Nurmela, G. E. (A)
O'Keefe, W. J. (SM)
Overacker, H. E. (SM)
Paltakoff, O. E. (M)
Palmquist, N. B., Jr. (SM)
Parks, J. K. (M)
Patterson, H. R. (SM)
Payne, R. R. (M)
Perkins, C. K. (M)
Peshel, R. L. (M)
Peters, E. O. (A)
Peterson, A. M. (M)
Peterson, C. J. (M)
Pfister, G. H. (M)
Pilgrim, C. A., Jr. (M)
Price, G. W. (SM)
Pruett, J. W. (M)
Rhodes, R. D. (A)
Rich, G. C. (SM)
Roberts, B. C. (M)
Roberts, W. L. (M)
Robinson, G. G. (M)
Rocklitz, H. C. (M)
Rockwood, C. G. (M)
Rodgers, J. L. (M)
Rorden, R. J. (M)
Roumbanis, T. (M)
Sackman, R. (A)
Scal, R. K. F (SM)
Schrock, N. B. (SM)
Schulke, G. F. (M)
Sedlacek, W. C. (M)
Sheriff, D. R. (SM)
Shields, R. E. (M)
Shockley, W. (F)

Show, O. C. (A)
Silver, J. (M)
Simpson, O. T. (SM)
Smith, C. A. (M)
Smith, D. L. (M)
Soderstrom, H. W. (M)
Sorensen, R. J. (M)
Sorvaag, C. M. (SM)
Spivey, J. F. (M)
Stangl, M. E. (M)
Stanley, C. B. (SM)
Stewart, E. C. (M)
Stone, J. E. (M)
Storke, F. P., Jr. (M)
Strehlow, R. J. (M)
Sturrock, P. A. (SM)
Summers, J. W. (M)
Swanson, W. E. (M)
Sweeney, J. F. (M)
Taleporos, A. D. (M)
Teall, D. E. (M)
Troxell, R. R. (M)
Twersky, V. (M)
Vader, R. L. (SM)
Van Rensselaer, C. (SM)
Varenhorst, V. D. (SM)
Vincent, W. R. (A)
Wallace, A. L. (M)
Walters, A. M. (M)
Wambsganss, B. A. (SM)
Ward, J. F. (SM)
Ward, R. B. (M)
Weagant, G. A. (M)
Weber, P. J. (M)
Weismann, R. J. (SM)
Weldon, J. M. (M)
Werner, H. C. (SM)
Wheeler, F. K. B. (SM)
Wheeler, G. J. (SM)
Whitacre, R. N. (A)
Whitmer, R. F. (M)
Wholey, W. B. (SM)
Wilcox, D. D., Jr. (M)
Wildanger, E. G. (M)
Wilkerson, J. R. (SM)
Williams, H. A. (M)
Willoughby, D. E. (A)
Wohl, J. (M)
Wood, R. A. (A)
Woodward, R. F. (A)
Woolsey, S. W. (M)
Worch, A. B. (M)
Zaphiropoulos, R. (M)
Zinky, W. R. (M)

Los Altos Hills (SF-7)
Anderson, J. R. (M)
Baker, R. H. (M)
Bowler, G. E. (SM)
Brandeis, E. P. (M)
Budd, W. E. (M)
Dawley, J. R., Jr. (M)
Doak, R. S. (SM)
Doten, E. F. (M)
Gagnon, R. J. (M)
Goodman, D. H. (SM)
Holser, A. F. (SM)
Hoover, W. G. (M)
Kirchner, A. A. (SM)
Libby, L. L. (SM)
Main, W. F., Jr. (M)
Metzger, J. F. (A)
Pappas, R. L. (SM)
Richter, E. O. (A)
Robertson, O. F. (SM)
Rockwell, R. G. (SM)
Shelton, E. J., Jr. (M)
Spitzer, C. F. (SM)
Wells, F. C. (SM)
Witry, M. B. (M)

Los Angeles (LA-7)
Abeson, I. S. (M)
Ackerman, C. L. (M)
Adachi, T. (SM)
Adey, W. R. (SM)
Adler, S. L. (M)
Ahlport, B. T. (M)
Ahrensdorf, R. E. (A)
Alcantara, I. W. (M)
Alder, J. R. (M)
Allen, F. W. (SM)
Allen, W. L. (M)
Altgeyer, G. O. (A)
Alvine, C. E. (M)
Ambrosio, A. (M)
Andelin, D. R. (M)
Anders, W. R. (M)
Anderson, D. N., Jr. (M)
Anderson, K. W. (SM)
Anderson, R. S. (M)
Anderson, W. J. (M)
Angwin, D. S. (SM)
Anker, E. R. (M)
Antell, S. (M)
Anzel, B. M. (M)
Aoki, M. (M)
Appleton, H. (A)
Arakawa, W. J. (M)
Arany, R. (M)
Armstrong, H. R. (M)
Am, S. F. (SM)
Arnold, F. M. (M)
Arnold, J. R. (M)
Arnold, W. O. J. (A)
Arnstein, G. P. (M)
Arterbery, A. C. (M)
Aseltine, J. A. (M)
Aurich, W. C. (M)
Ausbourne, R. K. (SM)
Avnet, R. H. (A)
Axelband, E. I. (M)

Ayers, R. D. (M)
Bailey, H. J., Jr. (M)
Ballin, L. L. (SM)
Bakeman, D. C. (M)
Baker, E. E. (M)
Baker, J. J. (M)
Baker, R. O. (M)
Balakrishnan, A. (M)
Balden, S. B. (M)
Baldwin, R. C. (M)
Ball, L. D. (M)
Ballard, K. C. (M)
Baluqo, J. J. (A)
Banks, L. (M)
Banks, R. E. (A)
Bannick, R. E. (M)
Barcus, E. D. (SM)
Barker, A. C. (M)
Barlow, J. T. (M)
Barnes, D. B. (M)
Barnes, J. L. (F)
Barnett, R. S. (M)
Barnun, J. F. (M)
Baskevitch, E. (M)
Bath, H. M. (M)
Battocletti, J. H. (SM)
Bauerschmidt, D. K. (M)
Baum, R. F. (SM)
Bayley, R. M. (M)
Becker, C. Z. (SM)
Becker, H. (M)
Beecher, O. E. (SM)
Behrens, A. D. (A)
Bejack, B. (M)
Belt, W. H. (SM)
Bennorth, D. W. (A)
Berg, A. M. (M)
Berkson, M. A. (M)
Berman, B. (M)
Berman, B. H. (A)
Bernhard, H. A. (M)
Bernstein, R. (M)
Beroza, P. P. (SM)
Berry, B. F., Jr. (M)
Berry, G. A. (M)
Berry, R. P. (M)
Bertram, S. (SM)
Berube, J. L. (M)
Bialek, J. (SM)
Bice, W. O. (M)
Bieging, G. P. (M)
Bilitey, J. C., Jr. (M)
Bilyeu, R. P. (M)
Bissell, H. M. (A)
Blackman, B. G. (SM)
Blackman, W. H. (M)
Blair, L. L. (M)
Blake, J. B. (M)
Blake, J. T. (SM)
Blanc, S. L. (M)
Blanchard, D. I. (M)
Blevis, E. (M)
Billie, J. L. (M)
Blocher, H. L. (SM)
Bluemel, C. R. (M)
Bocast, D. R. (SM)
Bodenstein, J. (M)
Boggs, C. A. (SM)
Bohlke, P. G. (SM)
Bohnert, H. G. (M)
Bolster, C. A. (M)
Bomeisler, R. E. (M)
Bonner, P. R. (M)
Bonney, L. A. (M)
Booher, C. F., II (A)
Boothroyd, J. H. (M)
Booton, R. C. (M)
Borks, M. D. (M)
Bourbeau, F. J. (A)
Bouse, G. B. (A)
Bowersock, W. S. (M)
Bowman, L. H. (SM)
Bowman, W. G. (M)
Box, F. M. (A)
Boykin, T. R., Jr. (M)
Bradley, J. L. (SM)
Bradley, J. O. (M)
Brady, M. E. (SM)
Brandt, R. (M)
Brauer, G. W. A. (SM)
Braun, E. L. (SM)
Bravo, A. (M)
Break, D. A. (M)
Bright, D. C. (SM)
Brinkman, K. L. (M)
Britton, C. W. (A)
Brooks, D. (M)
Browdy, A. A. (M)
Brown, E. L. (SM)
Brown, J. G. (M)
Brownstone, N. (M)
Broyles, R. S. (M)
Brubaker, G. P., Jr. (M)
Brugma, F. C. (M)
Brugman, W. E. (M)
Bucklin, E. P., Jr. (M)
Budnick, J. A. (M)
Burbeck, D. W. (M)
Burch, J. E., JR. (M)
Burdick, D. D. (M)
Burk, W. A. (M)
Burnett, E. D. (M)
Burnett, J. R. (SM)
Burnham, J. (M)
Burnswelg, J. Jr. (M)
Burrows, C. W., Jr. (M)
Bush, A. (A)
Bussell, B. (M)
Cahn, C. R. (M)
Campbell, F. L. (SM)
Campbell, S. (M)
Campbell, W. N. (A)

Carlson, C. O. (M)
Carlson, E. H., Jr. (M)
Carlson, R. D. (M)
Carnegis, G. A. (M)
Carpenter, R. L. (A)
Carroll, F. E. (SM)
Carroll, G. R. (M)
Carson, J. W. (M)
Carter, C. J. (M)
Carter, E. C. (M)
Carter, J. E. (SM)
Cataldo, J. T. (M)
Cate, F. M. (M)
Caulkins, D. C. (M)
Cayot, W. S. (M)
Chait, H. N. (M)
Chalfant, D. A. (A)
Chamorro, R. D. (M)
Chandaket, P. (M)
Chang, D. (M)
Chang, H. H. C. (SM)
Chapman, A. C. (M)
Chapsky, J. (M)
Chatt, R. H. (M)
Chemin, M. G. (SM)
Chew, T. W. (SM)
Chieffo, A. B. (SM)
Chow, A. V. (M)
Christian, B., Jr. (M)
Christoffers, W. H. (M)
Chudacoff, N. E. (M)
Churchill, O. R. (M)
Cirbo, A. J. (A)
Claar, D. E. (M)
Clark, A. C. (A)
Clark, B. L. (M)
Clark, D., Jr. (M)
Clark, D. R. (M)
Clark, R. W. (SM)
Coerver, L. E., Jr. (M)
Coffey, G. P. (M)
Cohen, M. (A)
Coil, E. A. (M)
Cole, E. M., Sr. (M)
Cole, W. Y. (M)
Collier, W. C. (M)
Collins, H. G. (M)
Collins, M. H. (M)
Colombano, L. (M)
Coltin, A. H. (M)
Considine, J. M. (A)
Conviser, H. (M)
Cook, I. M. (M)
Cook, L. (SM)
Cook, W. M. (A)
Cooke, R. M. (M)
Coolidge, J. E. (M)
Cooper, J. R. (M)
Cooper, L. (M)
Cooper, R. G. (A)
Copeland, W. H. (SM)
Corlett, H. C. (M)
Costanza, S. T. (M)
Cotterman, J. D. (M)
Court, P. R. J. (SM)
Cox, J. A. (M)
Crabb, R. C. (SM)
Crooke, V. E. (SM)
Cross, E. F. (M)
Crowder, H. A. (SM)
Crown, L. (M)
Croyle, J. C. (M)
Cryden, J. (SM)
Culbertson, G. T. (M)
Cullumber, G. L. (M)
Culver, W. H. (A)
Cunningham, E. W. (M)
Currie, J. D. (M)
Currie, W. D. (M)
Dalton, M. M. (M)
Damon, N. E. (M)
Daniels, J. A. (A)
Daniels, S. A. (M)
Danyiciw, M. C. (A)
Darling, J. K. (A)
D'Asta, J. (A)
Dautremont, J. L., Jr. (M)
Davenport, E. J. (A)
Davie, W. C. (M)
Davies, L. F. (M)
Davis, A. F. (M)
Davis, E. H. (M)
Davis, H. (SM)
Davis, H. G., Jr. (M)
Davis, J. F. (M)
Davis, J. I. (SM)
Davis, J. J. (M)
Dawson, S. L. (SM)
De Forest, L. (F)
De Kimpe, R. A. (M)
Demarest, J. W. (M)
Denny, W. I. (A)
Depner, D. M. (M)
Derchan, H. L. (M)
Dere, J. R. (A)
Demham, C. R. (M)
Deschamps, T. (M)
Dethlefsen, D. G. (M)
Dexter, G. W. (SM)
Dexter, P. F. (A)
De Zube, L. H. (M)
Dhein, D. D. (M)
Diamond, D. M. (M)
Diamond, R. L. (M)
Dibble, T. R. (M)
Di Blas, R. L. (M)
Diemer, F. P. (M)
Dierking, L. D. (A)
Digiulio, E. (A)
Dinerstein, J. (M)
Dinsmore, S. H. (M)
Dlugatch, I. (SM)



Dobbertin, W. H. (SM)
Dodd, G. M. (M)
Doll, E. B. (SM)
Donahue, T. H. (A)
Dong, P. (M)
Downes, L. C. (SM)
Dresselhouse, P. H. (M)
Driver, D. L., Jr. (SM)
Dudek, M. J. (M)
Dulin, J. J. (M)
Dunnigan, F. A. (SM)
Dutton, O. B. (SM)
Du Waldt, B. J. (M)
Dzilvelis, A. A. (M)
Eastman, R. S. (A)
Eckert, J. A., Jr. (M)
Eckstein, J. (M)
Eddy, T. G. (SM)
Edelsohn, C. R. (M)
Edelson, L. (M)
Edgerton, D., Jr. (M)
Edson, M. (M)
Ehrlich, M. J. (SM)
Elermann, R. R. (A)
Eisenscher, E. S. (M)
Eisenstein, A. M. (M)
Eisler, G. (M)
Elliott, R. T. (A)
Ellsworth, A. R. (M)
Endo, M. T. (SM)
Enoch, V. L. (M)
Enright, F. E. (A)
Epperson, H. A. (M)
Erdag, J. M. (M)
Escoffery, C. A. (M)
Estep, C. R. (M)
Estersohn, N. (M)
Estes, J. R. (M)
Estrin, G. (M)
Estrin, T. G. (M)
Euler, L. J., Jr. (A)
Evans, H. W. (A)
Evans, J. C. (M)
Ewing, R. G. (M)
Fahnestock, R. J. (M)
Falk, M. M. (M)
Fatton, G. A. (SM)
Felgus, J. I. (A)
Feldman, N. E. (SM)
Feldman, R. E. (M)
Fenaughty, A. L. (M)
Fenn, W. H. (SM)
Fernandez, F. (M)
Fields, L. G. (A)
Figoten, M. (M)
Finegold, L. (M)
Finger, T. A. (M)
Firth, E. (M)
Fischer, B. (SM)
Fischer, C. H. (A)
Fishback, K. H. (M)
Fitting, G. M. (A)
Fitzgerald, G. E. (M)
Fitzwater, H. L. (M)
Fleary, W. K. (A)
Fleischmann, F. A. (A)
Fletcher, J. C. (M)
Flock, W. L. (M)
Fluhrer, A. C. (M)
Fodor, F. H. (M)
Force, D. C. (M)
Fordyce, S. W. (M)
Forman, J. (SM)
Fortuna, A. F. (A)
Foulon, F. (SM)
Fox, E. M. (M)
Fox, R. K. (M)
Fraenkel, A. S. (A)
Frankel, S. P. (M)
Fraser, R. H. (M)
Freedman, L. M. (A)
Freeman, R. J. (M)
Friedman, P. (M)
Frink, F. W. (SM)
Frost, R. B. (M)
Fujimoto, B. (M)
Fujimoto, J. (M)
Fujimoto, Y. (M)
Fuller, R. H. (M)
Funderburg, J. D. (SM)
Fusfield, R. L. (M)
Futterman, M. (M)
Gabler, R. T. (SM)
Gallagher, H. E. (SM)
Galloway, W. J. (M)
Gamson, E. R. (SM)
Gapasin, F. G. (M)
Garblik, A. M. (SM)
Gasper, C. A. (A)
Gaston, J. L. (M)
Gates, H. P., Jr. (SM)
Gaude, W. G. (M)
Gaylord, R. S. (M)
Geddes, R. N. (M)
Geer, W. (SM)
Gehhardt, H. W., Jr. (M)
Geiger, A. A. (M)
Geisslinger, G. I. (M)
Gelbwaks, N. L. (M)
Genco, F. (M)
Genet, A. T. (M)
Gerard, P. L. (M)
Gerson, G. (M)
Gertsch, E. P. (SM)
Gertz, J. S. (A)
Gibbs, F. R. (M)
Gibbs, L. C. (A)
Gichin, A. L. (M)
Gigante, V. (M)
Gillespie, H. R., Jr. (M)
Gilliland, M. C. (SM)

Gillingham, A. D. (A)
Gillmann, H. E. (M)
Gilman, E. L. (M)
Gimpel, D. J. (M)
Gladstone, B. E. (M)
Glass, J. R. (M)
Glassberg, R. (M)
Glazer, S. (M)
Gloor, R. D. (M)
Glover, J. M. (A)
Goad, R. J. (M)
Goff, R. H. (M)
Gogolinski, J. A. (A)
Golbert, S. A. (M)
Gold, D. (M)
Goldenstern, G. M. (SM)
Goldman, H. (SM)
Goldman, S. (M)
Goldshine, K. B. (M)
Goldstein, S. (M)
Goodell, C. E. (SM)
Goodson, B. M. (A)
Goodwin, F. E. (M)
Goodwin, J. W. (M)
Gordon, G. (M)
Gordy, H. M. (M)
Goris, E. N. (M)
Gorman, J. M. (M)
Gossland, S. (A)
Gottler, T. L. (SM)
Gould, E. W. (M)
Gourrich, G. E. (M)
Gozzi, E. J. (M)
Grabbe, E. M. (M)
Grady, R. J. (M)
Graham, J. M., Jr. (M)
Grant, E. W. (M)
Gray, R. C. (A)
Gray, W. H. (M)
Green, A. S. (SM)
Greenbaum, M. (M)
Greenberg, R. I. (M)
Gregory, E. M. (M)
Greif, H. D. (M)
Griest, R. H. (SM)
Griffith, M. H. (M)
Griffith, S. D. (M)
Griffiths, F. J. (M)
Grignon, L. D. (SM)
Griswold, F. B. (M)
Grove, J. L. (M)
Guay, A. (M)
Guerrero, E. S. (SM)
Guiness, H. A. (A)
Gunny, E. R. (A)
Guterman, F. H. (M)
Gwynne, G. (M)
Haag, E. J. (SM)
Haberland, E. R. (M)
Habersatter, L. M. (M)
Haeff, A. V. (F)
Hageman, D. H. A. (A)
Hagen, D. H. (M)
Hagerott, R. E. (M)
Haggai, T. F. (M)
Hahn, A. C. (M)
Haim, H. J. (M)
Hajjar, N. S. (M)
Hakans, R. A. (M)
Haladej, M. A. (M)
Hall, A. L. (M)
Hall, T. S. (M)
Hamilton, R. F. (A)
Hammel, J. P. (M)
Hammer, I. W. (M)
Hammond, N. B. (A)
Haneman, V. S., Jr. (M)
Hanish, H. M. (A)
Hanrum, A. J. (SM)
Hanover, P. N. (M)
Hansen, R. C. (SM)
Hant, W. (M)
Harber, C. D. (M)
Hardin, R. H. (M)
Harman, C. G., Jr. (M)
Harpenau, R. L. (M)
Harrison, W. (A)
Hart, R. R. (M)
Hart, T. J. (M)
Hartman, R. H. (M)
Hasche, J. C. (A)
Hassel, R. R. (M)
Hata, F. T. (M)
Hatakeda, A. (M)
Hatch, G. M. (M)
Hautzik, R. M. (SM)
Hayashida, B. N. (M)
Hayata, T. (M)
Haynan, G. O. (M)
Haymond, H. R. (M)
Haynes, C. L. (A)
Haywood, V. M. (M)
Hecht, B. (SM)
Heidbreder, G. R. (M)
Heilbron, J. (A)
Heim, F. A. (M)
Heimiller, R. C. (A)
Heitzman, R. E. (M)
Helland, J. C. (SM)
Henry, J. A. (M)
Herrick, T. A., Jr. (M)
Hershberger, W. D. (F)
Heskel, J. H. (M)
Hetland, G., Jr. (M)
Hickey, J. R. (A)
Higashi, A. K. (A)
Higashi, P. (M)
Higashi, S. T. (A)
Higdon, R. V. (SM)
Hill, B. E. (A)
Hill, D. M. (M)
Hillard, W. R. (M)

Hillsdale, F. A. (A)
Hindin, M. J. (A)
Hippenstiel, M. H. (M)
Hitchcock, D. R. (M)
Hitterdal, A. B. (M)
Hobbs, G. H. (M)
Hodges, W. J. (M)
Hodgson, R. W. (SM)
Hoffman, H. L. (SM)
Hoffman, L. A. (SM)
Holcomb, D. R. (SM)
Holdsworth, D. M. (A)
Holley, A. E. (M)
Holliday, I. M. (SM)
Holmberg, N. A. (M)
Holmes, F. M., Jr. (M)
Holmes, J. L. (M)
Holt, D. G. (M)
Holtzman, J. C. (M)
Hom, H. K. (A)
Honey, J. F. (SM)
Hoo, E. (M)
Hook, W. R. (M)
Hopkins, R. C. (M)
Horejsi, R. M. (M)
Horowitz, I. M. (SM)
Horowitz, P. (A)
Horrell, M. W. (SM)
Horvath, J. S. (M)
Hosbach, G. H. (A)
Houghton, H. V., Jr. (M)
Howard, J. A. (M)
Howard, J. W. (M)
Howell, F. S. (SM)
Hoy, E. C. (M)
Huhn, R. J. (M)
Huitberg, D. E. (M)
Hume, P. D. (M)
Hundley, T. C. (M)
Huntley, W. P. (M)
Iannelli, E. (M)
Imhoff, J. J. (SM)
Ireland, R. O. (M)
Ishii, G. M. (M)
Iwamoto, I. (M)
Izuel, A. G. (M)
Izzo, A. J. (A)
Jackman, R. W. (M)
Jackson, B. B. (M)
Jackson, K. R. (SM)
Jacobs, D. M. (SM)
Jacobs, J. E. (SM)
Jaffe, J. S. (M)
Jahns, E. R. (SM)
Jamison, J. W., Jr. (M)
Jamison, R. S. (M)
Janeira, A. J. (M)
Janssen, R. R. (A)
Jarrett, H. F. (M)
Jatzas, S. J. (M)
Jeffs, C. R., Jr. (M)
Jensen, R. W. (M)
Jensen, S. K. (M)
Jepsen, T. L. (M)
Jevons, L. O. (M)
Jew, K. T. (M)
Johanson, E. H. (M)
Johnson, C. E. (M)
Johnson, G. (SM)
Johnson, J. H. (M)
Johnson, J. S. (M)
Johnson, K. K. (M)
Johnson, R. E. (M)
Johnson, R. M. W. (SM)
Jones, D. (A)
Jones, L. E. (M)
Jones, R. M. (A)
Jordan, K. E. (A)
Joseph, D. (M)
Joseph, D. A. (A)
Joseph, H. (A)
Joyce, F. J. (M)
Judge, W. J. (M)
Jung, R. M. (A)
Jurmain, J. H. (M)
Kaar, I. J. (F)
Kado, R. T. (M)
Kagan, M. F. (SM)
Kahne, L. (A)
Kamerer, G. C. (M)
Kaneko, G. S. (M)
Kaplan, L. M. (M)
Kapoler, M. O. (SM)
Kapriellan, O. A. (M)
Karplus, W. J. (M)
Karr, P. R. (SM)
Kato, C. H. (M)
Kato, M. M. (M)
Kato, P. S., Jr. (M)
Katz, J. (M)
Katz, S. (M)
Kaufman, A. B. (M)
Kaufman, B. A. (M)
Kaufman, S. (M)
Kavanaugh, E. V. (M)
Kawahata, B. I. (M)
Kaye, R. (A)
Keast, D. N. (M)
Keeran, R. V. (SM)
Keever, D. B. (M)
Kellerman, D. (M)
Kelly, D. A. (SM)
Kelly, F. G. (SM)
Kelsey, D. L. (A)
Kelso, J. M. (SM)
Kennedy, C. B. (M)
Kennedy, F. D. (M)
Kennedy, F. M. (SM)
Kennedy, M. E. (F)
Kenrick, A. F. (M)
Kern, R. D. (A)
Kerr, J. S. S. (SM)

Kershner, W. T. (A)
Kibler, P. J. (SM)
Kieman, E. F. (SM)
Kleruiff, C. T. (SM)
Kilchenman, L. U. (A)
Kim, B. (M)
Kimball, M. A. (A)
Kinaga, T. (SM)
King, E. (M)
King, E. F. (SM)
King, R. E., Jr. (SM)
King, S. M. (A)
Kinsell, W. L. (SM)
Kircher, R. J. (SM)
Kirsch, H. A. (M)
Kishi, F. H. (M)
Klapper, E. (M)
Klein, F. A. (M)
Klein, H. E. (M)
Klein, W. S. (M)
Klempel, A. D. (M)
Klimek, J. C. (M)
Kline, M. B. (SM)
Kline, R. L. (A)
Klinge, W. H. (M)
Knaul, J. E. (M)
Knell, E. A. (M)
Kobayashi, J. T. (M)
Kobayashi, R. (M)
Kober, B. K. (M)
Kohlhousen, C. J. (M)
Kohlmeyer, R. B. (M)
Koski, L. H. (M)
Koueiter, M. N. (M)
Koukol, J. F. (SM)
Kovach, L. D. (M)
Kowalski, W. S. (M)
Krafft, W. R. (SM)
Kraus, R. J. (M)
Krausz, A. (SM)
Krawiec, J. C. (M)
Krebs, J. H. (A)
Kreismanis, M. V. (M)
Kriewall, A. A. (M)
Krone, I. (M)
Kros, K. W. J. (M)
Kroy, W. H., Jr. (M)
Kuklin, H. S. (A)
Kummer, W. H. (SM)
Kurahashi, D. K. (M)
Kuratani, K. K. (A)
Kuretich, J.W. (SM)
Lader, L. H. (SM)
Lalande, B. H., Jr. (A)
Lambert, J. D. (M)
Lance, A. L. (M)
Landon, R. B. (M)
Lane, A. (M)
Lane, S. D. (M)
Lang, P. A. (M)
Langley, M. C. (M)
Lark, E. J. (M)
Larks, S. D. (M)
Larrick, R. W. (A)
Larson, D. E. (M)
Lash, E. (M)
Last, E. A. (M)
La Violette, R. F. (A)
Lawlor, R. C. (SM)
Leach, R. E. (M)
Lee, E. K. (M)
Lee, L. K. (F)
Lee, R. L. (M)
Lee, R. M. (M)
Leedy, C. A. (M)
Leeking, A. M. (M)
Lees, A. B. (M)
Le Grand, C. (M)
Lehr, S. N. (SM)
Lehrer, N. H. (M)
Leitch, W. S. (SM)
Leitner, R. G. (SM)
Lem, H. N. (A)
Lemmer, J. E. (M)
Leng, R. B. (SM)
Lenke, R. H. (M)
Leon, B. J. (M)
Leonard, T. J., Jr. (M)
Leondes, C. T. (SM)
Levine, L. (SM)
Levinson, R. M. (M)
Levy, E. C. (M)
Levy, P. G. (M)
Lew, H. W. (A)
Lew, L. (M)
Lewi J. (SM)
Lewis, S. B. (M)
Libaw, W. H. (M)
Lichtman, S. W. (SM)
Lichty, J. R. (M)
Liddicoat, W. L. (A)
Lieberknecht, J. A. (A)
Lin, H. (M)
Lindell, E. (M)
Lindenberg, S. (M)
Lindholm, P. A. (A)
Lindsay, W. W., Jr. (F)
Lindsey, L. C. (M)
Lindstrom, G. M. (M)
Lipman, C. E. (M)
Lissauer, S. (SM)
Lockwood, R. A. (A)
Logan, D. C. (A)
Long, M. C. (M)
Looney, B. W. (SM)
Loop, H. L. (M)
Losh, S. J. (M)
Louapre, M. E. (M)
Lowell, R. J. (M)
Lowitz, G. E. (SM)
Lowry, J. M. (M)
Loy, Y. S. (M)

Loyet, D. L. (M)
Lucas, A. (A)
Luce, D. W. (M)
Lum, H. K. W. (M)
Lund, W. W. (M)
Luth, P. A., JR. (M)
Lutz, S. G. (SM)
Lyman, J. (M)
Lyons, L. J. (A)
Macaluso, F. A. (A)
Mac Crone, C. R. (A)
Maguire, W. W. (M)
Maher, R. A. (SM)
Mallison, J. A. (M)
Mancini, U. S. (M)
Manderfeld, E. C. (SM)
Manley, R. W. (SM)
Mann, D. A. (M)
Manner, H. (M)
Manov, F. S. (M)
Mar, W. A. (M)
Margerum, D. L. (SM)
Margol, L. (M)
Margolis, J. (M)
Margolis, M. (M)
Margowsky, H. M. (M)
Markowitz, S. (M)
Marks, R. B. (M)
Markson, J. L. (M)
Marshall, F. C. (M)
Marshank, D. N. (A)
Martens, C. J. (M)
Martin, L. B. (M)
Martin, R. A. (M)
Mason, C. W. (SM)
Masterson, R. A. (M)
Masuda, H. B. (M)
Mathews, E. (M)
Mathews, W. E. (SM)
Matsubara, G. S. (M)
Matsumoto, T. E. (A)
Mautner, L. (SM)
Mazur, S. S. (M)
McAllister, J. T. (A)
McCaron, S. I. (M)
McCharles, J. R. (SM)
McClung, R. R. (M)
McCoy, R. E. (SM)
McDaniel, J. R. (M)
McDonald, W. W. (M)
McDonnell, J. D. (M)
McDougall, M. E. (SM)
McGann, L. (M)
McGaughey, J. R. (SM)
McKee, W. S., Jr. (M)
McKnight, B. E. (M)
McLaughlin, R. G. (A)
McLean, J. D. (SM)
McQuerry, W. H. (SM)
Mead, C. E. (M)
Meckfessel, E. F. (A)
Medina, L. G. (M)
Medow, J. (SM)
Meerschaert, C. M. (M)
Mehrbach, E. (M)
Meier, E. H. (SM)
Meisels, G. (SM)
Melssinger, H. F. (SM)
Melnick, R. A. (M)
Merrill, H. M. (M)
Merrill, J. A. (A)
Messner, G. P. (M)
Mettler, R. F. (M)
Meyer, A. W. (SM)
Meyers, R. C. (A)
Michels, L. S. (M)
Micka, E. Z. (M)
Miera, S. M. (SM)
Migliaccio, A. (M)
Milby, B. C. (M)
Miller, D. L. (SM)
Miller, D. S. (A)
Miller, J. C. (M)
Miller, T. (M)
Miller, W. B. (SM)
Miller, W. S. (M)
Millman, J. S. (M)
Millstone, S. D. (M)
Milunas, Z. (M)
Mirakenz, A. (A)
Mitchell, B. B. (M)
Mitchell, C. A., II (M)
Mitchell, J. M. (M)
Miwa, T. M. (M)
Miyahira, H. Y. (M)
Miyata, J. J. (M)
Mockbee, R. L. (M)
Modlinski, W. M. (M)
Mohr, M. E. (SM)
Molter, J. K. (SM)
Molnar, A. W. (M)
Molnar, L. A. (M)
Molnar, V. K. (M)
Moniz, J. J. (M)
Montrose, J. O. (M)
Moore, D. W. (M)
Moore, P. G. (M)
Moore, R. T. (M)
Moreno, C. A. (SM)
Morrill, D. D. (M)
Morris, J.

Munk, R. (M)
Munson, J. E. (SM)
Murakami, E. T. (M)
Murakami, P. K. (M)
Muranaka, D. M. (A)
Murray, K. M. (SM)
Nahl, N. E. (M)
Nakabe, J. Y. (M)
Neal, F. R. (A)
Nebleti, J. D. (A)
Nedland, E. H. (A)
Neelands, R. (M)
Neil, A. L. (M)
Nelson, K. L. (M)
Nelson, M. (A)
Nesheim, D. A. (M)
Neumann, H. J. (M)
Neumark, Z. (M)
Neville, R. C. (M)
Newhoffer, F. L. L. (A)
Newman, B. R. (M)
Nichols, C. A. (SM)
Niebuhr, J. E. (M)
Nihei, T. (A)
Niquette, R., Jr. (A)
Nomura, K. (M)
Nordstrom, G. J. (SM)
Norman, L. S., Jr. (M)
Norton, J. L. (M)
Norton, R. (A)
Norton, R. M. (M)
Norwood, L. R. (SM)
Norwood, V. T. (SM)
Notvest, R. A. (M)
Nourse, R. B. (M)
Nozawa, E. T. (M)
Nuttall, H. V. (SM)
O'Brian, E. D. (A)
O'Connor, G. J. (M)
Ogawa, K. (M)
Opelsby, W. D. (M)
O'Hara, C. L. (A)
Okafuji, S. (M)
Okamura, S. Y. (M)
Okimoto, J. Y. (M)
Okino, T. Y. (M)
Okubo, G. H. (M)
Oleesky, S. S. (SM)
Olson, M. W. (M)
Olson, R. L. (A)
Orr, J. A. (M)
Ort, D. L. (A)
Osugi, J. H. (M)
Ota, T. T. (M)
Otani, T. (A)
Otoide, J. K. (A)
Otoshi, T. Y. (M)
Ovitt, M. D. (M)
Padwa, M. N. (A)
Pamler, R. G. (M)
Pape, M. (A)
Parisky, R. N. (A)
Parker, A. T. (M)
Parker, D. K. (M)
Pascoe, T. S. (M)
Paskusz, G. F. (M)
Pass, H. R. (M)
Patel, B. D. (A)
Patlison, S. B. (M)
Patton, W. L. (M)
Peek, R. H., Jr. (M)
Perez, A. A. (M)
Perkins, L. G. (M)
Perry, E. D. (M)
Perry, W. C. (M)
Peterson, N. J. (M)
Petrov, G. M. (M)
Petz, L. E. (M)
Pew, J. M. (SM)
Pfiffner, H. J. (M)
Philipson, L. L. (SM)
Phillips, A. H. (M)
Phinizy, R. B. (M)
Pickens, De W. H. (SM)
Pieper, R. P. (SM)
Pierre, D. A. (M)
Pilrainen, C. A. (M)
Pinckney, C. B. (M)
Pincus, L. (M)
Pinczower, H. J. (M)
Piolt, C. J. (M)
Piper, C. A. (SM)
Pipes, L. A. (F)
Plass, S. (SM)
Plotkin, S. C. (M)
Poirier, J. P. A. (A)
Polzin, E. M. (M)
Pool, C. G. (M)
Pooi, G. B. (M)
Porro, E. D. (M)
Post, G. (M)
Potts, D. L. (M)
Pourtales, J. R. (M)
Powers, T. G. (M)
Price, R. L. (SM)
Priore, K. C. (M)
Pro, S. (A)
Pulsipher, L. C. (M)
Purdum, L. C. (M)
Pyle, J. L. (M)
Quan, J. (A)
Quinn, R. F. (M)
Quinn, T. B. (A)
Quirk, R. W. (SM)
Radant, M. E. (M)
Raits, E. J. (M)
Rappaport, R. B. (M)
Rath, E. D. (M)
Rau, E. C. (M)
Raymond, J. L. (M)
Raymond, W. R. (M)
Reade, R. B. (M)

Redding, F. W., Jr. (M)
Redheffer, R. M. (SM)
Redwood, R. C., Jr. (A)
Reece, J. O. (M)
Reed, A. C. (M)
Regel, E. L. (SM)
Rehbein, N. W. (A)
Relchik, M. (M)
Reimer, R. N. (M)
Reiner, O., Jr. (A)
Rescoe, J. M. (SM)
Rheams, C. J. B. (M)
Richards, W. S. (M)
Richesson, R. W. (M)
Richter, R. E. (M)
Rickords, T. J. (M)
Riewald, R. J. (M)
Rifkind, J. (M)
Rigys, J. O. (M)
Rittersbacher, J. E. (M)
Roach, W. E. (A)
Robb, E. J. (M)
Roberts, P. S. (M)
Robinson, T. J. B. (M)
Rocks, J. K. (A)
Rodgers, R. L. (M)
Rodman, N. (M)
Rogers, T. A. (M)
Rose, B. E. (M)
Rose, W. (M)
Rosen, P. J. (M)
Rosenbloom, F. H. (M)
Rosenstein, A. B. (M)
Rosenthal, R. N. (M)
Rosman, A. S. (M)
Ross, D. H. (M)
Ross, W. L. (M)
Rotberg, A. S. (M)
Rothe, C. W. (M)
Rothman, R. H. (A)
Rovell, A. (M)
Rowlands, B. O. (SM)
Royal, E. L. (M)
Rubinstein, R. (A)
Ruderman, M. (M)
Rudin, S. (M)
Ruhman, S. (SM)
Ruiz, M. L. (M)
Rupp, V. T. (A)
Ruppenthal, W. (A)
Rusch, W. V. T. (M)
Russell, W. T. (SM)
Rutishauser, R. W. (M)
Sackett, L. C. (M)
St. John, R. P. (M)
Sakai, Y. (M)
Sakamoto, R. Y. (M)
Saltzberg, B. (SM)
Salzberg, R. B. (A)
Sampson, W. F. (SM)
Samuelson, H. R. (M)
Samulon, H. A. (SM)
Sand, B. (M)
Sander, W. B. (M)
Sanders, J. (M)
Sanders, R. (M)
Sanderson, K. W. (M)
Sandoval, R. (M)
Saruwatari, K. R. (M)
Sato, B. T. (M)
Saxtenthwaite, G. M., Jr. (M)
Saturensky, G. (SM)
Saul, R. S. (M)
Savaglan, B. (M)
Savitsky, G. S. (M)
Sawyer, G. E. (M)
Sayano, K. F. (M)
Scapple, R. Y. (SM)
Schaefer, W. C. (A)
Schafer, N. B. (A)
Schaffer, A., Jr. (A)
Schilling, M. D. (M)
Schlosser, L. H. (M)
Schmid, R. C. (SM)
Schmidt, L. W. (A)
Schnauss, E. R. (M)
Schneidermeyer, F. W. (M)
Schoenduve, H. W. (M)
Schonbrun, L. M. (M)
Schonheinz, E. J. (SM)
Schott, F. W. (M)
Schreiber, E. H. (F)
Schultz, H. R. (M)
Schultz, P. R. (M)
Schulz, P. (A)
Schuster, D. H. (M)
Schwartz, A. (A)
Scoffone, R. G. (M)
Scope, S. (M)
Scott, R. G. (M)
Sears, R. E. (M)
Seborg, E. H. (M)
Segal, R. E. (M)
Segel, D. L. (SM)
Seidman, J. J. (SM)
Seitz, S. S. (M)
Self, J. A. (M)
Selleck, R. S. (M)
Semel, D. (M)
Sensiper, S. (F)
Sepmeyer, L. W. (SM)
Setzer, L. E. (SM)
Shabon, J. Jr. (M)
Shallon, S. C. (SM)
Shameson, L. (M)
Shanahan, E. F. (M)
Shannon, F. J. Sr. (SM)
Shapiro, A. (M)
Sharp, B. E. (M)
Sharpton, R. E. (M)
Shaw, C. P. (A)
Shaw, R. G. (M)

Sher, B. L. (M)
Shimabukuro, G. T. (M)
Shimizu, K. (M)
Shimizu, T. (M)
Shinoda, K. (M)
Shiratori, W. N. (M)
Shoemaker, H. L. (M)
Shoemaker, H. M. (A)
Shoop, W. F. (M)
Shore, H. G. (M)
Shoulders, H. D. (M)
Shrum, L. R. (A)
Shufflebarger, J. R. (M)
Shuler, M. H. (M)
Shulsinger, E. R. (M)
Sidio, G. J. (M)
Sigal, B. C. (M)
Sigmon, L. C. (SM)
Signer, R. M. (M)
Silfano, A. R. (M)
Silliman, W. B. (M)
Silven, S. (M)
Silverman, I. (M)
Silvern, L. C. (M)
Silvers, A. (M)
Simmons, V. J., Jr. (A)
Simon, A. (SM)
Simpson, W. P. (SM)
Singleton, H. E. (SM)
Sinn, G. (M)
Sion, E. (M)
Sizemore, L. E. (M)
Skelton, P. (M)
Skidmore, L. J. (M)
Skoller, M. (SM)
Slee, J. E. (M)
Slocomb, G. M. (M)
Slogar, J. W. (M)
Smith, C. C. (M)
Smith, C. H., Jr. (M)
Smith, C. V. (M)
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Smith, H. T. (M)
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Smith, R. W. (M)
Smuckler, E. J. (SM)
Snapp, K. M. (A)
Snell, H. R. (M)
Snitzer, T. L. (M)
Snow, V. M. (M)
Sodaro, J. F. (SM)
Sollars, R. C. (M)
Soltys, G. H. (A)
Soltz, J. E. (M)
Somers, F. J. (SM)
Sommer, J. G. (M)
Sommers, C. E. (M)
Sorensen, A. A. (M)
Sparks, B. O. (M)
Spellmire, R. J. (M)
Sperling, P. (SM)
Spira, H. (M)
Sprague, E. L., Jr. (M)
Spriestersbach, R. C. (M)
Spriggs, A. J. (SM)
Sprinz, E. (M)
Stahl, J. (SM)
Stan, J. (SM)
Stankevich, P. A., Jr. (M)
Staudhammer, J. (M)
Stear, E. B. (A)
Stearns, L. D. (A)
Steele, S. L. (SM)
Steenson, B. O. (M)
Steinberg, R. (M)
Steinkolk, R. B. (M)
Stellmacher, D. D. (SM)
Stephenson, R. G. (SM)
Stern, J. M. (M)
Steward, M. H. (M)
Steward, R. H. (A)
Stewart, R. K. (A)
Stockhoff, K. C. H. (M)
Stokes, L. S. (M)
Stone, D. (M)
Stone, D. (M)
Stork, J. E. (M)
Strandberg, J. E. (SM)
Strawn, G. A. (A)
Strawn, R. S. (M)
Strem, S. E. (M)
Strieby, M. (M)
Stringer, R. B. (M)
Strumwasser, E. (M)
Stuart-Williams, R. (SM)
Sussex, G. R. (M)
Szerlip, A. (SM)
Tairy, W. C. (M)
Tajima, G. K. (SM)
Takahashi, A. Y. (M)
Takahashi, K. (A)
Talbot, J. J. (M)
Tanke, H. F. (SM)
Tansky, R. I. (A)
Tarca, E. L. (M)
Tateoka, H. (M)
Tatsugawa, S. (M)
Tatsuta, R. S. (A)
Taylor, D. J. (M)
Taylor, K. E. (M)
Taylor, V. (A)
Terris, I. (M)
Terzian, R. C. (M)
Teske, J. A. (M)
Theodore, C. (M)

Thoma, F. J. (M)
Thomas, R. L. (M)
Thompson, D. M. (M)
Thompson, G. L. (M)
Thompson, R. B. (M)
Thornton, H. L. H. (M)
Tindall, K. V. (M)
Tinsley, R. G. (M)
Tinsley, W. E. (M)
Tobin, G. C. (A)
Tobolski, J. (M)
Toeppen, M. K. (SM)
Toffler, J. E. (M)
Tomash, E. (SM)
Tomikawa, K. B. (A)
Tomita, H. H. (M)
Tompkins, E. H., Jr. (M)
Tompkins, J. S. (M)
Tonal, Y. (M)
Trachinger, R. (M)
Triplett, W. R. (SM)
Troeger, F. R. (M)
Tsuda, R. Y. (A)
Tudor, J. E. (M)
Turin, G. L. (SM)
Tyson, G. (M)
Udalov, S. (M)
Ulzurrun, E. T. (A)
Ung, R. (M)
Uyetani, B. (M)
Vaiclunas, A. A. (M)
Valentine, D. T. (A)
Vallani, J. G. (M)
Van Curen, V. (M)
Vargas, R., Jr. (M)
Veach, C. W. (SM)
Velasco, B. M. (M)
Veneklasen, P. S. (M)
Vesely, D. D. (M)
Vesser, W. C. (M)
Villa, R. (A)
Viswanathan, C. R. (M)
Vitenbl, A. J. (M)
Vitzello, R. B. (A)
Vodoola, S. N. (M)
Von Lanken, J. R. (M)
Vomdran, J. W. (SM)
Voss, J. H. (A)
Wada, J. Y. (M)
Walker, E. S. (M)
Wall, J. E. (A)
Wallace, D. C. (M)
Walley, B. (SM)
Walsh, J. J. (A)
Walthers, G. A. (M)
Ward, R. A. (M)
Wardak, H. (M)
Ware, P. H. (M)
Warshaw, M. (M)
Waterman, H. B. (A)
Webber, D. W. (A)
Weber, F. V. (A)
Weeks, R. F. (M)
Wegtein, R. D. (SM)
Weinberg, L. (F)
Weinberger, H. L. (SM)
Weingarten, R. (M)
Weinstein, E. M. (M)
Wels, J. P. (M)
Weiss, P. H. (SM)
Weiss, W. J., Jr. (M)
Weissberg, E. (M)
Weldon, J. C. (M)
Welge, V. (SM)
Wellwer, C. L. (M)
Wells, C. A. (SM)
Wenters, R. L. (SM)
Wersen, D. T. (M)
Werts, L. C. (M)
Wessel, R. E. (M)
Westman, J. J. (M)
Wheeler, S. D. (M)
Wheelon, A. D. (SM)
Whitcomb, H. W. (M)
White, C. R. (M)
White, W. H. (M)
White, W. O. (A)
Whitford, R. K. (M)
Whiting, L. (M)
Whitten, M. G. (A)
Wieneke, R. G. (M)
Wiggins, E. T. (M)
Wilbur, E. T. (M)
Wilke, W. E. (A)
Wilkins, J. R. (A)
Williams, J. W. (M)
Willis, J. (A)
Wilson, A. E. (A)
Wilson, H. G. (SM)
Wilson, J. A. (M)
Wilson, L. W. (SM)
Winters, B. C. (M)
Winters, M. N. (M)
Winton, H. L. (M)
Wires, G. A. (M)
Witherwax, H. E. (M)
Witsels, J. L. (M)
Wolfe, R. E. (M)
Wolff, A. F. (A)
Wollrich, A. E. (M)
Wong, B. K. (M)
Wong, F. (A)
Wong, H. Y. (M)
Wood, G. D. (A)
Wood, R. W. (M)
Wooter, S. H., Jr. (M)
Wright, P. B. (A)
Wugalter, S. S. (A)
Yabitsu, C. T. (M)
Yadav, K. P. (M)
Yamamoto, J. R. (M)
Yamamoto, K. (M)

Yamamoto, T. G. (M)
Yamamoto, T. W. (M)
Yamamoto, Y. (M)
Yamasaki, R. G. (M)
Yasuda, J. K. (M)
Yatskin, G. C. (SM)
Yee, D. K. (M)
Yee, W. W. B. (M)
Yelcich, G. T. (M)
Yim, G. W. (M)
Yoder, D. R. (M)
Young, D. J. (M)
Young, W. D. (M)
Zacharias, R. (M)
Zall, P. M. (A)
Zappitelli, C. A. (A)
Zeh, R. J. (SM)
Zemanek, J., Jr. (M)
Zeoli, G. W. (SM)
Zimmerman, F. M. (M)
Zint, K. E. (SM)
Zuccaro, S. J. (A)
Zuckerberg, H. (M)
Zukerman, L. G. (SM)
Zwelzig, J. R. (M)

Los Banos (SF-7)
Hunt, M. D. (A)

Los Gatos (SF-7)
Bruce, P. E. (M)
Burns, W. E. (M)
Byrnes, P. J. (M)
Chaffee, B. J. (M)
Craddock, W. O. (M)
Critchlow, A. J. (M)
Davis, J. H. (M)
Drake, J. M. (M)
Dresbach, G. R. (M)
Estes, S. E. (M)
Glass, F. W. (M)
Goddard, W. A. (M)
Heintz, R. M. (F)
Hummel, K. H., Jr. (A)
Irving, D. W. (M)
Kaczanowski, W. (A)
Kownacki, S. (SM)
Lincoln, E. T. (A)
McLaughlin, J. A. (M)
McQuade, E. J. (M)
Meidell, P. I. (A)
Poole, J. R. (A)
St. Clair, H. K. (M)
Schultz, O. T. (SM)
Slutman, A. C. (M)
Stokes, B. C. (M)
Stoner, F. E. (SM)
Sund, H. E. (M)
Vinding, J. P. (SM)
Wear, G. L. (A)
Whelchel, W. M. (A)
Wilds, R. B. (M)
Witt, V. R. (SM)

Lynwood (LA-7)
Albon, R. Jr. (M)
Audick, G. C. (A)
Davidson, J. K. (A)
De Vito, R. A. (M)
England, R. E. (M)
Hawley, G. K. (M)
Reich, J. E. (M)
Roth, E. L. (M)
Solle, A. J. (A)
Yoder, A. A. (M)

Malibu (LA-7)
Anderson, J. R. (M)
Ayers, J. L. (M)
Batley, H. B. (SM)
Belntema, C. D. (M)
Bekey, I. (M)
Brewer, A. F. (SM)
Chatfield, M. B. (SM)
Destabelle, R. (M)
Dill, J. (A)
Gurske, V. P. (M)
Hellwarth, R. W. (M)
Hill, C. A. (M)
Hill, C. R. (SM)
Hudspeth, T. (M)
Ivey, L. I. (M)
Johnson, C. C. (M)
King, G. L. (M)
Knowles, W. S. (SM)
Koontz, D. E. (A)
Law, R. R. (F)
Lewis, D. E. (M)
Linvill, W. K. (M)
Love, C. E. (M)
Lyons, H. (F)
Morse, J. H (M)
Moss, G. E. (M)
Peirce, T. F. (M)
Simon, H. S. (M)
Van Horne, T. B. (M)
Wilcox, C. H. (M)
Williams, R. R. (A)
Yearsley, W. A. C. A. (M)

Manhattan Beach (LA-7)
Aird, L. D. (M)
Alessi, V. J. (M)
Barnett, L. (M)
Beachler, R. R., Jr. (SM)
Bernuy, J. F. (M)
Borgeson, P. W. (M)
Bower, G. G. (SM)
Bravo, R. J. (M)
Brett, C. F. (M)
Buell, F. D. (A)
Burke, H. W. (M)



Cardiff, D. L. (M)
Clay, J. D. (M)
Clunis, K. (M)
Curtis, C. W. (SM)
Desjardins, S. E. (SM)
Dobbins, W. E. (M)
Downey, E. J., Jr. (M)
Drake, W. E. (M)
Drong, R. W. (M)
Duffin, M. V. (A)
Ellis, A. (M)
Faulkner, A. H. (SM)
Fountain, J. G. (M)
Frost, F. K. (A)
Frystinger, E. B. (M)
Fuller, J. R. (M)
Glascock, R. D. (M)
Grabowski, K. P. (M)
Grapotta, F. C. (M)
Gray, W. W. (M)
Gregory, H. D. (M)
Gustafson, L. A. (M)
Hansen, J. R. (A)
Harris, J. W. (SM)
Hartmann, E. C. (M)
Heikkinen, R. R. (M)
Heil, J. F. (M)
Hendricks, J. T. (A)
Hiekel, W. H. (A)
Holmes, J. S. (M)
Hulsey, N. H. (M)
Janis, J. P. (M)
Johnson, C. R. (M)
Jumbeck, G. I. (A)
Kanter, E. (M)
Kelly, R. S. (M)
Kenny, P. C. (M)
Kirkland, V. D. (M)
Le Moln, F. M. (M)
Lepper, R. (M)
Lippitt, K. H. (SM)
Lydick, J. D. (M)
McCann, M. J. (SM)
McRoden, W. L. (M)
Monroe, J. C. (M)
Moore, J. M. (M)
Morrison, H. E. (A)
Mullins, W. H. (M)
Norsell, P. E. (M)
Northwood, W. E. (A)
Obray, D. C. (A)
Omik, L. L. (M)
Paymar, D. G. (A)
Putter, K. (M)
Ridinger, H. J., Jr. (M)
Rodman, S. B. (M)
Rogers, R. G. (M)
Rudich, R. (M)
Ryan, W. R., Jr. (M)
Shore, J. D. (M)
Sinclair, J. G., Jr. (SM)
Smith, W. B. (M)
Sokol, J. L. (M)
Sparling, A. J. (A)
Starkey, M. J. (M)
Stodder, D. J. (A)
Stolze, R. M. (M)
Swicegood, K. T. (M)
Tallon, W. J. (A)
Tucker, V. L. (A)
Vandegrift, R. B. (SM)
Vutz, P. (M)
Wagner, R. E. (M)
Washburn, D. M. (M)
Washington, L. P., Jr. (A)
Webb, R. C. (A)
Welcome, W. W. (M)
Weston, H. (M)
Whelan, D. E. (SM)
Williams, H. M. (A)

Manteca (SAC-7)
Arwine, R. (A)
Fulton, R. (M)

Martinez (SF-EB-7)
Bumpass, R. C. (A)

Mar Vista (LA-7)
Alford, W. H. (A)
Allen, B. G. (A)
Hanna, R. E. (M)

Marysville (SAC-7)
Millhollon, A. L. (M)

Maywood (LA-7)
Hansen, H. R. (M)
Osterhues, G. D. (M)
Parr, J. R. (A)
Willis, D. B. (M)

McClellan AFB (SAC-7)
Albert, C. C. (A)
Friday, R. G. (A)
Haines, R. S. (M)
Samuelson, R. R. (M)

Menlo Park (SF-7)
Alcorn, C. L. (SM)
Aldous, C. N. (M)
Amara, R. C. (A)
Ault, C. E. (M)
Ayer, W. E. (SM)
Babcock, D. F. (SM)
Badger, G. M. W. (M)
Baer, J. A. (SM)
Barnes, C. W., Jr. (SM)
Barnes, W. H. (M)
Baron, M. J. (M)
Bartelink, D. J. (M)
Benedict, D. L. (SM)
Benjaminson, A. (M)
Berg, M. R. (M)
Bourne, C. P. (M)
Bradley, R. E. (M)
Brain, A. E. (SM)
Brandon, E. T. (M)
Brierly, F. A. (M)
Brown, D. H. (SM)
Carter, E. F. (F)
Carter, P. S., Jr. (M)
Chellstorp, T. S. (M)
Chope, R. E. (A)
Christie, T. A., Jr. (SM)
Clarke, L. G. (SM)
Cohn, S. B. (F)
Cone, W. H. (SM)
Cox, B. (SM)
Crane, H. D. (SM)
Dawson, J. B. (M)
De Liban, R. (M)
Dodge, C. A., Jr. (A)
Dolphin, L. T., Jr. (M)
Dunbar, A. S. (SM)
Dupen, D. W. (M)
Durfey, G. K. (M)
Dyce, R. B. (M)
Elam, J. M. (M)
Eldredge, K. R. (SM)
Elliott, H. F. (F)
Ellsworth, R. L. (M)
English, W. K. (M)
Faries, A. M. (M)
Feinstein, L. (M)
Firschein, O. (M)
Fisher, L. L. (M)
Fleig, W. J. (M)
Forsen, G. (M)
Frankel, S. (F)
Frei, E. H. (M)
Fyler, N. F. (M)
Gallant, M. A. (M)
Gano, L. D. (A)
Gardiner, K. W. (M)
Gilden, M. (M)
Gill, W. J. (M)
Gillette, P. R. (SM)
Goetz, D. J., Jr. (M)
Goldberg, J. (M)
Gould, R. G. (SM)
Grass, J. W. (M)
Greco, N. A. (M)
Green, C. A. (A)
Griffith, C. G. (M)
Hall, E. G. (M)
Hamilton, R. H. (M)
Hansen, J. F. (M)
Harris, D. B. (F)
Haruyama, R. K. (M)
Hennies, S. R. (M)
Hilman, J. (M)
Hiramatsu, Y. (M)
Hirotsu, G. S. (M)
Honey, R. C. (SM)
Householder, D. B. (SM)
Hughes, R. D. (M)
Hunter, L. W. (M)
Hunter, S. P. (A)
Isberg, R. A. (SM)
Johnson, R. R. (M)
Jones, E. D. (M)
Jones, E. M. T. (SM)
Jung, G. C. (A)
Kaar, J. M. (M)
Kamphoefner, F. J. (SM)
Kautz, W. H. (M)
Kebby, M. H. (M)
Keller, N. E. (A)
Kennedy, H. D. (M)
Kerins, J. H. (M)
King, R. C. (M)
Kingsford-Smith, C. A. (M)
Kruse, C. J. (M)
Lathrop, R. J. (SM)
Leadabrand, R. L. (M)
Lennert, F. G., Jr. (SM)
Lequieu, C. M. (M)
Lindley, J. P. (SM)
Long, R. A. (M)
Lucke, W. S. (SM)
Luckenbach, R. R. (M)
Lynch, W. M. (M)
Lytle, D. N. (M)
MacKenzie, F. J. (M)
Mansur, F. (SM)
Marshall, D. (M)
Mattern, M. F. (M)
Matthael, G. L. (M)
Matthew, T. B. (M)
McCarthy, S. E. (M)
McCullough, W. R. (M)
McDonald, J. C. (M)
McLaughlin, J. (A)
McWhorter, M. M. (A)
Meader, H. W. (A)
Mercer, S. L. (M)
Meyer, H. M., Jr. (A)
Miller, A. (M)
Minnick, R. C. (SM)
Monson, J. E. (M)
Moore, E. J. (SM)
Moore, L. (M)
Morita, T. (SM)
Morrin, T. H. (F)
Mosley, R. B. (M)
Muehlner, J. W. (SM)
Murai, A. I. (M)
Nanevicz, J. E. (A)
Nelson, R. A. (M)
Noe, J. D. (SM)
North, D. O. (A)
Notthoff, A. P., Jr. (M)
Olson, H. D. (M)
Parsons, W. L. (M)
Patton, W. R. (M)
Paulsen, W. C. (A)
Petrak, J. R. (SM)
Pinckernell, H. (M)
Post, E. A. (SM)
Presnell, R. I. (M)
Priedigkeit, J. H. (SM)
Proctor, E. K., Jr. (SM)
Randall, R. H. (M)
Reyling, G. F. (M)
Reynolds, W. E. (M)
Rice, P. J., Jr. (SM)
Ridley, F. E. (SM)
Ritter, E. W. (SM)
Robbiano, P. P. (M)
Robertson, D. M. (M)
Ropa, R. L. (SM)
Rosen, C. A. (SM)
Roth, C. H., Jr. (M)
Rothman, H. S. (M)
Ruder, D. J. (M)
Rutledge, F. L. (A)
Salmon, V. (SM)
Scarborough, D. S. (M)
Scharfman, W. E. (M)
Schlobohm, J. C. (A)
Shapiro, E. B. (M)
Silhavy, W. M. (A)
Sleeper, G. E., Jr. (SM)
Smith, K. D. (M)
Smith, K. F. (M)
Sohar, C. H. (M)
Stoft, P. E. (M)
Stolaroff, M. J. (M)
Stoltz, P. G. (M)
Strathman, J. H. (M)
Sutton, G. L. (M)
Swain, J. R. (M)
Sweeney, H. E. (M)
Symons, R. S. (M)
Tanner, R. L. (SM)
Templeton, T. H. (SM)
Thille, R. W. (M)
Thompson, N. P. (A)
Tisue, J. C. (M)
Tracy, T. (M)
Trumbull, A. F. (A)
Valces, L. B. (SM)
Valiarino, A. R. (M)
Vane, A. B. (M)
Van Patten, W. D. (SM)
Vassiliadis, A. (A)
Walker, A. C. (SM)
Wallner, R. A. (M)
Weltbrecht, R. H. (M)
Wemli, J. M. (M)
Whitby, O. (SM)
Whitehorn, R. M. (SM)
Widrow, B. (M)
Wilke, R. R. (SM)
Williams, H. M. (SM)
Willrodt, M. J. (M)
Wilson, L. H. (M)
Wing, R. Y. (M)
Winkelman, R. E. (M)
Worley, O. C. (M)
Worth, G. E. (M)
Younker, E. L. (M)

Merced (SF-7)
Andrews, G. B. (M)
Fowler, R. H. (M)
Grace, E. H., Jr. (M)
Grace, H. F. (M)
Langan, J. C. (A)
Semenluk, B. G. (M)
Weiss, S. K. (A)

Midway City (LA-SA-7)
Berg, R. L., Jr. (M)
Schenet, W. A. (M)

Millbrae (SF-7)
Ashman, R. R. (M)
Berthold, W. L. (M)
Calvert, C. C. (A)
Hershyn, W. (M)
Moore, K. A. (M)
Reed, J. M. (M)

Mill Valley (SF-7)
Behringer, D. S. (M)
Davidson, J. D. (A)
Feeney, W. G. (M)
Jacobs, H. N. (M)
Kotrum, J. (A)
Smith, H. H. (M)
Stoye, D. A. (M)
Unsworth, R. G. (M)

Milpitas (SF-7)
Anderson, R. D. (M)
Bridges, J. C. (A)
Burkhart, R. N. (A)
Tritton, R. F. (A)
Zobel, F. J., Jr. (M)

Mission San Jose (SF-EB-7)
Hostetter, D. M. (M)
McGee, M. E. (M)

Modesto (SAC-7)
Bates, W. H., Jr. (M)
Dowler, C. E. (A)

Mojave (CL-7)
Notar, C. A. (M)

Monrovia (LA-P-7)
Ambrose, E. G. (A)
Bell, N. W. (SM)
Brandes, R. A. (M)
Brenner, D. S. (A)
Burns, J. D. (M)
Carney, D. E. (A)
Cary, H. H. (M)
Collins, C. R. (M)
Goodman, F. R. (M)
Gray, J. F. (M)
Hawes, R. C. (A)
Keck, L. J. (M)
Lawler, R. H. (M)
Livezey, J. A. (M)
McGill, J. J. (M)
Perrault, R. E. (M)
Petraglia, N. E. (A)
Rheingans, E. A. (M)
Skelrik, R. M. (M)
Steele, R. E. (M)
Waksman, A. (SM)

Montara (SF-7)
Booker, J. P. (M)

Monta Vista (SF-7)
Hockman, D. (SM)
Palmer, C. W. (M)

Montclair (LA-OB-7)
Grigg, J. W. (A)
Jameson, C. J. (M)
Lindstrom, R. G. (SM)
Lock, R. W. (M)
Montgomery, J. D., Jr. (SM)
Smith, P. E. (M)

Montebello (LA-7)
Alper, S. M. (M)
Bathauer, R. N. (A)
Clark, W. P. (M)
Emerson, R. W. (A)
Nakamura, M. (M)
Rodia, D. W. (M)
Sakamoto, R. T. (M)

Monterey (SF-7)
Ackerlind, E. (SM)
Baetsen, R. H. (M)
Bauer, W. M. (M)
Chaney, J. G. (SM)
Church, R. (M)
Conroy, T. R. (M)
Dorf, R. C. (M)
Frey, A. R. (SM)
Giet, G. R. (SM)
Glasgow, R. S. (F)
Gray, G. A. (M)
Hoisington, D. B. (SM)
Klamm, C. F., Jr. (M)
Lane, L. O., Jr. (M)
Lee, E. B. (M)
Marmont, G. H. (M)
McIlwraith, N. (M)
Murray, R. P. (M)
Norris, W. E. (M)
Oler, C. B. (SM)
O'Toole, J. B. (M)
Rightmyer, J. M. (M)
Rothauge, C. H. (M)
Sheingold, A. (M)
Smith, W. C. (M)
Strum, R. D. (M)
Thaler, G. J. (M)
Wilcox, M. L. (M)
Wilson, O. B., Jr. (M)

Monterey Park (LA-7)
Bacon, W. L. (A)
Borden, L. P. (M)
Crippen, C. E. (SM)
Davis, E. F. (M)
Eykholt, A. L. (M)
Fucile, F. B. (M)
Gong, H. (M)
Kasal, G. S. (M)
Kaspin, J. (M)
Klein, R. (SM)
Kliment, P. (A)
Koop, E. H. (M)
Leff, B. (M)
Lockhart, R. W. (SM)
Morrison, R. T. (M)
Perry, J. T. (M)
Robertson, G. R. (M)
Shenk, J. W. (M)
Sperbeck, J. H. (A)
Steuer, V. F. (M)
Takeda, A. H. (A)
Teragawa, R. (M)
Young, R. L. (SM)

Monte Sereno (SF-7)
Wettstein, J. E. (M)

Montrose (LA-P-7)
Christilaw, J. S. (M)
Fitzgerald, R. W. (M)
Jensen, A. K. (M)
Jurich, S. (A)
Wright, L. W. (M)

Moorpark (LA-B-7)
Anders, B. J. (A)

Moraga (SF-EB-7)
Tibbetts, D. R. (SM)

Morgan Hill (SF-7)
Yoshii, H. (A)

Morro Bay (LA-SB-7)
Waltz, K. E. (M)

Mountain View (SF-7)
Adams, B. (M)
Aitchison, D. C. (M)
Akerberg, E. D. (A)
Allen, K. J. (M)
Allen, S. E., Jr. (M)
Allington, R. W. (M)
Anderson, R. W. (M)
Arellano, A. (M)
Augustine, A. F. (SM)
Barry, J. E. (M)
Basham, E. F. (M)
Bay, T. H. (M)
Beall, R. W. (M)
Beard, C. I. (SM)
Beneteau, P. J. (M)
Bernier, L. E. (M)
Bert, J. E. (A)
Boennighausen, R. A. (M)
Boley, H. A. (M)
Bonselgneur, P. J., Jr. (A)
Booth, A. S. (M)
Booth, R. E. (M)
Borghi, R. P. (M)
Bourret, R. R. (A)
Brede, D. W. (M)
Bridgman, A. D., Jr. (M)
Briskin, H. B. (SM)
Broekemeier, A. E. (M)
Bryant, P. M. (M)
Byrne, G. C. (SM)
Casten, P. S. (M)
Cazanjian, R. S. (M)
Center, G. A. (A)
Chang, N. C. (M)
Christensen, R. T. (A)
Clark, C. B. (SM)
Clifton, J. K. (M)
Clinton, W. R. (M)
Cogshall, P. D. (M)
Cook, P. D. (M)
Cooley, R. E. (M)
Cooper, R. K. (M)
Cotterill, W. J. (M)
Cotterman, J. W. (M)
Cross, H. V. (M)
Curry, D. K. (M)
Danforth, J. A. (M)
Davis, V. L. (M)
Dean, J. F. (M)
Debs, R. J. (SM)
Dickson, J. D. (M)
Diessner, O. G. (M)
Dietz, D. P. (A)
Dilley, L. E. (M)
Don Carlos, J. E. (M)
Dore, B. Y. (M)
Doyle, W. C. (M)
Drake, A. L., Jr. (M)
Efting, H. J. (M)
Ehrmantraut, H. C. (A)
Fanjul, E. L. (M)
Farlow, C. C. (M)
Fire, P. (M)
Fishman, H. M. (M)
Fonda, R. D. (M)
Franklin, L. R. (M)
Frincke, P. O. (M)
Frost, R. D. (M)
Fuller, T. D. (M)
Furukawa, M. (SM)
Gaenzle, J. B. (M)
Garner, L. H. (A)
Garriott, O. K. (M)
Gates, J. P. (M)
Gavenas, A. R. (M)
Gee, W. (A)
George, E. P. (M)
Gibson, J. G. (A)
Gilford, J. T. (M)
Gillard, C. W. (M)
Goodwin, V. D. (M)
Graham, R. E. (M)
Grant, R. G. (M)
Gray, E. E. (M)
Grimm, R. A. (SM)
Grometer, D. C. (M)
Guglietta, P. A. (SM)
Gunn, T. L. (M)
Hall, J. T. (M)
Hanson, D. W. (M)
Hargrove, P. E. (M)
Harley, J. M. (SM)
Hartle, B. L. (SM)
Harvey, J. A. (M)
Hayes, R. L. (M)
Heinzinger, J. P. (M)
Henden, J. R. (M)
Henschke, R. A. (SM)
Heslop, M. D. (M)
Hofmeister, L. A. (A)
Hollimon, M. H. (M)
Horak, F. A. (SM)
Horsley, G. S. (M)
Hughes, F. J. (SM)
Hulett, H. R. (A)
Humphries, J. (M)
Hutter, R. G. E. (F)
Isabeau, J. G. (M)
Israelsen, B. P. (M)
Jacques, C. P. (M)
Johnston, A. M., II (A)
Jorgensen, H. E. (A)
Joste, T. R. (M)
Judy, N. A. (M)
Kaempf, U. (M)
Kearns, R. J. (M)
Kelch, R. D. (M)
Kellar, W. J. (M)
Kennedy, P. (SM)
Kent, G. R. (A)
Klein, W. F. (M)

Knapp, R. L. (M)
Kohl, W. H. (F)
Koski, T. H. (M)
Kotzebue, K. L. (M)
Laudenschlager, W. (M)
Lee, M. E. (M)
Lee, W. K. F. (M)
Leese, S. S. (M)
Leifer, M. (F)
Lemson, J. (M)
Lepoff, J. H. (SM)
Lewis, P. L. (M)
Lloyd, D. (M)
Long, J. A. (M)
Lovik, M. H. (M)
Maccono, F. J. (SM)
MacKenzie, M. H. (M)
Maldonado, C. D. (M)
Maloney, R. E. (M)
Maninger, L. L. (M)
Mansur, D. W. (M)
Marchant, G. R. (M)
Marcum, W. F. (M)
Markum, J. A., Jr. (M)
Mathers, G. C. (M)
McAlister, W. H. (A)
McMahon, T. O. (M)
McMullin, N. D. (SM)
McMurtry, B. J. (M)
Medlin, J. E. (M)
Meinheit, C. E. (M)
Melton, J. F. (M)
Metoff, T. J. (M)
Miller, M. R. (M)
Minella, M. J., Jr. (A)
Montagnon, N. B. (M)
Moore, M. J. (M)
Morse, E. W. (M)
Munger, J. C. (M)
Murphy, J. J. (M)
Myers, G. A. (M)
Needle, J. S. (SM)
Nelson, E. A. (M)
Nelson, K. D. (M)
Nord, R. H. (M)
O'Neill, J. R. (M)
Pace, N. M. (M)
Palmer, R. N. (SM)
Patch, C. S. (SM)
Peavey, W. W. (M)
Pegg, B. A. (M)
Penwell, J. R. (M)
Peters, D. W. (M)
Peterson, W. R. (M)
Pfost, R. F. (M)
Phillips, C. E. (M)
Phillips, R. R. (M)
Pinol, D. G. (M)
Pramann, R. F. (M)
Raju, P. S. (M)
Ramsay, W. R. (M)
Randall, K. K. (M)
Ratter, W. F. (M)
Reis, C. S. (M)
Reyna, R. C. (M)
Rice, J. E., Jr. (M)
Riggins, C. C. (M)
Riley, R. B. (M)
Rock, A. L. (M)
Roder, A. (M)
Roney, E. L. (SM)
Rossi, F. J. (M)
Rourke, C. R. (M)
Rowe, D. H. (M)
Rubenson, J. G. (SM)
Runoe, W. A., Jr. (M)
Santamaria, S. (M)
San Vicente, R. (M)
Sarouis, R. H. (M)
Saunders, C. L. (M)
Schiffman, B. M. (M)
Schodervek, J. J. (M)
Schorr, F. W. (M)
Schrumph, D. A. (M)
Schwartz, J. R. (M)
Searing, R. M. (M)
Seymour, R. N. (M)
Shedko, R. J. (M)
Shelton, W. L. (M)
Shipley, D. W. (M)
Shodiss, H. F. (M)
Siera, M. M. (A)
Simon, D. H. (M)
Sinclair, K. F. (SM)
Sklar, H. (M)
Slomski, J. J. (M)
Soshea, R. W. (M)
Sperry, A. B. (M)
Stephens, R. A. (M)
Sullivan, E. H. (M)
Stirling, H. J. (M)
Stone, R. E. (M)
Stringer, L. W. (M)
Strobele, C. H. (M)
Swanson, C. A. (M)
Swanson, J. A. (M)
Swiadek, S. F. (SM)
Tahara, G. R. (A)
Tamres, I. (M)
Tannenbaum, M. (M)
Thon, W. H. (SM)
Tomlin, W. T. (M)
Traver, H. R. (M)
Travis, L. J., Jr. (M)
Turenchalk, H., Sr. (M)
Twidwell, D. E. (M)
Van Duzer, V. E. (M)
Van Zuuk, D. A. (M)
Walker, L. F. (M)
Wardwell, R. H., Jr. (M)
Warn, L. O. (M)
Weaver, J. L. (M)
Weber, L. C. (M)
Weindorf, D. R. (M)
Wesenberg, C. M. (M)
Wetherell, M. L. (M)
Wheeler, W. R. (M)
Wickersham, A. F., Jr. (M)
Wiesner, S. (SM)
Wittol, W. (A)
Williamson, C. A. (A)
Wilson, A. L. (M)
Winn, C. B. (M)
Wunderman, I. (SM)
Young, R. K. (M)
Zimmerman, H. G. (A)

Mount Wilson (LA-P-7)
Knight, J. B., Jr. (SM)

Napa (SF-7)
Bruce, C. A. (A)
Mingst, H. C. (SM)
Morgenstern, H. S. (A)
Shephard, C. S. (A)
Sorensen, A. G. (A)

National City (SD-7)
Vawter, V. E. (M)

New Almaden (SF-7)
Engle, C. G. (M)
Perham, D. M. (SM)

Newbury Park (LA-B-7)
Looney, J. M., Jr. (M)
Tribe, A. C., Jr. (A)

Newport Beach (LA-SA-7)
Ambrose, J. R. (SM)
Amdahl, G. M. (M)
Barton, D. C. (M)
Bintdorf, S. B. (SM)
Benjamin, R. B. (SM)
Brown, L. E. (SM)
Brown, S. R. (M)
Ceccarini, R. E. (M)
Charter, T. R. (M)
Clark, P. S. (M)
Clavier, P. A. (SM)
Cohen, J. (M)
Cole, F. H. (M)
Coogan, J. H. (SM)
Courter, J. M. (M)
Deutsch, J. (SM)
Dillingham, E. (M)
Ducati, A. C. (A)
Duncan, D. B. (SM)
Fa, C. H. (M)
Frink, E. P. (M)
Gehlke, D. A. (SM)
Geiger, R. F. (M)
Gerber, W. D. (M)
Gillette, J. S. (M)
Goodman, H. C. (M)
Gould, R. E. (M)
Greenslade, R. S. (SM)
Hammerslag, J. G. (M)
Hammond, J. G. (SM)
Heaton, G. C. (M)
Hendershot, T. R. (M)
Herbert, C. (SM)
Hill, D. A. (SM)
Jamieson, J. A. (M)
Johnson, R. D. (SM)
Kitchens, W. L. (M)
Lankes, L. R. (SM)
Larson, H. T. (M)
Le Gette, E. L. (M)
Losee, F. A. (SM)
MacIntyre, R. M. (A)
McCaldin, J. O. (SM)
Montgomery, D. N. (M)
Myer, J. H. (SM)
Nickell, W. C. (M)
Paller, J. L. (M)
Parkinson, R. W. (M)
Pearce, P. F. (SM)
Pyle, W. I. (M)
Rosenblum, P. (M)
Sarlo, G. S. (M)
Schwank, R. T. (A)
Schwartz, B. (M)
Smith, C. H., Jr. (M)
Shedd, I. A. (M)
Steele, E. L. (SM)
Steiger, W. (SM)
Sykora, G. E. (A)
Vander Veer Hilker, H., Jr. (A)
Waldner, M. (M)
Wallere, L. G. (M)
Warren, W. B. (M)
Waters, W. P. (SM)
Weekes, B. B. (M)
Welken, R. L. (M)
Wennerberg, G. (SM)
Wilderman, L. F. (M)
Williams, A. B. (M)
Winston, H. (SM)

Niles (SF-SB-7)
Maxwell, J. A. (M)

Norco (LA-OB-7)
Bogue, P.N. (M)
Hinshaw, M.P. (M)
Lozo, K. G. (M)
Moore, L.C. (A)

North Fork (SF-7)
Pearson, D. R. (M)

North Highlands (SAC-7)
Austin, J.B. Jr. (M)
Bothwell, D. C. (M)
Holmes, C. M. (A)
Lohner, K. E. (A)
Masterson, J.P.(M)
Nolan, T.H. (M)
Schwartz, O. A. (M)
Towe, C. L. (M)
Whitlatch, A. M., Jr. (M)

North Hollywood (LA-SF-7)
Alter, J. E. (M)
Anderson, W. E. (M)
Bailey, F. W. (M)
Batsel, C. N., Jr. (M)
Bauman, H. W. (M)
Beaudine, D. M. (M)
Becker, L. E. (M)
Beller, E.G. (M)
Berns, H. L. (A)
Bookee, J. R. (M)
Braddock, R. C. (M)
Breitegger, L. G. (M)
Burkhart, E. H., Jr. (A)
Burrell, J. E. (M)
Callan, R. E. (M)
Camp, L. W. (M)
Campbell, B. K. (A)
Chester, W. H. (SM)
Clark, G. E. (M)
Cochran, E. D. (M)
Collins, D. L. (A)
Combes, R. M. (SM)
Conway, J. N. (M)
Craven, T. E. (M)
Curtis, J. P. (M)
Daniel, R. L. (SM)
De Young, H. (M)
Dite, W. (M)
Dobson, T. M. (A)
Droesch, F. A. (A)
Elsohn, I. A. (M)
Farnsworth, H. D. (SM)
Ferguson, J. G. (SM)
Fermelia, L. R. (M)
Filbert, W. B. (M)
Filizola, V. F. (M)
Fuller, R. E. (A)
Gantsweg, M. (M)
Garbowitz, L. (A)
Gardner, L. B. (M)
Gilbert, J. D. (M)
Gilroy, J. W. (M)
Gold, C. H. (M)
Goldsmith, L. T. (M)
Goodrich, P. E. (M)
Goodwin, A. N. (A)
Gove, E. L. (M)
Goyer, R. B. (M)
Gray, R. D. (M)
Gribble, W. R. (M)
Grossman, S. J. (A)
Haigh, W. B. (M)
Hamilton, R. E. (SM)
Hansen, H. J. (M)
Hansen, R. L. (M)
Hedene, T. H. (SM)
Hile, J. W. (M)
Hing, R. (M)
Hudson, C. A. (M)
Huntsman, H. F. (M)
Hunzeker, W. R. (M)
Jackson, J. A. (M)
Jensen, J. K. (SM)
Kellogg, W. A. (M)
Kienast, D. J. (A)
Kleinman, J. M. (M)
Kubicek, G. B. (M)
Lacer, D. A. (M)
Lagomarsini, G. C. (M)
Laslo, M. Z. (M)
Leonard, N. E. (M)
Loski, R. R. (A)
Lykins, G. E. (M)
Lyons, L. F. (SM)
Marlowe, J. R. (M)
Masters, W. N. (M)
Mather, T. S. (M)
Maxey, D. C. (M)
Metcalf, D. (SM)
Miller, D. C. (M)
Mohr, R. W. (SM)
Molloy, C. T. (SM)
Momjian, E. A. (A)
Montgomery, D. R. (M)
Moore, V. (SM)
Morgan, R. L. (M)
Morrow, J. E. (M)
Neely, N. B. (M)
Nercessian, Y. T. (M)
Newton, W. P. (M)
O'Connor, R. J. (M)
Oliverio, A. P. (M)
Osborn, T. F. (M)
Parry, H. J. (M)
Pearlman, J., Jr. (M)
Peters, E. L. (M)
Plummer, R. E. (SM)
Rabowsky, I. (M)
Reinhardt, J. C. (M)
Renshaw, K. H. (M)
Riepe, C. R. (M)
Sauck, G. L. (M)
Schieke, P. F. (M)
Seplow, S. (M)
Shaw, A. (M)
Shigemoto, J. M. (M)
Shon, A. (A)
Soggee, R. H. (M)
Sperling, R. D. (A)
Sposilli, M. C. (M)
Stalford, W. E. (M)
Sullivan, J. R. (M)
Sumner, T. B. (M)
Sussman, R. J. (M)
Taylor, E. H. (M)
Tesler, A. (M)
Thomas, F. M. (M)
Vega, C. J. (A)
Vodovoz, E. (A)
Warner, D. E. (SM)
Watanabe, K. (M)
Weaver, J. H. (M)
White, A. A. (M)
Wigdahl, E. E. (M)
Winkler, J. L. (A)
Winter, F. J., Jr. (A)
Wise, D. O., Jr. (M)
Wolf, M. B. (M)
Wolman, L. L. (M)
Woodbridge, E. A. (A)
Wright, J. T. (M)
Young, T. V. (M)

North Redondo Beach (LA-7)
Mott, R. H. (M)

Northridge, (LA-SF-7)
Adam, K. C. (M)
Allmandinger, E. F. (SM)
Amdahl, L. D. (M)
Ashley, C. A. (A)
Avrech, N. (M)
Baake, D. W. (M)
Baldwin, M. F., Jr. (M)
Bass, L. J. (M)
Beard, A. D. (M)
Bellenkes, W. A. (A)
Benbrooks, L. A. (M)
Berlin, W. N. (M)
Berryman, G. C. (M)
Bowling, J. S. (M)
Brian, W. T., Jr. (M)
Brown, D. (M)
Burton, E. B. (A)
Carfagno, S. J. (M)
Carl, W. J. (M)
Cary, R. J., Jr. (M)
Cassidy, C. J. (M)
Chamberlain, W. S. (M)
Choleva, H. L. (M)
Clement, A. J. F. (M)
Cobb, A. E. (SM)
Colander, R. E. (SM)
Coleman, H. B. (M)
Conway, W. H. (M)
Cornwall, E. A., Jr. (M)
Cox, G. C. (M)
Daush, A. J., Jr. (M)
Daverio, A. J. (SM)
De Voll, J. L. (M)
Dickerson, D. H. (M)
Dixon, T. P. (M)
Doelz, M. L. (SM)
Easley, G. P. (M)
Edling, D. C. (A)
Fortescue, G. H. (A)
Garrigus, W. E. (SM)
Gordon, M. F. (M)
Greenwood, P. E., Jr. (SM)
Guarrera, J. J. (SM)
Guerre, C. L. (M)
Hendry, E. F. (M)
Hills, V. E. (M)
Hoverman, W. O. (M)
Hughes, W. R. (SM)
Icenhice, P. J. (SM)
Jackson, B. B. (M)
Jones, A. H. (M)
Kehrer, H. R. (M)
Khoury, N. (M)
Kline, S. R. (M)
Konkel, A. J., Jr. (M)
Koskela, A. C. (M)
Krause, C. A. (M)
Kriz, K. H. (SM)
Lane, A. B. (M)
La Plant, O. (SM)
Laubenstein, R. A. (M)
Lazarus, A. (M)
Levine, I. H. (SM)
Marcus, M. G. (A)
Marcy, S. P. (M)
Marsh, K. W. (SM)
Martin, D. L. (M)
Mellott, R. N. (M)
Murdock, L. C. (SM)
Newberg, L. L. (M)
Newton, C. P. (M)
Norton, F. R. (F)
Nozick, S. (M)
Olson, A. B. (SM)
Ottinger, D. P., Jr. (M)
Paganelli, A. C. (M)
Paul, P. F. (M)
Paulos, L. B. (M)
Perkins, L. M. (M)
Perry, C. L. (M)
Peterson, E. J. (M)
Phillips, F. R. (M)
Randolph, R. C. (M)
Rice, B. G. (M)
Rice, R. E. (M)
Rieman, F. C. (M)
Robertson, R. E. (SM)
Rohrer, G. W. (M)
Romander, H. (SM)
Scarbrough, A. D. (M)
Seelig, G. (SM)
Sherwood, D. M. (SM)
Slor, A. D. (M)
Sofen, I. A. (M)
Taylor, W. V. (M)
Thier, P. (M)
Thomas, D. C. (A)
Thorne, R. L. (M)
Tillotson, J. H. (M)
Toporeck, E. R. (SM)
Trapp, R. R. (M)
Tucker, R. E. (M)
Van Vliet, W. H. (A)
Waxman, M. J. (M)
Wessel, H. J. (A)
Whitely, R. L. (M)
Wiggins, C. P. (A)
Williamson, C. N. (SM)
Woods, W. E. (A)
Wyland, G. P. (SM)
Wynhoff, F. J. (M)
Zimmerman, R. L. (M)

Norton AFB (LA-OB-7)
Melton, R. E. (M)

Norwalk (LA-SA-7)
Campbell, U. H. (A)
Collier, G. H. (M)
Greaves, H. L. (A)
Gregory, J. H. (M)
King, W. T. (M)
Kissinger, D. V. (M)
Martin, T. E. (M)
Mund, M. A. (M)
Roehl, E. R. (M)
Saworotnow, I. P. (M)
Thurman, E. J. (M)
Tomita, W. K. (M)

Novato (SF-7)
Ratsch, H. J. (M)

Oakland (SF-EB-7)
Ame, R. E. (A)
Avery, H. T. (A)
Barale, J. J. (SM)
Black, L. J. (F)
Boyd, W. R. (A)
Brown, P. H. (M)
Cagle, D. S. (M)
Chew, B. H. (A)
Chin, C. S. (M)
Cummings, R. W. (M)
Downey, C. E. (M)
Efstathiou, J. (M)
Forbes, A. C. (SM)
Gennett, D. F., Jr. (A)
Gilliland, W. D. (M)
Glessner, J. M. (M)
Gunst, M. A., Jr. (M)
Isakson, S. E. (M)
Jones, M. H. (A)
Kan, G. (A)
Kannelaud, J. (M)
Kenny, J. W. (M)
Lar Rieu, E. A., Jr. (SM)
Lewis, J. D. (M)
Little, C. P. (A)
Loule, P. Y. (M)
Mac Leod, D. A. (M)
Malone, W. C., Jr. (M)
Merkel, C. E. (M)
Mizuno, E. (M)
Murr, W. C. (A)
Olson, S. R. (M)
Park, C. W. (SM)
Penther, C. J. (SM)
Perrin, J. L. (M)
Pigozzi, L. J. (M)
Quarfoot, H. B. (M)
Ripley, J. N., Jr. (M)
Ross, A. (A)
Savant, D. E. (M)
Savellis, A. (M)
Schwemin, A. J. (A)
Siefert, D. G. (M)
Starr, L. (M)
Talmage, G. E. (A)
Thunen, G. W. (M)
Turnbull, W. L., Jr. (M)
Upham, F. T. (A)
Wahlgren, W. W. (SM)
Waldo, F. E. (M)
Watt, R. M., Jr. (SM)
Wixson, R. L. (M)
Wolfe, H. T. (M)
Wong, E. K. (M)
Wong, R. H. (M)

Oak View (LA-B-7)
Blount, G. H. (M)

Oceanside (SD-7)
Sutherland, J. J. (SM)
Utnes, H. W. (SM)
Wanderlich, G. F. (SM)

Oildale (LA-7)
Hall, H. R. (M)
Snyder, W. G. (M)

Ojai (LA-B-7)
Giles, J. N. (M)
Procter, E. N. (SM)

Ontario (LA-OB-7)
Adams, F. L. (M)
Armbuster, K. L. (M)
Avrin, J. S. (M)
Baird, W. H. (M)
Bessette, A. (M)
Caringella, P. C. (A)
Corrons, B. E. (M)
Cupp, J. D. (M)
Davis, H. H. (M)
De Diemar, J. L. (SM)
Florentino, J. S. (M)
Flatters, W. F. (M)



Howland, R. W. (A)
Johnson, H. P. (M)
June, R. H. (M)
La Porte, R. J. (M)
Odeklirk, M. D. (SM)
Oliverson, M. (A)
Pollock, R. D. (M)
Ritchie, R. W. (A)
Ritter, E. (SM)
Stephens, F. M. (M)
Warner, S. D. (A)
Wesley, G. H. (M)

Orange (LA-SA-7)
Adams, W. (M)
Baltz, L. E. (SM)
Billingsley, S. V. (A)
Bunge, W. R. (A)
Diederich, P. A. (M)
Eatough, C. D. (M)
Gardner, F. M. (SM)
Gluth, N. P. (M)
Hawkins, E. S. (M)
Hinshaw, R. R. (M)
Howard, W. T. (M)
Johnson, W. H. (M)
Jordan, J. C. (M)
Kachuck, I. J. (M)
Kovac, J., Jr. (M)
Lephakis, A. J. (M)
Link, W. F. (M)
Mac Gregor, W. (M)
McElveen, K. H. (M)
Minardi, M. M. (M)
Nelson, R. A. (M)
Olson, C. L. (SM)
Pentecost, E. E. (SM)
Riffle, L. V. (A)
Ross, F. L. (M)
Shawda, F. E. (A)
Spradlin, K. M. (M)
Toeppe, W. J. (M)
Trammell, A. K. (M)
Walker, N. L. (M)

Orangevale (SAC-7)
Lang, C. T. (M)
Petersen, M. C. (M)
Tucker, S. L. (M)
Whitcomb, A. W. (M)

Orinda (SF-EB-7)
Brobeck, W. M. (SM)
Chisholm, H. C. (M)
Dexter, W. L. (SM)
Farrell, S. R. (A)
Gregg, P. E. (M)
Maeshner, E. (M)
Meyer, J. H. (SM)
Sheldon, P. H. (M)
Werlin, J. H. (A)
Wilson, J. R. (F)

Orland (SAC-7)
Evitt, W. B. (A)

Oxnard (LA-B-7)
Ackley, R. M. (A)
Allen, P. S. (M)
Benafel, R. C. (SM)
Benninger, B. G. (M)
Bergman, R. L. (A)
Bosmajian, C. P. (M)
Bossoletti, J. E. (SM)
Bowen, W. A., Jr. (SM)
Bradford, W. O. (SM)
Bunk, J. E. (M)
Bushnell, P. S., Jr. (M)
Caraway, B. J. (M)
Cuthbert, W. W. (SM)
Dewey, R. E. (M)
Dunham, D. J. (M)
Dvoracek, F. H. (M)
Fields, M. H. (M)
Frederick, J. A. (M)
Ginn, A. (M)
Gleason, J. L. (M)
Gomez, P. D. (A)
Gregory, R. M. (M)
Haidle, L. L. (M)
Hill, C. V. (M)
Howe, W. F. (M)
Ishii, F. K. (M)
Jones, M. S. (M)
Kitabayashi, T. (A)
Leish, J. (M)
Leney, H. G. (M)
Lodi, J. J. (A)
Marvin, P. K. (M)
Miller, W. A. (M)
Moore, G. H. (M)
Murray, H. J., Jr. (M)
O'Bryan, R. L. (M)
Olson, M. H. (M)
Pichette, R. L. (M)
Pike, B. W. (SM)
Pike, J. M. (M)
Rigas, H. B. (M)
Sakazaki, Y. (M)
Sarabacha, H. (M)
Solferino, T. A. (M)
Sorden, L. V. (M)
Stone, G. J., Jr. (A)
Tendick, C. B. (SM)
Tillery, J. F., Jr. (M)
Webber, A. F. (M)
Webster, E. (M)
Wehmeyer, C. H. (M)
Wright, D. B. (M)
Ziheri, E. J. (M)
Griffith, C. D. (M)
Hertz, R. G. (M)
Howe, G. E. (A)
Jolles, A. J. (M)
Krulish, R. G. (M)
Mandel, M. (SM)
Meany, J. E. (SM)
Morton, P. G. (M)
Neuron, E. (M)
Reed, D. S. (SM)
Schmidt, D. V. (M)
Shovlowsky, M. (M)
Swarthout, W. M. (SM)
Torbron, J. (M)
Tumbull, J. S., Jr. (M)
Weaks, K. C. (M)
Weiss, L. F. (A)
Zechiel, W. J. (M)

Palmdale (LA-7)
Bennett, A. (A)
Bertorelli, R. J. (M)
Chernof, J., Jr. (M)
Crossman, T. F. (M)
Freeman, W. L. (A)
Hingson, G. D. (A)
Johnson, V. C. (A)
Jones, C. R. (M)
Kollar, T. J. (A)
Larson, J. M. (M)
McLarin, M. (M)
Neeley, J. C. (M)
Parsons, G. W. (A)

Palm Desert (LA-7)
Rowe, C. R. (SM)

Palo Alto (SF-7)
Abbott, W. R. (SM)
Abraham, W. G. (SM)
Acker, A. E. (A)
Adam, S. F. (M)
Addleman, L. A. (M)
Agbulos, E. C. (A)
Ahlgren, W. E. (M)
Aine, H. E. (A)
Allison, D. F. (M)
Andersen, R. A. (M)
Anderson, J. K. (M)
Anderson, T. C. (M)
Anderson, V. R. (A)
Anderson, W. A. (M)
Andreasen, M. G. (M)
Andrews, R. E. (M)
Archer, W. L. (M)
Arnold, C. A. (M)
Arnold, D. T. (M)
Arnold, J. R. (M)
Auld, B. A. (M)
Austad, R. W. (M)
Austin, N. A. (M)
Ayers, W. R. (M)
Baron, L. C. (M)
Ballieu, H. L. (M)
Bamhart, W. (M)
Barrett, J. C. (M)
Barry, F. N. (M)
Bauer, B. (SM)
Baumgartner, H. E. (M)
Beatie, R. N. (M)
Beaver, W. L. (M)
Bell, R. L. (M)
Benware, R. T. (SM)
Besag, E. T. (A)
Besag, P. L. (M)
Bieseke, R. L., Jr. (SM)
Biroe, W. A. (SM)
Bortlly, L. N. (M)
Bolijahn, J. T. (F)
Bothun, R. B. (M)
Boudrias, R. A., Jr. (M)
Bowes, J. D. (M)
Brady, M. M. (M)
Brichta, E. C. (A)
Brittain, G. H. (SM)
Britton, R. H., Jr. (M)
Brodersen, L. K. (M)
Broner, M. A. (M)
Brothers, C. F. (M)
Brown, A. S. (F)
Brunn, J. (A)
Burt, R. F. (M)
Busch, A. E. (M)
Byerlay, H. L. (SM)
Calfee, R. W. (M)
Campbell, W. E. (M)
Card, D. R. (M)
Carlson, A. R. (M)
Carnahan, C. W. (F)
Chan, W. W. (A)
Chao, S. (M)
Cherry, D. D. (M)
Chiang, F. C. (M)
Chown, J. B. (M)
Christensen, P. C. (A)
Clemens, J. K. (M)
Clifford, D. G. (SM)
Cline, J. F. (SM)
Coale, F. S. (M)
Colburn, D. S. (M)
Coleman, B. H. (M)
Colvin, R. S. (M)
Cone, D. I. (SM)
Cone, D. R. (SM)
Conklin, J. L. (M)
Conquest, E. A. (M)
Constable, R. A. (M)
Cook, R. M. (M)
Corbell, P. I., Jr. (M)
Cory, C. W. (A)
Coulter, H. N. (M)
Cromack, J. C. (M)
Cumming, R. C. (SM)
Cunningham, R. E. (A)
Curtis, E. C. (M)
Cutler, L. S. (M)
Dahlnden, D. T. (M)
Daniels, E. (M)
Davids, L. H. (M)
Davies, R. S. (SM)
Davis, J. L. (A)
Davis, R. A. (SM)
Davis, R. W. (M)
Dawson, C. H. (SM)
Day, J. P. (M)
De Broekert, J. C. (M)
Deck, R. O. (M)
Dell, H. R. (M)
Delling, H. W. (SM)
Dere, D. J. (M)
Desposito, G. J. (A)
Dixon, S. T. (A)
Dollinger, J. G. (M)
Donald, J. C., Jr. (A)
Dorset, D. E. (A)
Downing, J. J. (M)
Duer, S. J. (M)
Dukes, J. N. (M)
Duncan, C. E. (M)
Dunham, F. (M)
Durand, F. B. (M)
Dwight, H. M., Jr. (M)
Dye, R. A. (M)
Eaves, H. H. (SM)
Edson, W. A. (F)
Eisenberg, M. (A)
Eldon, C. A. (M)
Eldred, W. N. (SM)
Eldridge, D. F. (M)
Ellestad, T. G. (M)
Elliott, H. A. (M)
Elspas, B. (M)
Engelbart, D. C. (M)
Engelcke, D. H. (M)
Engler, C. G. (M)
Evans, W. E., Jr. (SM)
Falthorn, N. R. (M)
Falce, L. R. (M)
Falconer, R. (M)
Fank, F. B. (M)
Farley, W. W., III (SM)
Farrand, W. B. (M)
Fawcett, R. G. (SM)
Feln, L. (SM)
Ferguson, J. M. (M)
Ferguson, J. S. (M)
Fifmer, J. C. (M)
Fischmund, H. (M)
Fisher, G. (SM)
Fitzgerald, J. F. (M)
Fleenor, E. G. (M)
Florant, L. E. (M)
Flowerday, T. W. (M)
Floyd, W. B., Jr. (A)
Flynn, J. E. (A)
Fogle, B. T. (M)
Foglesong, R. L. (M)
Fong, A. (SM)
Forrer, M. P. (SM)
Foss, R. C. (A)
Fossum, R. R. (M)
Foster, C. P. Jr. (SM)
Fox, J. W. (M)
Foy, R. H. (M)
Frank, L. E. (M)
Franke, R. T. (M)
Frater, G. D. (A)
Fuller, K. K. (M)
Fuller, L. F. (F)
Fuller, R. L. (M)
Fuller, W. D. (SM)
Fulton, F. F., Jr. (M)
Gado, L. G. (M)
Gallant, J. W. (M)
Gemulla, W. J. (M)
Gessert, E. C., Jr. (M)
Geisinger, W. J. (M)
Gilles, M. A. (M)
Glingsling, A. A. (M)
Gleason, C. A. (M)
Goddard, E. G. (SM)
Gola, A. S. (A)
Goldfarb, E. M. (SM)
Grande, V. J. (M)
Granger, J. V. N. (F)
Green, P. S. (M)
Grigsby, J. L. (SM)
Grinich, V. H. (M)
Gugel, W. B. (A)
Gulick, E. C. (SM)
Guthart, H. (M)
Haas, I. (M)
Hagn, G. H. (M)
Halverson, H. L. (M)
Hand, B. P. (M)
Hans, W. J. (A)
Happ, W. W. (SM)
Harden, O. C. (M)
Harman, W. A. (M)
Harper, G. E. (M)
Harrington, R. D. (M)
Harris, H. F. (SM)
Hauser, J. R. (A)
Hazel, W. C. (M)
Healy, L. D. (M)
Healy, T. J. (M)
Heams, C. B. (M)
Heckinger, R. G., Jr. (M)
Heckler, C. H., Jr. (A)
Helszmann, F. C. (M)
Hennings, W. C. (M)
Herbert, R. S. (SM)
Herold, E. W. (F)
Herr, J. R. (M)
Hewlett, W. R. (F)
Higby, R. D. (M)
Hightower, W. D. (M)
Hilbers, G. K. (A)
Hlavka, L. F. (M)
Hoemi, J. A. (M)
Holden, G. R. (M)
Holland, E. R. (M)
Holmes, W. M. (M)
Horn, H. S. (SM)
Huffman, G. A. (M)
Hughes, J. M. (SM)
Hunt, J. M. (SM)
Hunton, J. K. (SM)
Hurd, E. C. (M)
Inthout, H. A. (A)
Jachowski, R. E. (M)
Jacobus, F. B. (M)
Jarvis, W. E. (M)
Jaye, W. E. (M)
Jenkins, J. (SM)
Jensen, F. J. (M)
Jensen, R. C. (M)
Jepsen, R. L. (SM)
Jeter, I. E. (M)
Johnson, H. R. (SM)
Johnson, R. B. (SM)
Johnston, R. W. (M)
Jones, B. L. (A)
Jones, C. D. (SM)
Jones, J. W. (M)
Joy, D. H. (M)
Kabell, J. (M)
Kaisel, S. F. (SM)
Karabats, C. (M)
Keitel, G. H. (M)
Kiltam, K. F. (A)
Klein, A. L. (M)
Kluznick, R. P. (M)
Knudson, J. A. (M)
Koenig, E. M. (M)
Koning, A. P. (M)
Kotman, C. M. (SM)
Kovalevski, N. N. (M)
Krakauer, S. M. (M)
Krause, R. A. (SM)
Kroemer, H. (M)
Kromer, A. P. (SM)
Kruse, F. W., Jr. (M)
Kuhn, N. J. (M)
Langevin, R. Z. (M)
Larsen, G. J. (A)
Larson, L. G. (M)
Last, J. T. (M)
Lawhorn, R. D. (M)
Lawrence, G. H. (M)
Lee, I. (M)
Lee. R. J. (A)
Levinthal, E. C. (SM)
Lewis, R. E. (M)
Light, R. H. (A)
Lin, D. (M)
Lincicome, D. C. (M)
Livingstone, R. H. (M)
Lob, C. G. (M)
Logan, J. S. (M)
Lohr, D. (SM)
Lomax, J. B. (M)
Loughry, D. C. (M)
Lowhurst, H. G. (SM)
Luedtke, R. L. (M)
Lutzker, L. (SM)
Lynch, H. S. (A)
Mager, R. F. (M)
Magill, D. T. (M)
Mahurin, C. R. (SM)
Malter, L. (F)
Mannas, R. G. (M)
Marion, T. M. (SM)
Markakis, M. J. (M)
Marsh, C. J. (M)
Martin, D. W. (M)
Martin, J. A. (A)
Martin, J. A. (M)
Maschino, R. G. (SM)
Masters, D. W. (M)
Maudens, L. C. (M)
Mauldin, C. W. (A)
Mays, A.S. (A)
McCann, J. E. (M)
McClellan, C. E. (SM)
McClintock, R. K. (SM)
McFarland, M. S. (M)
McKay, A. R. (M)
McKibbin, D. D. (M)
Merk, R. V. R. (A)
Metcalfe, J. D. (M)
Meyer, B. W. (M)
Milazzo, C., Jr. (M)
Miller R. E. (SM)
Miller, S. W. (M)
Miller, T. A. (M)
Minich, C. E. (M)
Mohr, H. J. (M)
Moore, G. E. (M)
Moran, J. F. (SM)
Morcott, T. (M)
Morgan, E. C. (M)
Morris, A. J. (SM)
Morris, D. J., Jr. (M)
Morris, R. E. (M)
Morris, R. J. (M)
Mullen, T. R. (M)
Muller, M. W. (SM)
Murphy, R. E., Jr. (M)
Nelson, F. A. (M)
Nelson, J. N. (M)
Nelson, R. B. (M)
Newton, R. M. (M)
Nickel, L. (SM)
Nitz, I. C. (M)
Norman, R. H. (A)
Novick, G. (M)
Noyce, R. N. (M)
Nunan, C. S. (SM)

Pacoima (LA-SF-7)
Briggs, J. G. (M)
Brigham, L. R. (M)
Brownstein, G. (SM)
Castle, K. J. (M)
Cleveland, P. (M)
Clintsman, R. B. (M)
Cowart, B. E. (M)
Deitz, J. L. (M)
Deyo, A. E. (A)
Dunn, G. R. (M)
Emus, H. (A)
Fingerett, J. A. (M)
Franco, M. (M)

Oberg, E. A. (A)
Ogle, H. M. (SM)
Ohtomo, R. H. (M)
Oka, A. K. (M)
Okamoto, H. K. (M)
Oliver, B. M. (F)
Olson, V. E. (M)
Otsuka, S. P. (M)
Ottem, I. E. (M)
Ozner, E. S. (SM)
Ozaki, G. K. (A)
Pacak, G. M. (A)
Packard, D. (F)
Palmer, D. L. (M)
Palmer, J. K. (M)
Pappas, N. L. (SM)
Parks, G. S., Jr. (A)
Pearson, P. A. (M)
Pedersen, T. H. (M)
Perkins, T. J. (M)
Petersen, G. W. (M)
Peterson, D. C. (M)
Pettegrew, J. B. (M)
Pettengill, D. A. (M)
Pillsbury, A. F., Jr. (M)
Plough, C. T. Jr. (M)
Popaduk, G. F. (M)
Porter, N. E. (SM)
Poulter, H. C. (M)
Powers, G. L. (M)
Price, V. G. (M)
Prickett, R. J. (M)
Prommer, A. (A)
Pruefert, H. (M)
Purl, O. T. (SM)
Putz, J. L. (M)
Ramsay, J. D. (M)
Rathjen, K. R. (M)
Ratner, M. (M)
Rawlins, R. E. (SM)
Razl, S. (M)
Rector, R. H. (SM)
Relche, L. P. (M)
Rendall, A. H. (M)
Reynolds, R. J. (M)
Riley, F. J. (A)
Riley, M. E. (A)
Roberts, C. S. (M)
Roberts, J. M. (SM)
Roberts, L. A. (A)
Robinson, A. L. (SM)
Rockwell, W. S. (M)
Rogers, R. M. (M)
Rolzen, J. (M)
Rolfe, J. J. (M)
Rooney, J. P. (M)
Rorden, L. H. (M)
Rosenberg, J. M. (SM)
Rosenman, Z. (M)
Rosenstein, M. D. (M)
Rosenthal, H. A. (A)
Roth, I. (M)
Ruddock, K. A. (M)
Ruetz, J. A. (M)
Russell, E. B., Jr. (M)
Rust, D. C. (A)
Ryan, A. H. (SM)
Sah, C. (M)
Sailor, D. E. (M)
Sailor, R. W., Jr. (SM)
St. Clair, M. W. (M)
Samuels, A. H. (M)
Santana, G. R. (M)
Sarda, R. (A)
Scheuch, D. (SM)
Scholz, C. E. (F)
Schonberg, R. G. (SM)
Schreiner, R. J. (M)
Schreiner, R. W. (M)
Schubert, R. A. (M)
Schultz, W. R. (M)
Schulz, R. F. (M)
Schumacher, F. M. (M)
Seaward, P. E. (M)
Sedin, J. W. (A)
See, C. J. (A)
Serang, A. M. (SM)
Shapiro, L. (M)
Sharp, E. D. (M)
Shaw, L. G. (M)
Shaw, T. M. (SM)
Shear, H. (M)
Sherrill, P. H. (M)
Shimizu, J. K. (M)
Sholes, A. E. (SM)
Sibley, C. E. (SM)
Simons, W. S. (A)
Singleton, R. C. (SM)
Slocum, R. L. (M)
Smith, A. R. (M)
Smith, G. A. (SM)
Smith, K. E. (A)
Smith, S. L. (M)
Smith, S. R. (A)
Snyder, W. (M)
Sorensen, H. O. (M)
Sorenson, K. G. (M)
Sorg, L. F. (M)
Spangenberg, K. (F)
Sparks, H. (M)
Spilker, J. J., Jr. (M)
Spraglns, J. D., Jr. (M)
Stack, B. R. (SM)
Stafford, L. E. (M)
Stanley, G. C., Jr. (M)
Stanley, S. M. (M)
Statler, T. W. (M)
Stead, D. A. (M)
Stearns, H. M. (F)
Steenhausen, D. R. (A)
Stelter, E. C. (A)
Stempel, V. M. (M)
Stephenson, J. M. (M)
Sterreti, J. E. (M)
Stevens, J. C. (A)
Stier, R. P. (M)
Stinson, W. D. (M)
Stoltz, J. R. (M)
Storer, T. S. (M)
Strassner, R. M. (M)
Straube, G. F. (M)
Streleski, T. L. (M)
Strum, P. D. (SM)
Sullivan, J. W. (M)
Sutherland, J. (A)
Swanson, W. E. (M)
Swedlund, L. E. (SM)
Swyryd, M. (A)
Szeremeta, P. J. (M)
Tallmadge, G. E. (M)
Tanaka, R. I. (M)
Tanner, W. O., Jr. (M)
Talman, R. L. (M)
Tatum, J. G. (M)
Teicher, S. W. (M)
Ten Zeldam, H. J. (A)
Thielen, L. R. (M)
Thomas, S. F. (M)
Thompson, K. L. (M)
Thormahlen, W. H. (M)
Tomiyasu, K. (SM)
Towle, R. W. (M)
Trager, J. L. (M)
Trout, R. C. (M)
Tucker, C., Jr. (A)
Tucker, J. C. (M)
Turner, G. K. (M)
Turner, T. F. (M)
Ullman, P. J. (SM)
Ura, F. (M)
Usim, W. (M)
Vance, E. F. (M)
Vanderbeek, H. B. (M)
Van De Riet, E. K. (M)
Van Green, J. (M)
Vartanian, P. H., Jr. (SM)
Vea, T. H. (M)
Vehn, R. E. (SM)
Veldhuizen, F. T. (A)
Veselovsky, L. R. (M)
Vickers, M. L. (M)
Villard, O. G., Jr. (F)
Vogelzang, W. F. (M)
Vurek, G. G. (M)
Wada, G. (M)
Wagener, W. G. (SM)
Wahuhahlig, W. H. (M)
Wallace, J. M., Jr. (M)
Walter, R. L. (SM)
Watson, R. H. (SM)
Watson, W. H. (M)
Weaver, J. N. (M)
Webber, S. E. (F)
Weis, W. G. (M)
Weissenstern, M. (M)
Weissman, I. (M)
Weissman, J. G. (SM)
Wells, H. N. (M)
Wespiser, H. J. (M)
Whitburn, R. A. (M)
White, F. M., Jr. (M)
Whitestine, P. W. (M)
Whitson, A. L. (M)
Wiesenbach, R. B. (A)
Wiltol, A. (M)
Wilkens, M. W. (M)
Willett, D. R., Jr. (M)
Williams, R. R. (A)
Wilson, A. M. (M)
Wilson, F. H., III (M)
Wise, W. L. (M)
Wisnlewski, J. H. (M)
Witherspoon, J. T. (M)
Wolf, M. F. (M)
Wolfson, A. S. (M)
Wong, E. C. (M)
Wright, R. B., Jr. (M)
Wye, R. E. (M)
Yadavalli, S. V. (M)
Yocom, W. H. (M)
Yoder, E. R. (M)
Zangrando, D. R. (M)
Zeidler, H. M. (M)
Zitelli, L. T. (M)

Palos Verdes Estates (LA-7)
Alter, J. E. (M)
Ankerstar, R. H. (M)
Aristei, J. (M)
Arni, E. L. (SM)
Barnes, J. G. (M)
Barnett, J. T. (M)
Bobrow, E. N. (M)
Boughton, E. M. (M)
Brewster, R. A. (M)
Burcham, N. P. (A)
Capuch, R. A. (M)
Chambers, J. T. (M)
Clark, R. D. (M)
Cully, R. A., Jr. (SM)
Daniel, R. E. (M)
Dazey, M. H. (SM)
Defenbach, R. W. (M)
Develet, J. A., Jr. (M)
Eckdahl, D. E. (SM)
Flynt, F. V. (A)
Gleghorn, G. J. (M)
Goodell, E. M. (M)
Hannum, D. E. (M)
Hayes, W. B. (M)
Hebenstreit, W. B. (SM)
Holzer, N. T. (A)
Honor, H. I. (M)
Hubbard, J. W. (M)
Hummer, J. L. (M)
Isley, C. T., Jr. (A)

Jensen, L. E. (M)
Johnson, L. P. (SM)
Jonas, K. L. (M)
Kaufman, F. H. (M)
Kellner, M. (A)
King, C. F. (M)
Kirkman, R. A. (SM)
Kukel, J. (M)
Laverty, N. P. (M)
Leone, W. C. (M)
Little, T. D. (A)
Loft, R. E. (M)
Marrison, W. A. (F)
McCoy, R. T. (SM)
McDonald, J. B. (M)
McKenna, Q. C. (SM)
McLaughlin, G. (SM)
McRae, F. B. (M)
Meader, G. S. (SM)
Mitchell, E. (M)
Moore, H. E. (SM)
Mortensen, R. E. (M)
Muldoon, W. J. (SM)
Ohlmann, G. A. (M)
Ohst, R. J. (M)
Owens, A. T. (SM)
Peckham, D. D. (M)
Peterson, W. E. (SM)
Pitman, G. R., Jr. (M)
Schauwecker, H. E. (M)
Scrafford, R. L. (M)
Seaton, A. F. (A)
Shedd, J. L. (M)
Shestag, L. N. (M)
Shook, G. R. (M)
Shuey, L. S. (A)
Spanier, B. (M)
Speer, W. S. (A)
Stevens, F., Jr. (SM)
Swiger, J. M. (M)
Thorp, W. E. (SM)
Waoenseil, W. (SM)
Walance, C. G. (SM)
Ward, R. C. (M)
Wensley, D. C. (M)
Wieneke, J. R. (SM)
Wilson, W. E. (A)
Wintroub, H. J. (M)
Withers, J. W. (M)
Wood, A. J. (M)

Panorama City (LA-SF-7)
Berri, R. E. (A)
Bule, J. L. (M)
Davis, B. E. (SM)
Flyr, J. C. (A)
Kleinschmid, C. J. (A)
Liska, J. (M)
Moore, L. W. (A)
Rosenthal, W. F. (M)
Sperling, I. (M)
Tyler, R. T. (M)

Paramount (LA-SA-7)
Appelman, J. F. (M)
Cahn, L. (SM)
Child, C. H. (SM)
Green, C. S. (A)
Ley, E. W. (A)
Noble, J. G. (M)
Pryga, S. A. (M)

Pasadena (LA-P-7)
Abbott, R. B. (A)
Adams, J. A. (M)
Adler, J. A. (A)
Allen, D. A. (M)
Ames, W. S. (M)
Andres, A. J. (M)
Apel, W. C. (M)
Arcand, R. T. (M)
Arens, W. E. (M)
Ashby, R. M. (F)
Bacon, R. N. (M)
Barasch, M. V. (SM)
Barton, L. R. (M)
Baugh, H. W. (M)
Bemis, R. C. B. (A)
Betzer, W. E. (M)
Beuger, J. C. (M)
Blackman, W. S. (M)
Blanchard, B. R. (M)
Blatterman, H. L. (M)
Bradburn, J. R. (SM)
Bradley, W., Jr. (M)
Breitwieser, C. J. (F)
Brockman, M. H. (SM)
Brown, D. E. (M)
Brown, P. M. (M)
Bull, H. T. (M)
Bumett, J. H. (SM)
Cady, W. G. (F)
Caldwell, P. G. (SM)
Carter, R. C. (A)
Chalin, R. L. (M)
Chaffin, N. L. (M)
Chao, J. T. (M)
Chapman, B. R. (M)
Charpentier, D. E. (M)
Chase, N. C. (M)
Chemiack, A. E. (M)
Choate, R. L. (M)
Christiansen, R. A. (M)
Clement, W. G. (A)
Coker, F. B. (M)
Cowley, J. P. (M)
Cromleigh, R. G. (A)
Cummings, C. I. (SM)
Curry, W. L. (M)
Cutting, E. (M)
Darling, H. R., Jr. (M)
David, J. R. (SM)
Davis, D. C. (M)

Davis, W. H. (M)
Dennison, P. R. (M)
Diercks, A. D. (M)
Dixon, W. J. (M)
Dow, D. G. (M)
Eckstein, E. A. (A)
Etazar, S. (M)
Ellis, A. T. (M)
Emerling, R. A. (M)
Erdman, D. C. (A)
Emstene, M. P. (M)
Enway, D. D. (M)
Escher, P. H. (M)
Everingham, L. R. (SM)
Fleming, L. (SM)
Fling, J. J. (M)
Fong, G. K. (A)
Forrester, A. T. (SM)
Gally, S. K. (M)
Garber, L. F. (M)
Gardner, J. A. (A)
Gates, C. R. (M)
George, N. (M)
Genie, A. L., Jr. (M)
Gilbertson, B. I. (M)
Glaser, E. L. (SM)
Gleim, R. A. (M)
Goetz, H. E. J. (M)
Golden, R. M. (M)
Goldsmith, P. (M)
Gould, R. W. (M)
Gratton, R. E. (M)
Gruder, J. F. (M)
Haas, J. K. (A)
Hale, C. R. (M)
Hamilton, R. C. (M)
Harden, P. A. (M)
Harker, R. B. (M)
Harriman, T. J. (M)
Hartel, C. F., Jr. (M)
Hatchi, S. (M)
Hawn, L. R., Jr. (M)
Herber, J. C. (SM)
Herman, N. H. (M)
Heyser, R. C. (M)
Higa, W. H. (SM)
Hill, R. E. (M)
Hiraoka, F. A. (M)
Holladay, J. A. (M)
Homsy, J. A. (SM)
Hotchkin, E. E. (M)
Howes, E. T. (M)
Humphrey, F. B. (M)
Huth, W. R. (SM)
Ireland F. (SM)
Jack, R. W. (M)
James, G. C. (M)
Josias, C. S. (M)
Jugend, J. (M)
Kawano, K. (M)
Keltun, E. E. (M)
Klebert, M. V., Jr. (F)
King, R. C. (A)
King, T. H. (M)
Klein, W. (M)
Knickrehm, A. F. (A)
Koehn, W. A. (M)
Kreuz, W. E. (M)
Krossa, K. D. (M)
Kuehl, H. H. (M)
Kunzelman, R. C. (M)
Kuta, G. (SM)
Lang, J. A. (A)
Langmuir, R. V. (M)
Lavine, R. (M)
Lawrence, J. F., Jr. (SM)
Lee, D. K. (M)
Lieberman, A. G. (M)
Lindeman, O. E. (SM)
Lindley, P. L. (SM)
Maass, C. F. (A)
MacGinitie, G. (A)
Marshall, R. (M)
Martin, B. D. (M)
Maserjian, J. (M)
Maure, D. R. (SM)
McCann, G. D. (SM)
McClure, L. W. (SM)
McCool, J. M. (M)
Mead, C. A. (M)
Meyer, J. F. (M)
Middlebrook, R. D. (SM)
Miller, G. J. (M)
Moran, R. B., Jr. (SM)
Morison, R. (M)
Moseley, F. L. (F)
Mott, J. S. (M)
Motz, H. (A)
Mullin, F. J. (M)
Musty, C. V. (M)
Neff, G. A. (M)
Nielsen, D. B. (A)
O'Neal E. D. (M)
Owen, R. P. (SM)
Papas, C. H. (M)
Paull, D. L. (M)
Pera, J. E. (A)
Pickering, W. H. (F)
Pierson, R. G. (M)
Polk, J. C. (M)
Poppen, L. W. (M)
Porter, J. C., Jr. (M)
Powell, R. V. (M)
Radhakrishnan, V. (M)
Ranks, J. E. (M)
Reaser, R. L. (SM)
Rechtin, E. (SM)
Reese, E. R. (M)
Regnier, N. J. (M)
Reilly, R. R. (M)
Richter, H. L., Jr. (SM)
Riddle, F. M. (SM)
Rieth, H. F. (A)

Sandefur, K. L. (M)
Sato, T. (M)
Scaff, D. M. (M)
Scharer, M. E. (M)
Sefton, W. E. (M)
Seigle, R. K. (M)
Shaffer, P. A., Jr. (M)
Sharp, J. C. (M)
Shaw, R. A. (A)
Sherer, P. N. (M)
Shimabukuro, F. I. (M)
Shuttlse, Q. M. (M)
Sidle, C. D. (M)
Silvertooth, E. W. (M)
Simmons, E., Jr. (M)
Sink, R. L. (F)
Slavin, M., III (A)
Smith, H. A. P. (M)
Smith, W. A. (M)
Sorensen, T. C. (M)
Stevens, D. F. (A)
Stevens, R. (M)
Stevens, R. A. (A)
Stolz, R. F. (M)
Stuart, J. L. (A)
Sugimoto, K. G. (M)
Sydnor, T. E. (M)
Talmo, R. E. (M)
Titsworth, R. C. (M)
Toukdarian, R. Z. (SM)
Updike, O. L., Jr. (M)
Vail, R. W. (M)
Vaughan, V. Z. (A)
Vernon, F. L., Jr. (M)
Wade, E. P. (M)
Wagner, D. W. (A)
Walker, F. R. (SM)
Ward, E. B. (M)
Warner, A. H. (SM)
Watts, E. W. (M)
Watts, H. M. (SM)
Wedel, J. J., Jr. (M)
Welget, W. G. (SM)
Wilson, G. P. (SM)
Wilson, M. C. (SM)
Wilts, C. H. (M)
Winsor, K. L. (M)
Winter, A. R. (A)
Wood, D. O. (SM)
Wright, H. D. (SM)
Zarem, A. M. (SM)
Zeman, J. A. (M)

Pebble Beach (SF-7)
Menneken, C. E. (M)
Pfenning, R. A. (M)

Pedro Valley (SF-7)
Muenzer, R. H. (M)

Penryn (SAC-7)
Yoshizuka, R. K. (A)

Petaluma (SF-7)
Boutz, F. E. (M)
Ravenscroft, H. A. (M)

Pico (LA-SA-7)
Swanson, R. L. (M)

Pico Rivera (LA-SA-7)
Adams, R. J. (M)
Riggs, P. F. (M)
Wilt, A. N. (M)

Piedmont (SF-EB-7)
Cole, C. H. (M)
Crigler, J. J. (M)
Evans, C. P. (M)
Fliegner, A. F. (M)
Forster, A. G. (M)
Lasky, P. G. (M)
Love, R. E., Jr. (M)
Mac Mahon, A. E. (SM)
Palmer, D. H. (A)

Pinole (SF-EB-7)
Buchanan, L. R. (M)
Sanders, R. B. (M)

Placentia (LA-SA-7)
Johnson, P., Jr. (M)
Kjerulff, E. R. (M)

Playa Del Rey (LA-7)
Bainbridge, B. O. (M)
Barhydt, H. (A)
Beckman, J. A. (SM)
Bell, J. E. (M)
Beveridge, J. M. (M)
Cadman, A. O. (M)
Carrier, G. T. (M)
De Wolf, J. L. (M)
Eckelmann, R. R. (M)
Edelman, W. E., Jr. (M)
Erickson, R. L. (A)
Erwin, H. P., Jr. (M)
Eshbaugh, R. L. (M)
Exner, W. L. (SM)
Fenton, A. N. (SM)
Fenton, R. N. (M)
Fish, K. L. (A)
Fisher, M. K. (M)
Foster, T. J. (SM)
France, R. W. (M)
Freytag, R. C. (A)
Gaul, E. R. (SM)
Gerardi, F. R. (M)
Gillis, D. E. (M)
Hayes, E. A. (SM)
Herin, J. G. (M)
Holtrichter, J. (M)
Irish, J. B. (M)



Johnson, R. P. (SM)
Jones, A. F. (M)
Keller, W. N. (A)
Kost, B. F. (M)
Levonian, P. V. (M)
Lobb, C. W. (M)
Mackie, W. L. (M)
McConnell, R. W. (M)
McJunkin, F. C. (M)
Miller, E. F. (M)
Rainville, L. E. (M)
Rand, S. (M)
Rousculp, P. J. (M)
Royal, D. E. (A)
Ruch, D. E. (M)
Scholtz, R. A. (M)
Sirvis, G. S. (M)
Stephenson, A. L. (M)
Strom, R. L. (SM)
Thomson, D. H. (M)
Uncapher, K. W. (M)
Weed, H. L. (M)
Witzen, E. L. (M)
Wooldridge, E. J. (M)
Wyllie, W. W. (M)
Yellman, T. W. (M)
Ziegler, R. M., Jr. (M)

Pleasant Hill (SF-EB-7)
Collins, H. E. (M)
Davis, R. W. (M)
Hall, R. F. (A)
Luchter, D. (M)
Nielsen, G. A. (M)
Roush, G. E. (SM)
Single, C. H. (M)
Skiff, E. W. (SM)
Voelker, F., III (SM)

Pleasanton (SF-EB-7)
Casterson, R. H. (M)
Curry, C. R. (M)
Hall, H. (SM)
Helgeson, G. L. (M)
Metz, R.E. (M)
Werner, R. E. (M)

Point Mugu (LA-B-7)
Bamcastle, L. (M)
Corvi, J. A. (M)
Fain, W. W. (M)
Githens, D. P., Jr. (M)
Greene, W. E. (M)
Heron, D. J. (M)
Isenson, R. S. (M)
Kellner, J. K. (M)
Reins, E. R., Jr. (M)
Richardson, B. (M)
Schreier, W. J. (M)
Toohill, D. L. (M)
Williams, R. G. (M)

Pomona (LA-OB-7)
Allen, J. W. (SM)
Bailey, N. A. (M)
Balsley, L. L. (M)
Benson, J. (M)
Black, L. M. (A)
Blackwell, M. B. (M)
Bomar, R. L. (M)
Boothe, G. W. (M)
Bredon, A. D. (M)
Brewer, C. P. (SM)
Bryla, L. (M)
Canchola, J. M. (M)
Clifford, R. F. (M)
Collins, W. G. (M)
Craig, F. D. (SM)
Davis, O. R. (M)
Dix, F. L. (A)
Domen, S. L. (M)
Donnelly, R. W. (M)
Douglas, I. M. (M)
Drake, W. A. (M)
Dunn, C. E. (A)
Edsinger, L. E. (M)
Egeling, F. W. (M)
Eggeman, D. J. (M)
Ellis, G. M. (SM)
Elzie, O. G. (M)
Enegren, F. D. (M)
Evendorff, S. (M)
Feather, J. B. (M)
Flanders, A. E. (M)
Froessel, C. H. (M)
Gastineau, L. (M)
Gelman, D. S. (A)
Goff, L. D. (SM)
Gotzler, R. L. (M)
Gross, F. A. (M)
Hanson, M. E. (M)
Harris, H. F. (A)
Hasenbeck, H. W. (SM)
Heumann, R. A. (A)
Hinderaker, L. M. (M)
Hino, R. H. (A)
Home, C. F., Jr. (F)
Hurmence, G. D. (M)
Ivey, R. W. (M)
Jaczewicz, E. J. (M)
Jahn, R. C. (M)
Kazelis, A. J. (M)
Kirk, C. N. (M)
Kirton, P. E. (A)
Knight, J. D. (M)
Le Coca, V. L. (M)
Lee, H. J. (M)
Le Fevre, C. E. (M)
Low, R. G. (M)
Lubeck, R. V. (M)
Magnenat, R. A. (M)
Marino, L. A., Jr. (A)
Marshall, R. R. (M)

Martin, G. W. (M)
Matthews, W. C. (A)
Maudal, I. (M)
McDaniel, C. E. (A)
McDermott, C. H. (M)
McLachlan, G. W., Sr. (M)
Mickelson, J. R. (M)
Morell, C. S. (M)
Nelson, E. K. (M)
O'Brien, J. C. (SM)
O'Dell, G. M. (SM)
Omiya, R. Y. (M)
Patterson, T. C. (SM)
Pemberton, T. (M)
Pizzuti, A. D. (M)
Ranish, H. (M)
Rea, D. E. (A)
Reeves, J. T. (M)
Schapiro, R. (M)
Schumacher, C. M. (M)
Scully, J. K. (M)
Shimada, G. (M)
Smith, C. R., Jr. (M)
Smith, R. D. (M)
Sprague, D. L. (A)
Squires, D. C. (A)
Stephan, A. (M)
Stichl, R. J. (SM)
Stone, R. E. (M)
Sutton, A. A., Jr. (M)
Taylor, C. A., Jr. (M)
Thorpe, R. W. (SM)
Turner, W. L. (M)
Van Deventer, J. A. (M)
Villere, A. C. (SM)
Ward, W. S. (M)
Welby, C. E. (M)
Wellsand, R., Jr. (M)
Wessels, P. S. (SM)
Wingard, C. G. (M)
Wink, G. R. (M)
Woore, E. H. (M)
Worden, D. W. (SM)
Young, T. (M)
Zeller, H. R. (M)
Zusag, R. J. (M)

Portervitle, (SF-7)
Margot, A. T. (M)
Poundstone, J. R. (M)

Port Hueneme (LA-B-7)
Braam, R. M. (M)
Cook, D. L. (M)
Dunham, D. C. (M)
Rich, A. P. (M)
Senesac, D. E. (A)
Shroyer, H. M. (A)
Waddell, T. P. (M)

Portola Valley (SF-7)
Ashe, W. B. (A)
Athey, S. W. (SM)
Battelle, R. B. (A)
Burke, R. J. (SM)
Davies, L. E. (SM)
Dawson, P. F. (M)
Hancock, N. (M)
Larkin, K. T. (SM)
Legge, R. B. (M)
Milwitt, W. (SM)
Rock, A. J. (M)
Smaller, P. (M)
Swanson, J. P. (M)
Ter Veen, L. A. G. (SM)
West, R. A. (M)

Portuguese Bend (LA-7)
Westcott, V. C. (M)

Poway (SD-7)
Brunt, N. F. (M)
Dershem, E. R. (M)
Emerson, R. M. (M)
Grindle, C. E. (SM)
Kaplan, M. N. (M)
McFadden, E. R. (M)
McLauchlan, J. M. (A)
Nyberg, L. V. (A)
Winans, G. L. (M)

Quartz Hill (LA-7)
Sutherland, L. C. (A)

Quincy (SAC-7)
Moss, R. A. (A)

Ramona (SD-7)
Broome, P. W., Jr. (M)
Clark, M. R. (M)

Rancho Cordova (SAC-7)
Christman, T. J. (M)
Harding, J. R. (M)
Hough, C. R. (M)
Kinnison, F. D., Jr. (M)
Shaw, M. E. (SM)

Rancho Santa Fe (SD-7)
Gardner, B. R. (SM)
Gonsett, F. R. (SM)
Haflinger, D. J. (SM)
Herbert, W. J. (M)
Sessions, S. H. (M)

Red Bluff (SAC-7)
Boer, P. E. (A)

Redding (SAC-7)
Banks, D. B. (A)
Hoeflich, A. F. (SM)
Machin, E. K. (A)

Maxey, G. S. (M)
Olsen, L. F. (A)

Redlands (LA-OB-7)
Brunetti, C. (F)
Crowley, J. J. (SM)
Herman, J. B. (A)
Miller, P. M. (M)

Redondo Beach (LA-7)
Albright, A. R. G. (M)
Barrar, R. B. (M)
Bartholomew, H. R. (M)
Beard, M. R. (SM)
Bettinelli, K. F. (M)
Biddle, J. M. (M)
Burton, J. R. (M)
Butts, G. A. (M)
Covington, A. W. (M)
Dahl, E. E. (M)
Date, A. W. (SM)
Davis, C. H. (M)
Eckess, W. S., Jr. (M)
Egan, J. J. (M)
Fiet, O. (SM)
Fontana, J. A. (M)
Gaston, R. N. (A)
Gould, E. (A)
Hanst, R. K. (M)
Hildreth, D. E. (A)
Howard, S. L. (M)
Jolley, N. A. (SM)
Kind, D. E. (M)
King, G. J. (A)
Klrlin, E. V. (M)
Kolostyak, J. (M)
Lerum, L. R. (M)
Lewison, G. L. (M)
Lindberg, H. E. (M)
Lytle, A. C. (SM)
Martin, D. (SM)
McClellan, L. D. (M)
McKesson, L. J. (SM)
McLeod, M. G. (M)
Oess, F. G. (M)
Olivares, J. E., Jr. (A)
Osborn, A. J. (M)
Owens, W. W. (A)
Pasonski, G. E. (M)
Pearce, C. R. (M)
Pi.tey, N. S., Jr. (M)
Pregler, R. A. (M)
Pruden, H. K. (A)
Reddicks, J. E. (M)
Reller, G. S. (M)
Risinger, P. N. (M)
Russell, B. J. (M)
St. John, J. L. (M)
Saiml, T. W. (M)
Shackleton, J. R. (M)
Simpson, C. H. (M)
Steinhoff, H. W., Jr. (M)
Weir, K. O. (M)
Williams, F. R. (A)
Winner R. N. (M)
Wolverton, R. W. (M)

Redwood City (SF-7)
Aiff, W. H., Jr. (M)
Allen, D. P. (M)
Anissimov, B. A. (M)
Ashley, A. C. (M)
Baer, M. H. (A)
Barbano, N. (M)
Barkley, W., Jr. (A)
Barnard, G. A., III (SM)
Benassai, B. D. (A)
Benz, B. D. (M)
Berry, B. H. (A)
Bleasdale, E. J. (M)
Boboricken, S. (A)
Bradford, C. W. (M)
Brooks, J. E. (M)
Burke, G. G. (A)
Cerruti, B. A. (M)
Cheney, C. O. (M)
Christie, J. W. (M)
Conti, E. A. (M)
Cook, G. V. (A)
Corn, J. W. (M)
Covell, D. F. (M)
Dover, J. J. (SM)
Dunne, P. F. (M)
Dyura, E. (A)
Ellis, I. M. (M)
Elfving, C. T. (M)
Farnon, W. B. (SM)
Fisher, W. C. (SM)
Fletcher, M. W. (M)
Fraser, E. J. (A)
Glaser, R. G. (M)
Granberry, H. W. (M)
Gundy, P. L. (M)
Harding, V. C. (A)
Hebb, J. W. (M)
Heine, R. A. (M)
Held, H. E. (M)
Hill, L. E. (M)
Hinners, K. J. (M)
Hoch, O. L. (M)
Holtmann, E. H. (A)
Ice, G. E. (M)
Jones, R. L. (A)
Kalder, H. J. (M)
Kanytsky, W. (M)
Kazanjian, H. A. (A)
Keenan, M. G. (M)
Kletz, E. K. (M)
Kushnick, A. E. (M)
Kreiss, W. T. (M)
Lacy, P. D. (SM)
Leong, J. K. (M)

Leslie, F. E. (SM)
Liang, M. T. M. (M)
Long, C. R. (M)
Lowman, C. E. (M)
Luebke, W. R. (SM)
Markevitch, B. V. (M)
Mawdsley, D. M. (M)
McAlpine, W. N. (M)
Merritt, C. H. (SM)
Morrison, W. L., Jr. (M)
Morwood, R. C. (M)
Murphy, H. E. (M)
Nagy, G. (SM)
Nye, W. H. (M)
Orr, J. E. (M)
Orsak, L. E. (M)
Pachynski, A. L. (SM)
Patterson, G. K. (SM)
Phillips, R. M. (A)
Plotnikoff, G. P. (M)
Reed, D. E. (M)
Rich, P. L. (M)
Riddell, A. I. (A)
Rolly, W. J. (A)
Rudee, E. (M)
Ruttenberg, R. M. (M)
Scarborough, H. L. (A)
Schmidt, R. C. (SM)
Selsted, W. T. (F)
Seth, T. L., Jr. (A)
Short, R. A. (M)
Silverstein, P. K. (A)
Smaha, N. F. (A)
Smith, G. M. (M)
Spier, C. G. (M)
Stahl, R. J. (M)
Stallman, H. E. (M)
Stewart, J. A. (M)
Stoddard, D. J., Jr. (M)
Stratton, B. L. (M)
Sutton, H. B. (M)
Swisher, C. F. (M)
Tarnodzychik, P. (SM)
Thompson, R. E. (M)
Tipping, C. C., Jr. (M)
Tuck, E. F. (M)
Valles, B. V. (M)
Walter, C. A., Jr. (M)
Warner, D. B. (M)
Wattenbarger, J. W. (M)
Wilder, T. W., III (M)
Wirth, C. H. (M)
Wood, J. R. (M)
Youngstrom, J. R. (M)

Reseda (LA-SF-7)
Abernathy, O. R. (A)
Babcock, R. L. (A)
Barnett, R. I., Jr. (M)
Beans, J. B. (M)
Berger, J. B. (M)
Blanton, M. J. (A)
Blomeyer, L. S. (M)
Briel, L. A. (A)
Brown, R. M. (A)
Busenkell, C. C. (SM)
Carson, V. S. (F)
Conover, W. V. (M)
Eckerman, R. C. (M)
Elberger, M. (A)
Epstein, M. P. (M)
Frank, C. E. (M)
Freedman, L. M. (A)
Garland, M. D., Jr. (M)
Goldstein, A. (M)
Goulet, T. A. (M)
Green, R. D. (M)
Greif, L. (M)
Harlan, R. E. (M)
Held, H. (SM)
Henrion, W. S. (A)
Hughes, R. A. (M)
Kaplan, A. J. (M)
Kelling, D. G. (M)
Kitchen, R. L. (M)
Lerman, N. (M)
Lester, V. R. (M)
Loll, W. E. (M)
Mackey, R. C. (M)
Markowski, E. (M)
Maynard, R. C. (M)
Minert, H. D. (M)
Mock, R. E. (M)
Morgan, H. C. (SM)
Mumma, J. W. (SM)
Paolantonio, A. (M)
Pedersen, F. C. (M)
Pedigo, W. R. (M)
Peterson, J. A. (A)
Plank, C. (M)
Politl, E. Y. (M)
Politis, S. (M)
Plasznik, C. J. (M)
Reth, A. R. (M)
Schuster, N. J. (M)
Schy, S. (A)
Smith, J. E. (SM)
Sottock, S. G. (M)
Stegelmann, E. J. (SM)
Stevenson, E. (M)
Sundberg, R. A. (M)
Symans, J. H. (A)
Tarr, R. (M)
Thaler, S. (A)
Thomas, R. L. (M)
Underberger, G. M. (SM)
Welch, D. K. (M)
Wills, J. D. (M)
Wood, J. R. (M)
Zak, E. T. (A)

Rialto (LA-OB-7)
Cool, P. E. (M)

Richmond (SF-EB-7)
Arens, V. R. (M)
Hamilton, E. P. (A)
Hom, N. P. (A)
Hussey, J. L. (SM)
Jensen, R. H. (A)
Krivohlavek, G. M. (M)
Larsh, A. E., Jr. (M)
Lovell, E. L. (A)
Metz, G. F. (M)
Nelson, O. A. (A)
Pritchett, W. (SM)
Ross, J. R. (M)
Smith, H. L. (M)
Thomason, T. H. (A)
Watson, H. M. (M)

Ridgecrest (CL-7)
Brown, L. B. (A)
Crawforth, J. E. (M)
Dorsey, S. E. (M)
Fowler, T. C. (M)
Freitag, W. E. (M)
Jenkins, C. E. (M)
Johansen, J. S. (M)
Kasper, D. P. (A)
Larsen, C. L. (A)
Madsen, L. L. (M)
Paulsen, A. J. (M)
Schneider, N. J. (M)
Schrur, S. T. (A)
Seeger, J. A. (M)
Skeeters, R. N. (M)
Thomas, D. W. (A)
Tkachuk, J. J. (M)
Walsh, J. E. (M)

Rio Vista (SF-7)
Bird, J. R. (SM)

Rivera (LA-SA-7)
Crosby, J. (M)
Fuller, C. A. (A)
Lynn, F. M. (M)
Samp, T. A. (M)

Riverside (LA-OB-7)
Atchison, F. S. (SM)
Barton, R. W. (SM)
Bauer, R. L. (M)
Berns, K. L. (M)
Beyer, J. J. (M)
Bishop, B. E. (A)
Blasjo, M. H. (M)
Blutman, E. (SM)
Borunda, G. S. (M)
Bowser, W. S. (SM)
Bradley, J. (M)
Brown, M. H. (M)
Buchanan, W. D. (SM)
Buchfeller, J. E. (M)
Bullock, D. W. (M)
Button, W. E. (M)
Byrne, J. F. (F)
Casey, S. D. (M)
Christensen, L. E. (M)
De Marco, R. J. (A)
De Young, C. M. (M)
Dick, J. O. (M)
Feeney, J. E. (M)
Fletcher, R. C. (A)
Friedmann, E. (M)
Grycko, S. R. (SM)
Hajic, E. J. (SM)
Heath, P. D. (M)
Heberling, E. D. (SM)
Hoover, M. C., Jr. (M)
Hornback, C. F. (M)
Jackson, T. B. (SM)
Jernigan, E. D. (SM)
Johns, R. R. (SM)
Johnson, E. J. (M)
Kelley, S. B. (M)
Kinzer, G. E. (M)
Kopulsky, S. (M)
Krilanovich, N. J. (A)
Liebig, V. W. (M)
Lindberg, A. C. (M)
Lundquist, C. R. (SM)
Macadam, J. F. (M)
Malinowski, L. P. (SM)
McNaughton, J. F. (M)
Miles, T. P. (M)
Morehouse, G. D. (SM)
Muncy, W. A. (M)
Parvin, J. A. (M)
Pawley, M. G. (SM)
Powers, A. B. (SM)
Pratt, S. L. (M)
Rolfe, E. O. (M)
Rowe, D. E. (SM)
Ryno, G. E. (M)
Sabih, D. S. (M)
Seeley, E. W. (A)
Sloan, C. B. (A)
Smith, R. P. (SM)
Taylor, T. T. (M)
Van Vorhis, J. L. (M)
Vasquez, F. (A)
Verano, F. (M)
Wall, R. A. (SM)
Waltner, C., Jr. (M)
Wells, R. E. (M)
Whalen, P. K. (M)
Wills, J. R. (M)
Witbeck, L. H. (M)

Witbeck, L. H. (M)

Rocklin, (SAC-7)
Brown, V. J. (A)

Rolling Hills (LA-7)
Anderson, M. J. (M)
Angel, A. M. (M)
Bar, M. (M)
Bercsi, J. A. (M)
Bergman, S. G. (M)
Boland, C. D., Jr. (M)
Boland, T. L. (M)
Casey, J. D. (M)
Chambers, G. R. (M)
Collins, W. C. (SM)
Cummins, J. W. (SM)
Dea, D. Y. F. (SM)
Edwards, R. F. (M)
Ellingboe, J. K. (M)
Ellis, T. O. (M)
Finkel, M. (SM)
Gedutd, A. (M)
Gilkison, C. A. (M)
Hall, C. A. (A)
Hogan, J. D. (M)
Holland, J. E. (M)
Hull, R. E. (M)
Jackson, R. E. (M)
Jakus, L. A. (SM)
Kazarian, D. G. (M)
King, E. N. (M)
Kluehe, J. (M)
Koehler, F. H. (M)
Ladd, A. W. (M)
Larson, R. L. (M)
Lillenstein, M. (SM)
Lind, H. V. (M)
Lorenz, R. O. (M)
Lucas, C. D., Jr. (M)
Matson, D. L. (M)
McAllister, D. R. (SM)
McMahon, G. V. (M)
McMahon, M. E. (M)
McNary, B. D. (M)
McPherson, R. G. (M)
Meyer, J. C. (M)
Moglewer, S. (M)
Moore, J. A. (M)
Nilsson, B. G. (M)
Oberholtzer, J. M. (M)
Olson, E. R. (M)
Peters, R. C. (M)
Riggs, D. D. (SM)
Sacks, J. M. (M)
Schnoor, J. E. (M)
Shibuya, Y. (M)
Shulsinger, J. (M)
Steohan, P. W. (M)
Stone, M. M. (M)
Tarot, A. (A)
Ule, L. A. (SM)
Walker, V. D. (M)
Walquist, R. L. (M)
Wannlund, A. L., Jr. (M)
West, G. P. (M)
Zaremba, J. G. (M)

Rolling Hills Estates (LA-7)
Clapp, R. W. (SM)
McClintock, D. G. (M)
Phillips, S. C. (M)
St. John, D. E. (SM)
Trapp, J. A. (SM)
Vail, A. E. (M)

Rosamond (CL-7)
Kibler, L. S. (M)

Rosemead (LA-P-7)
Ferl, R. H. (A)
Homecker, C. W. (M)
Whitehead, E. H. (A)

Running Springs (LA-OB-7)
Sutton, O. D., Jr. (M)

Sacramento (SAC-7)
Allstatz, J. E. (M)
Bailey, C. A. (M)
Baker, D. F. (M)
Baker, R. L. (M)
Baldwin, W. A. (A)
Beckwith, C. (M)
Bennett, R. C. (M)
Berger, E. W. (SM)
Berry, E. X. (M)
Blue, K. D. (A)
Bolander, P. E. (M)
Bourget, L. (M)
Breuer, H. J. (M)
Camerzell, P. L. (M)
Cook, R. H., II (M)
Corrigan, B. G. (M)
Crenshaw, H. L. (M)
Dickinson, I. E. (M)
Enzler, A. J. (M)
Feller, A. S., Jr. (A)
Field, S. E., Jr. (A)
Frederick, D. E. (M)
Friedlander, S. (A)
Garcia, L. V. W., Jr. (M)
Glum, D. E. (A)
Godfrey, X. W. (M)
Haydis, C., Sr. (M)
Hennige, C. W., III (M)
Hill, W. C. (SM)
Hofman, W. F. (M)
Julian, C. E. (M)
Kapandriis, G. N. (M)
Karpisek, W. J. (M)
Kibbey, M. B. (A)
Kidd, L. G. (M)
Klauer, W. R. (M)
Klinke, E. R. (M)
Kobzyashi, S. (M)
Koch, W. F. (M)
Kowalczyk, J. R. (M)
Lane, C. A. (M)
Lee, A. N. (M)
Leecing, R. W. (A)
Linquist, G. A. (A)
McKinnon, R. J. (A)
McWilliams, J. E. (M)
Minke, J. F., III (M)
Naschke, E. S. (M)
Nystrom, A. V. (M)
Oates, T. L. (M)
Okada, W. M. (A)
Onnigian, P. K. (SM)
Polgar, E. A. (M)
Poucher, R. A., Jr. (M)
Pound, A. W. (M)
Quackenbush, H. H. (M)
Roberts, C. L. (M)
Roberts, E. A., Jr. (A)
Rockey, G. H. (SM)
Rohde, A. O. (M)
Sassman, R. W. (M)
Schrader, F. S. (M)
Scotch, C. (A)
Shapiro, H. L. (M)
Sinkler, C. I. (M)
Slater, H. C. (M)
Smart, M. E. (SM)
Spadoni, A. F. (A)
Sronce, G. S. (M)
Starzec, J. S. (A)
Thompson, R. L. (M)
Tiedeman, C. R. (M)
Townsend, O. W. (M)
Watson, H. (A)
Watson, J. E. (A)
Weimar, G. P. (M)
Williams, H. T. (M)
Wilson, L. I. (A)
Wing, J. (M)
Young, M. E. (A)
Zander, C. E. (A)

Salinas (SF-7)
Anderson, R. A. (M)
Horton, J. A. (M)
Johnson, R. M., Jr. (M)
Shepherd, M. J. (M)
Wright, O. N. (A)

San Anselmo (SF-7)
Berryhill, J. L. (M)
Kaufman, J. (SM)
Oberg, V. H. (M)

San Bernardino (LA-OB-7)
Adamson, L. B. (M)
Carson, E. L. (M)
Ewing, G. W. (M)
Featherstone, S. J. (M)
Foeste, W. E. (SM)
Huddleston, J. C. (M)
Newman, W. P. (A)
Spurlin, C. E. (M)
Wadehul, R. R. (M)
Winter, W. T. (M)

San Bruno (SF-7)
Carr, E. A. (M)
Czelkowitz, R. F. (M)
Fuller, H. H. (A)
Iversen, A. H. (SM)
Kavanaugh, J. C. (M)
McDade, J. J., Jr. (A)
Miller, R. J. (M)
Mizuhara, A. (M)
Myhre, R. W. (M)
Olson, R. E. (M)
Preist, D. H. (SM)
Thompson, O. E. (M)
White, H. A. (M)
Woodward, W. J. (A)

San Carlos (SF-7)
Anderson, C. E. (M)
Anderson, C. E. (M)
Astin, B. (SM)
Baker, B. J. (A)
Bernstein, J. L. (M)
Brakeman, F. E. (A)
Bramhall, F. B. (SM)
Bristol, T. R. (SM)
Carter, R. W., Jr. (M)
Carver, V. D. (SM)
Chamberlin, R. H. (SM)
Chevron, R. R. (M)
Coe, W. G. (SM)
Combellick, T. A. (SM)
Condie, M. A. (SM)
Conn, M. L. (M)
Cool, L. R. (M)
Corcoran, J. W. (M)
Culbertson, A. F. (SM)
Cummings, K. M. (SM)
Davis, C. C. (A)
Dodd, C. (SM)
Doyka, S. F. (M)
Edens, R. L. (M)
Gellerman, R. F. (M)
Gillen, D. A. (M)
Graves, H. F. (SM)
Greene, H. A., Jr. (SM)
Groberg, L. R. (M)
Gross, E. H. (M)
Hahn, G. A. (M)
Hesselgrave, D. H. (SM)
Hull, J. F. (M)
Ingersoll, J. C. (M)
James, B. C. (M)
Johnson, J. B. (A)
Johnson, L. B. (SM)
Jolly, J. A. (SM)
Joseph, W. F. (M)
Kahrmann, H. C., Jr. (M)
Knorpp, J. L., Jr. (M)
Leidigh, W. J. (M)
Lewenstein, H. J. (M)
Lichtenstein, M. I. (M)
Magatagan, R. O. (M)
Maltzer, I. (SM)
McGibbon, G. D. (A)
Meacham, D. D. (M)
Mueller, M. T. (M)
Naugle, J. B., Jr. (M)
Orth, R. T. (SM)
Pathe, R. W (M)
Peirce, J. A. (M)
Pitts, J. E., Jr. (M)
Robinson, R. A. (SM)
Ross, A. T (M)
Royalty, M. C. (M)
Salihi, J. T. (M)
Savarin, A. (M)
Schussele, J. H. (M)
Seymour, A. M. (SM)
Smith, W. D. (M)
Star, J. (A)
Struven, W. C. (SM)
Stuart, G. S. (A)
Swartz, P. C. (M)
Wallace, D. C. (M)
Weber, J. H. (SM)
White, R. F. (M)
Winenow, R. E. (M)
Wortman, T. J. (M)
Wyand, D. L. (M)

San Clemente (LA-SA-7)
Casad, T. A. (M)

San Diego (SD-7)
Abbey, K. (SM)
Abel, C. F. (A)
Adams, O. E. (M)
Adamson, P. (M)
Albert, S. L. (M)
Allen, J. H. (SM)
Allen, M. M. (A)
Altman, O. E. (M)
Anders, J. R. (M)
Anderson, J. S. (M)
Anderson, J. (M)
Anderson, V. C. (SM)
Anthony, D. J. (M)
Arcidiacono, A. (A)
Arnett, W. (SM)
Arnold, W. R. (M)
Asato, C. K. (A)
Atkinson, W. H. (A)
Auburn, D. F. (A)
Augustin, E. P. (M)
Austin, R. W. (M)
Ayer, H. G. (A)
Aylott, A. J. (M)
Babbitz, H. B. (SM)
Bachman, C. R. (M)
Bailey, R. E. (M)
Barley, C. E. (A)
Barnard, J. C. (M)
Barnes, H. R. (A)
Bass, C. J. (A)
Bauer, J. A. (M)
Beaudrie, J. C. (M)
Beaulieu, J. P. (A)
Bebak, V. F. (A)
Bell, D. A., (M)
Bell, E. (M)
Bennett, V. M. (M)
Bentrott, D. W. (A)
Benzel, C. R. (M)
Bergant, G. G. (M)
Bertolino, T. R. (M)
Betsworth, R. K. (M)
Birkett, B. T. (M)
Birnbaum, M. D. (M)
Bishop, D. E. (M)
Bjornson, W. G., Sr. (SM)
Blair, W. L. (SM)
Bloschies, F. H. (M)
Bocchio, T. R. R. (A)
Bonham, J. F. (A)
Bowers, J. L. (SM)
Bowers, R. W. (M)
Boyce, W. E. L. (M)
Brackett, R. T. (M)
Bradford, W. R. (M)
Bradley, J. J. (SM)
Branson, E. C. (M)
Braun, S. (A)
Breeze, J. R. (M)
Brengle, A. S. (M)
Brissenden, P. (A)
Brock, P. A. (M)
Brokaw, H. R. (M)
Browder, J. W. (SM)
Brown, W. R. (M)
Bunce, D. S. (A)
Burbank, G. J. (SM)
Burgi, C. E. (M)
Burke, A. T. (SM)
Burnett, W. L. (M)
Buskirk, J. F. (M)
Byrnes, F. X. (M)
Campbell, C. C. (M)
Campbell, R. (M)
Campbell, W. D. (M)
Caporaletti, G. A. (M)
Carlson, E. W. (M)
Carson, A. C. (M)
Carson, D. E. (M)
Casal, F. G. (A)
Cassers, J. W. (M)
Catlin, K. (M)
Cawley, J. H., Jr. (A)
Celto, J. E. (M)
Cervenka, A. J. (M)
Chadwick, R. F. (A)
Chasinowitz, G. (M)
Chatelain, M. G. (M)
Cheney, A. G. (M)
Chew, K. (M)
Christensen, N. T. (M)
Christensen, R. J. (SM)
Cisneros, I. (M)
Clack, H. W. (A)
Clare, E. T. (SM)
Clark, E. N. (A)
Clarke, A. G. (A)
Clarke, G. W. (M)
Cleveland, W. A. (M)
Clough, L. G. (M)
Coates, J. R. (M)
Coleman, G. M. (M)
Collier, R. (M)
Comstock, R. L. (M)
Cook, M. (M)
Cornell, D. E. (M)
Covan, L. C. (M)
Cram, C. C (SM)
Creutz, E. C. (SM)
Crissell, H. L. (SM)
Crocker, W. F. (A)
Crotinger, R. M. (M)
Culnan, D. E. (M)
Curl, G. H. (M)
Cutler, M. (SM)
Cyr, K. C. H. (M)
Dallns, I. (M)
Daly, W. A. (A)
Dameson, L. G., Jr. (M)
Danielson, F. H. (M)
Davis, J. T. (M)
Davis, L. (M)
Day, S. M. (A)
Deavenport, J. E. (M)
De Hass, D. G. (M)
De Kozan, R. L. (M)
Delicath, R. C. (M)
Dellinger, K. A. (A)
De Marco, P. J. (A)
Demuth, H. P. (M)
Detwiler, J. R. (M)
Dickenman, R. L. (M)
Dickey, W. S. (SM)
Dickstein, H. D. (SM)
Dillon, T. E. (M)
Dobyne, J. C., Jr. (M)
Dolg, J. H. (M)
Donahue, J. (M)
Douglass, W. D., Jr. (M)
Doyle, J. W. (A)
Drayner, A. H. (SM)
Driskell, R. O. (M)
Dulin, G. F. (M)
Dunning R. A. (M)
Ehrlich, C. I. (M)
Elliston, R. O. (M)
Ely, M. D. (M)
Emmerich, L. (M)
Engh, P. B. (SM)
Enslow, P. H., Jr. (M)
Entenmann, R. C. (M)
Erickson, P. R. (M)
Erickson, W. L. (M)
Evans, A. R. (M)
Evans, C. S. (M)
Evans, W. O. (M)
Farhat, D. G. (M)
Farmer, A. A., Jr. (A)
Fay, W. J. (M)
Fazenbaker, P. J. (A)
Fenler, J. (M)
Finch, J. W. (SM)
Fischer, J. F., Jr. (M)
Fisher, C. R. (M)
Fiske, P. E. (SM)
Flaxen, R. E. (M)
Fogel, L. J. (SM)
Forsen, H. K. (M)
Frech, E. P., Jr. (M)
Frech, R. A. (M)
Freres, C. H. (M)
Frost, J. W. (M)
Fuhrer, D. L. (M)
Gadbois, R. D. (M)
Garcia, J. E. (A)
Geren, K. E. (M)
Gilbreath, J. A. (M)
Gillette, A. J., Jr. (M)
Girismen, M. F. (M)
Goddard, W. R., Jr. (M)
Goodwin, S. D. (M)
Gorby, J. H. (A)
Gordon, R. A. (SM)
Gottwald, C. H. (M)
Grafa, J. B. (M)
Granger, H. (SM)
Greeley, C. (M)
Greenstein, J. L. (M)
Greenwood, O. D. (M)
Gross, W. (M)
Grygar, R. A. (M)
Gulbrandsen, F. O. (M)
Guthrie, W. R. (A)
Haak, D. K. (M)
Halbirt, C. D. (M)
Hale, D. N. (M)
Hall, G. D. (M)
Halonen, C. A. (A)
Hambly, M. E. (A)
Hamilton, E. A. (M)
Hansen, H. J., Jr. (M)
Hansen, P. G. (M)
Hansen, W. C. (A)
Harrington, M. W. (M)
Harris, J. L. (M)
Harris, L. G. (M)
Harrison, J. F. (M)
Hartin, W. J. (A)
Hatch, A. R. (M)
Hatchett, C. (SM)
Hatchett, S. E. (SM)
Hauser, J. H. (M)
Hayes, J. C. (SM)
Hayth, W. D. (M)
Hedlund, K. W. (M)
Hedrick, W. (A)
Heldwein, C. (M)
Henderson, D. A. (M)
Henkel, R. M. (M)
Heritage, D. P. (M)
Heritage, J. L. (M)
Hernandez, E. R. (M)
Herz, E. (M)
Hickman, R. S. (M)
Hicks, C. N. (M)
Hicks, P. A. (M)
Higgins, V. M. (A)
Hively, R. R. (SM)
Hodgson, V. R. (A)
Hoffman, H. T. (M)
Hofcomb, D. E., Jr. (A)
Holly, C. M. (M)
Holman, F. P. (A)
Hommrich, R. A. (M)
Honea, K. G. (M)
Honer, R. E. (SM)
Hood, I. A. (M)
Hooyen, P. J. (M)
Hopkins, R. U. F. (M)
Hose, E. (M)
Howe, C. J. (A)
Hubiak, D. D. (M)
Huggin, F. E. (SM)
Hughes, L. R. (M)
Humphrey, R. D. (M)
Imhoff, R. M. (M)
Ingram, C. J. (M)
Ingram, J. B. (M)
Ivans, W. S., Jr. (SM)
Jallu, F. M. (M)
Janos, W. A. (M)
Johnson, G. B. (M)
Johnson, J. F. (M)
Johnston, D. L. (A)
Jones, H. G. (M)
Jones, K. N. (M)
Kalitz, P. H. (M)
Kalzbell, D. C. (SM)
Kaleta, G. J. (M)
Karcher, E. R. (SM)
Karel, L. G. (M)
Karmazin, W. R. (M)
Kasal, K. (M)
Kaspar, E. J. (M)
Kaswen, M. (M)
Kelley, D. R. (M)
Kelley, R. J. (A)
Kercher, T. C. (M)
Kerr, H. C., Jr. (A)
Kestler, G. (M)
Kinzel, G. A. (M)
Kipp, S. G. (M)
Kirk, J. F. (M)
Klee, H. J. (M)
Kluck, J. H. (M)
Laiuppa, A. S. (M)
Lakins, B. B. (M)
La Motte, K. E. (M)
Lander, B. (A)
Larkin, R. L. (M)
Larsen, H. L. (M)
La Zelle, L. L. (M)
Lee, J. E. (M)
Lee, R. G. (M)
Leffler, R. (M)
Leger, R. M. (SM)
Lessem, M. (M)
Leslie, J. P. (A)
Levy, E. S. (A)
Linsey, G. D. (M)
Lisak, L. R. (M)
Lively, J. D. (M)
Lodge, C. R. (M)
Loeb, M. (M)
Logue, R. D. (M)
Logue, S. H. (M)
Long, J. V. (M)
Longchamp, W. F. (M)
Lopez, W. M. (M)
Loucks, H. D. (M)
Luebben, R. G. (M)
Lund, T. J. (A)
Mainland, R. (M)
Majchrowicz, J. A. (A)
Makinson, H. O. (M)
Manning, C. S. (SM)
Marenholtz, P. E. (SM)
Marsh, C. L. (M)
Marsh, W. H. (M)
Martin, F. C., Jr. (M)
Martin, G. E. (SM)
Martin, L. J. (M)
Martin, L. E. (M)
Massengale, W. B. (A)
Matsumoto, T. (M)
Maughmer, J. M. (M)
McAuliffe, J. J. (M)
McCrary, G. W., Jr. (M)
McDaniel, G. A. (A)
McGehee, C. R. (M)
McKnight, C. L. (M)
McLennan, J. D. (M)
McLennan, R. A. (M)
McManus, R. P. (M)
McNaney, J. T. (SM)
Mealey, G. J. (M)
Medved, D. B. (SM)



Mehner, E. C. (A)
Migdal, P. (M)
Mildice, J. W. (M)
Miller, C. W. (M)
Miller, C. J. (A)
Miller, C. N. (M)
Millican, F. M. (M)
Mills, W. N. (M)
Mindte, R. T. (M)
Minol, O. N. (M)
Moe, C. R. (SM)
Moebus, L. F. (M)
Moffatt, V. J. (M)
Moleske, N. M. (M)
Molnar, S. (M)
Montalvo, E. (M)
Moore, E. J. (M)
Morgan, A. W. (M)
Mott, M. H. (M)
Mulvey, J. X., Jr. (M)
Murray, J. H. (M)
Nakamura, C. N. (M)
Nelson, A. W. (M)
Nelson, C. A. (M)
Nelson, J. A. (M)
Nelson, K. F. (M)
Nichols, B. B. (M)
Niderost, C. R. (M)
Nilsson, W. P. (M)
Nissley, L. E. (M)
Nizyborski, E. S. (M)
Noll, F. R. (M)
Norton, H. N. (M)
Novak, E. K. (M)
Noyes, A. E. (M)
Nuese, C. (M)
Nute, C. H. (M)
Ogram, R. L. (M)
Oliver, G. W. (M)
Omiya, C. I. (M)
Ong, A. M. (A)
Onstad, R. C. (M)
Orange, E. S. (M)
Ott, W. R. (M)
Pagels, W. (A)
Parker, A. B. (M)
Parker, B. E. (SM)
Parker, R. O. (M)
Pavela, H. W. (M)
Persons, C. E. (M)
Peterson, C. H. (A)
Peterson, D. M. (M)
Peterson, R. M. (M)
Petit, J. G. (A)
Petitjean, A. E. (A)
Phelps, J. M. (SM)
Pfender, W. H., Jr. (M)
Phillips, E. T. (M)
Photinos, H. R. (M)
Pine, T. G. (M)
Poe, C. M. (A)
Poehls, V. J. (M)
Pokorny, F. A. (M)
Poll, R. A. (M)
Pollard, W. A. (A)
Porter, J. B. (M)
Prager, R. H. (M)
Prather, A. W. (M)
Prim, D. C. (SM)
Prochoda, R. (M)
Proctor, D. (SM)
Pugh, E. L. (M)
Quigg, K. R. (M)
Rathbone, R. R. (A)
Ratte, J. P. G. (A)
Rayburn, D. A. (A)
Redelings, J. T. (M)
Redington, E. D. (SM)
Redmond, J. G. (M)
Reid, J. G. (M)
Reel, L. S. (M)
Renteria, R. (M)
Reynolds, Z. D. (M)
Rhamy, J. D. (M)
Rice, G. D. (SM)
Rice, R. D. (M)
Richman, R. L. (M)
Rideout, H. A. (M)
Rider, K. B. (A)
Roback, D. J. (M)
Roberts, C. G. (M)
Robinson, E. B. (SM)
Rodleck, R. H. (M)
Roeser, R. W. (M)
Rogers, R. M. (M)
Rogers, S. (SM)
Root, O. E. (M)
Rosenbaum, M. (SM)
Roshon, A. H. (M)
Roth, J. R. (M)
Roullard, G. P. (A)
Rush, O. A., Jr. (M)
Russell, J. D. (M)
Saari, E. S. (M)
Sahfran, L. (M)
Salik, C. E. (A)
Salked, E. M., Jr. (M)
Samaw, W. J. (M)
Sattro, R. L., Sr. (SM)
Scarborough, C. S. (A)
Scarborough, R. C. (A)
Schaefer, J. V. V. (M)
Schillinger, R. F. (SM)
Schlesinger, R. J. (M)
Schoengarth, M. D. (A)
Schoonover, M. R. (A)
Schrick, D. P. (M)
Schroeder, R. R. (A)
Schubert, U. L. (M)
Schukantz, J. H. (M)
Schwidetzky, W. H. (M)
Scott, J. E., Jr. (M)
Scott, R. J. (M)
Senterfitt, A. D. (A)
Shafer, D. E. (M)
Shaw, F. W. (M)
Shaw, G. A. D. (M)
Shaw, L. L., Jr. (M)
Shechet, M. L. (M)
Sherertz, P. C. (M)
Shipley, T. D., Jr. (M)
Short, D. W. (M)
Sidman, J. (M)
Silberman, R. T. (M)
Simmons, J. M., Jr. (M)
Sinnott, F. T. (M)
Skillman, B. D. (SM)
Skolil, L. L. (SM)
Slote, D. M. (SM)
Small, B. I. (M)
Smith, J. N., Jr. (M)
Smith, R. (M)
Snyder, D. R. (M)
Somes, G. W. (A)
Spani, W. M. (M)
Spillane, T. F. (M)
Spilmer, B. H. (M)
Squibb, W. F. (M)
Squire, R. W. (M)
Stalcup, T. L. (M)
Staroste, O. (A)
Steen, J. E. (M)
Steiff, D. L. (A)
Steppler, R. V. (M)
Stewart, W. A. (M)
Stoeckert, E. D. (M)
Stokely, R. J. (A)
Story, H. O. (M)
Stovall, D. J. (M)
Stover, R. F. (M)
Strobach, F. (M)
Strowig, K. W. (A)
Sturtevant, H. B., Jr. (M)
Suntin, W. M. (M)
Swann, E. S. (M)
Tabler, J. G. (SM)
Tamura, Y. (SM)
Taylor, S. V. (M)
Taylor, W. G. (M)
Thaanum, O. (M)
Thacker, C. L. (M)
Thatcher, E. W. (SM)
Thiede, E. C. (M)
Thiel, W. H. (M)
Thoman, R. E. (M)
Thomas, H. A. (SM)
Thompson, W. J. (SM)
Tibbals, L. (M)
Tidwell, G. L. (M)
Tirrell, C. W. (M)
Tracy, H. H., Jr. (M)
Trader, J. E. (M)
Tricoles, G. P. (M)
Trochanowski, A. J. (A)
Trotter, B. E. (SM)
Tumage, R. E., Jr. (M)
Ubry, L. E., Jr. (SM)
Underhill, J. T. (SM)
Underwood, W. H. (M)
Undesser, K. (SM)
Uyehara, M. (M)
Vachon, R. J. (M)
Van Caster, J. C. (M)
Van Horn, I. H. (M)
Van Meter, E. E. (A)
Varson, W. P. (M)
Velasco, J. W. (M)
Vette, W. J. (M)
Viles, F. L. (M)
Vinnell, L. F. (M)
Voell, R. F. (M)
Volberg, H. W. (M)
Waddell, B. L. (M)
Wade, E. (SM)
Wade, O. (M)
Wagner, H. B. (A)
Walker, W. B. (M)
Ward, D. M. (M)
Ward, J. R. (M)
Warr, G. D. (M)
Warzecha, T. D. (M)
Wasserman, P. D. (A)
Watkins, V. D. (M)
Watson, L. E. (A)
Watt, E. J. (M)
Weisbrod, S. (M)
Wells, A. T. (A)
Wells, R. J. (M)
Werner, R. V. (SM)
Westerfield, E. C. (M)
Westfall, W. D. (M)
Wetherill, C. A. (SM)
Wexler, H. T. (SM)
Whitted, H. A. (M)
Wilcox, L. L. (M)
Wilde, S. R. (M)
Wilhelm, C. G. (M)
Wilkins, R. G. (A)
Willard, F. H., III (M)
Williamson, G. H. S. (A)
Willingham, J. D. (A)
Wilson, D. (SM)
Wilson, W. D. (M)
Winant, A. T. (M)
Winkler, R. C. (M)
Wirth, H. J. (SM)
Wisdom, A. H. (M)
Witzel, A. B. (M)
Woldow, A. F. (M)
Wolfe, G. W. (A)
Wolfe, R. G. (M)
Wolff, H. G. (M)
Woodhill, W. H. (M)
Woodwilss, D. E. (A)
Woodward, E. O. (M)
Worden, H. E. (M)
Writer, P. L. (M)
Yager, E. K. (M)
Yearley, L. E. (M)
Yonemitsu, M. K. (M)
Young, T. P. (M)
Zable, W. J. (M)
Zimmerman, J. K. (M)

San Dimas (LA-OB-7)
Montcalm, M. T. (A)

San Fernando (LA-SF-7)
Axel, S. J. (M)
Bailey, C. C. (M)
Bauer, J. A. (M)
Begley, W. W. (M)
Berglund, A. Q. (M)
Bouquet, F. L., Jr. (M)
Bucher, F. X. (SM)
Clinger, E. C. (A)
De Nicolai, M. B. (M)
Denise, W. J. (M)
Diem, C. W. (M)
Duel, D. M. (M)
Ellis, J. W. (M)
Fairbanks, G. C. (M)
Friedman, J. A. (A)
Fuller, C. A. (M)
Graber, R. E. (SM)
Haase, K. (M)
Hunt, J. H. (M)
King, E. L. (M)
Larson, C. C. (SM)
Laub, R. E. (SM)
Loiler, R. D. (M)
Loumeau, R. F. (M)
Marchese, T. J. (SM)
Marsden, R. A. (M)
Martin, W. R. (SM)
McLaughlin, F. G. (A)
Neal, C. B. (M)
Peterson, R. L (M)
Riser, C. R. (M)
Rosenberg, R. E (M)
Rousey, W. A. (A)
Schlenker, J. H. (A)
Smith, I. A. (M)
Sohlgren, C. E. (M)
Starr, I. M. (M)
Toomin, H. (M)
Vincent, R. C. (M)
Wame, V. J. (M)
White, R. H. (M)
Wilkening, C. F. (M)

San Francisco (SF-7)
Alcorn, R. C. (A)
Alvarez, R. (M)
Avmuth, M. (M)
Baldwin, E. V. (M)
Baldwin, R. S. (M)
Bandes, H. (SM)
Barrow, E. M. (A)
Bechtle, C. G. (M)
Bellit, B. B. (M)
Berk, J. (M)
Bertrand, T. H. (M)
Bingham, J. A. C. (M)
Black, F. R. (M)
Bollier, J. (A)
Brinton, R. L. (SM)
Brown, R. L. (A)
Buntenbach, R. W. (M)
Cahn, B. L. (M)
Cheu, E. D. (SM)
Chin, R. R. (M)
Cohen, A. (M)
Collins, C. C. (A)
Connor, T. J. (M)
Cooke, L. G. (M)
Correlli, G. J. (M)
Danielson, E. G. (M)
Davis, T. J., Jr. (A)
Davy, L. H. (M)
Dent, W. U. (M)
Dessent, J. E. (A)
Dong, A. S. (M)
Drake, H. B. (M)
Dunlap, H. B. (M)
Durakov, J. S. (A)
Duste, G. H. (M)
Dutoff, D. A. (M)
Edison, E. (SM)
Emery, R. M. (A)
Esh, R. W. (M)
Fong, G. K. (M)
Fong, W. L. (A)
Fong, W. W. (M)
Forrest, W. S. (A)
Fort, L. R. (M)
Frear, R. B. (A)
Freiermuth, V. J. (M)
Froman, J. (SM)
Gallo, F. J. (M)
Gee, H. W. (A)
Given, I. (M)
Gunn, L. W. (M)
Hadik-Barkoczy, A. B. (M)
Hallbeck, R. F. (M)
Halloran, A. H. (SM)
Hammett, R. L. (M)
Harrington, R. R. (A)
Hewitt, D. E. (A)
Hoag, E. D. (M)
Holloman, C. J. (M)
Holloway, J. (SM)
Howland, R. S. (M)
Huymans, L. E. (A)
Jensen, T. A. (M)
Jobson, C. B. (A)
John, E. J. (A)
Juan, R. A. (M)
Kalafian, J. (M)
Kalb, H. N. (M)
Kanan, N. (M)
Kang, K. H. (A)
Karpenko, L. J. (M)
Kaufman, A. W. (M)
Kelley, T. B. (M)
King, B. D. (M)
Knight, R. H. (A)
Knutsen, H. L., Jr. (M)
Koch, J. F. A. (M)
Kochenderfer, W. E., Jr. (M)
Kramer, J. F. (M)
Kruesi, G. G. (M)
Kuhn, H. G. (SM)
Kunin, L. (M)
Kunzman, J. (A)
Landells, J. H. (A)
Lawrence, O. (A)
Lee, D. Y. (M)
Lee, F. (A)
Lee, F. B. (M)
Lee, H. Q. (M)
Lee, J. A. (A)
Lee, R. W. (A)
Lee, W. (A)
Lewis, E. L. (A)
Little, W. A. (M)
Loughran, G. P. (M)
Low, S. (A)
Luther, G. M. (A)
Mackay, R. S. (SM)
Marcellini, R. P. (M)
Marino, J. (A)
Marshall, E. G. (M)
Marshall, E. L. (M)
Martin, C. E. (M)
Massoglia, F. P. (M)
McBride, W. J., Jr. (SM)
McGuire, J. P. (M)
Middlebrook, D. G. (M)
Morrison, A. C. (M)
Most, N. (M)
Myers, J. S. (A)
Nelson, L. O. (M)
Newell, R. R. (A)
Noble, M. I., Jr. (M)
Nyberg, R. A. (A)
Oden, D. E. (M)
Oestreicher, D. L. (M)
Olinger, A. M., Jr. (A)
O'Neil, J. A. (M)
O'Rourke, J. B. (M)
Pacher, F. A. (A)
Pallas, C. M. (A)
Panages, T. S. (M)
Paull, J. O. (A)
Pawkett, L. E. (M)
Pinkney, J. L. (A)
Plummer, R. T. (M)
Potasz, P. J. (A)
Pressman, G. L. (M)
Prise, W. J. (A)
Raudso, R. (M)
Rakonitz, J. G. (M)
Ralls, J. W. (M)
Ramey, J. C. (A)
Rea, P. G. (M)
Rutkin, B. B. (M)
Schwarzschild, B. (A)
Scrievers, B. J. (A)
Sharman, H. M. (M)
Shepard, S. A. (M)
Sherman, S. (A)
Shoemaker, J. W. (A)
Shumway, J. L. (M)
Solomon, S. S. (M)
Spillane, L. W. (A)
Staprans, A. (M)
Stortz, R. A. (M)
Stroganoff, R. P. (M)
Tanaka, G. J. (M)
Taylor, G. J. (A)
Test, A. J. (M)
Tourville, G. A. (M)
Tzytovitch, M. A. (A)
Utter, D. H. (M)
Van Gelder, R. B. (M)
Van Scoy, C. P. (A)
Veizades, N. (M)
Voronoff, G. N. (M)
Ward, S. A. (M)
Warren, L. R. M. (A)
Weiner, J. R. (SM)
Whitehead, E. A. (M)
Wholey, C. W. (A)
Williams, N. H. (SM)
Williams, P. A. (M)
Wojcik, B. M. (M)
Wolfe, F. R., Jr. (SM)
Wollenberg, H. A. (M)
Wollin, E. (M)
Wong, D. S. (A)
Wong, E. (A)
Wong, H. Y. (M)
Wong, W. C. (M)
Woo, F. (M)
Wood, G. V. (M)
Woodruff, R. L. (M)
Woolverton, R. B. (F)
Yamamoto, N. (M)
Yee, A. W. (A)
Yee, P. (M)
Zipf, A. R. (A)

San Gabriel (LA-P-7)
Agadoni, C. A. (M)
Burtner, R. K. (A)
Crosby, J. C. (M)
Duquette, D. R. (A)
Dysinger, C. W. (A)
Fitzwater, W., Jr. (M)
Franklin, P. G. (M)
Gilbertson, S. R. (M)
Hullinger, W. L. (M)
Karsten, J. A. (M)
Le Gette, M. A. (A)
Mason, J. L. (A)
Merryman, W. R. (M)
Meyers, R. E. (A)
Ross, I. (M)
Seeley, E. M. (A)
Sessler, D. R. (M)
Stomuste, C. G. (M)
Street, N. C. (M)
Wells, J. L. (M)
Wilkinson, B. L. (M)
York, E., Jr. (M)

San Jose (SF-7)
Ackerman, F. G. (M)
Alley, W. D. (A)
Allgaier, J. R. (A)
Allman, D. L. (M)
Anderson, D. L. (M)
Anderson, E. P. (SM)
Anderson, R. A. (M)
Ando, A. (A)
Applequist, J. E. (M)
Armann, G. L. (M)
Astrahan, M. M. (SM)
Athens, A. S. (M)
Atkinson, J. H. (M)
Aylsworth, R. (M)
Aziz, R. A. (M)
Bailey, S. H. (A)
Bain, R. A. (M)
Bair, A. (M)
Baker, W. L. (M)
Barck, R. T. (M)
Barlow, B. R. (M)
Barr, G. L. (M)
Bartling, M. H. (A)
Battjes, C. R. (M)
Baty, D. L. (M)
Baxter, N. E. (M)
Beck, J. W. (M)
Beers, W. D. (A)
Bell, R. L (M)
Benedict, L. P. (M)
Benoit, R. E. (A)
Benz, W. G. (M)
Bindewald, E. R. (M)
Bixby, L. H. Jr. (M)
Booth, W. T. (M)
Bramley, N. V. (SM)
Bridges, D. B. J. (M)
Brown, C. J. (M)
Brown, R. G. (M)
Brown, R. W. (M)
Bueno, I. (M)
Butwell, R. J. (M)
Cain, D. C. (M)
Canioni, C. W. (M)
Carter, D. (M)
Caswell, D. A. (SM)
Cesar, L. G. (M)
Chandler, R. T. (M)
Chaney, M. E. (M)
Chapton, R. D. (A)
Childs, R. D., III (M)
Christensen, W. H. (M)
Christopherson, W. A. (M)
Clauer, C. K. (M)
Conroy, C. L. (A)
Cortez, A. A. (M)
Cotterel, E. D. (M)
Cummins, E. L. (M)
Couden, D. V. (SM)
Crespo, J. M. (A)
Croad, J. G. (M)
Cross, R. L. (A)
Daly, J. J. (M)
Daniels, J. W. (A)
Danielson, D. W. (M)
Darling, R. S. (A)
Davenport, K. R. (M)
Day, J. B. (A)
De Leonardis, V. M. (A)
Dodd, P. D. (M)
Dowling, R. H. (M)
Downham, H. A. (M)
Draper, J. K. (M)
Duba, L. (A)
Dudley, C. P., Jr. (A)
Dye, W. G. (M)
Eagle, I. D. (M)
Eggers, R. E. (M)
Eldridge, A. J. (M)
Eliezer, D. E. (A)
Elmer, H. G. (M)
Engwight, H. (SM)
Enslow, G. M. (M)
Erdman, J. P. (M)
Erickson, G. G. (M)
Faultner, H. E. (M)
Fernandez, J. P. (M)
Fine, W. P. (A)
Fitterer, C. E. (M)
Fletcher, B. J. (M)
Flippin, R. B. (A)
Flynn, F. J. (SM)
Fowler, W. J. (M)
Franks, R. E. (M)
Freiberg, L. (SM)
Fuqua, R. R. (M)
Gan, M. (A)
Geddes, D. A. (M)
Gee, L. S. (A)
Geppert, D. V. (SM)
Gilever, D. A. (M)

Gliever, J. H. (M)
Grano, N. J. (M)
Gray, K. B. (A)
Haag, M. W. (M)
Hagopian, J. J. (M)
Hall, J. W. (M)
Hamm, P. E. (M)
Hansen, J. W., Jr. (M)
Harries, G. V. (M)
Hasen, J. E. (M)
Havens, J. D. (M)
Hedquist, J. M. (M)
Hefte, C. B. (M)
Helt, I. M. (M)
Helley, R. M. (M)
Helmann, J. V. (M)
High, R. H. (M)
Hill, L. W. (M)
Hoagland, A. S. (SM)
Hogin, J. L. (M)
Hooper, E. (M)
Housman, B. (M)
Howard, A. B. (A)
Hughes, G. E. (M)
Hulme, J. R. (M)
Hunfer, D. L. (M)
Hurlbut, G. M. (M)
Hurley, R. B. (SM)
Idehara, R. K. (M)
Isaak, M. E. (M)
Isberg, C. A. (M)
Jacobs, I. M. (M)
Jacobs, J., Jr. (M)
Jakstys, V. J. (M)
Jakubowski, M. C. (M)
Jameson, R. J. (M)
Jeffers, R. E. (M)
Jenkins, L. E., Jr. (M)
Jennings, J. E. (SM)
Jesse, E. (M)
Johnson, D. R. (M)
Johnson, W. G. (M)
Johnson, W. J., Jr. (M)
Jones, D. F. (M)
Jones, R. C. (M)
Kiely, D. J., Jr. (M)
Kilten, D. E. (M)
Kirkland, J. A. (M)
Klein, E. A. (M)
Kuhlman, F. M. (M)
Lally, J. P. (M)
Lamy, R. C. (M)
Larson, R. C., Jr. (M)
Larson, R. D. (M)
Lazzarini, R. F. (M)
Ligonenides, P. A. (M)
Langafelter, D. P. (M)
Loeber, N. C. (M)
Maiaun, W. R. (M)
Matovich, J. M. (M)
Manchester, Q. F. (M)
Marez, A. D. (M)
Markey, H. G. (A)
Martin, V. G. (SM)
Martini, R. F. (M)
Massey, H. N. (A)
Mathias, M. L. (A)
Mayer, A. (M)
McClung, D. H. (M)
McCullough, C. E. (M)
McCullough, J. S. (SM)
McGrath, M. L. (M)
McKeehan, M. B. (M)
McQueeney, K. A. (M)
Meyer, C. C. (M)
Miller, H. P., III (M)
Miller, J. C. (A)
Moe, C. R. (SM)
Molzahn, V. L. (M)
Mongeon, R. W. (M)
Moore, J. D. (A)
Morgan, L. C. (M)
Morin, G. A. (M)
Morrill, R. A. (M)
Mundrick, E. L. (M)
Mussell, H. A. (A)
Nauss, B. M. (M)
Nellson, L. C. (A)
Nelson, K. L. (M)
Nickel, W. (M)
Niedrauer, J. J. (M)
Nye, R. L., Jr. (M)
O'Brien, G. A. (M)
O'Connor, R. E. (A)
Ogren, V. G. (M)
O'Keefe, E. W. (A)
Olson, R. F. (M)
O'Neil, C. E. (M)
O'Neill, R. J. (A)
Orrick, R. L., Jr. (M)
Pack, E. L. (M)
Palm, R. A. (M)
Pantaja, H. N. (M)
Paulson, J. N. (A)
Peck, W. E. (M)
Perkins, C. R. (M)
Perry, L. A. (M)
Pfaff, R. J. (M)
Philips, D. W. (M)
Phillips, W. J. (M)
Pilni, E. W. (M)
Piper, J. A. (M)
Potter, R. W. (M)
Prather, R. E. (M)
Publicover, J. V. (A)
Quement, F. J. (M)
Rambo, W. R. (F)
Rasmussen, W. R. (M)
Rawson, S. W. (M)
Rearick, H. F. (M)
Redeker, R. G. (M)
Reindel, J. (M)
Reinhardt, P. M. (M)
Reiser, R. R. (M)
Reynolds, W., Jr. (M)
Rinsler, L. (M)
Roberts, T. E., Jr. (SM)
Robinson, J. D. (M)
Robinson, W. H. (M)
Rodda, E. N. (M)
Romans, W. E. (A)
Ross, H. C. (SM)
Rouse, J. C. (M)
Roux, W. L. (M)
Rule, R. M. (M)
Sagara, K. (M)
Sagawa, S. S. (M)
Saint, R. C. (A)
Samario, E. J. (M)
Saylor, R. A. (A)
Schaffert, R. M. (SM)
Schellenburg, A. G. (M)
Schlaepfer, C. E. (A)
Schulze, C. D. (M)
Schumacher, R. T. (M)
Sedillo, R. R. (M)
Shadle, L. E. (A)
Shapiro, M. A. (M)
Shigemoto, F. H. (M)
Shiltinburg, T. D. (A)
Siegel, F. G. (M)
Stock, J. A. (M)
Stone, A. H. (SM)
Stringall, W. S. (A)
Sutton, J. G., Jr. (M)
Swallow, D. S. (M)
Takata, M. M. (A)
Thayer, J. K. (M)
Toschi, E. A. (M)
Townsend, C. K. (A)
Jennings, J. E. (SM)
Sordo, C. D. (M)
Spades, J. F. (M)
Specht, D. F. (M)
Spencer P. F. (M)
Steading, T. W., Jr. (M)
Steele, C. W. (M)
Steward, L. B., Jr. (M)
Traile, G. E. (M)
Treseder, R. C. (M)
Tully, J. F. (M)
Turner, E. L. (M)
Ulfusa, R. L. (M)
Van Gelder, M. K. (M)
Van Hook, R. D. (M)
Viallet, J. L., Jr. (M)
Vickers, W. H. (M)
Voge, F. (A)
Voyles, R. L. (M)
Walker, J. H. (SM)
Wattrip, D. F. (A)
Wang, P. K. C. (M)
Wasano, C. F. (M)
Watson, C. L. (M)
Watson, K. J. (M)
Weeks, R. W. (M)
Weger, R. E. (M)
Wengert, R. A. (M)
Widener, M. W. (M)
Willard, D. D. (SM)
Williams, B.W. (M)
Wilshinsky, I. (M)
Wilson, R. E. (M)
Winchell, J. A. (M)
Wise, C. D. (M)
Wise, G. C. (A)
Wong, P. (A)
Wood, F. B. (M)
Worster, J. R. (M)
Wright, B. (SM)
Yamada, D. A. (M)
Yoskowitz, L. K. (M)
Youngberg, W. A. (M)

San Juan Capistrano (LA-SA-7)
Mangus, T. W. (M)

San Leandro (SF-EB-7)
Albrecht, J. F. (A)
Andersen, R. L. (M)
Borrelli, R. N. (M)
Bramham, K. (A)
Haubrock, F. W. (M)
Jones, F. W. (M)
Salvador, J. G. (M)
Sanders, J. G. (A)
Silverman, B. P. (M)
Stitt, J. G. (A)

San Lorenzo (SF-EB-7)
Donahue, W. J. (A)
Jacobs, H. L. (A)
Murray, J. L. (A)

San Luis Obispo (AL-SB-7)
Brown, C. F. (M)
Chaney, N. H. (M)
Fisher, C. E. (A)
Hendriks, H. J. (SM)
Herald, C. A. (M)
Landyshev, A. (SM)
Landyshev, I. (A)
Look, A. (M)
Martin, W. W. (A)
Radius, C. (SM)
Wolf, H. K. (SM)

San Marcos (SD-7)
Conrad, R. A. (M)

San Marino (LA-P-7)
Baumgartner, W. S. (SM)
Beswick, W. A. (A)
Bucknell, W. H. (M)
Dryden, E. H. (M)
Gauldin, C. B. (M)
Irwin, E. M. (M)
Kent, S. S. (M)
Metzger, H. W. (M)
Pfeiffer, P. W. (M)
Pfeiffer, W. F. (A)
Post, G. E. (M)
Sanders, L., Jr. (M)
Sievers, E. S. (M)
Spaulding, C. P. (SM)
Stimson, J. D. (M)
Thatcher, J. W. (SM)
Wright, W. V., Jr. (M)
Zenner, R. E. (SM)

San Martin (SF-7)
Sylvain, E. F. (M)

San Mateo (SF-7)
Andrews, W. F. (M)
Armstrong, P. S. (A)
Bartine, F. (M)
Bartholomew, H. C. (M)
Batten, H. W. (M)
Brauer, F. (M)
Bennett, K. (M)
Bennett, W. S. (SM)
Breymayer, K. E. (SM)
Burt, J. M. (A)
Chow, B. (M)
Copeland, T. J. (M)
Diestelhorst, G. A. (A)
Downie, W. A. (M)
Erickson, L. G. (SM)
Ewy, M. D. (M)
Felder, L. A. (A)
Flanley, W. F. (SM)
Floyd, W. S., Jr. (A)
Fujii, W. M. (M)
Garrow, H. J. (SM)
Haylock, F. B. (M)
Heller, R. E. (SM)
Hong, K. G. (M)
Jones, H. R. (A)
Kimbell, G. D. (A)
Lambros, J. G. (SM)
Leonhardt, M. W. (M)
Line, G. D. (M)
Loring, C. M., Jr. (M)
Lott, T. M. (M)
Mackenzie, R.G. (SM)
Martinez, H. M. (M)
McGehee, W. W. (M)
Miller, C. M. (M)
Newman, R.J. (A)
Ogden, J. E. (M)
Oshima, K. (M)
Rinaudo, R. F. (M)
Sayer, W. H., Jr. (SM)
Snoddy, R. E. (M)
Soderstrum, J. C. (SM)
Slatherland, R. I. (M)
Taylor, E. D. (M)
Taylor, R. A. (M)
Wilber, L. E. (A)
Williams, J. A., Jr. (M)
Woodward, D. E. (M)
Zweifel, F. A. (M)

San Pablo (SF-EB-7)
Goble, R. W. (A)
McDaniel, R. F. (M)
Smith, C. H. (A)

San Pedro (LA-7)
Baines, F. L. (M)
Barina, E. J. (M)
Blum, M. (M)
Boyd, B. (M)
Breaskin, S. D. (M)
Brodek, W. J. (M)
Clyne, W. E. (SM)
Conant, J. L., Jr. (M)
Conn, R. B. (M)
Dye, R. R. (M)
Gispen, S. J. (M)
Goforth, J. L. (M)
Grove, R. C. (M)
Gustin, J. T. (A)
Hamren, S. D. (A)
Harris, D. B. (M)
Heaverlo, H. D. (A)
Hetzich, J. J. (M)
Holland, R. J. (A)
Jiu, R. (M)
Kelly, R. D. (M)
Kercher, R. B. (M)
Kind, D. E. (M)
Klein, E. F. (M)
Lowe, R. R. (SM)
McCord, H. L. (M)
McCready, K. F. (M)
McDaniel, G. A., Jr. (SM)
McWilliams, J. D. (SM)
Menes, H. C. (M)
Moore, M. E. (M)
Nickerson, H. H. (A)
O'Brien, W. C. (SM)
Oliver, R. B., Jr. (M)
Ransom, D. H. (M)
Rasoux, D. E. (M)
Reiss, R. I. (M)
Robinson, J. H., III (SM)
Robinson, N. O., Jr. (M)
Rosenberg, H. S. (M)
Sandoval, K. A. (M)
Scheres, W. J. (M)
Schmid, L. H. (M)
Stroud, S. G. (M)
Thomas, D. W. (M)
Wagoner, E. V., Jr. (M)
Wershoven, G. A. (M)
Yoder, R. F. (M)

San Rafael (SF-7)
Biegel, E. C. (M)
Brown, R. E. (M)
Catania, C. J. (M)
Etten, K. W. (M)
Fitzroy, D. C. (A)
Marshall, F. M. (M)
Miles, C. W. (M)
Paulson, G. A. (A)
Schaub, L. E. (A)
Watkinson, J. B. (M)
White, W. T. (A)
Yost, D. E. (M)

Santa Ana (LA-SA-7)
Akrell, C. A. S. (SM)
Anderson, G. W. (M)
Anderson, S. E. (M)
Arnold, H. J. (SM)
Attarian, R. V. (M)
Bailey, K. D. (SM)
Bailing, R. A. (M)
Baranoff, A. J. (SM)
Barnhart, M. W. (M)
Barton, H. D. (A)
Bergthold, F. M., Jr. (M)
Bixler, O. C. (SM)
Blair, D. R. (A)
Bonney, R. B. (SM)
Brown, C. A. (SM)
Buchanan, R. A. (M)
Buehner, M. R. (SM)
Burke, J. J. (SM)
Capps, J. W. (M)
Cavness, R. L. (A)
Chase, W. P. (M)
Cobb, H. A. Jr. (M)
Cooper, A. F. (M)
Cooper, T. W. (M)
Crafts, C. A. (SM)
Davis, R. (SM)
Dempster, B. (F)
Dored, W. (A)
Elliott, M. S. (A)
Emerson, M. R. (M)
Ermatinger, C. E. (A)
Fleger-Kollmann, H. (SM)
Frady, W. E. (M)
Galas, T. A. (SM)
Gangnes, A. V. (SM)
Gaul, T. W. (M)
Geis, E. R. (M)
Giannini, G. M. (SM)
Gipple, H. W. (M)
Gordon, J. F. (SM)
Groce, J. C. (SM)
Gudmundsen, R. A. (SM)
Haack, R. W. (M)
Haglund, H. H. (A)
Heald, E. T. (SM)
Herkimer, K. W. (A)
Herman, R. W. (M)
Hilliard, J. K. (F)
Holly, R. H. (M)
Hom, R. H. (SM)
Hoyt, M. W. (M)
Hudgins, V. H. (SM)
Hunter, R. T. (M)
Jarmie, T. W. (SM)
Jenkins, B. C. (A)
Johnson, H. B. (A)
Kelly, P. M. (M)
Klevans, W. L. (M)
Kobetich, E. A. (M)
Koger, G. W. (M)
Koppel, R. L. (M)
Lambert, L. M., Jr. (M)
Lander, R. F. (A)
Laughlin, J. G., Jr. (M)
Lawless, J. C. (M)
Levering, C. A. (M)
Mallinckroot, A. J. (SM)
Mancini, A. R. (M)
Maxson, R. R. (M)
Mayfield, J. D. (A)
McCain, G. (M)
McCandless, J. B. (M)
McGuire, T. B. (A)
McNair, R. D. (M)
Moore, M. H. (M)
Morrison, A. I. (SM)
Newman, C. (M)
Noble, J. J. (M)
Ostroski, A. B. (M)
Pasley, E. W. (A)
Perkins, M. G. (A)
Persons, L. D. (M)
Pike, F. R. (M)
Porter, W. R. (M)
Proctor, D. R. (SM)
Prothers, L. T. (M)
Randall, L. B. (A)
Reedy, P. H. (SM)
Sander, M. H. (M)
Sandhu, M. S. (A)
Schiffelbein, W. L. (M)
Schumann, W. A. (M)
Scullion, G. M. (M)
Seeley, E. S. (SM)
Seymour, R. A. (A)
Shannon, J. B. (M)
Shaw, L. B. (M)
Sherwin, J. S. (M)
Sisson, R. L. (M)
Skaggs, E. R. (M)
Slaughter, D. W. (M)
Smith, C. C. L. (M)
Smith, R. R. (SM)
Smith, W. K. (M)
Snyder, R. L. (SM)
Stone, K. A. (A)
Strong, W. J. (M)
Tackett, W. F. (SM)
Thayer, G. E. (M)
Timothy, K. O. (M)
Triman, E. L. (M)
Vandal, W. L., Jr. (M)
Van Meter, J. L. (SM)
Vincent, G. D. (SM)
Vincent, R. J. (M)
Wantass, C. L. (A)
Wantass, S. D. (M)
Warhurst, J. W. (M)
Weber, P. P. (M)
Wheeler, R. W. (A)
Wood, W. S. (M)
Young, S. (M)

Santa Barbara (LA-SB-7)
Abele, R. J. (M)
Anderson, J. F. (M)
Azari, E. (M)
Azgapetian, V. (SM)
Baravella, J. G. (A)
Barquist, W. S., Jr. (M)
Bartolini, E. (SM)
Benton, R. F. (M)
Berg, F. J. (M)
Blinn, W. J. (M)
Bock, M. J. (M)
Boxer, R. (M)
Boyle, S. R. (M)
Bream, H. C. (SM)
Brody, R. H. (M)
Brun, G. E. (M)
Buttschardt, C. C., Jr. (M)
Charipar, J. (M)
Crispa, E. R. (M)
Cruse, P. M. (M)
Dairiki, S. (M)
Dawley, R. L. (M)
De Vore, L. T. (F)
Ewing, W. J., Jr. (M)
Forster, M. C. (SM)
Gabrielsen, H. R. (M)
Gannaway, R. (SM)
Ginsburg, G. S. (M)
Gordon, E. E. (M)
Grant, G. R. (M)
Gullatt, S. P., Jr. (M)
Hacke, J. E., Jr. (SM)
Hannah, D. C. (A)
Harger, W. W. (SM)
Hausz, W. (F)
Haville, D. (M)
Hedges, C. P. (SM)
Henrisken, L. L. (M)
Herr, D. L. (SM)
Hill, D. R. (M)
Hinz, H. F. (A)
Hudson, H. K. (SM)
Hudson, K. (M)
Hummer, R. F. (M)
Humphrey, G. S. (A)
Hutcheon, R. S. (SM)
Ingle, G. F. (M)
Inoue, N. S. (M)
Irwin, C. P. (M)
Janeway, W. F. (M)
Johns, J. (M)
Kalstrom, R. D. (M)
Kelley, G. J. (M)
Kelsey, E. L. (A)
Kingman, G. M. (M)
Knapp, W. S. (M)
Krzyczkowski, R. (SM)
Kuerschner, H. A. (M)
Kvaas, T. A. (SM)
Lansing, J. C., Jr. (M)
Little, D. R. (M)
Looman, J. R. (M)
Luck, A. J. (M)
Majka, C. J. (M)
Maki, G. J. (SM)
Markin, J. (SM)
Mattiat, O. E. (SM)
McCaughna, J. R. (M)
Merian, R. F. (M)
Mescall, J. J. (A)
Moore, W. L. (M)
Morrison, L. H. (SM)
Moseley, J. A. (M)
Myers, J. J. (SM)
Nash, C. C., Jr. (M)
Padgett, E. P., Jr. (M)
Nelles, M. (M)
Nelson, P. H (SM)
Nistler, G. C. (M)
Noble, D. S. (SM)
Olmsted, D. T. (SM)
Padgett, E. P. Jr. (M)
Panec, G. A. (SM)
Patchell, J. T. (M)
Peterson, C. E. (A)
Pfeiffer, H. F. (M)
Phillips, R.G. (M)
Plake, W. C. (M)
Podlesny, R. F. (M)
Pressley, J. H. (F)
Price, R. A. (A)
Rahilly, J. P. (M)
Rauch, S. E. (SM)
Raymond, R. C. (F)
Reed, J. C. (M)
Reed, R. V. (M)
Remond, F. X. (M)
Riel, R. W. (M)
San Soucie, W. R. (M)
Savage, R. P. (M)
Sayre, G. L. (M)
Schropp, D. R. (M)



Schwartz, A. J. (M)
Scott, R. C. (SM)
Sears, J. F. (SM)
Shiers, G. (M)
Sigoloff, S. C. (SM)
Simpson, J. D. (A)
Smith, H. W. (A)
Smith, R. A. (M)
Smith, W. E. (M)
Snyder, R.W. (M)
Solomon, P. S. (SM)
Stassinos, J. (M)
Stoll, C. N. (M)
Sullivan, J. M., Jr. (SM)
Surette, L. T. (M)
Swift, I. H. (M)
Switzer, W. L. (M)
Tanhauser, A. J. (M)
Thomson, R. L. (A)
Thomsen, P. H. (SM)
Thomsen, R. N. (M)
Thoren, C. A. (M)
Tornheim, H. (SM)
Urbach, K. (SM)
Villers, D. (M)
Walker, B. G. (M)
Walker, J. E. (M)
Wall, V. W. (SM)
Watkins, R. A. (SM)
Weber, H. J. (M)
Weiss, M. (M)
Wildman, A. J. (M)
Wilkie, D. C. (A)
Williams, R. O. (M)
Witten, A. L. (SM)
Woerner, J. J. (M)
Wolfe, G. M. (SM)
Zopf, D. O. (M)

Santa Clara (SF-7)
Adams, J. C., Jr. (A)
Adams, W. H. (SM)
Adcock, M. B. (M)
Adelson, M. B. (M)
Agins, B. R. (M)
Alford, C. H., Jr. (M)
Altemati, R. B. (M)
Armann, D. E. (M)
Armstrong, J. E. (M)
Bennion, J. L. (M)
Bentley, J. H. (M)
Bily, J. J. (SM)
Bird, P. F. (M)
Black, S. H. (M)
Blatt, E. L., Jr. (M)
Brebrick, R. J. (M)
Britton, J. W., Jr. (M)
Brown, B. H. (M)
Brown, J. S. (M)
Bryson, J. (M)
Bustamante, H. A. (M)
Butt, N. C. (M)
Butterfield, S. E. (M)
Callahan, A. H. (M)
Cannon, R. A. (M)
Carney, D. A. (M)
Carr, J. W. (M)
Chang, H. K. H. (M)
Chenoweth, A. G. (M)
Chesley, B. E. (M)
Conner, C. C. (SM)
Convertino, R. O. (M)
Crowther, E. E. (M)
Dailey, D. G. (M)
Dickens, W. D. (M)
Dill, J. J. (M)
Duell, A. W. (M)
Ellis, W. (M)
Estrada, M. S. (M)
Ewing, G. D. (M)
Fitzpatrick, J. P. (SM)
Fleming, H. B. (M)
Forget, T. W. (M)
Forster, R. L. (M)
Fortner, W. D. (M)
Garthwait, E. G. (M)
Gaubatz, D. C. (M)
Geipes, K. S. (SM)
Geisztar, T. D. (M)
Giddis, A. R. (A)
Gluck, J. E. (M)
Goldstein, M. (M)
Griese, R. H. (A)
Gross, T. W. (M)
Guthrie, E. E. (M)
Haddad, J. D. (M)
Hall, T. F. (M)
Helm, J. L. (M)
Helsey, D. D. (A)
Herman, J. C (M)
Hillesland, C. B. (M)
Honore, P. M. (A)
Ingwerson, D. R. (M)
Jackson, C. F. (M)
Jacobsen, G. C. (M)
Johnson, R. W. (M)
Johnston, M. H. (A)
Jones, P. B. (M)
Katzman, H. (M)
Kikoshima, R. T. (M)
Killion, D. G. (M)
Kooyers, G. P. (M)
Kroener, D. F. (M)
La Gasse, S. G. (SM)
Lamberty, B. J. (M)
Lewis, F. V. (M)
Linn, C. W. (M)
Linn, F. S., Jr. (M)
Littler, D. (M)
Lynch, W. L. (M)
Lyon, D. J. (M)
Lyon, D. B. (M)
Magarian, J. D. (M)
Matsumoto, L. Y. (M)
Matthews, D. W. (A)
McClary, D. A. (M)
McCune, E. W. (M)
McPhail, J. H. (M)
McRae, R. C. (M)
Meader, R. O. (M)
Meadowcroft, E. A. (M)
Miller, S. K. (M)
Negrete, M. R. (M)
Ne Smith, W. W. (M)
Newman, H. L. (SM)
Pea, R. O. (A)
Pershing, P. D. (M)
Peterson, D. A. (M)
Peterson, K. F. (A)
Pickett, C. E. (M)
Poulsen, J. E. (A)
Riley, R. T. (M)
Rollins, D. F. (M)
Rudolf, S. (M)
Schulz, D. F. (M)
Seaman, H. K. (M)
Sepulveda, R. E. (M)
Shew, L. F. (M)
Sierra, H. M. (M)
Spesock, G. J. (M)
Spillane, J. K. (M)
Studevant, J. T. (M)
Sundberg, V. C. (M)
Swayze, D. W. (M)
Tenney, H. D. (M)
Todd, L. L. (A)
Van Ess, J. C. (M)
Wechsler, B. (M)
Welch, J. R. (SM)
Whitten, G. A. (SM)
Yagi, H. S. (A)
Yates, B. H. (M)

Santa Cruz (SF-7)
Baishiki, S. (M)
Bensen, R. F. (M)
Dunn, J. V. (M)
Gerhart, R. E. (M)
Gowdey, M. V. (M)
Jackson, C. L. (A)
Janitschke, E. O. (M)
King, J. W. (A)
Mattson, D. F. (SM)
Silvis, R. N. (M)
Stinker, V. B. (M)
Wilson, D. R. (M)

Santa Fe Springs (LA-SA-7)
Cryor, R. B. (A)
Houston, B. B. (A)
Tosspon, A. E. (M)

Santa Maria (LA-SB-7)
Blair, G. (M)
Bryant, J. D. (A)
Dann, J. A. (M)
Elam, O.R., Jr. (M)
Fratick, S. C. (M)
Franklin, L. F. (M)
Gallo, L. F. (M)
Greene, A. A. (M)
Hill, A. J. (M)
Hoffer, R. L. (M)
Holbrook, J. G. (M)
Jensen, D. E. (M)
Kellers, F., III (M)
Kelly, E. J. (M)
Kring, J. D., Jr. (M)
Maurer, R. S. (M)
Michelet, A. H. (M)
Patterson, A. F. (M)
Pefferle, D. L. (M)
Perkins, L. L. (A)
Pierson, J. L. (M)
Rabehl, W. C. (A)
Rhodus, R. D. (M)
Seymour, E. E. (M)
Snyder, E. C., Jr. (M)
Teeter, W. L. (SM)
Thompson, L. G. (M)
Warren, K. A. (A)

Santa Monica (LA-7)
Abrams, J. J. (M)
Alexander, B. H. (SM)
Alexander, M. A. (M)
Allee, R. V. (M)
Alperin, N. I. (M)
Anderson, T. G. (M)
Andreasson, R. I. (M)
Armer, P. (M)
Austin, E. W. (A)
Bagi, R. R. (M)
Baker, C. L. (M)
Banhagel, E. W. (M)
Baran, P. (SM)
Barr, I. (M)
Beattie, J. M. (M)
Beavin, R. L. (M)
Becker, L. E. (M)
Bennett, W. E. (SM)
Blick, R. (M)
Birmingham, D. J. (M)
Blodgett, W. G. (M)
Blount, W. A. (M)
Blue, R. M. (M)
Blumenthal, I. S. (M)
Boucher, R. J. (M)
Brand, D. L. (M)
Breneman, H. M. (M)
Brennan, L. E. (M)
Broadwell, W. B. (M)
Butt, C. (M)
Callan, R. W. (SM)
Campbell, J. T. (M)
Carne, J. B. (SM)
Carpenter, L. B. (M)
Carver, F. R. (SM)
Causey, G. D. (M)
Chambers, E. S. (M)
Chamoness, N. A. (SM)
Clark, J. W. (SM)
Clough, R. W. (M)
Cohen, A. C. (M)
Collins, A. D. (M)
Combs, W. E. (M)
Conklin, J. L. (M)
Cooke, C. W., Jr. (SM)
Craig, L. J. (M)
Crain, C. M. (F)
Cribb, W. W., Jr. (M)
Cuthane, L. G. (M)
Danenberg, L. W. (M)
Dasolt, J. I. (M)
Davie, M. C. (SM)
Davis, N. L., Jr. (M)
De Lucia, V. E. (SM)
Diedrichs, R. O. (M)
Difford, L. A. (A)
Digby, J. F. (SM)
D'Reilly, G. O. (SM)
Dugan, D. A. (M)
Durieux, C. W. (A)
Emery, W. K. (M)
Endler, H. M. (M)
Everest, F. A. (SM)
Faenza, G. R. (M)
Fears, C. R (M)
Feezor, J. G. (M)
Fliman, N. J. (SM)
Ford, G. M. (M)
Fox, A. J. (M)
Francis, G. A. L. (A)
Gauronskas, P. P. (M)
George, V. L. (M)
Goldberg, P. A. (M)
Goodykoontz, J. R. (SM)
Green, W. J., Jr. (M)
Gumbart, H. E. (M)
Guyer, E. (M)
Halter, J. E., Jr. (M)
Helmrich, F. (M)
Helprin, S. E. (A)
Higuchi, P. K. (A)
Highstrete, B. A. (M)
Hillard, J. T. (M)
Hori, K. (M)
Jisa, E. A. (M)
Joe, R. H. (M)
Judge, F. W. (M)
Kalaba, R. (SM)
Karalukas, J. (A)
Kidd, A. T. (M)
Kirkwood, R. L. (M)
Klinger, A. (M)
Kraepelien, H. Y. (M)
Krantz, C. H. (M)
Lakatos, E. (SM)
Langmuir, D. B. (SM)
Largent, J. R. (M)
Lavery, W. J., Jr. (M)
Lear, W. P. (SM)
Lee, D. H. (M)
Lemasters, H. G. (M)
Lenoyel, B. A. (SM)
Leo, M. J. (M)
Lietzan, A. A. (M)
Lindholm, C. R. (M)
Linquiti, A. A. (M)
Lipps, E. A. (M)
Luce, R. C. (A)
Lukenbill, R. S. (M)
Lustgarten, M. N. (SM)
Mackay, C. R. (SM)
Malone, E. P. (M)
Manser, D. E., Jr. (M)
McKelvy, M. J. (M)
Melara, J. D. (M)
Mergy, A. E. (M)
Miller, E. M. (A)
Miller, K. M. (SM)
Miller, M. L. (A)
Million, J. W., Jr. (SM)
Molloy, H. R. (M)
Montalbano, G. (M)
Morris, C. R. (M)
Morriss, B. E. (M)
Moser, J. L. (M)
Moulton, A. B. (M)
Nakano, H. (M)
Neideffer, C. R. (A)
Nolde, G. V. (SM)
Nutten, D. C. (M)
Paine, J. A. (A)
Parkin, T. R. (A)
Parkinson, C. B., Jr. (SM)
Pendleton, W. H. (A)
Plew, H. E., Jr. (M)
Pugh, R. A. (M)
Quandt, R. L. (M)
Ralford, J. D. (M)
Raymond, J. P. (M)
Rehler, K. M. (M)
Reichert, D. G. (M)
Renaud, H. G. (A)
Reynolds, J. L. (M)
Richter, W. A. (D)
Rieser, H. M. (A)
Robertson, V. H. (M)
Rolt, G. H., Jr. (A)
Roney, R. K. (M)
Rosen, H. A. (M)
Rosenbaum, J. L. (A)
Rosenberg, M. (M)
Rosenthal, W. (M)
Salzer, J. M. (SM)
Sanford, R. C. (SM)
Schindler, M. (M)
Scott, J. N. J. (M)
Scultto, T. J. (M)
Snow, W. B. (SM)
Sohler, J. F. (M)
Solley, J. C. (M)
Soltwedel, E. B. (SM)
Soring, L. K. C. (A)
Stalford, P. L. (M)
Stark, H. P. (A)
Stewart, A. A. (A)
Stewart, W. F. (SM)
Stineman, V. E. (M)
Swerling, P. (M)
Tatum, F. A. (A)
Tesdall, D. W. (M)
Thomas, D. H. (M)
Tor, W. G. (M)
Tracey, B. P. (M)
Troy, P. (M)
Valadez, F. D. (M)
Valette, H. C. (M)
Van Dyke, W. D. (SM)
Vestine, E. H. (SM)
Vickery, B. L. (M)
Vuilleumier, R. F. (M)
Wagstrom, R. G. (M)
Ware, W. H. (SM)
Waymeyer, W. K. (M)
Weber, R. I. (M)
Wehner, R. S. (M)
Welty, R. M. (M)
Wennerstrom, D. O. (M)
Wheeler, D. D. (M)
Whitaker, J. N. (SM)
Wileman, R. A. (M)
Williams, J. V., Jr. (SM)
Wilmers, F. J. (M)
Wilson, D. W. (M)
Woods, H. D. (M)
Yates, W. A., Jr. (M)
Yoshida, M. (M)
Zazulak, R. R. (M)

Santa Paula (LA-B-7)
Carpenter, D. D. (M)
Sharp, J. M. (M)
Wasmansdorff, C. (SM)
Wymore, R. H. (M)

Santa Rosa (SF-7)
Dawes, W. W. (M)
King, F. N. (M)
Merrill, G. E. (M)
Parker, J. F. (A)
Robbins, C. M., Sr. (SM)

Santa Susana (LA-B-7)
Najemnik, G. F. (A)

Santa Ynez (LA-SB-7)
Pischel, E. F. (SM)
Shannon, W. W. (M)

Santee (SD-7)
Brown, W. R. (M)
Freedman, S. (SM)
Maxa, R. F. (M)
Morgan, L. A. (M)
Ursin, B. E. (M)
Wilson, R. E. (M)

Saratoga (SF-7)
Aubry, J. D. (A)
Becker, H. A. (M)
Belleville, L. M. (SM)
Bender, D. W. (M)
Bowen, D. A. (M)
Boyer, A. H. (SM)
Brolly, A. H. (SM)
Burger, R. W. (M)
Burns, M. C. (SM)
Carlson, B. V. (A)
Chromy, B. J. (M)
Davis, R. G. (M)
Dawson, E. C. (M)
Dinapoli, F. C. (M)
Ferguson, L. N. (A)
Hammack, C. M. (SM)
Hart, A. L. (M)
Hartke, D. C. (M)
Heninger, G. O. (M)
Hermstad, J. A. (M)
Hexem, J. (M)
Hodge, M. H., Jr. (M)
Horvath, A. (SM)
Imboden, G. J. (A)
Jones, R. E. (M)
Kurzweil, F., Jr. (M)
Law, L. R. (A)
Marandino, N. J. (M)
Martin, J. B. (M)
McCole, J. F. (M)
McEuen, A. H. (SM)
Melas, C. M. (M)
Meyer, W. E. (M)
Moats, R. R. (SM)
Nettesheim, N. P. (SM)
Nylander, R. F. (SM)
Palmer, W. G. (M)
Pease, M. C., III (SM)
Powell, R. M. (M)
Ransil, R. J. (M)
Rolph, D. B. (M)
Seader, L. D. (M)
Smith, P. G. (SM)
Test, L. D. (M)
Tripp, R. M. (M)
Tyminski, W. V. (M)
Tyrrell, R. A. (A)

Saugus (LA-7)
Cannon, H. E. (A)
Cavanagh, M. J. (M)

Sausalita (SF-7)
Dudley, A. L. (M)

Seal Beach (LA-SA-7)
Berard, R. G. (M)
Cosgrave, S. J. (M)
Kempf, R. A. (M)
Kett, L. G. (M)

Sebastopol (SF-7)
Sherron, R. J. Jr. (M)

Sepulveda (LA-SF-7)
Adamson, W. H. (M)
Ahmann, J. J. (M)
Bloom, R. E. (M)
Bly, S. W. (M)
Bock, E. L. (SM)
Buckley, J. W. (A)
Carpenter, S. L. (M)
Casarow, L. Jr. (M)
Catran, J. (M)
Chu, H. (M)
Clarke, D. R. (M)
Corey, E. J. (A)
Decuir, L. E. (M)
Donnelly, M. E. (M)
Edwards, W. P. (M)
Erhardt, K. D. (M)
Fishill, M. (M)
Gardner, J. M. (SM)
Goodman, S. N. (M)
Grimes, W. J. (A)
Heidbrink, M. E. (M)
Holly, R. (M)
Hughes, E. L. (M)
Ingebretsen, E. E. (SM)
Kempf, B. E. (M)
King, E. J. (M)
Lesch, S. (M)
Lords, F. V. (A)
Lund, R. E. (M)
McCormick, W. G. (M)
Menasco, L. C. (M)
Miller, D. E. (SM)
Montijo, R. E. Jr. (M)
Nesbit, E. E. (SM)
Norby, H. A. (SM)
Nowak, R. F. (M)
Palmquist, M. L. Jr. (M)
Patin, O. E. (SM)
Peterson, R. W. (M)
Reaver, R. R. (M)
Richards, C. B. (M)
Schneidewind, N. F. (M)
Speen, G. B. (SM)
Swales, S. (M)
Tenenberg, S. E. (M)
Wolf, S. M. (M)
Wylie, L. (A)

Sharp Park (SF-7)
Vreeland, R. W. (M)

Shell Beach (LA-SB-7)
Pesek, R. A. (M)

Sherman Oaks (LA-SF-7)
Abott, J. R. (M)
Allen, F. C. (M)
Beekman, R. E. (SM)
Bernstein, P. L. (M)
Bloomberg, R. A. (M)
Blumberg, N. (M)
Bockwoldt, W. H. (M)
Campbell, E. J. (A)
Childs, H. A. (SM)
Dean, J. P. (M)
Derderian, N. (A)
Deutsch, R. (SM)
Dickinson, H. B. (A)
Ferrel, D. W. (M)
Foote, S. H. (M)
Froehlig, G. M. (M)
Garafalo, J. J. (M)
Glasspool, W. T. G. (M)
Griswold, W. A. (M)
Herget, C. J. (M)
Herlinger, L. F. (A)
Hooper, B. E. (SM)
Ito, R. A. (M)
Johnson, H. (M)
Jones, B. J. (M)
Kabuss, N. G. (SM)
Krinsky, S. S. (A)
Lamm, R. A. (SM)
Landman, R. M. (M)
Lawrence, B. J. (SM)
Lebell, D. (M)
Leon, H. I. (SM)
Liebeskind, J. A. (M)
Markin, N. (M)
Millet, M. R. (M)
Neuman, G. O. (A)
Pollack, S. (A)
Pugsley, D. W. (F)
Rogne, R. J. (M)
Rolnik, J. A. (M)
Ross, M. N. (M)
Rove, G. (SM)
Russell, D. C. (M)
Rutland, D. F. (A)
Rysinski, C. A., Jr. (M)
Scanlan, J. A. (SM)
Schoenbaum, W. J. (M)
Signorelli, P. R. (A)
Slotnick, D. (M)

Smead, H. J. (M)
Spranger, P. B. (A)
Sprong, D. C. (M)
Suffield, F. G. (SM)
Sutliff, C. N. (M)
Tropita, J. F. (M)
Wahlstrom, J. W. (M)
Waller, R. W. (M)
Webb, P. S. (M)
Wichmann, T. F. (M)
Wittsey, G. C. (M)
Winkler, T. (M)
Wolff, E. H. (SM)
Zuehlke, E. R. (M)

Sierra Madre (LA-P-7)
Burke, H. E., Jr. (SM)
Carpenter, F. C., Jr. (M)
Da Silva, E. G. (M)
Kelley, J. R. (A)
Oliver, S. M. (M)
Phillips, E. V. (M)
Posthill, B. N. (A)
Reinsch, F. J. (M)
Sharp, R. S. (A)
Siegmeth, A. J. (SM)
Stefansson, R. (M)
Tahl, J. E. (A)
Wheelon, W. E. (A)
Zeuschner, R. F. (SM)

Simi (LA-B-7)
Black, R. J., Sr. (M)
Prehn, G. G. (M)

Solana Beach (SD-7)
Cannon, J. W. (A)
Gibb, R. F. (M)
Heid P. R. (M)
Kuck, B. M. (M)
Stephenson, R. O. (M)

Somis (LA-B-7)
Holzgraff, H. G. (M)

Sonoma (SF-7)
Sievert, G. F. (M)

Soquel (SF-7)
Wheeler, D. E. (SM)

South Gate (LA-7)
Dickinson, H. (A)
Fujimoto, M. (A)
Gilliam, C. E. (A)
Jeffrey, H. S. (M)
Nardi, F. G. (M)
Rogers, J. M. (M)
Wilgus, D. S. (M)

South Laguna (LA-SA-7)
Pringle, R., Jr. (M)

South Palo Alto (SF-7)
Huynen, J. R. (M)

South Pasadena (LA-P-7)
Banta, R. P. (M)
Bartel, W. B. (A)
Blasier, H. E. (M)
Brunner, H. (M)
Freel, C. L. (A)
Holmes, W. T. (M)
Horiuchi, H. H. (M)
Houdyshell, H. H. (M)
Kuck, R. G. (SM)
McGrath, R. P. (M)
Newhouse, G. B. (M)
Salomone, L., Jr. (M)
Sell, D. D. (M)
Shapiro, H. (M)
Storer, W. F. (M)
Trzyna, T. S. (A)
Wiker, G. A. (M)

South Redondo Beach (LA-7)
Froelich, R. W. (M)

South San Francisco (SF-7)
Bowle, R. L. (A)
Elkins, C. E. (M)
Garzoli, F. F. (M)
Jenkins, C. D., Jr. (M)
Johnston, J. S. (A)
Karp, P. W. (M)
Kline, S. H. (A)
Rumble, G. F. (A)
Tripp, A. L. (M)
Tudor, H. (M)

South San Gabriel (LA-P-7)
Fairbanks, A. F. (M)
Morrison, R. H. (A)
Painchaud, P. A. (M)

Spring Valley (SD-7)
Bailey, D. G. (M)
Hooper, N. J. (M)
Siperly, B. H. (M)
Smith, H. C. (M)

Stanford (SF-7)
Allen, M. A. (M)
Bahrs, G. S. (M)
Barnett, E. F. (M)
Bevensee, R. M. (M)
Braceweil, R. N. (SM)
Braverman, D. J. (M)
Bryan, J. H. (M)
Buss, R. R. (SM)
Chodorow, M. (F)

Coates, D. B. (M)
Constantinides, J. S. (A)
Craig, R. A. (SM)
Crane, M. (M)
Crary, J. H. (M)
Davis, K. S. (M)
Drapkin, P. E. (M)
Dunn, D. A. (SM)
Dunn, V. E. (M)
Egan, R. D. (M)
Eshleman, V. R. (SM)
Fischler, M. A. (M)
Fontana, J. (M)
Franklin, G. F. (M)
Gallagher, P. B. (M)
Ginzton, E. L. (F)
Goldsmith, A. (M)
Grace, D. J. (SM)
Hagfors, T. (A)
Hare, M. D. (SM)
Harker, K. J. (M)
Harman, W. W. (SM)
Harris, D. P. (M)
Heffner, H. (SM)
Helliwell, R. A. (F)
Holmes, C. H. (A)
Hsu, J. (M)
Huntley, W. H., Jr. (M)
Ivarek, F. (SM)
Jasberg, J. H. (M)
Jones, R. L. (SM)
Karp, A. (SM)
Kincheloe, W. R., Jr. (SM)
Kino, G. S. (A)
Lagerstrom, R. P. (M)
Lebacqz, J. V. (SM)
Linden, D. A. (M)
Linvill, J. G. (F)
Loew, G. A. (M)
Ludovici, B. F. (M)
Ma, L. N. (M)
Malila, W. A. (M)
Manning, L. A. (SM)
Moll, J. L. (M)
Musser, H. H. (M)
Nelson, C. G. (M)
Norby, M. E. (M)
Paine, S. T. (M)
Pantell, R. H. (A)
Pettit, J. M. (F)
Sass, D. J. (M)
Scarlett, R. M. (M)
Shaw, H. J. (M)
Shoens, C. J. (M)
Siegman, A. E. (M)
Simpson, L. E. (M)
Sonkin, S. (SM)
Southworth, M. P. (M)
Steed. E. C. (M)
Taussig, N. W. (M)
Terman, F. E. (F)
Turner, F. M. (M)
Tuttle, D. F., Jr. (F)
Vaughan, D. G. (A)
Waterman, A. T., Jr. (SM)
Watkins, D. A. (F)
Williams, C. B. (M)
Wilson, P. B. (M)
Winslow, D. K. (SM)

Stanton (LA-SA-7)
Kramer, R. J. (A)
Sierra, J. G. (M)
Smith, C. L. (A)

Stockton, (SAC-7)
Dausman, R. H. (M)
Echandi, J. (M)
Fegan, A. A. (M)
Huff, J. J. (A)
Lazaro, S. A. (A)
Robinson, K. L. (M)
Welch, H. E. (M)

Studio City (LA-SF-7)
Allen, F. W. (M)
Burns, J. J. (M)
Fox, M. (M)
Hollmann, H. E. (F)
Horth, T. C. (M)
Kaebum, L. K. (SM)
Klotz, E. S. (SM)
McGaughey, R. P. (M)
Meyer, R. A. (M)
Moon, R. B. (M)
Nelson, C. S., Jr. (M)
Norwalt, R. H. (A)
Schick, H. G. (M)
Smith, W. W. (A)
Zeese, J. A. (M)

Sunland (LA-SF-7)
Brink, E. W. (M)
Fielding, B. L. (M)
Fuller, C. L. (M)
Kent, R. C. (A)
Kowal, L. J. (A)
Muir, H. M. (A)
Saunders, C. F. (A)

Sunnyvale (SF-7)
Andrews, C. A., Jr. (M)
Antony, C. (SM)
Arnold, J. B. (M)
Ballard, J. W. (M)
Barnett, R. M. (SM)
Barr, B. C. (M)
Barton, J. L. (M)
Bauman, R. E. (M)
Bean, J. A. (M)
Bean, R. N. (M)
Bederka, S. E. (M)

Benson, S. (SM)
Bergfield, W. E. (M)
Best, F. G. (M)
Bodnar, E. R. (M)
Bollard, D. I. (M)
Bougher, W. G. (A)
Bower, D. A. (A)
Boysen, J. A. (M)
Bradski, M. (M)
Brandt, F. D. (M)
Brooks, W. (A)
Brown, A. E. (M)
Brown, J. W. (A)
Brown, K. H. (M)
Bumstead, C. R. (M)
Burley, C. H. (M)
Burlingame, L. G. (SM)
Caddes, D. E. (M)
Calhan, C. L. (M)
Carpe, B. (M)
Carter, M. B. (M)
Case, M. D. (M)
Chalmers, P. H. (M)
Chop, A. (M)
Cirimele, E. F. (M)
Cleno, C. B. (M)
Cohen, S. A. (A)
Contos, P. A. (M)
Coogan, E. A. (M)
Cooper, R. D. (M)
Cornwell, R. C. (SM)
Cottrell, C. J. (A)
Cragun, S. B. (M)
Craine, W. P. (M)
Curphey, D. G. (M)
Curtis, T. J. (M)
Danielson, L. K. (M)
Davies, R. W. (M)
Daw, E. H. (M)
Declerco, V. J., Jr. (A)
Dehring, J. C. (M)
De Lorenzo, R. J. (M)
Demo, B. L. (M)
De Vault, R. L. (M)
Dickerson, L. W. (A)
Di Giuseppe, A. (M)
Disman, M. (M)
Downey, J. P. (M)
Eallonardo, C. M. (M)
Earl, H. O. (M)
Eckert, H. R. (M)
Elliott, P. C., Jr. (M)
Ellis, J. R., Jr. (M)
Endsley, J. P. (A)
Ericson, E. E. (M)
Evans, W. S. (M)
Ferrin, K. S. (M)
Fields, R. L. (M)
Finney, D. J. (SM)
Fishman, M. (M)
Fitch, W. T. (M)
Flora, J. (A)
Flowers, W. P. (M)
Fogard, D. C. (M)
Freshour, S. G. (M)
Fritchie, F. P. (M)
Frohbach, H. F. (M)
Frosolone, A. (M)
Fucci, E. A. (A)
Fullmer, M. D. (M)
Gabriel, W. F. (SM)
Gabrielson, H. C. (M)
Gallagher, J. J. (M)
Gallichotte, J. H. (M)
Gang, R. E. (M)
Glass, L. L. (A)
Goldsborough, R. R., Jr. (SM)
Graham, B. (SM)
Greporiar, R. P. (M)
Hall, T. W. (A)
Hammond, E. B., Jr. (SM)
Hankel, E. M. (M)
Hansen, Q. M., Jr. (M)
Harbaugh, R. D. (M)
Harper, J. W. (M)
Harris, C. F. (A)
Harris, P. (M)
Harrison, B. H. (M)
Hasert, C. (M)
Hassell, B. M. (M)
Hedberg, H. E. (M)
Hemmita, A. (M)
Herman, J. J. (M)
Hess, G. (M)
Hibbard, E. R. (SM)
Higgins, D. H. (M)
Hopp, H. W. (M)
Horowitz, R. B. (A)
Hoving, H. R. (M)
Howe, G. A. (A)
Huggins, R. A. (SM)
Hughes, H. H. (M)
Hughes, L. T. (A)
Ihly, F. J. (M)
Isaacs, R. A. (M)
Isaacson, R. G. (M)
Jellison, K. A. (M)
Jensen, P. E. T. (M)
Jeske, A. (M)
Jobbins, C. W. (M)
Johnson, D. E. (M)
Johnston, R. J. (A)
Jones, M. R. (M)
Kati, D. R. (M)
Kaufmann, J. (M)
Kean, D. W. (SM)
Kenney, B. D. (A)
Kerwin, W. J. (SM)
Kiessling, R. C. (M)
Kimple, K. M. (M)
King, T. J. (M)

Kinney, E. L. (M)
Kleist, R. A. (M)
Klimberg, J. (A)
Klingman, W. A. (M)
Kluge, J. E. (M)
Kroll, W. (M)
Labro, J. J. (A)
Lang, R. B., Jr. (M)
Lark, J. E. (M)
La Rue, J. S. (SM)
Lee, F. (M)
Linders, T. E. (M)
Lopes, R. R. (A)
Loyd, M. L. (M)
Lucero, R. C. (M)
Lundstrom, O. C. (M)
Lusk, T. D. (M)
Malasky, S. W. (SM)
Marshall, J. A. (M)
Martinson, G. O. (M)
Matovich, M. J. (M)
Maurer, C. D. (A)
Mays, C. H. (M)
McAlpine, G. A. (M)
McClain, W. J. (M)
Meehan, R. D. (A)
Mendez, I. O. (M)
Mendoza, A. A. (M)
Metevia, E. E. (M)
Mills, J. J. (M)
Moleski, T. G. (A)
Monroe, P. P. (A)
Moore, G. O. (SM)
Morgan, R. B. (SM)
Morse, R. A. (M)
Nash, J. P. (SM)
Nassie, T. A. (A)
Moy, M. S. (A)
Nelson, D. B. (M)
Ohlemacher, R. F. (A)
Okamura, C. Y. (A)
Onia, J. (M)
O'Rourke, D. M. (M)
Parker, C. F. (M)
Paulos, P. J. (M)
Paulson, C. R. (M)
Peters, P. L. (M)
Pitsenbarger, G. A. (M)
Pitts, K. J. (M)
Postman, M. H. (M)
Pound, A. E. (M)
Powell, R. J. (M)
Powers, E. J., Jr. (M)
Premo, A. F., Jr. (M)
Rianda, F. A. (M)
Prue, W. W., Jr. (M)
Pyburn, R. W. (M)
Rau, J. H. (M)
Raub, W. E. (A)
Reinhold, W. D. (M)
Reisman, S. J. (M)
Rogers, R. L. (M)
Romano, V. J. (M)
Root, K. E. (M)
Rosenberg, S. (SM)
Rowley, R. J. (M)
Ruggieri, D. J. (M)
Sackman, D. A. (M)
Schick, H. F. (M)
Schmidt, A. R. (M)
Schneider, R. F. (M)
Schultheis, H. B., Jr. (SM)
Shankle, S. B. (M)
Shepherd, J. H., Jr. (M)
Sherman, J. E. (M)
Showen, L. (SM)
Smith, D. L. (M)
Smith, H. E. (M)
Smith, J. I. (M)
Smith, R. T. (M)
Spencer, J. M., Jr. (M)
Stefancik, R. T. (M)
Steiner, F. W. (M)
Stenger, F. J. (M)
Stevenson, J. C. (M)
Stewart, R. J. (SM)
Stone, R. H., Jr. (M)
Swainston, D. W. (M)
Szatrowski, Z. (A)
Tangney, J. F. (M)
Taylor, J. M. (M)
Taylor, N. J. (M)
Tetenbaum, S. J. (M)
Thom, J. C. (SM)
Thomas, A. C. (M)
Thornton, W. M., Jr. (A)
Trainer, R. F. (M)
Troetschel, W. O. (M)
Vernon, F. C. (M)
Volth, W. L. (M)
Walden, L. H. (M)
Waldman, M. D. (M)
Wallis, D. W. (M)
Weir, R. A. (M)
West, S. F. (A)
Westwood, G. C. (M)
Whiteley, R. B. (SM)
Whitten, J. R. (M)
Wielenga, L. J. (M)
Wilkins, W. H. (M)
Williams, W. F. (M)
Wilson, D. L. (M)
Wilson, D. K. (M)
Woo, C. (M)
Wood, R. A. (A)
Woolsey, W. O. (M)
Wright, F. L. R. (M)
Wythe, D. H., Jr. (M)
Yonge, P. K. (M)

Sun Valley (LA-SF-7)
Abbey, C. R. (M)

Barnhart, W. H. (A)
Braswell, J. P., III (M)
Crystal, D. G. (A)
Engstrom, R. H. (A)
Frieburg, H. E. (A)
Grossman, M. B. (M)
Johnson, C. E. (M)
Martin, M. H. (M)
Marygold, G. E. (A)
Moore, W. J. (A)
Price, D. S. (M)
Stoehr, W. F. (M)
Swenarton, E. W. (A)
Wells, H. G. (M)

Surfside (LA-SA-7)
Bromberg, R. S. (M)
Davisson, J. R. (M)

Sylmar (LA-SF-7)
Hallquist, G. W. (M)
Hill J. E. (M)
Jones, J. M. (A)
Mann, A. F. (M)
McClure, G. E. (M)
Niska, V. E. (A)
Raines, O. E. (A)
Smith, N. J. (A)
White, G. S. (M)

Tahoe Valley, (SAC-7)
Tucker, M. (M)

Tarzana (LA-SF-7)
Adams, E. S. Jr. (A)
Ambrosio, B. F. (M)
Anderson, H. R. (SM)
Bantle, D. W. (A)
Bartlome, R. D. (M)
Beck, G. R. (SM)
Benson, R. S. (M)
Braverman, R. (M)
Brunner, R. H. (SM)
Butts, L. E. (M)
Chesebro, E. L. (M)
Connor, J. A. (SM)
Dadant, P. M. (M)
Debaun, J. R. (M)
De Lano, R. H. (SM)
Dickinson, G. R. (M)
Enenstein, N. H. (M)
Favors, H. A. (SM)
Friedman, S. (M)
Glon, J. A. (A)
Gruen, W. J. (F)
Hildy, J. H. (SM)
Hilz, G. D. (M)
Liu, F. F. (M)
Philster, M., Jr. (M)
Pierson, K. E. (SM)
Porter, J. H. (SM)
Rozas, F. (M)
Russell, R. M. (SM)
Schmeid, W. F., Jr. (M)
Seeberger, L. M. (SM)
Sklar, B. (SM)
Smith, F. E. (M)
Woodbury, E. J. (SM)

Tehachapi (LA-7)
Smith, L. D. (M)

Temple City (LA-P-7)
Hauenwaas, R. V. (M)
Paterson, W. L. (M)
Ross, J. P. (A)
Snykers, A. B. (M)

Thousand Oaks (LA-B-7)
Albone, N. G. (M)
Boandl, J. S. (M)
Bond, F. E. (SM)
Clapp, M. F. (M)
Crinklaw, R. H. (M)
Dehm, R. E. (M)
Engels, L. H. (A)
Fogelberg, A. E., Jr. (SM)
Frost, C. R. (M)
Fulton, A. S. (M)
Halket, D. R. (M)
Jansen, J. F. (M)
Koontz, R. H. (A)
Nelson, R. S., Jr. (M)
Oda, D. J. (SM)
Schira, J. C., Jr. (M)
Taylor, J. M. (M)
Vittum, W. M. (M)
Zander, H. D. (A)

Topanga (LA-SF-7)
Stephenson, H. G., Jr. (A)

Torrance (LA-7)
Ajioka, J. S. (M)
Anderson, P. E. (M)
Austin, R. H. (M)
Barton, B. H. (M)
Beagle, C. K. (M)
Bell, A. F. (M)
Blackstone, W. G. (M)
Botos, R. A. (M)
Bowlus, M. A. (M)
Broatch, N. L. (M)
Brosal, J. (A)
Browne, J. D. (M)
Burr, R. L. (M)
Busutili, H. L. (M)
Carter, E. V. (M)
Chanklin, H. M. (A)
Chapin, R. G. (M)
Clopton, E. J. (M)



Collins, R. F. (M)
Condy, R. E. (M)
Cooper, P. V. (A)
Cowan, C. F. (M)
Coy, L. H., Jr. (A)
Croyts, H. S. (M)
Dain, H. W. (M)
Dennis, J. (M)
Dizinno, R. E. (M)
Eads, J. J., Jr. (A)
Edgerton, A. D. (M)
Egger, A. (A)
Ekberg, J. V. (M)
Elkin, H. S. (M)
Fachtmann, R. R. (M)
Field, F. W. (M)
Flower, D. W. (M)
Fogel, R. L. (SM)
Forster, D. C. (M)
French, D. W. (M)
French, H. M. (M)
Freymodsson, J. B. (A)
Frith, L. O. (M)
Funk, J. D. (M)
Funk, R. E. (M)
Gaar, H. E. (M)
Gabilofsky, H. (M)
Garrison, F. K. (A)
Gibbard, J. R. (M)
Gillean, M. E. (M)
Golightly, R. T. (A)
Gottfried, R. E. (M)
Griggs, R. W. (M)
Haines, C. S. (M)
Hakala, P. E. (M)
Hamon, W. G. (M)
Harper, R. Z. (M)
Hart, C. W. (M)
Herrst, L. R. (M)
Hewitt, E. W. (M)
Heyming, J. M. (M)
Highwart, J. E. (M)
Hilberg, R. P. (A)
Hughes, G. L. (M)
Huston, E. E. (M)
Janer, R. (M)
Jicha, A. J. (A)
Jones, E. E. (M)
Keach, B. C. (M)
Kendall, R. W. (A)
Kern, W. W. (A)
Kinsman, R. G. (M)
Kudlich, R. A. (SM)
Lakin, H. D. (M)
Leonard, D. L. (M)
Linhart, T. F., Jr. (A)
Lippman, L. (M)
Low, H. (M)
Ludwig, D. E. (A)
Lundy, C. (SM)
Martin, D. P. (M)
McCarthy, J. W. (M)
McComb, B. J. (M)
McConnell, R. W. (M)
McCoy, H. L. (M)
McDonald, W. H. (M)
McKeand, R. W. (M)
McRee B. R. (M)
Medeiros, W. P. (A)
Mehner, E. W. (A)
Meronek, D. F. (M)
Mills, R. A. (M)
Monroe, F. R. (M)
Moore, T. H. (M)
Nolde, P. C. (M)
Norman, F. J. (M)
Norris, R. M. (M)
Nussbaum, O. N. (A)
Oliver, J. R. (M)
Olson, R. D. (M)
Page, D. W. (M)
Perry, C. L. (M)
Philpot, J. W., Jr. (M)
Pitt, G. E. (M)
Ross, T. L. (M)
Rush, P. L. (M)
Saunders, S. R. (M)
Schmid, A. A. (M)
Schwier, J. P. (M)
Seckinger, W. C. (A)
Shea, R. S. (M)
Silence, N. C. (M)
Sinnette, J. T., Jr. (M)
Skjervem, K. D. (M)
Smithberg, S. B. (M)
Snee, F. J. (M)
Spencer, D. J. (M)
Springer, K. E. (M)
Stade, T. D. (M)
Stanlec, R. R. (M)
Stasch, J. E. (M)
Stephens, C. W. (M)
Tatlan, S. (M)
Thomas, W. M. (A)
Thorensen, R. (M)
Torre, R. C. (A)
Trumbo, D. E. (A)
Trumpler, J. H. (M)
Uberman, S. (M)
Velasco, F. C. (M)
West, D. B. (M)
Whistler, C. H. (SM)
Whiteside, W. C. (M)
Wilbur, W. C., Jr. (M)
Williams, J. B., Jr. (M)
Winterstrom, R. L. (M)
Wise, G. E. (M)
Wrench, R. G. (A)
Young, R. G. (A)

Trabuco Canyon (LA-SA-7)
Leftwich, L. L. (M)

Tracy (SAC-7)
Albertson, W. R. (A)
Edson, D. J. (M)

Tujunga (LA-SF-7)
Gardner, R. J. (M)
Hickey, P. R. (M)
Lake, R. A. (M)
Marcy, W. J. (A)
Miller, J. A. (M)
Pilkington, W. C. (SM)
Ure, G. R. (A)
Walcek, E. J. (M)

Tustin (LA-SA-7)
Buland, R. N. (M)
Crawford, V. L. (M)
De Bord, M. J. (SM)
Dorsett, J. W., Jr. (M)
Fjeldsted, N. B. (M)
Isaac, K. N. (M)
Jay, H. A. (SM)
Kawsky, W. F. (SM)
McQuiston, W. R. (SM)
Molander, A. B. (A)
Quackenbush, R. E. (M)
Ramsauer, F. J. (A)
Rudin, M. B. (A)
Ryland, M. E. (A)
Smith, R. E. (M)
Sublett, C. R. (M)
Temple, F. J. (SM)
Umlauf, E. W. (M)
Vigilone, S. S. (M)
Woods, E. L. (M)
Zurn, J. T. (M)

Twenty-Nine Palms (LA-OB-7)
Fitzgerald, B. P. (M)
Hayes, R. W. (M)
Williams, M. M (M)

Universal City (LA-SF-7)
Filipowsky, R. (SM)

Upland (LA-OB-7)
Hardin, C. A. (M)
Hitchcock, R. W. (M)
Sampson, P. M. (M)
Stokes, L. C. (M)
Takenaka, G. (M)
Watkins, E. L. (SM)
Whitcomb, L. A. (M)

Vacaville (SAC-7)
Carroll, J. C. (A)
Young, C. W. (M)

Vallejo (SF-7)
Clark, W. M., Jr. (M)
Decker, K. M (M)
Ekstrand, P. A. (SM)
Hanley, R. J. (M)
Kalamaras, G. A. (A)
Traver, J. W. (A)
Upton, J. W., Jr. (M)

Valley Center (SD-7)
Newburgh, H. (M)

Vandenberg AFB (LA-SB-7)
Bowdish, C. G. (M)
Bower, M. M. (M)
Bywater, D. G. (M)
Dobbs, W. (M)
Elverson, V. E. (M)
Fix, O. W. (SM)
Fraher, R. J. (A)
Friedrich, J. M. (M)
Haulbosky, W. D. (A)
Herman, R. E., Jr. (M)
Kipper, G. A. (A)
Leonis, A. (A)
Luce, R. H. (M)
Madson, G. A. (M)
McNatt, E. J. (M)
Moore, E. F. (M)
Nielson, R. W. (M)
Orrick, T. W. (M)
Reed, R. C. (SM)
Ridout, G. W. (M)
Schelonka, E. P. (M)
Siler, M., Jr. (M)
Stevens, D. J. (M)
Stitch, B. D. (A)
Thorne, D. C. (M)
Vanderford, W. H. (A)
Wade, R. J. (M)
Wenk, R. L. (A)
Windham, J. A. (M)

Van Nuys (LA-SF-7)
Abstein, H. T., Jr. (M)
Anderson, G. R. (M)
Amstutz, M. F. (M)
Angell, D. H. (M)
Arndt, L. A. (SM)
Arsenault, L. J. (M)
Bangs, G. A., Jr. (M)
Barker, D. W. (M)
Becker, J. T. (M)
Belmont, R. A. (M)
Bennett, R. G. (M)
Bernds, E. L. (M)
Bernstein, T. (M)
Bidermann, W. R. (M)
Bidun, E. L. (A)
Bishop, G. W. (M)

Blaine, R. F. (A)
Blancher, D. W. (M)
Bonebreak, R. L. (SM)
Botts, W. V. (M)
Boyd, J. C. (A)
Breitwieser, G. F., Jr. (SM)
Brockway, W. W. (SM)
Brough, J. W. (M)
Brown, B. W. (A)
Caldwell, W. D. (M)
Campbell, H. (A)
Carmichael, R. L. (M)
Chase, L. R. (M)
Clock, D. P. (M)
Cohen, J. E. (M)
Coler, B. A. (M)
Curtiss, A. N. (F)
Cutler, S. (M)
Davis, S. W. (M)
Denton, R. F., Jr. (M)
Dinning, J. R. (M)
Doboen, S. (M)
Elser, F. J. (SM)
Entin, A. J. (M)
Fanwick, C. (SM)
Farley, E. J. (SM)
Felman, M. F. (M)
Fisk, J. W. (M)
Fives, J. J. (M)
Fox, J. A., Jr. (M)
Fritts, R. E. (A)
Funfstuck, H. (M)
Gallenson, L. (M)
Gieseke, G. R. (M)
Gigante, G. A. (M)
Gilbert, H. L. (A)
Goldberg, J. J. (M)
Goltz, A. D. (M)
Gottmer, G. W. (M)
Green, A. P. (M)
Grondin, G. F. (SM)
Halpern, R. L. (SM)
Hammond, J. R. (A)
Heiman, E. F. (M)
Hempling, N. G. (M)
Herter, C. V. E., Jr. (SM)
Hewitt, G. E. (SM)
Hickman, D. D. (M)
Hinshaw, E. C. (M)
Hirschberg, W. J. (M)
Hirschfield, G. A. (M)
Hish, D. M. (M)
Hughes, R. L. (A)
Humphrey, J. F. (M)
Hyden, I. F. (M)
Iko, K. K. (M)
Irskens, T. E. (A)
Irwin, B. L. (M)
Ito, N. (M)
Jacobs, L. (M)
Jacobson, S. (M)
Jacobus, R. L. (M)
Jamieson, H. W. (SM)
Kane, P. M. (M)
Klein, M. L. (SM)
Klemens, W. P. (SM)
Korson, I. (M)
Kosseff, J. W. (A)
Krause, W. B. (M)
Lemmen, R. M. (M)
Lieber, M. (M)
Locus, S. S. (SM)
Lovick, E., Jr. (SM)
Lueders, L., Jr. (A)
Lutz, C. H. (SM)
Lyon, R. E. (A)
Malcolm, L. (SM)
Mallach, L. W. (SM)
Mancini, R. A. (M)
Mann, M. (M)
Margolin, A. R. (SM)
Marshall, N. P. (M)
McClanahan, R. T. (M)
Mead, R. C. (M)
Miller, C. E. (SM)
Miller, E. H. (M)
Monderer, B. A. (M)
Naef, C. A. (M)
Natenstedt, H. (M)
Nay, L. R. (M)
Newland, B. F. (A)
Ohrenstein, S. B. (A)
Olsefsky, C. C. (SM)
Palmer, D. L., Jr. (M)
Pangbom, H. W. (SM)
Parker, W. H., Jr. (SM)
Price, J. F. (M)
Radmacher, D. S. (M)
Reichenbach, H. F. (M)
Rempt, H. F. (SM)
Richards, J. A. K. (SM)
Roseman, L. (M)
Ross, W. J. (M)
Rothrock, J. H. (SM)
Rumble, W. G. (M)
Ryan, W. J. (A)
Savory, W. A. (M)
Schmitz, D. W. (M)
Selditz, N. (M)
Siegrist, R. F. (A)
Smith, J. C. (M)
Smokler, M. I. (M)
Steger, R. J. (SM)
Stewart, C. O. (A)
Strassman, A. J. (SM)
Strauss, H. E. (M)
Tabor, E. D. (M)
Tampico, J. (SM)
Tasker, R. B. (SM)
Timineri, A. A. (M)
Turn, E. (M)
Urman, B. S. (M)
Van Egmond, J. (A)

Van Emden, B. M. (A)
Wachowski, H. M. (SM)
Walker, G. A. (M)
Walker, P. B. (SM)
Wallick, W. L. (M)
Wasney, A. (M)
Walz, D. A. (M)
Wasmer, W. F. (A)
Watstein, J. I. (M)
Weidemann, R. F. (M)
Weiss, B. S. (M)
Weller, D. B. (M)
Whitman, K. C. (M)
Wick, O. F. (A)
Wilson, H. H. (M)
Wilson, R. A. (M)
Wood, G. R. (M)
Worth, F. L. (M)
Zajec, J. M. (SM)
Zboril, F. R. (SM)
Zimmet, S. J. (M)

Venice (LA-7)
Bekey, G. A. (M)
Berk, A. D. (SM)
Berman, S. D. (A)
Cohn, R. M. (M)
Fanzot, A. H. (M)
Goltzman, D. (M)
Gurley, J. G. (M)
Howard, G. L. (A)
Howard, L. W. (SM)
Huggins, W. G. (M)
Noda, N. (M)
Reedy, J. F. (M)
Stribling, R. E. (M)
Wayment, K. D. Jr. (M)

Ventura (LA-B-7)
Andersen, J. F. (M)
Arnold, W. F. (M)
Benetier, L. E. (M)
Bernhardt, E. C. (M)
Browning, R. A. (M)
Case, D. M. (M)
Childs, C. W. (M)
Clark, D. B. (M)
Dember, A. B. (A)
Dewey, D. C. (M)
Doss, D. R. (A)
Edlun, W. O. (M)
Eikelman, J. A. Jr. (M)
Guyton, C. W. (M)
Hewson, J. F. (SM)
Hudson, R. (A)
Johnson, L. E. (A)
Jones, B. R. (M)
Kirch, J. H. (A)
Kvamme, E. F. (M)
Lange, D. M. (M)
Larey, B. W. (A)
Lash, J. R. (A)
Leiner, J. H. (M)
MacDonald, W. L. (M)
Mark, R. A. (M)
Markell, J. H. (SM)
Potter, E. V. (SM)
Scott, R. P. (M)
Shellabarger, J. N. (M)
Skoog, H. A. (M)
Stankovich, D. (M)
Sturm, T. F. (SM)
Timm, J. D. (A)
Timmerman, H. A. (SM)
Von Breyman, G. E. (M)
Weidemann, H. K. (M)
Whybark, D. L. (M)
Ziegler, T. A. (M)
Zoll, D. J. (M)

Victorville (LA-OB-7)
Castellucci, A. H. E. (M)
Galyean, M. W. (A)
Wolf, J. E. (M)

Visalia (SF-7)
Eklund, M. H. (M)
Hammers, G. A. (A)
Rogers, R. R. (M)
Rush, J. M. (M)
Schwartz, H. (SM)
Sheehan, R. P. (M)

Vista (SD-7)
Blanco, J. D. (M)
Canning, R. G. (M)

Walnut (LA-OB-7)
Ashley, G. W., Jr. (M)

Walnut Creek (SF-EB-7)
Chase, R. C. (M)
Coakley, T. P. (M)
Edwards, L. Z. (A)
Elsken, R. H. (M)
Eukel, W. W. (M)
Graham, R. H. (M)
Hansen, W. L. (M)
Hartwig, E. C. (SM)
Horton, M. C. (M)
Mitchell, J. R. (M)
Pope, J. C. (A)
Sorenson, G. P. (A)
Sterne, K. E. (M)
Van Ness, H. W. (SM)
Westerman, R. L. (M)

Walnut Park (LA-OB-7)
Gaal, I. G. (M)

Watsonville (SF-7)
Cronin, L. J. (M)

West Covina (LA-OB-7)
Abramis, D. (M)
Allen, J. R. (M)
Auletti, R. L. (M)
Baker, E. W. (M)
Barr, H. J. (SM)
Bass, J. W. (M)
Bates, C. E. (M)
Bethard, C. T. (M)
Bickhart, E. C. (M)
Brown, R. E. (A)
Brown, W. A. (A)
Catkins, W. R. (M)
Callot, S. (A)
Delaney, H. J. (M)
Fithian, D. H. (M)
Foster, W. H. (SM)
Garcia, J. G. (M)
Glser, H. W. (A)
Grantham, G. W. (M)
Jacobs, H. M. (M)
Johnson, H. A. (SM)
Jones, P. D. (SM)
Kemp, G. H. (M)
Kempf, W. F., Jr. (M)
Kirsten, C. C. (M)
Lewis, G. E. (A)
Marston, G. A. (M)
McCormick, G. F. (M)
Mette, R. J. (M)
Ming, D. L. (M)
Nadel, L. (M)
Nestlerode, C. D., Sr. (M)
Olson, R. E. (M)
Porrazzo, R. J. (M)
Ross, H. (M)
Samaras, T. T. (M)
Sampson, J. C. F. (M)
Schneider, A. M. (M)
Seamer, C. W. (M)
Shaffer, A. (M)
Shield, R. G., Jr. (M)
Steinback, E. A. (M)
Stokely, R. G. (M)
Swain, L. D. (A)
Taylor, A. D. (A)
Taylor, L. A. (M)
Walley, W. E. (M)
Wells, M. A. (M)
Williams, A. M. (M)
Winner, R. J. (M)

West Hollywood (LA-7)
Pipher, M. D. (M)

West Los Angeles (LA-7)
Bottomley, R. O. (M)
Glazer, C. R. (M)
Grimsley, K. D. (M)
Healy, M. J. (A)
Hellmann, C. S. (SM)
Kelly, D. H. (M)
Mizell, M. H. (SM)
Nakatsu, G. Y. (M)
Reed, R. A. (M)
Reiter, A. M. (SM)
Remmes, J. A. (SM)
St. Gean, E. (A)
Smith, M. V. (A)
Stahl, R. (A)
Wallace, P. R. (M)
Walle, A. C. (A)
Weed, G. E. (M)
Wright, E. C. (M)

Westminster (LA-SA-7)
King, P. D. (M)

Westmorland (SD-7)
Boyer, M. J. (A)
Stout, D. J. (M)

West Sacramento (SAC-7)
Fuller, G. R. (A)

West Van Nuys (LA-SF-7)
Corbin, G. C. (A)

Whittier (LA-SA-7)
Amendt, L. E. (M)
Anderson, D. B. (M)
Bashore, C. E. (A)
Becker, W. C. (M)
Blaski, M. F. (A)
Bowman, J. Y. (M)
Boyer, R. J. (M)
Breece, R. C. (M)
Brown, H. R., Jr. (SM)
Carroll, W. P. (M)
Darlington, H. T., Jr. (M)
Davenport, C. M. (M)
Farley, J. S., Jr. (M)
Gow, K. P. (SM)
Hadler, P. H. (M)
Hall, C. R. (M)
Harriman, D. E., Jr. (SM)
Hodge, J. (M)
Hoffmann, H. J. (M)
Holmes, E. A., III (SM)
Hooper, G. E. (M)
Jackson, M. O. (A)
Jennings, B. R. (M)
Kaminski, A. A. (M)
Kleinhofer, B. A. (SM)
Klepinger, L. H. (SM)
Krueger, D. E. (A)
Lalkin, M. (M)
Lanzinger, D. J. (M)
Lent, W. C. (SM)
Lincoln, W. S. (SM)
Lockhart, E. H. (M)
Martin, H. W. (M)

McGaffey, H. F. (M)
McMillin, D. W. (M)
Miller, J. F. (M)
Miner, C. R. (SM)
Moody, R. E. (M)
Nelson, E. E., Jr. (M)
O'Brien, E. J. (SM)
Ontiveros, P. C. (SM)
Overton, C. B. (M)
Paikoff, B. L. (A)
Parker, N. F. (A)
Peelle, A. R. (A)
Provost, C., Jr. (M)
Quinn, J. L., Jr. (M)
Randall, G. M. (A)
Savant, C. A. (M)
Sawyer, H. F. (M)
Scheets, B. R. (M)
Schleich, W. T. (SM)
Schmidt, F. W. (SM)
Schulz, K. S. (M)
Senf, G. A. (A)
Shutt, S. G. (M)
Simkins, E. D. (M)
Sterns, W. G. (M)
Sterrett, J. P. (M)
Stoney, W. E. (M)
Thatcher, R. B. (M)
Thomas, E. E. (M)
Tice, A. R. (SM)
Tjaden, L. L. (M)
Trerise, B. L. (M)
Vorie, I. N. (M)
Wagner, E., Jr. (M)
White, J. V. (M)
Wunderlich, F. J. (M)
Yetter, W. P. (M)
Zemenick, C. J. (M)
Zoller, C. J. (M)

Willits (SF-7)
Rumfelt, A. (M)

Winnetka (LA-SF-7)
McAfee, P. (M)

Woodland Hills (LA-SF-7)
Abel, A. O. (M)
Anderson, T. J. (SM)
Aroyan, G. F. (M)
Baker, M. L. (M)
Barker, L. H. (SM)
Bendar, J. A. (M)
Blatchford, D. (M)
Bonness, Q. L. (M)
Broderick, D. L. (M)
Brooks, W. O. (SM)
Carman, J. N. (SM)
Carson, D. G. (M)
Chaiken, L. (M)
Cornell, J. A. (SM)
Counts, T. J. (SM)
Crowe, J. W. (M)
Dau, W. K., Jr. (SM)
Davidson, E. D. (M)
Davis, M. R. (M)
Drummond, E. J. (M)
Duggan, J. R. (SM)
Edwards, J. N. (M)
Ellis, D. O. (M)
Ellis, J. W., Jr. (M)
Engel, H. L. (A)
Eslinger, R. L. (M)
Falls, W. A. (M)
Felsman, W. O. (M)
Fiden, W. H. (M)
Fogle, J. A. (M)
Forrest, C. B. (M)
Fortier, R. E. (M)
Fredricks, R. W. (M)
French, R. L. (M)
Ganstwig, M. (SM)
Gerken, G. H. (M)
Gewant, S. (SM)
Gillies, M. A. (M)
Halloran, R. G. (M)
Hammill, C. W. (M)
Harrison, J. F. (M)
Harrison, W. H. (M)
Hasin, S. L. (A)
Heath, G. F. (M)
Helbig, W. A. (A)
Helms, C. J. (SM)
Hicks, A. R. (M)
Hirschl, L. (M)
Howard, R. A., Jr. (M)
Hudson, R. D., Jr. (SM)
Hutchison, L. D. (M)
Ingersoll, E. R. (SM)
Johnson, R. L. (M)
Jones, A. J. (M)
Kanze A. J. K. (M)
Kaufman, E. N. (M)
Kaufman, I. (M)
Khouzaz, E. G. (A)
Koda, N. J. (M)
Kouba, J. T. (M)
Kurtz, L. A. (M)
La Fetra, F. E. (M)
Lamb, W. X., Jr. (M)
Lesser, R. H. (SM)
Levy, G. F. (SM)
Lewis, R. A., Jr. (M)
Lillibridge, E. H. (M)
Mac Innes, N. A. (M)
Makush, W. S. (M)
Malbrain, J. P. (A)
Mallinckrodt, C. O. (SM)
McKee, W. P., Jr. (M)
McKenzie, J. A. (A)
Mellor, J. R. (A)
Michaels, E. C. (A)
Miller, M. H. (M)
Mitchell, W. C. (M)
Moody, H. L. (M)
Newman, D. D. (SM)
North, N. B. (M)
Nyberg, J. J. (M)
Oltman, H. G., Jr. (SM)
Owens, J. E. (M)
Oyster, D. E. (M)
Pallett, H. E. (M)
Payne, G. H. (A)
Perry, R. E. (M)
Peterson, F. V. (M)
Pratt, J. H. (SM)
Raffensperger, M. J. (SM)
Red, A. G. (M)
Reilly, P. E. (M)
Ress, T. I. (M)
Ritter, B. S. (SM)
Robbins, B. A. (M)
Rosenberg, A. L., Jr. (SM)
Rosenbloom, A. (M)
Saltzman, H. (SM)
Schoen, S. (M)
Schwartz, I. (M)
Scott, L. W. (M)
Secretan, F. (M)
Seferian, R. K. (M)
Shepard, W. (M)
Sibillo, R. A. (M)
Silk, N. R. (SM)
Smeltzer, J. C. (M)
Smith, B. N. (A)
Soderholm, L. H. (M)
Sorensen, C. E. (M)
Stanton, G. (M)
Staub, D. W. (M)
Strauss, D. J. (M)
Stumof, R. J. (M)
Sturm, W. A. (M)
Summerfield, A. R. (M)
Tetherow, R. C. (M)
Thompson, K. A. (M)
Tidus, D. B. (M)
Tinney, P. (SM)
Udey, J. (SM)
Urlovic, W. C. (A)
Van Bemmelen, H. M. (M)
Van Groos, J. C. (SM)
Vega, J. C. (A)
Vick-Roy, J. W. (SM)
Wagner, W. F. (M)
Walters, R. F. (M)
Wanselow, R. D. (M)
Westenhaver, J. L. (M)
Whistler, J. P. (SM)
Williams, C. E. (SM)
Williams, F. K. (SM)
Wilson, K. M. (M)
Wilson, R. E. (M)
Wollaeger, L. A. (M)
Woodson, W. L. (M)
Young, R. D. (M)
Zdanowich, C. A. (M)

Woodside, (SF-7)
Abramson, N. M. (M)
Braccini, S. M. (M)
Eddy, J. S. (M)
Eitel, W. W. (F)
Eldredge, A. L. (SM)
Keehn, D. G. (M)
McAulay, W. H. (M)
Smith, H. W., Jr. (M)

Yorba Linda (LA-SA-7)
Clary, W. T. (SM)
Colson, R. B. (M)

COLORADO

Akron (DEN-6)
Cooley, H. M. (A)

Arvada (DEN-6)
Johler, J. R. (SM)
Longhart, C. C. (M)
Robertson, A. L. (M)
Sargent, R. E. (A)
Spano, A. J. (A)
Whitcomb, J. P. (M)

Aurora (DEN-6)
Fredricks, I. E. (M)
Kerver, N. E. (A)

Bayfield (DEN-6)
Endo, F. Y. (M)

Broomfield (DEN-6)
Crandall, C. L. (M)
Kemper, J. A. (M)
Peterson, S. B. (SM)
Webb, R. C. (F)

Broomfield Heights (DEN-6)
Mulligan, M. A. (A)
Wendt, K. R. (F)

Boulder (DEN-6)
Allred, C. M. (M)
Andresen, S. G. (M)
Andrews, D. H. (SM)
Angus, G. W. (M)
Applegate, C. J. (M)
Auterman, J. L. (M)
Baisley, B. B. (M)
Bayclay, C. (A)
Barphausen, A. F., Jr. (A)
Barnes, F. S. (M)
Barsis, A. P. (M)
Bean, B. R. (A)
Beatty, R. W. (SM)
Behrent, L. F. (M)
Bensema, W. D. (M)
Berry, I. S. (M)
Bowles, K. L. (A)
Breyfogle, L. D., III (M)
Brown, F. W. (M)
Brown, M. J. (A)
Brunner, R. C. (M)
Bussey, H. E. (SM)
Byrne, W. J. (M)
Carlin, P. W. (M)
Carney, J. A. (M)
Case, W. E. (M)
Cateora, J. V. (M)
Clewes, T. W. (M)
Cohen, R. S. (M)
Conda, A. M. (M)
Cook, C. C. (M)
Coombs, W. C. (SM)
Coon, R. M. (M)
Cottony, H. V. (SM)
Crichlow, W. Q. (SM)
Culshaw, W. (SM)
Daniels, W. H. (M)
Davies, K. (M)
Davis, T. L. (M)
Decker, M. T. (M)
De Gregorio, J. F. (M)
Doherty, R. H. (SM)
Emi, J. B. (M)
Estin, A. J. (M)
Florman, E. F. (M)
Freudenberg, H. O. (A)
Gallehouse, R. H. (M)
Gatterer, L. E. (M)
George, W. D. (SM)
Gierhart, G. D. (M)
Goerke, V. H. (M)
Gray, A. M. (M)
Greene, F. M. (M)
Guiraud, F. O. (M)
Harper, J. D., Jr. (M)
Harrington, R. D. (A)
Haydon, G. W. (M)
Heaton, V. E. (SM)
Herbstreit, J. W. (F)
Hubbard, R. W. (M)
Hudson, P. A. (M)
Janes, H. B. (M)
Jean, A. G., Jr. (M)
Jessen, W. E. (A)
Jickling, R. M. (M)
Johnk, C. T. (M)
Johnson, D. S., Jr. (A)
Jones, R. H. (M)
Kindig, N. B. (M)
Kingsbury, B. A. (SM)
Kirby, R. C. (SM)
Kirby, R. S. (SM)
Kirkpatrick, A. W. (A)
Koch, J. W. (M)
Kraus, A. (M)
Krueger, R. E. (M)
Lance, H. W. (SM)
Larsen, E. B. (M)
Larson, R. E. (SM)
Lee, R. H. (A)
Linfield, R. F. (SM)
Little, C. G. (M)
Longley, A. G. (A)
Maloney, L. J. (M)
Martinez, J. L. (A)
McGavin, R. E. (M)
McQuate, P. L. (M)
Merlli, R. G. (M)
Miller, L. W., Jr. (M)
Morgan, A. H. (M)
Murahata, S. (M)
Nielsen, E. (A)
Norton, K. A. (F)
Ochs, G. R. (M)
Ostrow, S. M. (SM)
Patterson, D. W. (SM)
Phelps, F. P. (A)
Posakony, G. J. (M)
Powell, R. C. (M)
Rathburn, R. H. (M)
Reed, D. R. (M)
Reed, J. E. (M)
Repstein, R. E. (A)
Rice, P. L. (M)
Richardson, J. M. (SM)
Ried, L., Jr. (M)
Ries, F. X. (M)
Salaman, R. G., Jr. (M)
Schafer, G. E. (SM)
Schiffmacher, E. R. (M)
Scott, W. W., Jr. (M)
Selby, M. C. (SM)
Sheets, W. R. (M)
Shoaf, J. H. (M)
Silberstein, R. (SM)
Simpson, P. A. (M)
Stutz, R. J. (SM)
Smith, E. K., Jr. (SM)
Snyder, L. G. (M)
Snyder, W. F. (SM)
Spracklen, R. K. (A)
Stacey, D. S. (SM)
Sugar, G. R. (M)
Sykes, J. A. (M)
Taggart, H. E. (M)
Tary, J. (M)
Thompson, M. C., Jr. (SM)
Trembath, C. L., Jr. (M)
Twombly, J. C. (M)
Utaut, W. F. (SM)
Vierbicke, P. P., Jr. (A)
Vogler, L. E. (A)
Walt, J. R. (SM)
Walters, L. C. (SM)
Wassink, H. W. (M)
Waters, D. M. (M)
Watkins, J. S. (M)
Watt, A. D. (SM)
Watts, J. M. (M)
Wells, C. V. (M)
Wells, P. I. (M)
Whelan, E. H. (M)
Wicks, P. (SM)
Wilber, R. W. (M)
Wilson, A. C. (M)
Wolzlen, E. C. (M)
Woodward, M. W. (SM)
Worcester, W. G. (SM)

Colorado Springs (DEN-6)
Adams, C. W. (M)
Adams, E. L. (M)
Behnke, A. O. (SM)
Bitzner, B. J. (SM)
Bretthauer, L. G. (M)
Carr, B. J. (M)
Chapman, J. M. (M)
Crecelius, P. H., Jr. (M)
D'Auteuil, R. J. (M)
Donegon, R. E. (M)
Ferguson, C. A. (A)
Fowler, A. F. (A)
Gardner, O. K. (M)
Green, L. V. (A)
Heartz, L. C. (M)
Hoffman, J. R. (M)
Holmgren, W. A. (M)
Holt, R. A. (A)
Howard, W. G. (M)
Howell, H. R. (M)
Jessen, P. L. (M)
Kay, D. J. (M)
Kuehn, R. J. (M)
Kyer, F. E. (A)
Linke, K. W. (A)
Manlove, W. R. (M)
Mathis, J. B. (SM)
Miller, O. W. (M)
Mooney, R. E. (M)
Price, H. J. (A)
Quinn, T. J. (A)
Quirk, W. J. (M)
Roberts, R. W. (M)
Russell, J. D. (M)
Rynning, J. L. (M)
Singer, L. M. (M)
Victoreen, J. A. (SM)
Wilson, L. H. (M)

Denver (DEN-6)
Ackworth, D. L. (M)
Allen, M. A. (M)
Anderson, C. R. (A)
Anderson, J. B. (M)
Bachman, M. N. E. (M)
Bahlay, A. (SM)
Barlow, H. S. (M)
Barnett, B. E. (M)
Barnett, R. H. (M)
Barr, B. F., Jr. (A)
Bealey, C. F. (A)
Beaver, H. E. (M)
Bills, E. S. (M)
Bishop, H. L., Jr. (M)
Blanchard, R. R. (M)
Blankenship, L. F. (M)
Bowen, R. G. (M)
Bowie, W. S. (SM)
Bromberger-Barnea, B. (A)
Butts, J. H. (A)
Capehart, M. E. (M)
Clark, L. R. (SM)
Clawson, L. F., Jr. (M)
Cole, A. E., Jr. (A)
Collins, P. B. (A)
Cook, D. J. (A)
Cooper, R. R. (A)
Cooper, R. R. (M)
Cotter, J. B. (A)
Cottrell, D. E. (M)
Davidson, G. (SM)
Detwiler, W. L. (M)
Deutsch, K. T. (M)
Diddens, P. A. (M)
Dillon, J. R. (SM)
Dosch, E. L. (M)
Drury, S. F., Jr. (M)
Dubbert, D. R. (M)
Edwards, H. T. (M)
Elchelberger, W. H. (SM)
Farrell, R. J. (A)
Ferketich, G. (A)
Finch, M. D. (M)
Fingado, F. H. (M)
Flaharty, C. L. (M)
Fleming, C. W. (A)
Foley, W. V. (SM)
Fuqua, C. (M)
Garretson, H. W. (M)
Gibson, W. R. (A)
Goddard, A. A., Jr. (M)
Gould, W. S. (M)
Grace, J. R. (SM)
Green, E. H. (M)
Grigsby, T. N. (M)
Hall, A. C. (F)
Harrell, C. D. (M)
Hart, W. G., Jr. (M)
Hartel, B. (M)
Hartzell, W. M. (M)
Hastings, L. E. (SM)
Hedberg, C. A. (SM)
Hedrick, W. M. (M)
Hindman, R. S. (A)
Housego, J. W. F. (M)
Hroch, H. J. (M)
Hurlbut, J. F. (SM)
Jackson, G. A. (M)
James, V. N. (SM)
Johnson, E. L. (A)
Johnson, H. S. (M)
Just, G. D. (A)
Kardos, M. (M)
Kennedy, J. E., Jr. (A)
Klessig, R. J. (SM)
Knight, S. J., Jr. (M)
Koch, R. C. (M)
Koppl, W. J. (SM)
Kyelberg, L. D. (A)
Lahana, P. (M)
Lanz, R. W. (M)
Leighou, R. O. (M)
Lilley, C. M. (M)
Longmire, R. C. (M)
Lover, G. L., Jr. (M)
Luckock, W. J. (M)
Maer, C. M., Jr. (A)
Maras, R. G. (M)
Messler, F. J. (M)
Meyer, D. E., Jr. (M)
Mielziner, W. (A)
Moravec, C. T. (A)
Morrissey, T. G. (SM)
Morroni, O. J. (M)
Murray, J. M. (A)
Neale, D. J., Jr. (M)
Nelson, A. J. (A)
Newell, D. R. (M)
Ostwald, L. T. (A)
Paige, A. E. (SM)
Parrish, V. L. (M)
Patton, F. T. (M)
Peterson, C. F. (M)
Petterson, W. N., Jr. (M)
Phillips, R. E. (M)
Pieper, G. E. (SM)
Plywaski, W. (M)
Pochop, D. R. (M)
Porter, H., Jr. (M)
Posakony, P. R. (M)
Pyle, J. C. (A)
Raymond, K. N. (A)
Rector, J. D. (M)
Reno, H. (M)
Rinker, E. A. (M)
Roark, L. A. (M)
Robinson, M. E. (A)
Roth, T. A. (A)
Ruehle, R. A. (A)
Rugo, D. E. (A)
Sahl, G. R. (M)
Saum, G. H., Jr. (M)
Schlichtemeier, K. H. (M)
Seiberlich, J. S. (M)
Shreve, T. S. (M)
Shumaker, M. J. (A)
Sjostrom, R. W. (M)
Smilley, J. D. (A)
Smith, A. D. (M)
Smith, W. F., Jr. (M)
Stoss, E. G., Jr. (A)
Swanson, R. E. (M)
Terbush, H. W. (SM)
Thatcher, R. N. (A)
Throop, L. L. (M)
Tlemann, R. F. (M)
Tilton, W. D. (M)
Todd, F. J. (M)
Tulloh, C. F. (M)
Turbeville, W. L. (M)
Tumquist, E. R. (M)
Van Allen, J. W. (M)
Venditti, F. P. (M)
Wagner, G. D. (M)
Walter, J. H. (M)
Wang, C. S. (M)
Watson, J. E. (M)
Weeks, W. A., Jr. (M)
Weil, W. W. (M)
Wickersham, P. D. (M)
Williams, A. L., Jr. (M)
Wolfsey, D. (A)
Wolff, G. (SM)
Zanboorie, M. H. (M)

Englewood (DEN-6)
Anderson, R. L. (M)
Andrews, H. A. (M)
Brechwald, R. D. (M)
Cobbs, D. M. (M)
Gishpert, J. F. (M)
Greene, J. F. (A)
Hyde, R. A. (A)
Jones, W. G. (M)
Lavin, J. F. (A)
McGowan, G. F. (M)
Meuer, J. M. (M)
Mueller, A. G. (A)
Plantz, V. C. (M)
Roberts, H. L. (M)
Rodgers, D. A. (SM)
Skeels, H. V. (A)
Sprengeler, D. F. (M)
Thaxton, H. A. (M)
Van Zant, F. N., Jr. (M)
Wilockl, R. L (M)

Ent AFB (DEN-6)
Kofler, E. J. (M)

Evergreen (DEN-6)
Steiner, K. E. (M)

Fort Collins (DEN-6)
Britton, C. C. (SM)
Budak, A. (M)
Davis, I. F. (M)
Ebner, G. A. (A)
Faris, J. J. (M)



Fort Morgan (DEN-6)
Zambo, J. W. (M)

Glenwood Springs (DEN-6)
Baker, B. Z. (A)

Golden (DEN-6)
Coors, J. (A)
Cowell, P. K. (M)
Fletcher, H. E. (SM)
Hoover, D. B. (A)
Sturgill, C. L. (M)
Visilisel, R. L. (A)

Grand Junction (DEN-6)
Howell, R. G. (SM)
Lawton, K. G. (A)
McCormick, C. E. (A)
Van Houten, R. G. (M)

Greeley (DEN-6)
Balamonte, F. L. (M)
Clark, J. S. (M)
Cooper, K. H. (A)
Stewart, S. J. (A)

Idaho Springs (DEN-6)
Bell, B. G. (M)

Lafayette (DEN-6)
Haller, F. B. (A)

Lakewood (DEN-6)
Bennett, J. B., Jr. (M)
Cook, G. V. O. (M)
Daniels, R. G. (M)
Harrison, J. L. (M)
Woodard, H. L. (A)
Yost, H. T. (A)

Littleton (DEN-6)
Anderson, W. M. (M)
Ayre, T. P. (M)
Beckley, T. L. (M)
Bender, E. R. (M)
Bertiner, H. J. (A)
Bickford, K. F. (A)
Bradt, A. W. (M)
Braunagel, M. V. (M)
Breggin, A. (M)
Byman, E. C. (M)
Carty, E. H. (M)
Case, C. W. (M)
Clausen, R. H. (SM)
Cleveland, W. C., Jr. (SM)
Craig, J. B. (M)
Dachsler, F. E. (A)
Daggett, C. C. (M)
Danner, R. V. (SM)
Davis, V. M. (SM)
Diamond, A. M. (M)
Dingman, E. H. (M)
Dinzl, R. A. (A)
Duddy, E. M., Jr. (A)
Earles, D. R. (M)
Elam, T. W. (SM)
Eldridge, A. J. (SM)
Englund, R. A. (M)
Evans, R. E. (M)
Foster, F. L. (A)
Girard, L. J. (M)
Golding, L. N. (M)
Grassia, C. C. (M)
Gyger, C. E. (M)
Hecksel, W. (M)
Helt, S. L. (A)
Hughes, E. S. (A)
Herlogstad, V. (A)
Heyliger, G. E. (M)
Hoffman, R. J. (A)
Holloway, J. A. (M)
Hudolf, F. H. (M)
James, D. C. (SM)
Janusz, J. S. (A)
Jensen, H. R. (M)
Johnston, H. H. (M)
Jones, E. E. (M)
Kaaz, F. W. (M)
Kupilik, F. M. (M)
Mallory, G. L. (M)
Marizza, D. S. (A)
Masters, M. R. (A)
Maxwell, T. M., Jr. (SM)
Metz, E. W., Jr. (A)
Missler, C. W. (M)
Mossman, J. M. (A)
Nold, F. D. (M)
Olson, G. O. (M)
Oppenheimer, D. S. (SM)
Parish, M. L. (M)
Perrin, B. J. (M)
Pope, A. E. (M)
Reber, E. E. (M)
Rice, R. B. (A)
Ringoen, R. M. (SM)
Rizzo, S. J. (A)
Robel, M. C. (M)
Rosine, L. L. (A)
Schafer, H. G. (M)
Scheele, P. F. (M)
Schneebeck, D. A. (M)
Seesiedt, H. C. (SM)
Sladkey, R. J. (M)
Slater, T. L. (M)
Smith, E. F. (M)
Smith, G. H. (M)
Smith, G. W. (SM)
Smith, M. P. (M)
Splitane, L. R. (M)
Sykes, R. P. (M)
Walker, G. A. (A)
Wiseman, S. D. (M)
Wolfe, C. E. (A)
Wood, E. E. (M)
Wren, C. A. (M)

Longmont (DEN-6)
Grant, W. B. (M)
Kuhn, R. L. (A)
Nelson, P. A. (M)

Loveland (DEN-6)
Cullen, D. E. (M)
Follmer, G. C. (A)
Kelley, E. K. (SM)

Palisade (DEN-6)
Boardman, J. L. (M)

Pueblo (DEN-6)
Oh, S. J. (M)
Rothers, D. L. (A)
Schealer, R. C. (M)

Red Wing (DEN-6)
Sanborn, R. H. (M)

Salida (DEN-6)
Stout, J. E. (A)

Sedalia (DEN-6)
Carter, F. W. (M)

Sterling (DEN-6)
Henderson, F. R. (A)
Marks, K. E. (M)

Trinidad (DEN-6)
Cunico, C. D. (M)

Wheat Ridge (DEN-6)
Boyd, R. K. (M)
Forsman, E. H. (M)
Gleason, G. W. (M)
Haase, A. H. (A)
Marshall, G. B. (M)
Wyatt, D. E. (M)

Westminster (DEN-6)
Dougherty, H. T. (M)

Whitewater (DEN-6)
Hathaway, C. M. (SM)

CONNECTICUT

Amston (CON-1)
Crooks, W. D. Jr. (M)

Andover (CON-1)
Anson, Y. (M)

Avon (CON-1)
Boehm, A. R., Jr. (M)

Bethany (CON-1)
Sheehan, J. F. (M)

Bethel (CON-F-1)
Briscoe, F. J. (M)
Gereg, C. V. (M)
Shogren, J. (A)
Warner, F. C. (M)

Bloomfield (CON-1)
Gillie, A. C. (M)
Hall, G. M. (M)
Hendrickson, H. S. (M)
Lerner, I. S. (M)
Norkin, H. (M)
Reens, L. H. (M)
Von Kummer, F. G. (M)
Wasem, E. F., Jr. (M)
Whitney, D. J. (M)

Bridgeport (CON-F-1)
Autuori, V. A. (M)
Beck, J. H. (M)
Dlupos, D. F. (M)
Evans, R. E. (M)
Foner, M. (A)
Harris, W. C. (A)
Hettinger, M. (A)
Jones, J. O. (M)
King, A. M. (M)
Koscor, J. A. (A)
Kosowsky, L. H. (M)
Krok, T. J. (M)
Lapinski, C. S. (A)
Lemkin, H. J. (A)
Mike, J. G. (M)
Mikusky, C. J. (M)
Packer, J. J. (A)
Rosenberg, H. A. (A)
Silverstone, D. M. (M)
Simoneau, E. P. (M)
Winquist, R. T. (M)
Ziller, M. A. (A)

Bristol (CON-1)
Fazio, R. (M)
Jones, M. C. (M)
Kavanaugh, R. J. (M)
Nelson, A. B. (SM)
Piantoni, G. L. (M)
Ptak, E. J. (M)
Scherff, L. S. (M)
Snowdon, A. E. (SM)
Vaughan, E. W. (SM)

Broadbrook (CON-1)
Yamron, J. (M)

Brookfield (CON-F-1)
Gordon, T. M., Jr. (M)
Pedersen, I. C. (SM)

Brooklyn (CON-1)
Halford, J. H., Jr. (M)
Vroom, E. (SM)

Canton (CON-1)
Whitney, C. A. (M)

Central Village (CON-1)
Poremba, J. J. (M)

Cheshire (CON-1)
Ely, R. S. (M)
Grebe, A. H. (M)
Hines, J. E., Jr. (A)
Hoffmann, G. O. (A)
Perrins, A. R. (M)
Rhein, G. W. (M)
Thomas, A. R. (A)
Warren, R. E. (M)

Colchester (CON-1)
Harasimowitz, S. (M)
Steg, R. C. (A)

Cos Cob (CON-F-1)
Bukowski, C. P. (M)
Fingerle, W., Jr. (SM)

Danbury (CON-F-1)
Arendt, E. J. (A)
Ashford, C. R. (A)
Boesch, A. H. (A)
Campbell, C. A. (M)
Concelman, C. W. (M)
Di Paola, R. G. (M)
Estelle, W. E. (M)
Henriques, J. B. (M)
Hyde, R. H. (M)
Johns, N. H. (M)
Kotkowski, J. F. (M)
Lowy, M. A. (SM)
McVicar, S. H., Jr. (A)
Moran, J. H. (A)
Otha, W. R. (M)
Ott, O. J. (M)
Rothlein, B. J. (SM)
Rurran, R. A. (M)
Schatzle, F. D. (A)
Schmidt, E. (M)
Van Valkenburg, H. E. (M)
Webb, R. H. (M)

Darien (CON-F-1)
Bowley, R. J. (M)
Bozak, R. T. (SM)
Flower, G., Jr. (A)
Goodnow, A. C. (M)
Mac Gregor, R. R. (M)
Mack, C. L. (M)
McElrath, G. (F)
Moffat, W. H. (SM)
Placente, J. W. (A)
Smith, P. B. (M)
Townsend, R. (SM)

Deep River (CON-1)
Desnoyers, R. W. (M)

Derby (CON-1)
Carman, E. B. (A)
Clark, M. C. (M)
Keefe, E. M. (M)

Devon (CON-1)
O'Connell, P. R. (A)

Durham (CON-1)
Schilling, C. R. (M)
Turck, D. S. (M)

East Hartford (CON-1)
Aas, H. G. (M)
Capraro, R. R. (M)
De Pietro, R. A. (M)
Gorton, R. E. (A)
Guyton, B. T. (A)
Kemble, T. H. (M)
Lovkay, J., Jr. (M)
Main, R. C. (SM)
Searle, P. C. (M)
Slesers, J. (M)

East Hartland (CON-1)
Neill, G. W. (M)

East Norwalk (CON-F-1)
Phillips, J. (M)
Warner, E. J. (SM)
Yellin, H. (SM)

Easton (CON-F-1)
Cummings, C. S., II (A)
Koch, R. L. (M)

East Woodstock (CON-1)
Dixon, E. O. (SM)

Elmwood (CON-1)
Marchese, J. H. (M)

Enfield (CON-1)
Carrier, R. R. (A)

Fabyan (CON-1)
O'Brien, B., Jr. (M)

Fairfield (CON-F-1)
Bishop, N. (SM)
Brooks, F. A., Jr. (M)
Codomo, J. (M)
Dellenbaugh, F. S. (M)
Di Matila, A. L. (A)
Gilchrist, E. S. (M)
Mitchell, W. F. (A)
Roberts, F. W. (SM)
Stem, P. D. (A)

Forestville (CON-1)
Alcorn, L. F. V. (A)
Forman, J. (M)

Fort Trumbull (CON-1)
Von Winkle, W. A. (A)

Gales Ferry (CON-1)
Tutty, J. E. (M)

Georgetown (CON-F-1)
Grossman, F. J. (A)
Lyuta, G. R. (M)

Glastonbury (CON-1)
Haarshalter, C. H. (SM)
Humphrey, C. D. (M)
Kapuscienski, S. J. (M)
Miller, R. A. (M)
Speed, D. K. (M)
Taylor, D. S. (M)
Waterman, A. (M)

Glenbrook (CON-F-1)
Edmondson, R. H. (SM)
Lewis, S. M. (M)
Wadhams, S. C. (M)

Granby (CON-1)
Brockett, R. I. (M)
White, J. A. (M)

Grass Valley (CON-1)
Hamme, R. D. (M)

Greens Farms (CON-F-1)
Schmid, C. E. (M)

Greenwich (CON-F-1)
Anderson, W. C. (SM)
Badoyannis, G. M. (M)
Burroughs, G. (M)
Fetherolf, J. M. (M)
Haanstra, J. W. (M)
Hallenbeck, R. A. (M)
Halloran, V. P. (M)
Hemstadt, W. H. (M)
Hollywood, J. M. (F)
Kimes, R. A. (SM)
Mallory, H. R. (SM)
Marchand, N. (SM)
Mills, C. A. (M)
Morse, J. L. (M)
Peterson, E. F. (M)
Petrucelly, V. J. (M)
Van Vliet, W. G. (A)

Groton (CON-1)
Blaisdell, K. L. (SM)
Bowes, H. N. (SM)
Comiskey, J. M. (M)
Curran, R. J. (M)
Mali, P. (M)
Matthews, C. I. (A)
Miller, K. K. (M)
Moeller, H. J. (A)
Mulierl, L. A. (M)
Dolan, O. F. (M)
Dugan, D. J. (M)
Fanelli, F. A. (M)
Latham, W. S. (M)
Leuze, W. F. (M)
Palmer, W. F. (M)
Rose, A. E., Jr. (M)
Stephanz, G. H. (M)
Watkins, F. T., Jr. (M)

Guilford (CON-1)
Fisher, E. H. (M)

Hamden (CON-1)
Bogan, S. C. (M)
Davidson, R. B. (M)
Doolittle, F. M. (F)
Dunklee, W. F. (M)
Fricker, S. J. (M)
Goclowski, C. F. (M)
Hewitt, C. D. (M)
Hovey, D. P. (A)
Jefferies, K. D. (M)
Lyons, W. J., Jr. (M)
Mapes, T. J. (M)
McNamara, F. T. (M)
Mulligan, R. J. (M)
Quackenbush, E. C. (A)
Reich, H. J. (F)
Smith, R. E. (M)
Stancliff, V. A. (M)
Temple, L. M. (SM)

Hartford, (CON-1)
Boak, I. S. (M)
Britton, R. C. (M)
Broderick, H. M., Jr. (M)
Coleman, G. A. (M)
Dorschuo, H. A. (SM)
Dungan, L. B. (M)
French, E. C. (M)
Hettinger, S. (M)
Jarrett, M. A. (A)
Lescarbeau, R. F. (M)
Mazurkiewicz, R. J. (M)
Platt, D. R. (SM)
Piskor, J. (M)
Rioux, V. A. (M)
Roth, W. (M)
Sapega, A. E. (M)
Shor, N. (M)
Tuttle, R. W. (M)
Weissman, D. (A)
Wentz, J. L. (A)

Harwinton (CON-1)
Weaver, W. B. (M)

Hazardville (CON-1)
Brown, D. C. (M)
Kelly, G. E., Jr. (M)
Sandelin, M. P. (SM)

Higganum (CON-1)
Brien, C. J. (A)

Huntington (CON-F-1)
Emerson, W. H. (SM)

Kensington (CON-1)
Dickon, A. J. (M)

Kent (CON-1)
Ewald, L. H. (M)

Lebanon (CON-1)
Smith, A. C. (M)
Stocking, M. H. (A)

Ledyard (CON-1)
Dutton, F. L., Sr. (M)

Litchfield (CON-1)
Palmer, H. H. (A)
Zurich, W. G. (A)

Long Hill (CON-F-1)
Kaiser, A. (M)

Madison (CON-1)
Mac Donald, D. H. (A)

Manchester (CON-1)
Anderson, E. J. (M)
Anton, R. F. (M)
Billmyer, C. M. (M)
Dean, C. M. (M)
Fray, L. L. (M)
Hubbard, R. G., Jr. (M)
Nicola, R. N. (M)
Rathbun, W. F. (M)
Russell, A. A., Jr. (M)
Schettler, R. B. (M)
Stanek, W. F. (A)
Stoker, W. C. (SM)
Tomaiuolo, F. P. (M)
Young, W. H., Jr. (M)

Mansfield Depot (CON-1)
Norling, A. E. (A)

Mansfield Center (CON-1)
Booth, T. L. (M)
Preston, R. J. (M)

Meriden (CON-1)
Lavin, H. (M)
Parker, C. B. (A)
Rettenmeyer, P. F. (M)
Wrinn, E. C., Jr. (M)

Middlebury (CON-1)
Fullero, R. (A)

Middletown (CON-1)
Gunter, S. Z. (M)
Heinzmann, J. D. (M)
Snow, C. A., Jr. (M)
Thompson, L. (SM)
Van Dyke, K. S. (F)

Milford (CON-1)
Baldwin, A. L., Jr. (M)
Helnold, E. F. (M)
Lindsay, C. D. (SM)
Lyman, H. T. (SM)
Malecki, A. S. (A)
Malmleaf, W. R. (M)
Mitchell, C. (M)
Moffitt, G. R., Jr. (M)

Monroe (CON-1)
Tavella, R. P. (A)
Wormser, J. J. (M)

Mount Carmel (CON-1)
Pagano, E. L. (M)

Mystic (CON-1)
Coleman, C. H. (M)
Hansen, R. C. (M)
Kirby, T. H. (SM)
Pryor, W. L., Jr. (SM)
Vouch, S. D. (M)
Wardle, W. F. (M)

Naugatuck (CON-1)
Scranton, W. J. (M)

New Britain (CON-1)
Chase, S. E. (M)
Cyran, E. J. (M)
Maino, A. G. (M)
Matulis, B. J. (M)
Nachilly, J. L. (M)
Quinn, Q. Q. (M)
Richardson, H. L. (SM)
Tabor, S. A. (A)
Thesing, R. H. (A)

## CONNECTICUT

New Canaan (CON-F-1)
Bancroft, C. (A)
Benedict, T. W. (M)
Castle, D. H. (SM)
Conron, G. F. (M)
Conron, W. H. (SM)
Doerschuck, J. (M)
Harris, C. H. (A)
Johnson, J. K. (F)
Maple, T. G. (M)
Mull, H. R. (SM)
Murphy, J. T. (A)
Offenhauser, W. H., Jr. (A)
Raviola, G. (M)
Sutherland, E. F. (A)
Walker, J. B. (M)
Weeks, J. T. (A)

New Haven (CON-1)
Bergmann, H. M. (M)
Bradley, K. M. (M)
Breit, G. (F)
Cannon, J. F. (M)
Carlson, E. F. (M)
Chimitch, J. M. (M)
Conrad, A. G. (SM)
Cunningham, W. J. (M)
Curtis, R. C. (SM)
Cutler, L. H. (M)
Daniel, W. E. (A)
Doyle, L. P. (M)
Esposito, V. R. (A)
Fletcher, R. A. (M)
Genera, V. A. (A)
Goldenthal, S. (M)
Grew, L. B. (SM)
Hall, B. A. (M)
Hon, E. H. G. (M)
Izenour, G. C. (M)
Izzo, N. F. (M)
Jacobson, E. R. (M)
Jones, H. W., III (A)
Krauss, H. L. (SM)
Kushner, A. M. (M)
Light, R. J. (M)
Lupoli, P. J. (M)
May, J. C. (SM)
Merriam, S. W. (A)
Murray, G. J., Jr. (M)
Ordung, P. F. (F)
Preston, K., Jr. (M)
Pridmore, T. C. (SM)
Rohloff, H. E. (SM)
Rubin, H. B. (M)
Ruchkin, D. S. (M)
Schultheiss, P. M. (M)
Shank, R. R. (M)
Skalnik, J. G. (M)
Spang, H. A., III (M)
Spang, T. C. (M)
Sundis, H. W. (SM)
Thompson, G. S. (M)
Thomas, L. E., Jr. (M)
Turner, H. M. (F)
Tustin, W. (M)
Tuteur, F. B. (M)
Usher, T., Jr. (M)
Wan, L. A. (M)
Wessenberg, H. W. (A)
Wilcox, E. J. (M)
Willis, P. A. (M)
Wogrin, C. A. (M)
Zweig, F. (M)

Newington (CON-1)
Bilharz, O. W., Jr. (A)
Bliss, P. (SM)
Cenci, A. A. (M)
Kimball, J. L. (M)
Lees, J. W. (A)

New London (CON-1)
Adams, W. S. (M)
Andrews, B. H. (M)
Angel, F. F. (A)
Behrends, P. O. (A)
Calabrese, J. F. (M)
Cavanaugh, J. P. (M)
Cobb, A. D. (M)
Gannon, E. C. (M)
Hoag, J. B. (SM)
Horton, J. W. (F)
Menard, M. E., Jr. (M)
Nash, H. E. (SM)
Newiln, T. G. (A)
Ruble, H. E. (SM)
Sibold, A. P., Jr. (M)
Smandra, S., Jr. (M)
Sussman, H. (SM)
Turner, R. W. (M)
Tylaska, T. T., II (M)
Woollett, R. S. (SM)

New Milford (CON-1)
Rowley, W. E., Jr. (A)

Newtown (CON-F-1)
Finch, W. G. H. (F)
Henry, E. A. (M)
Pfund, E. T., Jr. (M)
Schafer, C. R. (SM)

Niantic (CON-1)
Bishop, H. M. (M)
Saars, W. F. (M)
Sunega, E. M. (M)
Wilkes, R. C. (M)

Noank (CON-1)
Fain, R. A. (M)
Lapenson, S. (M)

Noroton Heights (CON-1)
Horaw, J. J. (M)
Mason, H. L. (A)

North Branford (CON-1)
Johnstone, P. N. (M)
Utting, G. R. (M)

Northford (CON-1)
Baker, R. R. (A)
McCluskey, D. S. (M)
Stone, F. A. (M)

North Haven (CON-1)
Barker, R. C. (M)
Davidson, D. S. (M)
Ryan, H. T. (M)
Valley, R. A. (M)

North Stamford (CON-F-1)
Doolittle, H. D. (M)
Rabin, R. (M)

North Woodbury, (CON-1)
Petit, F. W. (M)

Norwalk (CON:F-1)
Barr, F. M. (M)
Bernard, P. (A)
Bertram, J. J. (M)
Brunhart, W. (M)
Bruntil, I. M. (M)
Buckley, R. E. (M)
Calvert, T. J. (M)
Carricato, R. H. (M)
Courene, E. E., Jr. (M)
Coutermash, L. E. (A)
Curtiss, R. H. (M)
Damsteadt, A. L. (M)
Flores, I. (SM)
Georgi, E. A., Jr. (A)
Gettner, D. A. (M)
Grimstad, E. J. (A)
Kay, M. (M)
Levy, E., Jr. (M)
Lowenstein, M. G. (M)
Mehr, M. H. (M)
Milinowski, A. S. (M)
Miller, E. F. (M)
Miller, T. W. (M)
Mitchell, W. M. (SM)
Muchnick, P. (M)
Polak, R. (A)
Poland, W. L. (A)
Pritkin, L. (A)
Rodgers, L. M. (SM)
Rogell, P. S. (M)
Russo, J. J. (A)
Schenkel, F. W. (M)
Scherer, B. L. (M)
Shea, J. E. (M)
Slaker, F. A. (A)
Smith, P. J. (M)
Smith-Vaniz, W. R., Jr. (M)
Steinberg, G. N. (M)
Teller, W. R. (M)
Theall, C. E., Jr. (A)
Tulgan, S. S. (M)
Wegener, A. F. (M)
Williamson, R. G. (M)
Wines, W. R. (M)
Woodcock, E. L. (SM)
Zarkower, B. (A)

Norwich (CON-1)
Henry, W. O. (A)
Keltonic, F. J. (M)

Oakdale, (CON-1)
Whannel, R. L. (M)

Old Greenwich (CON-F-1)
Aguie, G. J. (M)
Ellsworth, W. C. (SM)
Fulton, O. H., Jr. (M)
Harrington, R. H., Jr. (M)
Harris, J. S. (SM)
Janik, C. L. (A)
Lott, A. L. (M)
Murphy, J. L. (SM)
Palmer, J. H. (A)
Peiker, A. S. (M)
Powell, A. E. (A)
Unger, J. W. (M)

Old Lyme (CON-1)
Orr, J. F. (M)
Webb, H. R. (M)

Old Saybrook (CON-1)
Radom, R. (M)

Orange (CON-1)
Jamison, A. F. (M)
Riccio, L. A. (M)
Sandner, C. A. (SM)

Pawcatuck (CON-1)
Crandall, C. P., Jr. (M)

Plantsville (CON-1)
Thayer, D. C. (A)

Poquonnock Bridge (CON-1)
Chapman, R. Y. (M)

Portland (CON-1)
Pulda, A. H. (M)

Putnam (CON-1)
Bemler, E. J. (M)
Bosworth, C. D. (A)

Quaker Hill (CON-1)
Pallange, E. P. (M)
Scannell, E. H., Jr. (M)
Sentelf, F. N. (M)

Redding Ridge (CON-F-1)
Rand, P. S. (SM)

Ridgefield (CON-F-1)
Carr, C. E. (M)
Clarke, E. N. (SM)
Danuff, M. L. (A)
Danvis, P. F. (A)
De Chambrier, P. (M)
Delany, E. B. (M)
Deutsch, H. (A)
Doll, H. G. (SM)
Edighoffer, E. A. (SM)
Erlandson, P. M. (SM)
Farwell, R. P. (M)
Ferre, M. C. (M)
Grant, M. L. (M)
Heller, J. H. (A)
Heino, K. W. (M)
Holcomb, P., Jr. (SM)
Kunz, K. S. (M)
Meier, T. M. (M)
Miller, G. K. (SM)
Replogle, F. S., Jr. (SM)
Rhyins, R. W. (M)
Segesman, F. F. (M)
Smith, J. S. (M)
Wesley, C. A. (M)

Riverside (CON-F-1)
Burns, R. F. (A)
Huckel, O. W., Jr. (A)
Ryan, W. R. (M)

Rockville (CON-1)
Davids, W. (A)
Hart, B. E. (M)
McKinney, J. G. (M)
Schneider, R. W. (M)
Staiger, E. H. (M)

Rocky Hill (CON-1)
Friedman, S. (SM)
Meigs, D. H. (M)
Warren, J. A. (M)

Rowayton (CON-F-1)
Fredrick, R. E., Jr. (M)
Snell, P. A. (M)

Roxbury (CON-1)
Drake, F. H. (F)
Farr, H. K. (SM)

Seymour (CON-1)
Dana, A. S. (SM)
Fryncko, P. (M)

Shelton (CON-F-1)
Fisher, A. L. (M)
Paige, W. (M)
Zaskalicky, J. J. (M)

Short Beach (CON-1)
Maki, C. E. (M)

Simsbury (CON-1)
Clark, F. K., Jr. (M)
Ogle, J. D. (A)
Schulz, H. R. (SM)
Shinn, C. E. (SM)
Somers, B. A. (M)
Wood, R. H. (M)

Southington (CON-1)
Perkins, R. W. (A)
Raymond, G. H. (SM)

South Norwalk (CON-F-1)
Austad, H. (M)
Beltz, G. E. (M)
Benson, K. B. (M)
Canepa, M. (A)
Chase, L. S. (A)
Dorogusker, B. (A)
Helterline, L. L., Jr. (M)
Kagy, L. A. (M)
Kohn, S. T. (M)
Kunkel, B. M. (M)
Munson, H. D., Jr. (M)
Norton, C. A. (SM)
Randner, J. A. (SM)
Shower, E. G. (SM)
Sittner, W. R. (SM)
Youden, R. H. (A)

Southport (CON-F-1)
Armstrong, C. W. (M)
Bachman, W. S. (F)
Chewning, W. H. (A)
Lack, F. R. (F)

South Windham (CON-1)
Taylor, L. L. (A)

Springdale (CON-F-1)
Bonacci, E. L. (A)
Botticelli, R. A. (M)
Buegler, R. J. (M)
Couch, W. M., Jr. (M)
Dion, W. E. (SM)
Gluck, J. (M)
Leferson, J. (A)
Newman, R. W. (M)
Spurck, R. F. (A)
Weden, C. V., Jr. (M)
Yanagisawa, S. T. (SM)

Stamford (CON-F-1)
Allen, S. (A)
Anderson, C. P. (M)
Baker, G. W. (M)
Bauer, B. B. (F)
Becker, J. P. (M)
Branson, N. G. (M)
Brown, W. J. (SM)
Buckles, R. A., Jr. (M)
Carroll, W. E. (M)
Castrignano, R. A. (SM)
Chaikind, S. L. (M)
Chou, W. W. (M)
Christensen, J. W. (SM)
Comerci, F. A. (SM)
Couturier, R. A. (M)
Croft, G. T. (M)
Daoostino, V. L. (M)
De Jeude, C. P. V. L. (M)
Devaney, R. J. (M)
Dingley, H. L. (A)
Dora, G. I. (A)
Eisenbeis, G. W. (A)
Evans, J. (M)
Evans, T. P. (SM)
Flynn, T. F. (M)
Geiger, R. H. (A)
Geist, H. J. (SM)
Gheorghiu, P. (M)
Goldberg, A. A. (SM)
Golden, A. (M)
Goldmark, P. C. (F)
Gorn, M. (SM)
Grab, F. W. (M)
Grayson, G. (M)
Greenblum, C. (M)
Greenfield, A. (SM)
Greenwood, I. A., Jr. (M)
Gutterman, A. Z. (M)
Halpern, H. S. (M)
Hannah, M. R. (M)
Higgins, J. N. (A)
Holloway, H. R. (M)
Hyams, H. C. (SM)
Kantor, A. C. (A)
Kelley, C. R. (SM)
Kiser, J. L. (SM)
Knoll, J. (M)
Koushouris, J. L. (SM)
Kramer, A. (M)
Kramer, N. H. (SM)
Krauss, B. F. (M)
Krauss, R. (A)
Kronenberg, M. H. (SM)
Kuch, B. L. (M)
Lazecki, S. (M)
Leftwich, R. F. (M)
Lilie, M. I. (M)
Malina, B. (M)
Maltais, W. E. (SM)
Marchand, B. B. (M)
McCarroll, J. F., Jr. (M)
Mee, C. D. (SM)
Molday, B. V. (SM)
Moore, J. K. (M)
Morse, C. P. (A)
Murphy, J. P. (A)
Oefinger, H. C. (A)
Ostendorf, B. (M)
O'Toole, B. R. (M)
Paddock, R. B. (M)
Palmquist, E. B. (M)
Plehaty, S. L. (SM)
Pomponi, S. J. (M)
Prager, L. (A)
Quick, H. R. (M)
Rabinowitz, C. M. (M)
Ramsa, A. P. (M)
Rathje, E. (M)
Reilman, J. (M)
Rendell, G. (M)
Ridley, D. W. (A)
Roggenstein, E. O. (M)
Rosenblatt, P. (M)
Rosenthal, A. S. (M)
Sackler, A. A. (M)
Salsman, C. F., Jr. (M)
Sanders, M. (M)
Schermer, D. (M)
Schneider, G. (M)
Schneider, P. (M)
Schwarz, F. (M)
Seidler, S. W. (M)
Shapiro, J. M. (SM)
Silver, N. (A)
Singer, E. (M)
Skehan, J. W. (M)
Spirer, H. F. (M)
Sprague, R. E. (M)
Steinberg, E. B. (SM)
Stocklin, W. A. (SM)
Teichman, S. (M)
Troti, B. S. (SM)
Uphoff, R. L. (SM)
Veremakis, C. (A)
Wachowski, H. P. (M)
Wahlberg, E. C. (SM)
Wai, K. N. (M)
Weiner, S. L. (M)
Weiss, M (M)
White, R. E. (SM)
Wienski, S. E. (A)
Wilder, M. P. (SM)
Williams, G. C. (A)
Wischnia, H. F. (SM)
Wohl, J. G. (SM)
Yaeger, V. M. (M)
Zukowsky, W. S. (M)

Stepney (CON-F-1)
Weller, B. L. (M)

Stonington (CON-1)
Richardson, R. J. (M)
York, E. P. (A)

Storrs (CON-1)
Crompton, R. H. (M)
Haas, V. B., Jr. (SM)
Hawkins, P. J. (M)
Knapp, C. H. (M)
Knauss, H. P. (M)
Kochenburger, R. J. (SM)
Lindorff, D. P. (M)
Lof, J. L. C. (SM)
Lucal, H. M. (M)
Melehy, M. A. (SM)
Northrop, R. B. (M)
Schultz, C. W. (M)
Timoshenko, G. S. (SM)
Torgersen, H. (M)
Torrance, J. H. (M)

Stratford (CON-1)
Craig, G. F. (SM)
Deamico, J. C. (M)
Evans, O. L. II (M)
Fox, F. J. (M)
Graham, G. E. (SM)
Jensen, H. T. (M)
Kenney, D. P. (M)
Keough, E. C. (A)
Kubicko, R. E. (A)
Loiacono, J. V. (M)
Mancini, D. (M)
Nelson, E. P. (SM)
Platt, W. G. (A)
Richard, R. L. (A)
Ryckman, W. D., Jr. (M)
Senia, J. W. (M)
Simko, R. S. (A)
Sulman, R. K. (M)
Sweet, R. D. (A)

Suffield (CON-1)
Landers, T. P. (M)

Talcottville (CON-1)
Howard, L. L. (M)

Tariffville (CON-1)
Nelson, G. E. (M)
Sluis, M. H. (M)

Terryville (CON-1)
Bycoski, C. T. (M)
Krenicki, J. (M)

Thomaston (CON-1)
McNellis, J. F. III (M)
Reynolds, A. C., Jr. (M)

Thompsonville (CON-1)
Diodati, R. R. (A)
Langdon, D. H. (M)
Tavidian, E. (M)
Ziegler, I. A. (M)

Tolland (CON-1)
Penney, A. W. (M)
Weston, F. B. (M)

Torrington (CON-1)
Gerbi, H. S. (M)
Watson, J. M. (M)
Wilczenski, A. M. (A)

Trumbull (CON-F-1)
Angel, H. R. (M)
Balogh, J. J., Jr. (M)
Dresser, W. R. (SM)
Fulmer, N. C. (M)
Gill, H. A. (SM)
Howard, N. S. (A)
Kojalowicz, A. M. (M)
McBrian, J. E. (M)
Schiro, A. J. (A)
Schweitz, E. P. (M)
Zahn, E. (M)

Vernon (CON-1)
Saich, R. B., Jr. (M)

Walcott (CON-1)
Swain, R. S. (M)

Wallingford (CON-1)
Brazee, J. A. (M)
Davis, R. B., Jr. (M)
Hoff, P. T. (M)
Landon, R. B. (A)
McKead, M. F. (M)
Palmero, A. (M)
Schaefer, R. W. (M)
Schoke, J. A. (SM)

Wapping (CON-1)
Martin, H. E. (M)
Neel, J. M. (M)

Waterbury (CON-1)
Busby, A. E. (A)
Cannizzano, M. (M)
Casey, G. V., Jr. (M)
Cicchetti, J. B. (SM)
Finelli, P. C. (A)
Garrity, G. E. (A)
Hales, F. B. (M)
Martinelli, A. A. (M)
McLeod, K. A. (A)
Migliaro, B. J. (A)
Pannullo, F. T. (A)
Pesce, W. J. (A)
Pichard L. A. (SM)
Platt, F. L., Jr. (A)





Somers, D. L. (M)
Stanescki, W. (M)
Walesky, J. W. (M)

Waterford (CON-1)
Dunn, C. M. (M)
Haefner, S. J. (SM)
Hazard, W. R. (M)
Henrikson, F. R. (M)
Jellerson, F. R. (M)
Jucksch, W. J. (M)
Olson, R. C. (M)
Provost, R. J. (M)
Stevens, A. M., Jr. (A)
Weatherlow, H. R. (M)
White, D. M. (M)
Williams, F. J. (M)
Wilms, H. J., Jr. (M)

Watertown (CON-1)
Bryson, R. W. (A)

Weatogue (CON-1)
Hildebrandt, W. J. (M)

Westbrook (CON-1)
Wren, W. M. (A)

West Hartford (CON-1)
Andersen, W. A. (M)
Anderson, P. G. (M)
Bourret, C. J. (M)
Chase, A. E. (A)
Cohen, M. H. (M)
De Maria, A. J. (M)
Driscoll, J. D. (M)
Esakov, D. A. (M)
Ferla, S. J. (M)
Galin, J. L. (M)
Gilman, H. (M)
Golec, E. J. (M)
Grammer, G. (F)
Handy, F. E. (M)
Harris, D. J. (M)
Hatton, A. T. (A)
Holland, J. H. (M)
Hornett, H. (M)
Joyson, J. L. (M)
Kendall, D. E. (M)
Latanne, R. L. (A)
McCrae, A. W. (M)
Perkins, W. W. (SM)
Rich, L. G. (M)
Rivers, G. D. (M)
Smith, N. F., Jr. (SM)
Stanley, P. F. (M)
Sulters, C. W. (A)
Warner, S. E. (SM)
Witte, R. (M)
Woodward, R. W. (SM)
Zastow, J. (M)

West Haven (CON-1)
Corvari, J. (M)
Coxeter, G. W. (M)
Fidler, H. E. (A)
Kricek, J. V. (M)
Rougelot, R. S. (M)

Weston (CON-F-1)
Chadwick, M. P. (SM)
Kruse, J. R., Jr. (M)
Mason, F. G. (M)
Masterson, E. (M)

Westport (CON-F-1)
Aylor, R. P., Jr. (M)
Brumbaugh, G. M., Jr. (M)
Copp, W. C. (M)
Dinsmoor, T. E. (SM)
Ellinger, L. (SM)
Gaffney, F. J. (F)
Goodyear, W. F. (M)
Haggott, J. C. (A)
Hanson, O. B. (F)
Hierholzer, F. J., Jr. (M)
Johnson, A. F. (M)
Levine, S. (M)
Rackey, C. A. (SM)
Roshkind, H. (M)
Steinhardt, L. (A)
Stone, C. G., Jr. (M)
Swift, W. C. G. (A)
Van Der Veen, H. (M)
Vamum, A. M. (M)
Wissinger, A. B. (M)
Wolff, G. (M)
Yoder, J. R. (SM)

West Redding (CON-F-1)
Rahal, N. S. (M)

West Suffield (CON-1)
Boring, J. W. (A)

Wethersfield (CON-1)
Beal, E. W. (M)
Bernard, D. T. (A)
Chaffee, B. A. (M)
Harden, L. R. (A)
Hesse, H. R. (M)
House, L. G. (M)
Kindl, R. O. (M)
Latina, M. S. (M)
Manganelli, F. D., Jr. (M)
Mitchell, J. A. (M)
Paquette, G. A. (M)
Rhodes, P. G. (M)
Santucci, A. H. (M)
Strempfer, W. L. (A)

Wilton (CON-F-1)
Bowe, J. J. (M)
Bazon, A. (M)
Clark, J. L. (SM)
Cunniff, J. F. (M)
Dibner, D. (M)
Dupre, H. P. (M)
Erstad, J. (M)
Hemstreet, H. S. (SM)
Hufnagel, R. E. (M)
Jackson, M. L. (M)
Korper, G. W., Jr. (M)
Levick, H. (M)
Marshall, N. K. (M)
Riley, A. J. (M)
Ruckstuhl, C. E., Jr. (M)
Schlesinger, E. R. (M)
Sontheimer, C. G. (M)

Windham Center (CON-1)
Miller, A. C. (SM)

Windsor (CON-1)
Case, L. R. II (M)
Hamlin, J. W. (M)
Intaglata, S. J. (M)
Reale, J., Jr. (M)
Shoham, R. (M)

Windsor Locks (CON-1)
Gray, N. L. (M)
Kidwell, N. E. (M)
Larkins, A. H. (M)
Stasiowski, C. M. (M)
Zax, J. A. (M)

Winsted (CON-1)
Bolus, J. J. (M)

Wolcott (CON-1)
Bolsvert, G. R. (M)
Winchell, A. M. (SM)

Woodbridge (CON-1)
Montgomery, R. H., Jr. (A)

Woodbury (CON-1)
Harris, W. T. (SM)
Mandelkorn, R. S. (SM)
Nye, J. R. (SM)

### DELAWARE

Claymont (PHI-3)
Anderson, L. N. (M)
Da Grosa, V. (A)
O'Donnell, G. H. R. (M)

Dover (PHI-3)
Davison, C. R. (M)
Duff, T. O. (M)

Hockessin (PHI-3)
Morris, J. M. (SM)

Lewes (PHI-3)
Blenwirth, R. A. (M)

Milford (PHI-3)
Drummond, W. D. (A)

Milton (PHI-3)
Morris, C. P. (M)

Newark (PHI-3)
Albright, C. M., Jr. (M)
Arnold, N. W. (M)
Bolgiano, L. P., Jr. (M)
Dell, C. G. (M)
Freeman, L. A. (M)
Gottschalk, W. M. (M)
Hill, D. L. (M)
Howe, H. V. (M)
Lutz, B. C. (M)
McClure, R. W. (M)
Robinson, D. M. (A)
Van Name, F. W., Jr. (SM)
Vansant, F. T. (M)
Young, M. G. (SM)

New Castle (PHI-3)
Cushing, C. J. (M)
Hampton, L. R. (A)
Kelley, W. D., Jr. (SM)

Wilmington (PHI-3)
Bowyer, K. M. (A)
Carter, E. P. (M)
Conner, H. G. (M)
Couper, W. D. (M)
Dilis, W. L. (M)
Faulhaber, M. E. (M)
Gallagher, G. J. (M)
Graebe, R. H. (M)
Heath, A. C. (M)
Hughes, R. M. (A)
Kelly, N. B. (M)
Kisko, R. P. (A)
Liddicoat, C. A. (M)
Mandas, J. J. (M)
McDaniel, F. (M)
McMillen, R. C. (SM)
Meyer, G. E. (A)
Miller, T. M. (M)
Moore, J. T., Jr. (A)
Noonburg, W. I., Jr. (M)
Owens, J. E. (M)
Panico, R. R. (M)
Paris, R. (A)

Pastell, D. L. (M)
Perkins, J. R. (SM)
Petze, C. L., Jr. (SM)
Rinehart, B. B. (M)
Seer, H. G. (M)
Sliwkowski, J. J. (M)
Steele, P. V. R., II (M)
Swarter, P. H., Jr. (A)
Swearer, H. F. (M)
Walsh, R. R. (M)
Webb, E. L., Jr. (A)
Weir, D. G. (M)
Williams, T. R. (M)
Yetter, E. W. (M)

### DISTRICT OF COLUMBIA

Anacostia (W-DC-3)
Riccobono, S. (M)

Washington (W-DC-3)
Abraham, G. (SM)
Abromavage, M. M. (M)
Adair, G. P. (F)
Adams, P. R. (M)
Adams, R. (SM)
Adams, R. J. (SM)
Ahearn, J. L., Jr. (SM)
Albertson, F. W. (SM)
Alexander, B. (M)
Alexander, J. A., Jr. (M)
Alexander, L. K. (A)
Allaro, R. J. II (A)
Algor, M. M. (M)
Allen, P. J. (SM)
Allman, F. L. (M)
Altomare, R. E. (M)
Anda, R. O. (A)
Anders, F. W. (M)
Anderson, D. J. (SM)
Anderson, L. D. (M)
Anderson, R. V. (M)
Anderson, R. C. (M)
Anderson, R. A. (M)
Anderson, S. R. (M)
Anderson, W. R. (A)
Andrasco, C. J. (M)
Andrew, W. M. (M)
Andrias, J. (M)
Antony, L. J. (A)
Anesberger, E. A. (A)
Apperson, D. D. (M)
Aouli, J. A. (SM)
Arnett, H. D. (SM)
Astholz, P. T. (SM)
Attmore, R. G. (M)
Avey, R. J., Jr. (A)
Awramik, J., Jr. (SM)
Ayer, W. T. (M)
Bagg, T. C. (M)
Bailey, S. L. (F)
Bain, W. F. (M)
Ball, N. T. (SM)
Ball, R. H. (M)
Ballard, J. L. (A)
Bank, W. J. (M)
Banning, W. C. (M)
Banta, J. H., Jr. (M)
Barlow, G. E. (A)
Bartholomew, C. A. (M)
Bass, C. A. (M)
Battison, J. H. (SM)
Bauer, P. S. (M)
Baxter, L. M. (M)
Beabout, E. G. (M)
Bearce, L. S. (A)
Beck, H. M. (M)
Beecher, W. C. (M)
Beque, G. P. (M)
Behrens, W. V. (M)
Belcher, H. P. (M)
Benjamin, V. E. (M)
Benns, W. E., Jr. (M)
Berg, W. B., Jr. (M)
Bergeson, A. H. (SM)
Berilla, D. (M)
Bernard, W. B. (SM)
Biaggi, B. E. (M)
Birmingham, H. P. (SM)
Biscomb, L. I., Jr. (M)
Black, C. J. (M)
Black, R. (SM)
Blake, L. V. (M)
Bloom, R. A. (A)
Boesch, P. W. (SM)
Bohnert, J. I. (F)
Booth, R. M., Jr. (M)
Bostick, B. E. (M)
Bourland, L. T. (SM)
Bowden, B. (M)
Boymel, B. R. (SM)
Bradley, W. E. (F)
Brady, F. B. (SM)
Brantley, W. W. (M)
Breen, J. M. (A)
Breetz, L. D. (SM)
Brennan, J. X. (M)
Brenner, M. (M)
Brester, W. A. (M)
Bright, R. (SM)
Britt, T. (A)
Broberg, J. B. (A)
Brody, H. I. (A)
Brodzinsky, A. (M)
Brogden, J. W. (SM)
Brown, H. W. (SM)
Brown, H. E. (A)
Brown, R. M. (M)
Brown, S. R. (M)
Brown, T. H. (M)
Bruner, W. G. (M)
Bryant, F. B. (M)
Buck, C. U., Jr. (A)
Buckberg, M. L. (M)
Bullock, G. M. (M)
Bullock, R. N. (M)
Burke, A. A. (SM)
Burkett, J. A. (M)
Burns, R. O. (SM)
Burrows, C. R. (F)
Busch, K. L. (M)
Butt, H. R. (M)
Byers, J. N. (A)
Callaway, H. D. (M)
Campagna, J. H. (SM)
Canal, A. P. (M)
Carnes, W. T., Jr. (SM)
Carpenter, H. E., Jr. (M)
Carpenter, M. B. (M)
Carpenter, R. A. (A)
Carter, J. M. (A)
Carter, J. M. (M)
Cauffman, J. A. (M)
Celander, B. (A)
Chaconas, N. J. (M)
Chan, W. K. W. (M)
Chandler, C. E. (M)
Chapman, G. H. (M)
Chapouis, C. K. (SM)
Chase, C. S. (M)
Chernikoff, R. (M)
Chi, A. R. (M)
Clark, G. L. (M)
Clark, H. L. (M)
Clark, R. J (M)
Clarke, A. S. (SM)
Clarke, F. H. (SM)
Clasen, S. M. (M)
Claydon, R. G. (A)
Cleeton, C. E. (F)
Clement, L. M. (F)
Clements, S. E. (SM)
Coates, R. J. (SM)
Codel, M. (M)
Cohen, L. R. (M)
Colalanni, J. V. (M)
Coleman, J. M. (A)
Colligan, F. S. (A)
Conrad, G. T., Jr. (M)
Cooley, R. W. (M)
Corkill, J. F. (M)
Cosby, L. A. (M)
Countryman, G. L. (SM)
Counts, S. T. (M)
Courtis, R. P. (M)
Cove, M. (M)
Crabill, P. F., Jr. (A)
Crandall, W. R. (M)
Craven, T. A. M. (F)
Crenca, J. J. (M)
Crenshaw, C. M. (SM)
Creveling, C. J. (SM)
Crickman, C. W. (M)
Croarkin, J. A. (M)
Cubbage, H. D. (M)
Cuellar, O. L. (A)
Cullen, F. H. (M)
Culver, R. H. (M)
Cunningham, J. A. (M)
Currier, M. G. (M)
Cushing, R. E. (M)
Dale, N. H. (A)
Dalseide, C. S. (A)
Damelin, J. (A)
Danner, B. L. (M)
Dame, F. R. (M)
Daubenheyer, H. W. (M)
Davies, R. C. (M)
Davis, B. L. (SM)
Davis, G. C. (SM)
Davis, T. McL. (F)
Davis, W. L. (M)
Davis, W. J. (A)
Dawson, L. R. (SM)
Day, H. M. (M)
Decker, K. M. (M)
Del Grosso, V. A. (SM)
Dellinger, J. H. (F)
De Milla, J. (M)
Demmerle, A. (M)
Deplan, L. (SM)
Dewire, K. S. (M)
Diels, J. C. (M)
Dietz, A. P. (M)
Dillard, E. L. (A)
Dillion, J. C., Jr. (M)
Di Masso, R. T. (M)
Dines, G. A. (M)
Dinger, H. E. (F)
Dinnick, G. M. (M)
Dix, E. L. (M)
Dod, L. R. (M)
Dodrill, G. E. (SM)
Doheny, J. F. (M)
Dohne, C. F. (M)
Donovan, P. F. (M)
Dorreli, R. E. (SM)
Dorsey, H. G. (F)
Doyle, W. T. (M)
Draper, C. A. (SM)
Dropkin, H. A. (M)
Duey, J. W. (A)
Duncan, F. B. (M)
Duncan, J. R. (M)
Dunn, J. H. (SM)
Dupree, F. F., Jr. (M)
Dupree, J. N. (M)
Du Vall, D. L. (M)
Easton, R. L. (M)
Eaton, C. F. (A)
Eaton, W. W. (SM)
Edgerly, J. J. (SM)
Edwards, A. J. (M)
Ellerman, K. E. (A)
Elliott, H. H., Jr. (M)
Ellis, B. J. (M)
Emile, P., Jr. (M)
Engleman, C. L. (F)
Ennis, A. G. (M)
Evans, S. (A)
Fahy, E. J. (SM)
Falk, M. B. (A)
Falvey, J. P. (M)
Fedak, J. (M)
Feist, W. M. (M)
Fenn, R. W. (M)
Ferris, C. D. (M)
Feyjoo, M. A. (M)
Fine, H. (SM)
Finney, W. J. (SM)
Fish, P. W. (M)
Fitzgerald, K. P. (M)
Flaska, M. D. (M)
Fleischer, A. (M)
Fleming, H. D. (M)
Fleming, J. J. (M)
Floegel, M. E. (A)
Fluhr, F. R. (M)
Fogelman, A. H. (M)
Fong, L. B. C. (SM)
Forrest, H. S. (SM)
Fowler, R. W. (M)
Fox, E. S. (A)
Franklin, P. J. (SM)
Fratianni, S. V. (SM)
Fraumann, J. W. (A)
Frazier, H. S. (SM)
Frenk, J. L. (M)
Friedberg, S. (M)
Friedman, G. E. (M)
Friel, F. J., Jr. (M)
Fuchs, W. C. (M)
Fuller, I. W., Jr. (M)
Fulper, R., Jr. (M)
Galane, I. B. (SM)
Gallelnao, I. Y. (A)
Gall, J. E. (M)
Gancie, J. J. (A)
Garofalo, N. R. (M)
Gaskey, G. E. (M)
Gaylord, R. E. (M)
Gazlano, J. S. (M)
Gebhard, L. A. (F)
Gee, W. S. (SM)
George, S. F. (SM)
Gerber, H. (M)
Gerngross, J. E. (M)
Gerstenberg, H. M. (M)
Gettings, H. W. (M)
Gibson, R. D. (M)
Gieseler, W. L. (M)
Gignour, D. (M)
Gignour, F. E., Jr. (A)
Gilbert, L. H. (M)
Gillette, K. G. (M)
Ginsberg, M. B. (M)
Giroux, R. A. (M)
Gleason, R. F. (M)
Glenn, L., Jr. (A)
Glenn, R. (A)
Golden, T. S., Jr. (SM)
Golding, E. I. (M)
Goldman, I. D. (SM)
Goodman, A. I. (M)
Goodman, S. I. (SM)
Gordon, H. E., Jr. (M)
Gossard, W. H. (M)
Graves, F. V. (A)
Greathouse, D. E. (A)
Grebenkemper, C. J. (SM)
Green, W. C. (M)
Greenberg, D. L. (M)
Greene, E. E. (M)
Greene, R. M. (M)
Greenwell, R. G. (A)
Greeves, J. J. (A)
Grider, J. W. (M)
Griffin, R. W. (SM)
Griffith, K. E. (M)
Grisamore, N. T. (M)
Grobowski, Z. V. (SM)
Groverman, A. B. (M)
Gruenberg, E. L. (SM)
Grundy, R. D. (M)
Gunn, R. (F)
Gunshinan, T. B. (M)
Guthrie, R. C. (M)
Gwaltney, C. M. (A)
Habermann, R., Jr. (SM)
Hagen, J. P. (F)
Halslip, D. T. (M)
Hall, C. C. (M)
Hall, W. H. C. (M)
Hamilton, C. R. (SM)
Hamrick, J. D. (M)
Hanan, J. E. (M)
Hanley, T. E. (SM)
Hanna, C. C. (M)
Harris, F. D. (A)
Harris, W. P. (M)
Harrison, J. H. (M)
Hart, G. E. (M)
Harter, J. R. R. (M)
Hastings, H. F. (SM)
Hauser, H. (SM)
Haynes, A. P. (A)
Hays, N. P. (M)
Hazelwood, C. A. (M)
Head, H. T. (SM)
Hedge, L. B. (SM)
Heinz, K. E. (A)
Hemenway, D. F. (SM)
Hennessey, F. L. (M)
Henry, W. O. (M)
Henson, R. F. (A)
Hepler, D. S. (M)

Herman, H. (M)
Herndon, P. H. Jr. (SM)
Hesse, A. W. (M)
Heyert, M. (M)
Hill, J. S. (SM)
Hill, R. L. (M)
Hinchion, F. A. (M)
Hinds, J. E., Jr. (M)
Hine, M. K., Jr. (M)
Hobbis, C. E. W. (M)
Hodges, M. F. (SM)
Hogge, S. F. (SM)
Hollander, K. W. (M)
Holmes, R. E. (M)
Hooker, R. H. (A)
Horman, F. L. (M)
Horne, R. C., Jr. (SM)
Howard, D. D. (SM)
Howe, W. E. W. (SM)
Hudgens, J. E. D. (M)
Hull, D. R. (F)
Humphrey, E. C. (M)
Hunt, C. M. (SM)
Hunt, M. L. (A)
Huntoon, R. D. (F)
Hymowitz, E. W. (M)
Hynes, R. (M)
Ihnat, J. (M)
Ingles, H. C. (SM)
Inman, B. D. (M)
Irons, H. R. (M)
Irvine, J. S. (M)
Israel, L. J. (SM)
Jacobs, K. E. (M)
Jacocks, T. B. (SM)
Jaffe, G. (M)
James, G. E. (SM)
Jansen, J. (A)
Jansen, J. J. (M)
Jansky, C. M., Jr. (F)
Jansky, M. M. (M)
Jenkins, J. L. (SM)
Jennings, M. H. (SM)
Jesswein, A. J., Jr. (A)
Jolly, N. (M)
Johanningsmeier, W. F. (M)
Johnson, C. L., Jr. (M)
Johnson, C. Y. (M)
Johnsrud, M. H. (M)
Jones, C. T. (A)
Jones, G. (A)
Jones, H. S., Jr. (SM)
Jones, P. W. (M)
Jones, U. T. (A)
Julian, O. K. (M)
Kahal, R. (SM)
Kahler, F. C. (SM)
Kaiser, H. F. (A)
Kales, M. L. (M)
Kalmus, H. P. (F)
Kaputa, E. J. (M)
Katzin, M. (F)
Kaufman, J. (SM)
Kaufman, M. G. (SM)
Keachie, J. H. (SM)
Kear, F. G. (F)
Keel, J. J. (M)
Keiter, J. E. (SM)
Kellerman, K. F. (SM)
Kelly, F. J. (M)
Kennedy, J. R. (M)
Kennedy, R. L. (SM)
Kershner, S. W. (M)
Kilchil, J. A. (M)
Killilea, T. J. (F)
Kilpatrick, D. D. (M)
King, A. F. (A)
King, A. M. (M)
King, E. S. (M)
King, W. J. (M)
Kinnally, J. W. (M)
Kirby, P. S. (M)
Kiszs, P. J. (M)
Klise, K. W. (M)
Kloeffler, R. G. (F)
Knight, G. L. (M)
Knowles, R. C. (M)
Knox, C. B. (M)
Kohler, E. E. (M)
Kohler, H. W. (SM)
Kolkedy, J. G. (M)
Kompolt, A. (M)
Kouchnerkavich, T. A. (M)
Kowalski, C. L. (M)
Kramer, E. R. (A)
Kramer, E. (M)
Kube, H. D. (A)
Kuder, M. L. (A)
Kullback, S. (SM)
Kumer, C. J. (M)
Kyser, R. H. (M)
Laker, E. F. (A)
Lantz, P. A. (SM)
Larison, J. F. (A)
Lawline, L. (M)
Lear, J. R. (M)
Leavitt, W. E. (M)
Lebel, A. L. (M)
Ledley, R. S. (M)
Lee, F. M. (M)
Lee, F. P., Jr. (A)
Lefkov, S. (SM)
Lehfeldt, H. J. (M)
Leidy, K. L. (M)
Leifer, J. C. (SM)
Leiner, A. L. (M)
Leiphart, J. P. C. (M)
Leone, J. M. (SM)
Leppert, M. L. (M)
Lesko, N. J. (M)
Le Teffier, J. M. (M)
Lewis, C. H. (SM)
Lewis, J. E. (M)
Lewis, J. I. (M)
Lieberman, T. (A)
Light, L. (M)
Liimatainen, T. (SM)
Link, J. H. (A)
Link, J. C. (SM)
Lipscomb, J. L. (M)
Little, L. J. (M)
Little, R. P. (M)
Loeber, C. W. (SM)
Logan, F. J. (M)
Lohnes, G. M. (SM)
Looney, C. H., Jr. (M)
Lorenzen, H. O. (M)
Loucks, P. G. (M)
Lovell, W. A. (M)
Lupton, W. H. (M)
Lutrell, N. H., Jr. (M)
MacKay, J. G. (M)
Maddox, C. H. (SM)
Maddox, R. G. (M)
Malden, R. M. (SM)
Malinowski, A. B. (M)
Mansberg, G. (M)
Mantek, P. A. (M)
March, J. W., Jr. (M)
Marcopulos, D. P. (M)
Marini, J. W. (M)
Marks, D. M. (M)
Marsh, E. V. (M)
Martin, A. P., Jr. (M)
Martin, J. F. (M)
Martin, K. L. (A)
Martin, P. J. (M)
Marzullo, S. (A)
Maskaleris, C. L. (M)
Matacotta, M. (A)
Mathes, R. H. (M)
Mathews, R. L. (A)
Mayer, C. H. (M)
Mayewsky, V. V. (M)
Mayo, R. D. (M)
Mayo-Wells, W. J. (SM)
Mazur, D. G. (SM)
McBiles, C. D. (M)
McCallum, J. D. (M)
McClain, E. F. (SM)
McClenon, D. (SM)
McCluskey, P. M. (M)
McCormick, E. M. (SM)
McGowan, J. E. (M)
McGuire, H. G. (M)
McGunigal, W. E. (A)
McIntosh, F. H. (M)
McIntosh, W. L. (A)
McKenna, J. A., Jr. (A)
McKinney, J. C. (M)
McLaughlin, D. J. (SM)
McLean, M. H. (M)
McMann, I. H. S. (SM)
McNary, J. C. (SM)
Meads, S. K. (M)
Medaris, J. B. (SM)
Medrow, K. R. (M)
Meek, T. J., Jr. (SM)
Melton, G. H. (M)
Merer, G. E. (SM)
Merritt, E. A. (A)
Metcalf, G. F. (F)
Metz, H. I. (SM)
Miller, F. P. (SM)
Miller, G. F. III (M)
Miller, J. L., Jr. (M)
Miller, J. E. (M)
Milne, J. S., Jr. (M)
Miranda, R. T. (A)
Mischler, E. F. (SM)
Misner, R. D. (SM)
Mitchell, F. T., Jr. (SM)
Mitchell, T. A., Jr. (A)
Mock, T. D. (M)
Montgomery, G. F. (SM)
Montgomery, G. T. (A)
Moore, A. H. (M)
Moore, A. L. (M)
Moore, N. (M)
Moore, W. J. (A)
Moreau, F. E. (A)
Morgan, C. L. (M)
Morgan, E. D. (M)
Morris, H. (M)
Morton, A. W. (A)
Muchmore, T. F. C. (M)
Mullaney, J. H. (SM)
Muncy, C. F. (M)
Muncy, J. H. (M)
Murphy, K. H. (A)
Murray, A. F. (F)
Murray, J. M. (A)
Mallor, D. J. (A)
Neely, G. M. (M)
Nelson, D. H. (M)
Nichols, W. A. (M)
Nordenberg, H. M. (SM)
Nowakoski, D. B. (M)
Nye, H. A., Jr. (M)
O'Brien, B. C. (SM)
O'Brien, E. G. (M)
O'Brien, J. R. (SM)
Odarenko, T. M. (F)
Oelke, H. J. (M)
Oertel, M. F. (A)
Ohman, G. P. (SM)
Olitinen, K. E. (A)
Olin, W. C. (M)
Ornstein, E. (M)
Orsino, R. J. (M)
Oscar, I. S. (A)
Otto, E. D. (SM)
Ould, R. S. (M)
Over, J. J., Jr. (M)
Owens, R. B. (SM)
Pace, N. C. (SM)
Packard, A. C. (SM)
Page, E. C. (SM)
Page, I. H. (SM)
Page, R. M. (F)
Page, V. E. (M)
Paine, H. G. (M)
Palik, F. (M)
Palmer, C. E., Jr. (A)
Panchot, H. W. (SM)
Pangas, P. (M)
Parker, L. W. (M)
Parker, R. D. (F)
Parks, A. O. (M)
Parry, C. A. (SM)
Pasquariello, C. J. (M)
Passerini, H. J. (M)
Patch, H. W., Jr. (M)
Patnos, W. M. (M)
Paul, T. T., Jr. (M)
Pease, C. H. (A)
Peaslee, J. R. (M)
Pefferman, E. B. (M)
Pelzman, L. (M)
Perry, J. E. (A)
Pesselnick, L. (M)
Peterkin, E. W. (M)
Peters, C. W. (SM)
Peterson, H. L. (SM)
Petry, C. A. (SM)
Petteway, A. B., Jr. (M)
Phelps, R. B., Jr. (A)
Pike, E. H. (M)
Pinsky, B. (A)
Pitsenberger, J. W. (A)
Plavnieks, E. (A)
Plummer, C. B. (SM)
Plummer, W. E. (SM)
Pontious, C. E. (M)
Portner, R. T. (A)
Ports, D. C. (SM)
Postove, H. (M)
Potter, R. S. (M)
Powers, W. F. (M)
Powles, F. T. (SM)
Powley, A. T. (M)
Pratt, H. A. (M)
Pray, G. E. (SM)
Pride, R. W., Jr. (M)
Pulvari, C. F. (SM)
Puttcamp, R. R. (M)
Pyle, E. J., Jr. (M)
Pynn, G. W. (M)
Queen, F. D. (M)
Quinn, R. B. (M)
Rablnow, J. (F)
Radkowsky L. (M)
Ralsbeck, G. (SM)
Ramos, E. (M)
Ramos, P. A. L. (A)
Randall, C. R. (M)
Ransom, R. A. (M)
Ransone, J. T., Jr. (M)
Ray, H. (M)
Read, A. H. (SM)
Redcay, P. W. (M)
Reed, M. D. (M)
Reed, O. W. B., Jr. (SM)
Reed, P. B. (M)
Reed, S. F. (M)
Regardh, C. G. B. (A)
Reid, D. C. (M)
Reynolds, H. M. (M)
Rich, A. H. (M)
Richards, R. A. (M)
Richardson, D. J. (M)
Richardson, W. M. (SM)
Ridgely, N. R., Jr. (M)
Rietzke, E. H. (SM)
Riley, L. A. (A)
Ring, A. D. (M)
Ringler, D. H. (A)
Ringwalt, D. L. (M)
Robertson, B. S., Jr. (A)
Robinson, C. A., Jr. (M)
Robinson, H. H. (SM)
Robinson, R. E., III (M)
Robson, A. B., Jr. (M)
Rogers, E. B. (M)
Rogers, T. W. (SM)
Rohlfs, D. C. (M)
Rohrer, R. E. (SM)
Rohrich, G. J. (M)
Rolle, R. T. (A)
Rooker, W. T., Jr. (M)
Rosen, H. H. (M)
Rosen, S. B. (M)
Rosenberg, A. (A)
Rosenblatt, A. B. (A)
Rothenberg, N. B. (M)
Rothrock, H. B. (M)
Rouse, R. E. (M)
Rovang, R. J. (A)
Rubel, J. H. (M)
Rubin, L. A. (M)
Rubin, S. (M)
Ruff, D. (SM)
Ruina, J. (M)
Rumyantsev, Z. A. (A)
Runyon, C. A. (SM)
Ruscus, P. V. (M)
Russ, J. A. (M)
Russell, P. H., Jr. (A)
Ryan, F. M. (F)
Ryan, W. E. (M)
Ryser, L. W. (M)
Sahagian, A. B. (A)
Salisbury, L. L., Jr. (M)
Samuel, J. (A)
Sann, K. H. (SM)
Sappe, N. G. (A)
Sarbacher, G. W., Jr. (A)
Schairer, N. J. (M)
Schenck, H. H. (SM)
Schenker, B. (M)
Schleter, G. C. (M)
Schmalbach, S. (M)
Schmidt, L. C. (M)
Schneider, W. H. (M)
Schooley, A. H. (F)
Schoolmeester, J. K. (A)
Schrack, R. A. (M)
Schrenk, M. H. (F)
Schurr, E. J. (A)
Schuyler, W. E., Jr. (M)
Schwalbe, M. I. (SM)
Schwartzbard, R. (M)
Schwarz, K. M. (A)
Scott, D. G. (M)
Scott, J. J. (M)
Seaman, E. F. (SM)
Segal, D. D. (SM)
Segal, P. M. (SM)
Seijo, E. (M)
Shamp, D. J. (M)
Sharp, N. S. (A)
Shaskey, E. N. (M)
Sherman, W. K. (SM)
Shields, W. T. (A)
Shimabukuro, K. (A)
Shoreman, A. (M)
Shumaker, J. F., Jr. (M)
Sibul, L. H. (M)
Sick, W. N., Jr. (M)
Sigman, M. (M)
Siling, P. F. (F)
Silins, A. (A)
Silliman, R. M. (SM)
Silver, S. H. (M)
Simas, V. R. (SM)
Singer, C. H. (SM)
Skramstad, H. K. (SM)
Small, C. F. (M)
Smeby, L. C. (SM)
Smith, E. R. (A)
Smith, F. A. B. (M)
Smith, J. E. (SM)
Smith, M. T. (M)
Smith, P. L. (SM)
Snowberger, A. A. (M)
Snyder, E. O. (M)
Snyder, S. S. (SM)
Spalding, J. P. (SM)
Spencer, T. K. (M)
Spitzer, J. W. (M)
Spurlock, E. M. (M)
Sreb, J. H. (M)
Stahl, B. E. (M)
Stair, R. (SM)
Stamoff, R. A. (A)
Stansbury, C. (SM)
Stanwick, T. (SM)
Steel, D. L., Sr. (M)
Steggerda, C. A. (M)
Stein, E. (M)
Stephens, R. P. (M)
Stern, H. I. (M)
Stern, M. (M)
Steward, C. (M)
Stewart, R. B. (SM)
Stine, P. T. (M)
Stoleson, H. N. (A)
Stone, H. B. (M)
Stone, R. O. (M)
Stoops, C. W. (M)
Stout, C. M. (M)
Strange, M. G. (M)
Street, N. H. (M)
Stump, W. D., Jr. (M)
Sturm, P. J. (SM)
Sullivan, A. H. (SM)
Sullivan, L. D. (M)
Suski, H. M. (SM)
Svendsen, E. C. (M)
Swan, N. C. (A)
Sweet, R. A. (M)
Talshoff, S. J. (SM)
Talkin, A. I. (M)
Tall, R. E. (M)
Talmadge, H. G., Jr. (SM)
Taylor, B. H. (M)
Temple, F. B. (A)
Terauds, J. J. (M)
Tersoff, A. I. (SM)
Thacker, J. U. (M)
Thomas, L. W. (SM)
Thompson, R. J. (SM)
Thompson, R. T., Jr. (M)
Thomsen, C. M. (A)
Thomson, N. W. (M)
Thorp, M. B. (A)
Thrift, S. R. (M)
Thwaites, K. W. (M)
Titcomb, F. C. (M)
Torrealba, J. (M)
Tozzi, L. M. (M)
Tridico, J. J. (M)
Troutman, J. S. (M)
Troutner, J. R. (M)
Tschiegg, C. E. (SM)
Tucker, M. C. (M)
Tuckerman, L. P. (SM)
Trafton, D. C. (SM)
Trexler, J. H. (A)
Trexler, R. C. (M)
Turner, G. S. (F)
Tuve, M. A. (F)
Vallin, J. M. (M)
Van Atta, L. C. (F)
Van Every, A. (M)
Van Horn, J. W. (M)
Van Leunen, P., Jr. (A)
Van Voorhis, S. N. (SM)
Vary, W. J. (M)
Virden, F. (SM)
Vogel, H. O. (M)
Vossen, B. (SM)
Votaw, M. J. (M)
Voznak, E. (M)
Wagner, R. J. (M)
Wald, B. (SM)
Walden, G. R. (M)
Waldschmitt, J. A. (SM)
Walker, A. P. (SM)
Wallace, J. D. (F)
Warner, T. R. (A)
Waterman, P. (M)
Watkins, G. F. (SM)
Watkins, W. H. (M)
Watson, H. L. (M)
Watter, J. F. (SM)
Weathers, B. F. (A)
Weber, W. J., Jr. (M)
Weedman, W. F. (SM)
Wegstein, J. H. (M)
Weimer, E. W. (M)
Weiss, F. (M)
Wenger, F. E. (A)
Wenger, L. S. (SM)
Werth, M. W. (M)
Weston, T. C., Jr. (M)
White, C. F. (M)
White, W. A. (M)
Whitelock, L. D. (SM)
Whittemore, P. B. (SM)
Wilcox, R. H. (M)
Wilcox, R. L., Jr. (M)
Wilder, D. B., Jr. (M)
Wildermuth, J. L. (M)
Williams, C. H. (M)
Williams, E. I., Jr. (A)
Williams, J. P. (A)
Williams, J. R. (M)
Williams, M. P. (M)
Willis, J. W. (M)
Willison, S. S. (M)
Willoughby, J. A. (SM)
Wilson, M. W. (M)
Wilson, R. E., Jr. (M)
Wimer, A. G., Jr. (SM)
Winston, G. C. (M)
Winters, J. N. (A)
Withington, F. G. (M)
Woodson, H. L., Jr. (M)
Woodward, G. F. (SM)
Works, H. A. (A)
Wome, B. E. (M)
Wright, E. A. (M)
Wright, J. H. (M)
Wright, R. B. (M)
Wynne, J. J. (M)
Yagelowich, J. J. (M)
Yannarell, N. T. (M)
Yashin, A. A. (A)
Yeh, L. P. (M)
Young, L. C. (F)
Young, P. J. (M)
Young, R. T. Jr. (SM)
Younger, H. C. (M)
Younson, E. J. (M)
Yovits, M. C. (M)
Yunk, G. W. (M)
Zachary, J. D. (M)
Zakowski, L. F. (M)
Zastrow, K. D. (M)
Zeek, R. W. (SM)
Zempolich, B. A. (M)
Zirm, R. R. (M)

FLORIDA

Apopka (ORL-3)
Craver, L. W. (M)
Kowalski, R. (A)

Bartow (F-WC-3)
Williams, L. E. (M)

Bellair Beach (F-WC-3)
Andrews, E. F. (M)

Belle Glade (MIA-3)
Clemans, C. S. (SM)

Boynton Beach (MIA-3)
Sayre, E. E. (M)

Bradenton (F-WC-3)
Brand, P. M. (SM)
Clemons, T. C., Jr. (A)
Dannals, E. W. (SM)
Hanson, W. R. (A)
Hauber, E. N. (M)
Lampkin, G. F. (M)
Saunders, E. N. (A)
Schnell, F. H. (SM)

Brandon (F-WC-3)
Brodie, W. A. (A)

Brooker (CF-3)
Rhoads, A. S., Jr. (M)

Carrabelle (WWF-3)
Carter, W. D. (M)

Clearwater (F-WC-3)
Adkisson, W. M. (M)
Ainsworth, F. W. (M)
Andrews, J. E. (M)
Apperson, R. C. Jr. (A)
Barrett, A. B. (A)
Billingsley, F. C. (SM)
Bischoff, A. F. H. (SM)
Blakeslee, K. L. (M)
Bozardt, W. R. (A)
Broadwell, B. L. (M)
Bromander, G. C. (M)
Brown, J., Jr. (M)



Brown, P. F. (M)
Campbell, W. H. (SM)
Clark, T. L. (M)
Cleotelis, H. J. (M)
Coble, H. F. (M)
Cozart, A. B. (M)
Dale, C. H., Jr. (M)
Duncan, B. J. (M)
Eckert, G. F. (A)
Ely, P. C., Jr. (M)
Farina, J. S. (M)
Fowler, H. V., Jr. (M)
Free, W. R. (M)
Friebele, E. J. (M)
Grimes, E. S., Jr. (M)
Head, G. M. (M)
Helderman, T. E. (A)
Henning, R. E. (SM)
Henry, P. P. (M)
Hunt, H. W. (M)
Inman, T. F. (SM)
Jansen, J. N. (M)
Johnstone, J. F. (M)
Keeler, R. J. (SM)
Littlejohn, C. E. (M)
McCarthy, R. R. (A)
Meredith, R. P. (M)
Mitchell, E. M. (M)
Morris, C. C. (M)
Parkes, D. A. (M)
Pate, G. W., Jr. (M)
Petersen, M. E. (M)
Pippin, J. E. (M)
Requeiro, W. R. (A)
Reid, J. R., (A)
Reynolds, G. E., Jr. (M)
Richard, S. J. (M)
Ryan, J. J. (M)
Savage, B. R. (M)
Scott, D. C. (M)
Seller, N. C. (M)
Shalloway, A. M. (SM)
Shimer, R. B. (M)
Sloan, S. C., Jr. (M)
Smallwood, W. O. (M)
Smith, R. W. (A)
Southerly, N. D. (M)
Sparks, J. R. (M)
Sullivan, D. J. (M)
Swartz, D. B. (M)
Taft, D. R. (M)
Thomas, M. U. (M)
Tiller, W. H. (M)
Venaglia, E. J. (SM)
Vergon, F. (SM)
Walker, A. H (M)
Wells, J. D. (SM)
Wimberly, W. B. (M)
Wooten, W. W., Jr. (A)
Wright, J. C. (M)
Wyatt, J. C. (M)

Cocoa (CF-3)
Benn, D. G. (A)
Bennett, A. O. (A)
Betts, P. H. (SM)
Blasingame, J. J. (M)
Borum, R. L. (M)
Burton, H. L. (M)
Collier, R. W., Jr (A)
Edwards, M. D., Jr (M)
Fairfield, K. G. (M)
Fowler, C. D. (M)
Gasparovitch, S. (A)
Ginn, R. (M)
Gladkowski, E. R. (M)
Gotcher, R. W. (M)
Gray, J. O. (M)
Graziadio, S. J. (M)
Hamilton, C. C. (A)
Jordan, A. E. (M)
Koch, C. P. (M)
Lesh, M. A., Jr. (M)
Mattox, C. E. (SM)
McMath, D. C., Jr. (M)
Melton, B. R. (M)
Newell, R. A. (M)
Payne, R. E. (SM)
Peeples, J. W., Jr. (A)
Reinwinkel, J. A., Jr. (M)
Reynolds, R. E. (M)
Robson, R. B., Jr. (M)
Stiefel, K. E. (M)
Sweat, R. E. (A)
Terek, A. A. (A)
Toole, P. C. (SM)
Valentine, E. (A)
Wilson, D. E. (M)
Wright, C. J., Jr. (SM)
Zimmerman, M. G. (A)

Cocoa Beach (CF-3)
Allen, M. H. (M)
Baldini, E. A. (M)
Brown, H. H. (M)
Brown, W. R. (M)
Campbell, R. L. (SM)
Carpenter, R. D. (A)
Chaitoff, M. (A)
Corte, R. L. (A)
Cox, H. C. (A)
Deasy, R. D. (M)
Ellington, J. E. (A)
Elliott, J. O. (M)
Gilfillen, L. J. (SM)
Gjermundson, G. J. (M)
Goldberg, G. A. (M)
Gould, M. J. (SM)
Greer, B. G. (M)
Guelzow, C. W. (A)
Hagner, D. R. (M)
Hart, M. T. (M)
Hartman, R. E. (A)
Howard, J. R. (M)
Jackson, R. H. (M)
Jattuso, A. J. (M)
Lichty, R. G. (A)
Mackey, A. J., Jr. (M)
Martinez, M., Jr. (M)
McKune, W. J. (M)
Mead, M. C., Jr. (A)
Melgaard, J. L. (SM)
Miller, J. S. (M)
Mitchell, W. R. (M)
Moore, M. J. (M)
Myers, W. A. (M)
Noone, J. R. (M)
Parker, J. E. (M)
Peterson, R. A. (M)
Sandhofer, E. R. (M)
Stephenson, E. V. (M)
Terry, J. F. (M)
Thibodeau, R. A. (M)
Thoman, C. A. (M)
Thyrion, K. (A)
Tyzenhouse, E. J. (M)
Valluzzi, A. J. (M)
Warner, H. V. (A)
Wever, L. R. (SM)
White, J. R. (M)
Wright, T. R. (M)
Wrisley, J. C. (A)

Coconut Grove (MIA-3)
Rosenson, A. H. (A)

Coral Gables (MIA-3)
Birch, R. S., Jr. (M)
Christophel, G. H. (M)
Clarke, V. E. (M)
Craig, P. H. (SM)
Eubanks, J. M. (M)
Graves, H. B. (A)
Haeger, J. R. (M)
Hiser, H. W. (SM)
Lang, L. B. (A)
Lucas, F. B. (SM)
Macklin, F. R. (M)
Ray, P. R. (M)
Roberts, F. G., Jr. (M)

Dade City (F-WC-3)
Stubbs, J. E. (M)

Daytona Beach (CF-3)
Bollum, C. W., Sr. (SM)
George, E. M. (SM)
La Tour, J., Jr. (M)

Deerfield Beach (MIA-3)
Vigil, A. E. (M)

De Funiak Springs (NWF-3)
Kramer, A. W. (SM)

Destin (NWF-3)
Eddy, H. C. (A)

Dunedin (F-WC-3)
Appleton, J. W. (M)
Barton, G. R. (SM)
Blincoe, H. P. (M)
Coates, J. R. (M)
Connell, J. W. (M)
Day, W. B. (M)
Dowell, W. B., Jr. (M)
Funke, W. G. (M)
Greenwood, R. E. (M)
Hinchee, A. E. (A)
Johnson, R. C. (A)
Karnath, N. A. (M)
Kelly, W. C. (M)
McLaren, D. C. (A)
Pulley, L. A. (M)
Vinson, A. L. (M)
Wilson, L. K. (M)

Eau Gallie (CF-3)
Alvarez, J. (M)
Baker, R. C. (M)
Basim, D. S. (SM)
Beach, A. R. (SM)
Burube, G. N. (A)
Bewerse, R. A. (M)
Bivans, R. W. (M)
Bond, J. F. (M)
Bradford, G. E. (M)
Brown, W. H. (M)
Butler, A. T. (M)
Cahill, W. J. (M)
Castello, R. C. (M)
Clark, F. J. (SM)
Clarke, R. L. (A)
Cockerham, F. E. (M)
Conerly, P. (M)
Constantine, D. (M)
Cook, R. M. (A)
De Jonghe, J. J. (M)
De Mars, S. A. (M)
Dibble, H. L. (M)
Downs, J. W. (SM)
Du Bose, R. L., Jr. (A)
Duryee, J. B. (M)
Eaton, C. B. (M)
Eckenrode, A. H. (SM)
Elsea, R. B. (M)
Emig, I. L. (M)
Finley, J. D. (SM)
Fogle, R. E. L., Jr. (M)
Gleason, T. R. (M)
Glenn, W. L., Jr. (M)
Griffith, M. E. (SM)
Haberhem, W. J., Jr. (M)
Hafer, F. L. (SM)
Harris, B. E., Jr. (M)
Hatcher, E. T. (M)
Herring, R. W., Jr. (M)
Hicks, W. H., Jr. (M)
Hines, W. S. (SM)
Hlavaty, E. M. (M)
Howell, R. L. (M)
Johnson, R. A. (SM)
Johnson, R. J. (M)
Jonas, A. (M)
Jones, A. E. (M)
Jones, D. R. (M)
Jones, R. B. (M)
Kaeser, J. M. (SM)
Kahlenberg, A. H. (A)
Katalva, F. B. (M)
Knowles, D. M. (M)
Korpal, J. W. (A)
Lindemann, N. L. (A)
Lipske, B. R. (M)
Loftus, R. P. (A)
Mac Gregor, W. R. (SM)
Madrid, D. C. (M)
Mann, M. E., Jr. (A)
Martin, B. W. (M)
McCarthy, E. A. (M)
Miller, R. T. (A)
Mills, L. P. (M)
Mock, B. H. (M)
Nelson, D. M. (M)
Nichols, H. C., Jr. (M)
Nordbusch, J. L. (M)
Olilkkala, E. E. (M)
Paul, H. C. (M)
Poehler, H. A. (SM)
Powell, L. W. (M)
Rathbone, W. M. (M)
Rector, C. V. (M)
Reynolds, F. N. (M)
Richardson, E. W. (M)
Riddle, P. (A)
Robbins, L. S. (M)
Rowley, C. S. (M)
Rowley, W. A. (A)
Sakryd, V. (M)
Satterfield, J. M. (M)
Scheopan, J. E. (A)
Shem, I. (SM)
Shirley, R. C. (M)
Simpson, E. M., Jr. (M)
St-claire, L. W. (A)
Singer, J. S. (M)
Smith, A. E. (M)
Smith, C. E. (M)
Smith, E. O. (A)
Soderquist, G. W. (SM)
Sparling, A. G. (SM)
Stallworth, A. W., Jr. (A)
Stoklas, F. P. (SM)
Straits, R. G., Jr. (M)
Sundberg, G. A. (A)
Thomas, D. H. (M)
Trochesset, H. J. (M)
Turner, S. D., Jr. (M)
Vice, V. W. (SM)
Votava, V. (M)
Wedekind, D. E. (M)
Weed, A. C., Jr. (M)
Weiss, B. J. (M)
Weiss, E. J. (M)
Wesp, I. H. (M)
West, K. A. (SM)
Williamson, W. L. (M)
Wilson, H. C. (M)
Wooded, K. M. (M)
Wynn, J. B., Jr. (M)
Young, C. H. (M)
Young, L. R. (M)
Zyzak, E. E. (M)

Eglin AFB (NWF-3)
Albright, R. E. (M)
Bredahl, A. (M)
Deex, A. J. (M)
Gaumer, D. C. (M)
Gould, E. E. (M)
Hohman, V. R. (M)
Kirlin, W. F. (M)
Locklair, J. M. (M)
Magrane, J. H. (M)
Meeker, J. I. (M)
Nicholson, G. O. (M)
Scheible, W. R. (M)
Schofield, D. F. (M)
Shanks, F. B. (M)
Sites, F. J. (M)
Stevens, G. W. (M)
Teeuw, J. W. (A)
White, A. R. (M)

Englewood (F-WC-3)
Clapp, J. K. (F)

Eustis (ORL-3)
Schwab, W. G. (M)

Floral City (F-WC-3)
Palka, F. M. (M)

Fort Lauderdale (MIA-3)
Bassett, R. E. Jr. (M)
Bleckner, E. Jr. (M)
Bumstead, J. J. (M)
Clippard, R. W. (M)
Cook, H. A. (M)
Cummings, M. M. (M)
Dice, W. H. (M)
Dvorak, A. F. (M)
Evans, C. L. (M)
Gorder, L. O. (A)
Granucef, F. P. (M)
Harding, K. P. (M)
Hieronymus, T. G. (SM)
Kamsas, T. P. (A)
Mazzeo, B. A. (M)
Pritchard, W. S. (M)
Richardson, M. S. (M)
Robinson, D. A. (M)
Rogers, M. O. (A)
Ryan, C. M. (SM)
Schmidt, F. G. (A)
Schwartz, H. C. (A)
Stetson, H. T. (M)
Thompson, H. V. (SM)
Vlasak, W. R. (M)

Fort Myers (F-WC-3)
Lynch, A. H. (SM)
McDaniel, E. A. (M)
Propst, H. R. (A)

Fort Myers Beach (F-WC-3)
Lowell, D. R. (M)

Fort Pierce (CF-3)
Goldsborough, P. (SM)

Fort Walton (NWF-3)
Bloomquist, J. C. (A)
Falkenberg, H. R. (M)
Fowler, L. O. (M)
Howard, F. E., Jr. (M)

Fort Walton Beach (NWF-3)
Abney, K. L. (M)
Atkinson, P. L. (M)
Barrow, G. E. (M)
Bell, L. W., Sr. (M)
Brown, M. J. (M)
Butler, F. M., Jr. (M)
Coe, R. B. (M)
Combs, J. W. (M)
Cox, E. R. (M)
Davidson, J. B. (M)
Dooley, R. (M)
Ellis, R. J. (M)
Elmore, H. J. (M)
Fleming, G. C. (M)
Gamel, W. W. (M)
George, J. A. (M)
Gillette, L. D. (A)
Hamilton, R. J. (M)
Hammack, J. W. (M)
Hendrix, C. E. (M)
Herold, R. R. (M)
Hicks, W. S. (A)
Hufnagle, H. H. (M)
Huntley, K. L. (SM)
Jackson, W. E. (M)
Kaiser, H. W. (A)
Lane, J. H. (M)
Leach, F. W. (M)
Leger, P. P. (A)
Long, C. E., Jr. (M)
Longaker, C. D. L. (M)
Lucas, H. B. (A)
Metts, L. W. (A)
Mchnay, D. F. (M)
Perkins, D. L. (A)
Pierce, J. R. (M)
Pruitt, J. R. (M)
Randall, F. J. (M)
Reuther, C. R. (M)
Roth, A. Q. (M)
Rotta, E. A. (M)
Shaw, L. R. (A)
Somerset, J. B. (M)
Somerset, R. D. (M)
Taylor, D. H. (M)
Teleha, C. K. (A)
Todd, M. A. (M)
Tollerson, J. C. (M)
Tomberlin, J. L. (M)
Wallace, J. E. (M)
Welley, R. C. (M)
Wierenga, W. B. (A)
Wilson, L. L. (M)
Wise, W. L. (M)
Zwaska, J. F. (M)

Freeport (NWF-3)
Stoffel, B. L. (M)

Gainesville (GAI-3)
Akre, R. O. (SM)
Arpin, R. J. (M)
Bean, E. W., Jr. (A)
Bosisio, R. G. (M)
Brenner, J. C. (SM)
Bryant, F. S., Jr. (M)
Butterfield, L. D. (M)
Chambers, R. P. (M)
Chen, W. H. W. (M)
Cisne, L. E. (M)
Cook, H. A. (A)
Craig, P. H., Jr. (M)
Day, W. R., Jr. (M)
Dickinson, P. C. (M)
Eaker, L. C. (M)
Eisenberg, M. F. (M)
Elfe, T. B. (SM)
Elgerd, O. I. (SM)
Erickson, E. E. (M)
Fisk, H. V. (SM)
Forlaw, R. F. (M)
Forsman, M. E. (M)
Frerking, H. W. (M)
Fuller, K. H. (M)
Garrott, W. L. (SM)
George, T. S. (SM)
Hagler, T. A. (M)
Hailey, W. M. (M)
Koning, R. E. (M)
Kundel, T. (SM)
Lally, P. M. (SM)
Langston, C. A. (M)
Latour, M. H. (SM)
Lear, W. E. (SM)
Lowry, J. L. (M)
Mathews, B. E. (M)
McManus, W. K. (M)
Medler, R. (M)
Minkel, M. S. (M)
Montgomery, H. R. (M)
Neidert, J. H. (SM)
Newhall, S., Jr. (M)
Raczynski, A. T. (M)
Reichert, K. R., Jr. (M)
Rentkiewicz, H. F. (M)
Rich, C. E. (SM)
Rolfe, F. R. (M)
Rosier, N. E. (M)
Russ, D. S. (M)
Schrader, G. F. (SM)
Schwartz, L. (M)
Schwartz, S. (M)
Searles, C. B. (M)
Shaffer, C. V. (SM)
Sias, F. R., Jr. (M)
Sifas, L. W. (M)
Smith, S. B. (M)
Sterling, R. W. (A)
Strauss, R. (SM)
Studstill, H. F. (A)
Sutherland, A. D. (M)
Swearingen, J. D. (M)
Tierney, D. R. (M)
Veronda, C. M. (SM)
Walters, J. H. (M)
Warner, F. W. (M)
Weil, J. (F)
Westmeyer, J. A. (M)
Whisennant, P. L. (M)
Williamson, E. P. (M)
Wing, A. H., Jr. (SM)
Winters, B. C. (A)
Wohlers, M. D. (M)
Yost, N. V. (M)
Zetrouer, W. F., II (M)

Greenville (GAI-3)
Bailey, J. W. (A)

Gulf Breeze (NWF-3)
Bivans, G. A., Jr. (M)

Gulfport (F-WC-3)
Lindner, J. (A)

Hialeah (MIA-3)
Fossler, D. E. (M)
Sneed, J. O. (M)
Warner, C. E. (A)

Holly Hill (CF-3)
Bodnar, J. M. (M)

Hollywood (MIA-3)
Fraser, H. B. (A)
Lane, H. K. (A)

Homestead AFB (MIA-3)
Knight, J. R. (SM)

Indialantic (CF-3)
Detweiler, J. E. (A)
Dillon, J. D. (M)
Doane, H. J. (M)
Haney, B. M. (M)
Hill, F. E. (SM)
Kearney, R. J. (M)
Kozel, M. S. (A)
Lovitt, O. R. (SM)
Marquis, D. C. (M)
McKee, J. F. (A)
Moore, P. H. (M)
Moran, F. D. (SM)
Preece, B. P. (A)
Preece, R. G. (M)
Roberts, G. E. (M)
Ross, H. T. (M)
Sawyer, W. R. (M)
Shaw, G. S. (SM)
Smith, J. J. (M)
Yatauro, P. (A)

Indialantic Heights (CF-3)
Hultberg, R. M. (M)

Indian River City (CF-3)
Boone, K. E. (M)
Haydon, R. E. (SM)
Herring, H., Jr. (SM)
Jacobus, R. G. (A)
Moreyn, H. J. (M)

Jacksonville (GAI-3)
Acosta, E. (A)
Carruth, D. C. (M)
Clarke, J. W. (M)
Dandelake, J. (M)
Dawson, O. D. (A)
Ffoulkes, C. E. (M)
Ficke, H. C. (A)
Harrell, S. R. (M)
Helmsing, L. C. (A)
Hill, A. L. (A)
Holman, J. C. (M)
Imes, G. C., III (A)
Martindale, N. B. (A)
McClure, G. F. (M)
Meadow, W. L. (M)
Osmundsen, G. A. (A)
Richmond, R. E. (A)
Strandberg, P. R. (M)
Vordermark, E. B. (SM)
Weber, D. C. (M)

Wilcoxon, L. (A)
Wintriss, G. V. (M)
Yeager, A. G. (M)

Jupiter (MIA-3)
Maxwell, C. D. (A)

Key West (MIA-3)
Anderson, B. G., Jr. (M)
Bajus, J. C. (M)
Braun, P. A. (M)
Brooks, J. F. (SM)
Conable, J. H. (M)
Cook, H. B. (SM)
Danse, A. M. (M)
De Noon, N. L. (A)
Dunlap, G. R. (A)
Ervi, W. L., Jr. (M)
Fitch, G. E. (M)
Lenkerd, J. P. (M)
Myers, C. B. (A)
Payne, Y. E. (M)
Small, D. G. (M)
Snyder, R. D., Jr. (M)
Swafford, L., Jr. (A)
Trammell, J. K., Jr. (A)
Witt, A. J. B. (M)

Kissimmee (ORL-3)
Hagen, G. D. (M)
Lowe, M. J., Jr. (A)
Ramer, J. P. (M)
Wooten, A. D. (A)
Wray, R. A. (A)

La Belle (MIA-3)
Williamson, H. L (A)

Lake City (GAI - 3)
Van Idenstine, T. J. (A)

Lakeland (F-WC-3)
Allen, J. G. (SM)
Cipray, F. J. (A)
Polskin, L. J. (A)

Lake Park (MIA-3)
Good, L. F. (M)
McAllister, T. R. (M)

Lake Wales (F-WC-3)
Kimbrel, G. M. (M)

Lake Worth (MIA-3)
Baran, A. S. (M)
Larkin, J. P (M)
Meachem, J. R. (SM)
Wernlund, R. F. (M)
Wood, W. H. (M)

Lantana (MIA-3)
Lamm, J. L. (M)
McWilliams, R. R. (M)
Paslay, L. C. (M)

Largo (F-WC-3)
Abernathy, T. C. (M)
Arena, F. G. (A)
Bailey, R. L. (M)
Benfield, C. W. (SM)
Berry, H. W. (SM)
Christensen, T. W. (M)
Cyphert, V. M. (A)
Daniel, E. L. (M)
Denison, J. W. (A)
Eadie, D. (SM)
Finegan, E. F., Jr. (M)
Fryer, R. B. (M)
Hoover, J. C. (M)
Kuckler, G. C. (M)
Lazarchik, R. E. (M)
Lewis, C. A. (M)
Lewis, H. R. (M)
Marion, J. F. (M)
Miller, J. H. (F)
Murdock, J. B., Jr. (M)
Nations, C. T. (M)
Parker, R. F. (M)
Ross, L. (M)
Savalli, F. P. (A)
Scheidenhelm, R. (M)
Schmidt, A. P. (M)
Shaw, H. S. (F)
Steele, F. E. (M)
Weems, N. T., Jr. (M)
Wilbur, E. C. (SM)
Woodruff, D. L. (M)
Yolken, B. S. (M)
Young, D. B. (M)

Leesburg (ORL-3)
Ball, I. D. (SM)

Lutz (F-WC-3)
Wallace, S. K. (A)

Lynn Haven (WNF-P-3)
Adair, B. M. (M)
Barry, C. J. (M)
Wellhoner, J., Jr. (M)
White, P. K. (M)

Mac Dill AFB (F-WC-3)
Briscoe, R. J. (M)
Jaffe, A. P. (M)
Spontak, J. (M)

Madeira Beach (F-WC-3)
Day, F. R. (SM)
Leedham, R. K. (M)
Stanford, C. E. (M)
Wenner, R. G. (M)

Maitland (ORL-3)
Bales, C. W. (M)
Baswell, A. C., Jr. (M)
Bayston, T. E. (M)
Bradley, S. R. (M)
Browning, R. N. (A)
Byerly, E. H. (A)
Duquet, E. A. (M)
Fox, A. R. (A)
Gilbreath, R. E., Jr. (A)
Goldsmith, J. (SM)
Holmes, L. G. (M)
Johnson, R. E. (M)
Linhart, D. J. (M)
Matysek, J. J. (A)
McGinnis, C. E. (SM)
Mills, R. W. (M)
Nancy, A. E. (SM)
Riley, C. L., Jr. (M)
Roche, A. O. III (M)
Spiegel, S. S. (M)
Spoon, G. E. (M)
Starling, W. H. (M)
Staudt, H. R. (SM)
Taglauer, E. R. (M)
Vargo, F. J. (A)
Williard, M. W. (M)
Yancey, J. L. (M)

Marathon Shores (MIA-3)
Moore, K. F. (A)

Margate (MIA-3)
Nemetz, R. (A)

Mary Esther (NWF-3)
Atherly, D. H. (M)
Bennich, E., Jr. (M)
Haughton, W. B., II (A)
Honey, W. E. (M)
MacDowell, J. E. (M)
McCarthy, D. W. (M)
Nichols, J. (A)
Offermann, F. B. (M)

Melbourne (CF-3)
Acevedo, L. E. (M)
Anderson, B. E., Jr. (M)
Apriletti, C. A. (M)
Baker, R. L. (M)
Barkes, R. L. (M)
Bessey, R. C. (A)
Bicksler, D. H. (M)
Booth, R. Y. (M)
Bordelon, C. J. (A)
Boska, R. A. (M)
Campbell, S. V. (M)
Cauthen, I. L. (M)
Clark, L. P. (SM)
Crowder, W. R. (M)
Davenport, F. S. (M)
Davis, H. B. O. (M)
Delly, W. H. (M)
Denius, H. R. (SM)
Dickenson, J. P., Jr. (M)
Dodgson, W. W., Jr. (A)
Doughty, S. D. (M)
Eddins, W. T. (M)
Ellis, D. H. (M)
Evans, R. T. (M)
Falls, M. P. (SM)
Farabee, L. B. (M)
Ferguson, R. E. (M)
Fifield, F. P. (M)
Fisher, H. F., Jr. (M)
Fleming, J. S. (M)
Fletcher, R. C. (M)
Fraustro, B. (M)
Friedland, M. S. (SM)
Friedman, R. F. (M)
Glass, W. F. (M)
Goatley, C. (A)
Griffin, C. E. (M)
Grover, D. W. (M)
Harris, L. (M)
Hartley, J. T., Jr. (M)
Hartzog, G. R., Jr. (M)
Haywood, W. D. (M)
Hazel, W. M. (M)
Hoeppner, C. H. (F)
Holland, R. E. (M)
Holmes, T. G. (M)
Houchin, C. D. (M)
Houghton, R. A. (M)
Howard, D. C., Jr. (M)
Hyde, K. C., Jr. (M)
Jackson, C. H. (M)
Jones, J. R. (M)
Knight, J. P. (M)
Ledgerwood, F. A. (M)
Leonard, S. E. (SM)
Mahaffey, R. F. (M)
Marquand, R. E. (M)
Marsh, E. N. (M)
Martin, J. W. (M)
McLamb, F. D. J. (M)
McMillian, L. S., Jr. (M)
McRae, D. D. (M)
Mead, W. L. (M)
Mederos, T. S., Jr. (M)
Merwin, R. L., Jr. (SM)
Meyer, E. G. (SM)
Meyrose, H. S. (M)
Mixsell, S. A. (M)
Mohre, C. L. (M)
Morrison, H. G. (A)
Murray, R. V. (M)
Myers, C. E. (M)
O'Kelley, H. E. (SM)
Pace, A. J. (M)
Pelchat, G. M. (M)
Pettijohn, R. E. (M)
Pickover, H. (M)
Pieck, H. (M)
Pifer, T. D. (M)
Quinlivan, W. F. (M)
Ragsdale, R. G., Jr. (M)
Ratliff, M. (M)
Rawnsley, J. A. (M)
Relf, K. E. (M)
Rich, D. F. (M)
Ritchie, N., Jr. (M)
Robinson, J. A. (M)
Scharla-Nielsen, H. (SM)
Searcy, J. H. (M)
Sellers, J. D. (SM)
Shingler, D. F. (A)
Smith, J. H. (M)
Stilwell, R. J. (M)
Sullivan, C. T. (M)
Tomlinson, J. W. (M)
Tommerdahl, J. B. (M)
Van Atta, J. P. (A)
Voss, R. C. (M)
Walker, J. R. (M)
Walker, R. A. (A)
Walter, J. M., Jr. (M)
Wang, C. (SM)
Weiant, M. A., Jr. (M)
Wentzel, M. G. (A)
West, C. F. (M)
Westphal, F. (M)
Wicker, G. E. (M)
Widerquist, V. R. (SM)
Wiener, W. A. (M)
Williams, J. B. (M)
Williams, L. E. (SM)
Willis, A. D. (M)
Work, R. A., Jr. (M)
York, L. M. (M)
Young, J. (A)
Young, P. D. (A)

Melbourne Beach (CF-3)
Dodson, L. F. (SM)
Drew, R. E. (M)
Fox, R. A. (SM)
Glover, E. B. (M)
Jory, J. H. (M)
Kolderup, L. E. (A)
Murray, R. W., Jr. (M)
Price, W. A. (M)

Melrose (GAI-3)
Gano, O. R. (M)

Merritt Island (CF-3)
Ciaffardini, A. N. (A)
Cooper, W. H. (SM)
Damme, M. C. (A)
Daniher, C. E. (SM)
Hart, F. N. (A)
Martin, J. D., Jr. (M)
Morris, H. N. (SM)
Noda, T. T. (A)
Phillips, M. J. (M)
Raulins, K. R. (M)
Saffos, J. L. (A)
Shupe, P. G. (M)
Sorrell, D. (M)
Thomas, W. A., Jr. (M)

Miami (MIA-3)
Adcock, S. E. (SM)
Bernard, H. F. (M)
Bie, E. W. (M)
Bledsoe, R. E. (M)
Bower, G. E. (M)
Brookfield, R. F. (A)
Bryant, C. S. (A)
Camus, G. E. (M)
Cheng, K. Y. (M)
Crapo, S. T. (M)
Dale, K. N. (A)
Danielsen, D. A. (M)
Dann, R. (M)
Drexel, A. (M)
Ellis, H. J., Jr. (M)
Embree, L. O. (M)
Epperson, W. H. (SM)
Evans, H. (A)
Francis, J., Jr. (M)
Gordon, L. L. (SM)
Gussow, S. S. (A)
Ham, B. D. (A)
Hannum, E. W. (M)
Hardesty, G. A. (M)
Hellings, F. J. (M)
Herrmann, N. P. (M)
Johnson, W. H., Jr. (M)
Johnson, W. L., Jr. (M)
Jones, R. M. (M)
Jones, T. J. (M)
Jorgensen, O. J. (M)
Kimball, E. W. (SM)
Kinney, W. E. (M)
Kitson, J. E., Jr. (A)
Konter, P. (A)
Larkins, G. L. (M)
Lewis, E. W. (M)
Liedholz, G. A. (M)
Livingston, I. (A)
Lockwood, E. C. (SM)
Lowenstein, J. M. (A)
Magee, T. T. (A)
Magid, P. (A)
Mangus, G. (A)
Martin, S. (M)
Mason, E. C. (A)
McKay, D. B. (SM)
McLeod, B. F. (SM)
Middleton, T. F., Jr. (A)
Miller, M. A. (SM)
Murphy, W. P., Jr. (A)
Nairn, J. B. (M)
Nelson, W. A. (A)
Nirenberg, A. (M)
Palmer, R. P. (A)
Pelick, J., Jr. (M)
Perkinson, J. A. (M)
Pohl, J. S. (M)
Pollack, B. H. (M)
Pollack, M. (M)
Randolph, H. D. (M)
Reid, T. D. (M)
Rich, R. S. (A)
Rider, F. E. (SM)
Rodgers, E. R. (M)
Rondel, V. D. (A)
Rose, R. M. (M)
Schneider, H. W. (M)
Shamblin, H. D. (M)
Shattuck, J. C. (M)
Shay, J. A. (M)
Sira, M. A., Jr. (A)
Smith, F. S. (M)
Smith, R. L. (M)
Soukaras, K. M. (M)
Spragg, L. A. (M)
Stephens, F. H., Jr. (M)
Summers, C. H. (M)
Ware, P. (SM)
Weber, G. L. (M)
Williamson, H. G. (M)
Yeager, H. R. (SM)
Young, P. A. (M)

Miami Beach (MIA-3)
Boundy, G. G. (SM)
Crane, W. S. (M)
Defoggi, E. (M)
De Hass, T. M. (A)
Geartner, J. (A)
Kantor, R. R. (M)
May, B. M. (A)
Richter, H. L. (A)
Senauke, A. (SM)
Shropshire, A. W. (M)

Miami Shores (MIA-3)
Howard, C. I. (M)
Miessner, B. F. (F)
Shearer, S. L. (A)

Miami Springs (MIA-3)
Cook, C. (A)
Kronengold, M. (M)
Mehrling, H. W. (M)
Murr, V. E. (M)
Nicholls, R. F. (A)

Micanopy (GAI-3)
Perry, A. D. (A)

Milton, (NWF-3)
Farrar, R. L. (A)
McKinney, J. W. (A)

Mims (CF-3)
Sumner, L. E. (A)

Monticello (NWF-3)
Groves, C. L. (A)

New Smyrna Beach (CF-3)
Dinwiddie, E. W. (M)
Kimmell, R. G. (M)

Niceville (NWF-3)
Drake, H. (A)
Grossel, R. L. (M)
Putriment, B. W. (M)

North Miami (MIA-3)
Castle, C. X. (M)
Farwell, R. C. (A)
Parsons, E. G. (M)

North Miami Beach (MIA-3)
Needs, W. R. (A)
Ostheimer, E. J. (M)
Rifkin, M. S. (M)

North Palm Beach (MIA-3)
Adams, V. F., Jr. (A)
Craver, J. N. (M)
Lefka, M. (M)

Oldsmar (F-WC-3)
Wilt, R. E. (M)

Orlando (ORL-3)
Abrams, E., Jr. (A)
Alexander, J. E. (M)
Anderson, E. B. (A)
Anderson, G. F. (A)
Andrews, R. C. (A)
Arbuckle, W. L. (M)
Ashbrook, S. B., Jr. (A)
Barnett, F. M., Jr. (A)
Barrett, J. W. (SM)
Barwick, K. E. (M)
Basch, A. L. (M)
Bassett, N. L. (M)
Bateman, G. H. (SM)
Bauer, J. A. (SM)
Bauer, L. H. (A)
Beard, A. L. (M)
Beers, W. T. (A)
Bendett, R. M. (M)
Bishop, R. P. (M)
Blumenstein, O. J. (M)
Bobber, R. J. (SM)
Bodin, B. H. (A)
Bogard, J. R. (M)
Boor, S. B. (M)
Boquist, T. A. (M)
Bradbury, L. D. (A)
Branch, W. D. (M)
Brantley, J. Q., Jr. (SM)
Breit, R. I. (M)
Brigham, R. C. (A)
Brooks, M. M. (A)
Browder, L. P. (M)
Brown, J. O. (A)
Brown, L. R. (M)
Bryant, J. A., Jr. (M)
Buchan, J. F. (A)
Buchanan, D. B. (M)
Cadiz, E. E. (M)
Campbell, R. D. (SM)
Camolon, H. H. (M)
Cardwell, L. R. (SM)
Carlson, W. J. (A)
Carnahan, P. G. (M)
Carr, S. O. (M)
Chasteen, J. W., Jr. (SM)
Clifford, R. F. (A)
Clutterham, D. R. (SM)
Collins, P. (A)
Conley, J. W., III (M)
Criddle, W. S. (M)
Cullis, R. N. (M)
Cullman, F. A. (SM)
Cutler, M. A. (A)
Dalrymple, J. H., Jr. (SM)
Darling, R. E. (A)
Davis, D. E. (M)
Day, W. R. (M)
Decino, A. (SM)
Dement, J. F. (M)
Dickinson, R. H. (SM)
Drescher, L. (M)
Dudley, W. A. (A)
Duke, J. B., III (M)
Duval, A. N. (M)
Eagle, G. R. (A)
Eastman, M. R. (M)
Eddy, W. L. (M)
Eggerton, W. H. (M)
Elzold, D. J. (M)
Feehrer, M. R. (M)
Fisk, N. H. (M)
Ford, H. P., Jr. (M)
Ford, R. E. (SM)
Frazier, E. R. (A)
Garcia, C. M. (M)
Gardner, N. H. (M)
Garrard, J. T. (M)
Gerst, R. L. (M)
Godlewski, V. J. (A)
Gover, W. M. (M)
Gray, A. R. (SM)
Green, G. M. (M)
Green, R. E., Jr. (M)
Grider, K. V. (M)
Grimes, J. W., Jr. (M)
Gryder, W. L. (M)
Haas, D. L. (M)
Half, M. C. (M)
Hall, G. L. (M)
Hardison, C. W. (M)
Hawley, D. T. (SM)
Hazel, H. K. (M)
Heffner, R. W. (A)
Helvey, T. C. (M)
Henry, R. F. (A)
Herbeck, A. E. (M)
Herndon, J. W. (SM)
Hickman, D. A. (M)
Hierholzer, E. L. (M)
Hill, G. R. (SM)
Hoefl, E. R. (M)
Hoover, K. W. (M)
Horton, W. H. (SM)
Houseman, E. O., Jr. (M)
Hughes, E. A. (SM)
Hughes, M. J. (M)
Hyatt, J. L. (M)
Isaacson, S. (M)
Jaramillo, J. G. (M)
Johnson, C. W. (M)
Johnson, L. M. (M)
Jones, A. H. (A)
Kaplan, S. M. (SM)
Karkeck, P. (A)
Kasprzak, T. L. (M)
Katis, C. W. (A)
Kaufmann, W. (SM)
Keating, T. J. (M)
Keith, C. E. (SM)
Kent, K. E. (M)
Kepner, W. E. (SM)
Kirkley, E. L., Jr. (A)
Klaasen, B. J. (M)
Koepsell, E. M. (A)
Korn, R. A. (A)
Langpaul, E. A. (M)
Lanzkron, R. W. (M)
Larson, K. T. (SM)
Le Grand, H. R. (M)
Lemasters, J. N., III (A)
Levy, A. J. (A)
Lewis, R. D. (M)
Linden, A. E. (SM)
Lipowitz, E. (A)
Longley, R. M., Jr. (M)
Lowrie, R. W. (M)
Mallison, R. E. (M)
Mark, W. V. (A)
Marti, E. (SM)
Martin, A. F. (A)
Mason, W. A. (M)
Matthews, J. L. (M)
McCanless, C. P. (M)
McCasland, R. S. (M)
McDimit, E. L. (M)
McNiece, G. T. (M)
Merrill, J. (M)



Mesa, A. M., Sr. (A)
Miller, D. (M)
Mills, L. W. (M)
Minderman, P. A. (M)
Mockus, J. M. (SM)
Moore, T. A. (M)
Morgan, J. C. (A)
Moss, B. B. (A)
Murray, M. P. (M)
Myers, A. C., Jr. (M)
Naylor, M. W. (M)
Ness, J. W. (M)
Neville, T. E. (A)
Newberry, V. A. (M)
Nichols, R. C. (M)
Noriega, J. R. (M)
North, C. W. (SM)
Ohanek, F. J. (M)
Painter, P., Jr. (SM)
Panzitta, J. (A)
Parrish, C. E. (M)
Patrick, W. S. (SM)
Paxton, R. K. (M)
Payne, R. C. (M)
Pennanen, V. W. (A)
Perich, M. (M)
Pevak, F. F. (M)
Philbin, J. A. (A)
Phillips, R. L. (M)
Pickering, T. A. (A)
Picou, W. E. (M)
Poole, H. H. (M)
Powers, D. M. (M)
Radcliffe, A. J., Jr. (M)
Reed, E. F. (M)
Reel, W. R. (M)
Robinson, B. H., Jr. (M)
Rothar, D. E. (M)
Ruthenberg, W. G. (M)
Santee, B. D. (M)
Sasser, T. (M)
Schindelin, J. W. (M)
Schisler, C. W. (M)
Schneider, V. A. (M)
Shaw, W. H. (M)
Sheffield, T. W. (M)
Sherrill, H. P. (M)
Short, D. S. (A)
Schreckengost, R. C. (SM)
Slager, D. M. (M)
Smith, E. F., Jr. (M)
Smith, G. S. (SM)
Smythe, R. C. (M)
Snyder, L. J. (A)
Spore, H. B. (SM)
Stadnik, T. J. (A)
Stalls, W. M. (M)
Staschke, R. A. (A)
Stateler, D. V. (M)
Steele, W. L. (M)
Stelene, L. H., Jr. (M)
Sternbach, S. J. (A)
Stevenson, G. D. (A)
Stiles, J. E. (M)
Stone, R. E. (M)
Stupp, R. L. (M)
Suganuma, P. K. (A)
Summer, C. F., Jr. (M)
Tanguay, A. R. (SM)
Terry, J. W. (M)
Thompson, W. H. (M)
Tighe, M. J. (A)
Tipton, R. W. (M)
Tracy, J. E. (M)
Tripoe, W. D. (M)
Tritt, E. M. (M)
Truex, E. H. (M)
Trutter, J. A. (A)
Tucker, R. W., Jr. (M)
Turner, R. E. (M)
Uzel, F., Jr. (M)
Van Dyke, C. H. (M)
Van Nostrand, P. B. (M)
Weaver, H. R. (M)
Weber, R. L. (SM)
Webster, R. E. (SM)
Weiss, G. H. (M)
Williams, W. T. (M)
Wilson, G. D. (A)
Wong, J. B. (A)
Wooldridge, A. L. (SM)
Yarbrough, J. F. (SM)
Yarian, E. L. (A)

Palatka (GAI-3)
Peterson, T. R. (A)
Yetverton, C. W. (M)

Palm Beach (MIA-3)
Sarbacher, R. I. (SM)

Palm Harbor (F-WC-3)
Bushnell, T. R. (M)
Everitt, B. A. (M)

Panama City (NWF-P-3)
Ault, J. F. (M)
Bridges, F. L. (M)
Bryant, W. E., Jr. (M)
Buffkin, W. R. (M)
Bycroft, E. E. (A)
Cartwright, C. C. (M)
Cooper, A. T. (M)
Crosby, A. E. (M)
Crowell, R. J. (A)
De Coutouly, G. C. (SM)
Galloway, R. T. (M)
Hagemann, J. (SM)
Hautman, C. A. (SM)
Hill, J. W. (M)
Koesy, C. B. (SM)
Lloyd, B. H. (M)
Lowry, R. C. (M)
Marley, S. B. (M)
Mathis, G. F. (M)
Miller, C. E., Jr. (M)
Moody, J. G. C. (M)
Murphree, F. J., Jr. (M)
Naeseth, M. H. (M)
Penton, H. H. (M)
Rhyne, W. A. (M)
Smith, J. R. (M)
Stafford, J. D. (M)
Steffen, G. P. (M)
Teet, W. A. (M)
Thomas, A. M. (M)
Waltonen, W. W. (M)
Watz, N. P. (M)
Wegmann, G. A. (M)
Wells, W. E. (M)
Wheeler, R. H. (M)
Whittaker, C. A. (M)

Parker, (NWF-P-3)
Gilbert, W. N. (M)

Pass-A-Grille Beach (F-WC-3)
Rives, T. C. (F)

Patrick AFB (CF-3)
Abbilt, C. W. (M)
Anderson, J. P. (M)
Bailey, C. W., Jr. (A)
Black, R. L. (A)
Campbell, C. C. (A)
Fada, C. V. (M)
Green, P. L. (M)
Heins, D. E. (M)
Hewett, C. W. (A)
Hoeper, H. B. (A)
Knauf, G. M. (M)
Leal, C. V. (A)
Lentz, W. K. (A)
McCoy, S. E. (M)
Mitchell, R. W. (M)
Nelson, R. V. (M)
Perkins, F. M., Jr. (A)
Petty, T. D., Jr. (M)
Quolidoonine, F. (M)
Richardson, W. A. (M)
Ritter, L. M. (A)
Rorant, J. H. (A)
Ross, J. A., Jr. (M)
Rowland, M. O. (M)
Schum, E. J. (A)
Sence, R. L. (A)
Shank, R. B. (M)
Thompson, W. W. (A)
Wescott, J. C. (A)
Wiss, G. (A)
Yates, D. N. (SM)
Young, W. L. (M)
Zinn, T. B., Jr. (M)

Pensacola (NWF-3)
Bryan, C. E. (M)
Damm, T. P. (M)
Dunham, R. E. (M)
Earps, E. W. (A)
Fisher, D. E. (M)
Hanle, R. L., Jr. (M)
Hixson, W. C. (M)
Kohr, C. M. (A)
Moore, B. G., Jr. (A)
Reither, S. I. (M)
Simpson, E. S., Jr. (A)

Pine Castle (ORL-3)
Chin, W. Y. (M)

Pinellas Park (F-WC-3)
Bryant, J. H. (M)
Ross, R. J. (A)

Plant City (F-WC-3)
Cockrell, J. H. (A)
Kendrick, F. D. (M)

Pompano Beach (MIA-3)
Elwood, A. A. (SM)
Johnson, T. B. (M)
Miller, J. M. (F)
Morrison, D. K. (A)
Pratt, H. (F)

Port Canaveral (CF-3)
Ellis, G. W. (M)
Goff, H. C. (M)
Sanders, A. W. (M)

Port St. Joe (NWF-3)
Mefford, C. W. (M)

Punta Gorda (F-WC-3)
Roller, E. R. (A)

Redington Beach (F-WC-3)
Ebeling, W. (M)

Riverview (F-WC-3)
Hart, C. L. (A)

Rockledge (CF-3)
Childers, F. M. (A)
Horchler, F. W. (M)
Lahr, N. L. (M)
Rawls, O. B. (M)
Smith, D. L. (M)
Smith, V. K. (M)

Safety Harbor (F-WC-3)
Farrar, H. B. (A)
Lega, H. F. (A)

St. Augustine (CF-3)
Berger, M. (A)
Gupton, H. S., Jr. (A)

St. Cloud (CF-3)
McDonnell, R. L. (M)

St. Petersburg (F-WC-3)
Arbuckle, C. E. (M)
Aucremann, R. C. (M)
Back, G. I. (F)
Bare, C. C. (M)
Bartlum, G. C., Jr. (A)
Bellare, D. (SM)
Boulay, R. R. (A)
Brown, D. C. (M)
Campbell, C. D. (SM)
Carlson, K. L. (A)
Carnevale, M. D. (A)
Carnevale, V. D. (M)
Carr, G. W. (SM)
Cobb, J. P. (M)
Codding, W. J. (M)
Colbert, D. C. (M)
Cooper, C. B. (A)
Councilman, C. L. (SM)
Davis, J. H. (M)
Dingley, E. N., Jr. (F)
Donaldson, M. R. (SM)
Durham, B. H. (M)
Dyer, J. H. (M)
Eberwine, J. A. (A)
Ehrlich, E. (M)
Eliason, M. (SM)
Fazio, F. (A)
Feldhusen, R. L. (A)
Felton, L. E. (SM)
Findley, L. K. (SM)
Friebertshauser, R. (M)
Goldberg, H. L. (A)
Goldie, S. P. (M)
Gonzalez, R. E. (M)
Grlesl, R. M. (A)
Guthe, J. M. (M)
Hackert, W., Jr. (A)
Halem, N. (A)
Hart, W. F. (A)
Hassell, J. E. (M)
Helmrichs, R. M. (A)
Hemmer, F. A., Jr. (M)
Herzig, M. E. (M)
Hines, N. M. (M)
Hoffman, R. S. (M)
Holley, M. V. (M)
Homer, G. F. (M)
Humphery, B. E. (M)
Jelen, M. J. (SM)
Johnson, B. (M)
Johnson, R. L. (A)
Kamen, A. (M)
Katelansky, P. (M)
Keeler, C. E. (SM)
Kimberlin, D. E. (A)
Klein, M. S. (SM)
Kleinfelder, D. S. (M)
Koechel, W. P. (M)
Kraxberger, G. S. (A)
Landry, W. J. (SM)
Langmack, C. E. (M)
Lawton, G. P. (SM)
Levine, A. (M)
Lindtner, E. G. (A)
Loudermilch, R. C. (M)
Ludwick, C. A. (A)
Ludwig, J. T. (A)
Martoccia, F., Jr. (M)
Mensch, J. R. (M)
Monahan, H. J. (A)
Munday, T. W. (A)
Myers, R. T. (SM)
Oliver, J. G. (M)
Paparlello, P. J. (A)
Paris, H. T. (A)
Parvin, R. H. (SM)
Peacock, W. T., Jr. (A)
Pelton, E. A. (A)
Phillips, E. M. (SM)
Phillips, J. E. (M)
Pichal, H. T. (SM)
Polcar, J. L. (M)
Randolph, G. L. (M)
Riley, J. M. (A)
Saraydar, R. A. (M)
Sawyers, E. R. (A)
Schinabeck, J. R. (M)
Schinski, D. L. (A)
Scott, L. E. (M)
Smith, M. P. (M)
Snipes, W. C. (M)
Snyder, H. Z. (SM)
Sollie, S. A. (SM)
Spratt, R. E. (M)
Stebbins, R. S. (A)
Sullivan, A. W. (SM)
Sumpter, R. C. (A)
Taylor, J. R. (A)
Tims, E. F. (SM)
Trapozzano, V. R. (A)
Tuthill, A. F. (A)
Versteeg, D. A. (A)
Vincent, H. B. (SM)
Voissem, N. H. (M)
Wahlman, J. E. (A)
Walker, R. G. (M)
Wallis, A. V. (A)
Wasserlein, H. G. (A)
Wells, E. L. (A)
Wenz, C. P. (SM)
White, M. B. (A)
Wilcox, H. J., Jr. (M)
Willert, A. F. (M)
Williams, J. B. (SM)
Willing, H. A. (M)
White, E. L. (F)
Wilson, R. G. (A)

Sanford (ORL-3)
Knight, L. A. (M)
Levy, S. L. (M)
Munday, T. M. (M)
Osborne, W. H. (A)
Taylor, J. C. (M)

Sarasota (F-WC-3)
Belkin, M. (M)
Blair, W. W. (M)
Blesse, H. O. (M)
Cannon, R. S., Jr. (M)
Cumings, R. G. (SM)
Ensall, T. (M)
Fisher, S. (SM)
Harry, J. B. (A)
Hartman, C. J. (M)
Hazebrook, H. (M)
Holderman, C. C. (M)
Janda, F. J. (A)
Loper, L. E. (A)
Magnin, J. P. (M)
Pantuso, A. J., Jr. (M)
Peck, W. D. (A)
Pettler, P. R. (M)
Richardson, J. D. (M)
Seitner, J. E. (M)
Slaughter, G. S. (SM)
Spencer, L. V. (M)
Stewart, T. E., Jr. (A)
Swain, W. H. (M)
Tisdale, G. E. (M)
Uglow, K. M., Jr. (SM)
Ulrey, D. (F)
Whitehead, C. C., Jr. (M)

Shalimar (NWF-3)
Day, J. P. (M)
Howe, J. W. (A)
Lowe, B. W. (A)
Mantey, W. F. (M)
Massey, W. A. (M)
Null, F. E. (M)
Overton, B. H. (SM)
Pfeiffer, D. A. (M)
Shea, J. H. (A)
Von Wegern, F. C. (A)

Sharpes (CF-3)
Malcolm, A. (A)
Olson, R. E. (M)

South Merritt Island (CF-3)
Bass, D. C. (M)

South Miami (MIA-3)
Andres, L. J. (SM)
Keller, J. W., Jr. (SM)

Surfside (MIA-3)
Lurie, E. M. (SM)

Tallahassee (NWF-3)
Carr, L. O. (M)
Clifton, C. L. (M)
Deters, A. A. (A)
Grafe, R. W. (A)
Kromhout, O. M. (M)
Ragsdale, W. E. (M)
Saffer, R. A. (M)
Schieferstin, R. W. (M)

Tampa (F-WC-3)
Anders, A. W., Jr. (M)
Bailey, D. C. (M)
Bascome, P. L. (A)
Begue, E. (M)
Biemacki, H. R. A. (A)
Boyd, R. M. (A)
Brice, J. R. (M)
Chandler, W. G. (M)
Hodgson, J. C. (A)
Hoque, D. C. (M)
Husbands, C. L. (M)
Jean, R. P. (M)
Jones, H. H. (M)
King, C. J. (M)
Kotze, J. (A)
Landry, E. P. (A)
May, T. W. (A)
McDaniel, C. B. (A)
Metcalfe, W. L. (M)
Miller, M. P. (A)
Mitchell, J. H. (M)
Moore, W. P. (SM)
Murphy, R. (SM)
Neeb, C. H. (A)
Nores, R. P. (M)
Nott, J. H. (M)
Parker, J. W. (M)
Quinones, D. E. (A)
Raines, R. M. (A)
Randell, R. R. (M)
Rich, J. C. (A)
Rosenzvaig, J. E. (M)
Schuneman, J. D. (M)
Smith, W. E. (M)
Squillace, R. E. (M)
Turner, R. D. (A)
Uranga, E. (A)
Van Valkenburg, W. P. (A)
Wascher, M. A. (M)
Winfree, W. C., Jr. (A)

Tarpon Springs (F-WC-3)
Bait, M. T. (M)

Titusville (CF-3)
Amos, C. D. (A)
Blum, F. W. (M)
Bravo, M. V. (A)
Brown, W. A. (M)
Cortright, P. W. (A)
Crager, J. A. (M)
D'Albora, J. B., Jr. (SM)
Davidson, H. K. (M)
Davidson, J. K. (M)
Gilmore, Q. E. (M)
Grieser, T. J. (M)
Grimm, E. W. (M)
Hall, W. N. (A)
Herndon, W. F. (A)
Houston, E. E., Jr. (M)
Jackson, K. J. (M)
Matthews, G. D. (M)
Osborn, H. H. (A)
Schenck, A. K. (M)
Siemen, H. A., Sr. (SM)
Stroud, A. A. (A)
Weissenborn, H. E. (M)
Wheeler, W. P. (M)

Treasure Island (F-WC-3)
Augustine, E. F. (A)
Britton, E. R. (SM)
Dashiell, E. V. (SM)
Soldwedel, H. T. (SM)

Tyndall AFB (NWF-P-3)
St. Germain, A. A. (A)

Umatilla (ORL-3)
Vossberg, C. A. (M)

Valparaiso (NWF-3)
Golden, R. J. (M)
Kossler, P. A. (M)
Sapp, E. F., Jr. (M)

Vero Beach (CF-3)
Chamening, C. M. (M)
Paddock, D. G. (M)
Van Dyck, A. F. (F)

Warrington (NWF-3)
Schwenter, G. E. (A)
Toole, J. L., III (A)

West Miami (MIA-3)
Speirs, G. E. (A)

West Palm Beach (MIA-3)
Cohen, M. J. (SM)
Cordell, B. R., Jr. (M)
Cronin, C. E. (M)
Edleman, V. W. (A)
Ford, M. J. (A)
Gibson, H. C., Jr. (M)
Hall, J. M., Jr. (M)
Holdren, E. H. (M)
Knowles, W. A. (A)
Kraft, F. J. (M)
Nichol, D. W. (M)
Peralta, B. C. (M)

Windermere (ORL-3)
Ketchen, F. W. (M)
Raboy, B. (SM)
Towles, W. B. (M)

Winter Garden (ORL-3)
Greenman, L. R. (M)
Yokomoto, R. K. (A)

Winter Haven (F-WC-3)
Craig, L. O. (M)
Potter, F. N. (M)

Winter Park (ORL-3)
Barney, J. M. (SM)
Boutwell, E. D. (M)
Bowers, R. S. (SM)
Boyles, G. W. (M)
Bradmiller, R. W. (M)
Center, M. (SM)
Chaney, H. L. (M)
Chioma, L. D. (A)
Cooper, G. (M)
Crowell, L. J. (A)
De Pasquale, N. D. (A)
Doolittle, J. H. (SM)
Doroshow, S. R. (SM)
Dryden, R. E. (SM)
Ebel, D. G. (M)
Ferguson, J. K. (M)
Frutchey, M. P. (A)
Gennett, K. A. (M)
Gimon, E. E. (M)
Harrison, P. W. (SM)
Henderson, J. C. (M)
Holmes, G. A. (A)
Johnson, R. J. (A)
Karres, G. E. (M)
Le Gare, J. M. (SM)
Lyden, J. A., Jr. (M)
Lyerly, E. E. (A)
Marks, W. S., Jr. (F)
Matzinger, J. R. (SM)
McQueen, J. E. (M)
Melvin, E. A. (M)
Meyerson, M. (SM)
Pearson, J. R., Jr. (M)
Pierson, C. D., Jr. (SM)
Rhodes, D. R. (SM)
Romano, G. F. (M)
Severance, F. D. (M)
Sheppard, J. H., Jr. (SM)
Simmons, C. A. (SM)
Sutton, J. R. (A)
Titen, H. (M)
Townsend, H. D. (M)
Tripp, B. R. (M)
Von Pahlen-Fedoroff, G. (A)
Webber, H. E. (SM)

Williams, A. G. (M)
Wood, R. M., Jr. (SM)

Zephyrhills (CF-3)
Oglesby, T. L. (M)

GEORGIA

Albany (ATL-3)
Freund, K. M. (A)
Goudeau, J. P., Jr. (M)
Harris, J. W., Sr. (A)
McClung, W. C. (M)
Orr, J. P. (M)
Schnitker, F. B. (M)

Alpharetta (ATL-3)
Phillips, R. E. (M)

Athens (ATL-3)
Graham, E., Jr. (M)

Atlanta (ATL-3)
Adamson, H. D. (A)
Aderhold, H. J. (M)
Badgett, A. F. (M)
Bailey, R. N. (M)
Bangs, P. C. (M)
Bennett, A. L. (SM)
Berry, J. B., Jr. (M)
Bezaire, W. A. (M)
Bivins, W. P. (M)
Blaine, W. E. (A)
Blakely, C. E. (M)
Bondy, H. A. (M)
Booth, T. S. (M)
Bouffiou, C. L. (M)
Boyd, J. E. (SM)
Bradley, W. H. (M)
Branch, B. S. (M)
Bryant, D. J. (M)
Callaway, W. M., Jr. (A)
Carr, R. T. (A)
Carter, J. V., Jr. (M)
Chastain, J. B. (M)
Chick, E. B. (M)
Clayton, L., Jr. (M)
Cloninger, W. C. (M)
Coker, Q. W. (M)
Corriher, H. A., Jr. (M)
Cozad, J. W. (A)
Craddock, H. C., Jr. (M)
Creel, J. D. (M)
Crenshaw, B. M. (M)
Crowe, W. H. (M)
Dasher, B. J. (F)
Daugherty, C. F. (M)
Davis, J. D. (A)
Dean, H. G., Jr. (M)
Duggan, R. S., Jr. (M)
Ellis, R. L., Jr. (M)
Faris, D. W. (M)
Fattig, W. L. (M)
Fausett, F. (SM)
Fears, C. D. (M)
Fielder, D. C. (SM)
Finn, D. L. (M)
Flynt, E. R. (SM)
Foster, H. O. (M)
Glass, S. N. (M)
Glenn, L. E. (M)
Golsen, C. H. (A)
Groover, R. J., Jr. (M)
Hammond, J. L., Jr. (M)
Hawthorne, G. B., Jr. (M)
Hayes, R. D. (M)
Heskett, J. A. (SM)
Holbrook, R. A. (M)
Hollis, J. S. (M)
Holmes, E. G. (SM)
Hurd, F. K. (M)
Hutchison, P. T. (M)
Jackson, E. B. (M)
Jacobs, C. J. (M)
Jenkins, S. P., Jr. (M)
Jones, C. T. (M)
Jones, W. B., Jr. (SM)
Jordan, J. H., Jr. (A)
King, L. T. (M)
Kleinman, R. L. (M)
Knight, G. A. (M)
Kresge, P. A. (M)
Lenoir, S. P., Jr. (M)
Lesser, N. (M)
Lichtenstein, H. (M)
Lindgren, T. D. (M)
Lindsey, E. B., Jr. (M)
Long, J. T. (M)
Long, M. W. (SM)
Lord, C. R. (M)
McCorvey, A. (M)
McCurley, E. A. (M)
McKinley, H. L. (SM)
Meek, R. E. (M)
Miller, W. B., Jr. (SM)
Minton, R. (M)
Montgomery, B. E. (SM)
Morris, J. S. (M)
Morris, K. G. (M)
Morrissey, D. J. (M)
Mullins, R. M. (M)
Myers, R. E. (M)
Olsson, C. O. (M)
Opie, A. (SM)
Overcash, F. J. (SM)
Paris, D. T. (M)
Parkins, F. A. (M)
Peacock, W. M. (M)
Penney, A. T. (A)
Pidgeon, R. E., Jr. (M)
Prince, M. D. (SM)
Ragsdale, H. W. (SM)
Randall, T. M. (M)
Reid, H. L. (M)
Reynolds, B. G. (A)
Rivers, T. A. (M)
Roberts, A. P. (A)
Robinette, S. L. (M)
Robinson, G. P., Jr. (SM)
Rogers, W. M., Jr. (M)
Smith, G. H., Jr. (M)
Smith, J. B. (A)
Strain, C. E. (M)
Stubbs, J. A., Jr. (A)
Su, K. L. (SM)
Sylvester, R. C. (M)
Teegardin, H. H. (A)
Tooke, R. H. (A)
Turner, C. J., Jr. (M)
Vaughn, C., Jr. (SM)
Wallace, J. M., Jr. (M)
Walsh, J. R., Jr. (M)
Warren, W. B., Jr. (M)
Webb, J. A. (M)
White, T. M., Jr. (M)
White, W. H. (M)
Williamson, F. R., Jr. (M)
Witt, S. N., Jr. (SM)

Augusta (S-CAR-3)
Armstrong, J. H. (M)
Cook, L. H., Jr. (M)
Cooper, L. D., Jr. (M)
Eberl, R. C. (A)
Hudson, C. A. J. (A)
Pignataro, J. A. (M)
Rice, J. S. (M)
Smith, B. M. (M)
Swink, J. E. (A)
Tarpley, M. W. (M)
Walker, J. E. (M)
White, B. F. (A)
Williamson, W. A. (A)

Bainbridge AFB (ATL-3)
Brand, T. E. (M)

Blythe (ATL-3)
Galloway, R. E., Sr. (SM)

Brunswick, (ATL-3)
Smith, J. E. (M)

Carrollton (ATL-3)
Crawford, E. W. (M)

Chamblee (ATL-3)
Carter, R. C. (M)
Duncan, C. L. (SM)

Cochran, (ATL-3)
Roth, F. P. (M)

College Park (ATL-3)
Billings, R. H. (M)

Columbus (ATL-3)
Des Portes, C. (M)
Gamble, J. A. (M)
Gullatt, G. E. (M)
Harmer, J. D. (A)
Hogencamp, H. C. (SM)
Knowles, R. G. (A)

Crawfordville (ATL-3)
Doughty, E. C., Jr. (M)

Cumming (ATL-3)
Borman, A. P. (A)

Dalton (ATL-3)
Andrews, J. S. (A)

Decatur (ATL-3)
Attaway, O. L. (A)
Derry, C. C. (A)
Currie, C. H. (A)
Fry, J. C. (A)
Gregorie, J. A. (A)
Johnson, T. F. (M)
Moore, W. H. (M)
Morgan, T. W., Jr. (M)
Robertson, D. W. (SM)
Seanor, J. C., Jr. (M)
Wilson, J. C. (M)

Doraville, (ATL-3)
Chupp, E. W. (M)
Goodwin, J. P., Jr. (M)
Harvey, J. (A)
Shockley, T. D., Jr. (M)

Dunwoody (ATL-3)
Payne, J. V., Jr. (M)

East Point (ATL-3)
Brewer, R. V. (A)
Hunt, J. N. (M)
Newman, C. L. (A)

Forest Park (ATL-3)
Clayton, J. F., Jr. (M)
Schmidt, H. H. (M)
Walker, P. D. (A)

Fort Benning (ATL-3)
Boatright, B. C. (M)
Clemons, J. K. (M)
Kost, M. (A)

Fort Gordon (S-CAR-3)
Corless, R. L. (M)
Ullman, H. L. (A)
Williams, H. C. (A)

Fort McPherson (ATL-3)
Buchak, K. (SM)
Fort Stewart (ATL-3)
Barton, C. H. (M)
Caffey, T. W. H. (M)

Gainesville (ATL-3)
Butenhoff, R. L. (M)

Griffin (ATL-3)
Blasingame, J. R. (M)

Hapeville (ATL-3)
Almand, A. F. J. (A)

Macon (ATL-3)
Bush, A. M. (M)
Farber, E. (M)
Finison, G. W. (M)
Hildreth, H. J. (A)
Howard, M. G. (M)
Reardon, L. J. (M)

Marietta (ATL-3)
Benson, J. W., Jr. (A)
Carman, H. B., Jr. (M)
Carter, W. E. (M)
Davis, C. C. (M)
Dunphey, H. B., Jr. (M)
Erwin, E. (SM)
Griffin, C. H., Jr. (M)
Haley, D. C. (A)
Hassler, S. S. (A)
Hatmaker, D. B. (M)
Holder, F. P. (SM)
Holliday, F. S. (M)
Levine, R. B. (M)
Mash, J. T., Jr. (A)
McJunkin, W. D. (M)
Mooney, J. A. (M)
Moseley, R. E. (M)
Reed, E. A., Jr. (M)
Stebbins, C. W. (M)
Stitz, H. L. (M)
Van Valkenburg, H. M. (A)
Whitten, M. C. (M)
Wilkinson, L. E. (A)
Wrigley, W. B. (SM)

Milledgeville (ATL-3)
Rosser, B. M. (A)

Monroe (ATL-3)
Stokes, P. B. (M)

North Atlanta (ATL-3)
Gunson, D. O. (M)

Powder Springs (ATL-3)
Luedtke, A. (M)

Reynolds (ATL-3)
Bond, D. E. (M)

Robbins AFB (ATL-3)
Lyle, W. R. (M)
Wingfield, J. D. (M)

Rome (ATL-3)
Jones, A. E. (M)
Starr, R. A. L. (M)

Savannah (S-CAR-3)
Bigbie, E. F. (A)
Chambers, D. T. (A)
Goodman, K. E. (M)
Hanscom, R. L. (M)
Nilsson, W. H., Sr. (M)
Turner, J. I. (A)

Smyrna (ATL-3)
Blanks, B. L. (M)
Brown, W. E. (M)
Gorton, R. M. (M)
Haire, D. E., Jr. (M)
Hartley, W. N., Jr. (M)
Hurst, H. C. (M)
Reagh, W. L. (M)
Speer, T. K. (M)
Spencer, J. M., Jr. (M)
Weingarten, R. (M)

Summerville (ATL-3)
Stowers, J. S. (M)

Thomasville (ATL-3)
Holloran, T. F. (A)
O'Quinn, P. D. (A)
Totman, S. (M)

Tifton (ATL-3)
Dozier, W. A. (M)

Valdosta (ATL-3)
Stillman, G. E. (M)

Warner Robins (ATL-3)
Kahrs, E. R. (M)
Parris, R. D. (A)
Rodenroth, R. D. (M)
Sanchez, C. M. (M)

West Point (ATL-3)
Hogg, J. C., Jr. (M)
Strother, F. P. (M)

HAWAII

Hawaii

Hilo (HAW-7)
Allison, R. E. (SM)

Naalehu (HAW-7)
Okuna, T. M. (A)

Quan, H. L. (M)

Kauai

Eleele (HAW-7)
Angle, E. E. (M)

Kekaha (HAW-7)
Dykes, W. E. (A)
Selvaggio, V. F. (A)

Kilauea (HAW-7)
Motoyama, R. S. (A)

Maui

Kahului (HAW-7)
Katahara, S. (M)

Oahu

Aiea (HAW-7)
Kelly, V. (M)
Nishimura, K. K. (A)
Owskey, R. D. (A)

Ewa (HAW-7)
Comez, A. L. (M)
Kobayashi, H. K. (M)
Lawlis, R. L. (A)

Haleiwa (HAW-7)
Martin, R. G. (A)

Honolulu (HAW-7)
Alden, R. M. (M)
Anderson, J. W. (A)
Asato, M. (A)
Atherton, J. B. (M)
Baker, C. A. (M)
Bekins, D. M. (A)
Bell, R. E. (M)
Britton, J. R. (M)
Brown, D. R. (M)
Bulce, G. S. (M)
Chang, D. C. (M)
Chang, R. H. M. (M)
Ching, R. T. K. (M)
Chun, R. H. C. (M)
Edwards, N. R. (SM)
Dillinger, W. D. (SM)
Ellison, J. L. (A)
Fenner, P. R. (A)
Fuchikami, A. H. (A)
Fujimura, T. M. (A)
Gilroy, R. B. (M)
Goo, J. F. S. (M)
Goo, S. H. (M)
Gott, E. (SM)
Grubb, D. L. (M)
Harger, E. J., Jr. (A)
Harlan, R. A. (M)
Higa, K. (M)
Hosokawa, K. (M)
Hughes, G. R. (M)
Ing, J. C. Y. (M)
Izumi, G. Y. (A)
James, F. L. (A)
Johnson, W. F. (M)
Kam, B. W. (M)
Kam, P. Y. T. (A)
Kang, Y. D. (M)
Kato, R. S. (A)
Kobold, J. W. (A)
Kommel, B. B. (A)
Krulish, R. C. (A)
Kung, L. (A)
Kuyper, D. M. (M)
La Porte, B. E. (M)
Leong, A. L. T. (M)
Lewbel, S. H. (M)
Lindemann, E. G. (A)
Lovelace, D. G. (M)
McLeod, J. S. (M)
McMenamin, S. B. (M)
Mercer, I. G. (M)
Metz, N. J. (M)
Miller, R. W. (A)
Miyake, I. (M)
Morgan, W. R., Jr. (A)
Murray, J. D., Jr. (M)
Nakamura, O. S. (M)
Neifert, K. G. (A)
Odenthal, L. H. (M)
Osumi, S. Y. (M)
Pang, D. L. (M)
Partridge, R. E. (SM)
Picty, G. (M)
Pires, M. D. (A)
Ponsness, R. D. (M)
Roberts, T. H. (A)
Sanders, J. R. (A)
Schultz, J. E. (A)
Shak, H. K. Y. (A)
Shibata, A. M. (A)
Shigetomi, S. S. (A)
Short, R. C. (M)
Stagner, G. H. (M)
Suzuki, C. K. (A)
Swain, H. L. (M)
Takase, R. H. (M)
Tamura, L. T. (A)
Vaughan, V. (M)
Warren, H. E. (M)
Waterman, R. D. (A)
Weiss, J. D. (M)
Woerz, M. W. (A)
Yasaka, E. K. (A)
Yoshimori, H. E. (M)
Young, M. F. (M)
Yuen, C. M. F. (M)

Kailua (HAW-7)
Brenessel, A. (M)
Clark, G. W. (SM)
Dashiell, D. H. (M)
Jones, R. C., Jr. (M)
Lane, H. (A)
Meyer, E. E. (M)
Michell, A., Jr. (M)
Rotolo, N. V. (M)
Sickle, G. V., Jr. (A)
Springel, M. (M)
Vitum, M. S. (SM)

Kaneohe (HAW-7)
Andrews, F. D. (A)
Lee, R. T. S. (A)
Schoen, E. C. (A)
Tanigawa, N. F. (M)
Turner, H. E. (M)

Pearl City (HAW-7)
Hiser, E. F., Jr. (M)
Maertz, W. A. (M)

Pearl Harbor (HAW-7)
Mason, F. L. (SM)

Wahiawa (HAW-7)
Hahn, G. K. P. (A)
Janda, E. G. (A)
Lachman, D. (M)
Yang, T. N. H. (A)

Waianae (HAW-7)
Florez, H. (SM)
Hoag, D. S. (M)
Hooper, W. O. (A)

IDAHO

Arco (SLC-7)
Pope, B. K. (M)

Boise (SLC-7)
Barry, R. W. (M)
Beadles, R. V. (M)
Betebenner, G. W. (M)
Oberbillig, D. D. (M)
Roberts, V. (A)
Ryman, J. L. (M)
Sterling, A. J. (M)

Idaho Falls (SLC-7)
Anderson, S. D. (M)
Brockett, G. F. (M)
Criddle, C. B. (M)
Faller, J. H. (M)
Hyndman, R. W., Jr. (M)
Kendron, J. H. (M)
Mangold, J. F. (M)
McCollom, K. A. (M)
Melchle, F. A. (M)
Purcell, R. B. (M)
Sheridan, W. R. (M)
Thompson, J. B. (A)

Lewiston (SEA-7)
Neumann, W. E. (M)
Olin, R. W. (M)

Malad (SLC-7)
Jones, H. P. (M)

Moscow (SEA-7)
Beattie, L. A. (M)
Hustead, L. D. (M)
McKean, G. A. (M)

Pocatello (SLC-7)
Cox, J. W. (M)
Wilson, T. J. (A)

Rockford Bay (SEA-7)
Webb, H. J. (M)

Twin Falls (SLC-7)
Foss, M. L. (M)
Oberbillig, D. D., Jr. (A)
Robinson, F. A., Jr. (A)

Weiser (SLC-7)
Miller, E. C. (M)

ILLINOIS

Addison (CHI-5)
Battin, J. W. (M)
Krause, E. H. (M)
Lindsay, W. R. (M)
Roberts, E. L. (M)

Algonquin (CHI-5)
Peterson, W. G. (SM)

Alton (SL-6)
Alexander, W. (M)
Day, R. T., Jr. (M)
Grant, M. G. (A)
Schwandt, W. (A)
Ullrich, D. P. (A)

Antioch (CHI-5)
Balsamello, J. (A)
Pechousek, T. W. (A)

Argonne (CHI-5)
Abd-El-Aziz, M. E. (M)
Brill, T. (SM)
Frigerio, N. A. (A)

Arlington Heights (CHI-5)
Babcock, L. V. (M)
Bez, R. O. (M)
Carmody, L. M. (M)
Coblenz, A. (SM)



Dickerson, T. J. (A)
Gerlach, A. A. (SM)
Hampel, W. J. (M)
Hanft, K. E. (M)
Kahanic, F. P. (M)
Koeritz, K. W. (M)
Kopp, C. J. (M)
McCarty, J. M. (A)
Melvin, D. K. (M)
Mueller, A. A. (M)
Patterson, W. S. (M)
Raef, A. J. (A)
Remley, H. L. (M)
Revor, R. J. (M)
Schroeder, K. W. (A)
Stout, E. R. (M)
Wegwert, J. (M)
Weirich, E. M. (SM)
Weltin, O. K. (SM)
Wray, P. G. (M)

Atlanta (CHI-5)
Speciale, J. S. (A)

Aurora (CHI-5)
Cruz, R. (M)
Du Fau, W. R. (M)
Golz, H. C. (A)
Gramley, W. D. (M)
Lamb, C. (M)
Schultz, R. J. (M)
Ziegler, A. A. (A)

Barrington (CHI-5)
Adler, W. A. (A)
Aram, N. W. (M)
Geltzer, J. R. (M)
Krumhardt, C. (A)
Landeck, J. H. (M)
McNabb, L. A. (SM)
Nearing, F. G. (M)
Ryan, R. J. (SM)
Stroh, W. J. (SM)

Bartlett (CHI-5)
Irelan, H. F. (M)
Tappan, P. W. (M)

Batavia (CHI-5)
Livingston, E. V. (M)
Siekman, W. J., Jr. (A)

Beardstown (CHI-5)
Davidson, A. P. (M)

Belleville (SL-6)
Burton, F. E. (A)
Demel, W. J. (A)
Friedrich, W. J. (M)
Klingler, R. R. (M)
Kunkel, W. E. (A)
Mercer, W. T. (A)
Mueller, T. E. (M)
Nance, M. E. (A)
Nance, W. F. (M)
Nevenner, R. J. (A)
Pfister, R. C. (M)
Reiniger, R. A. (A)
Scharringhausen, R. L. (M)
Stewart, J. H. (A)
Swantz, F. W. (SM)
Vasile, J. A. (M)
Warren, J. H. (A)

Bellwood (CHI-5)
Baltezore, R. C. (M)
Bergstrom, C. R. (A)
Castor, R. W. (M)
Chilpala, E. J. (A)
Lafferty, V. C. (M)
Marik, E. (A)
Malzahn, H. W. (M)
Sellen, D. E. (M)
Thompson, J. P. (A)
Walker, D. B., Jr. (M)
Weishar, W. J. (M)

Benld (CHI-5)
Bertorello, T. A. (M)

Bensenville (CHI-5)
Atwood, A. G. (M)
Bernstein, J. M. (M)
Druz, W. S. (SM)
Goedjen, R. W. (A)
Hilton, F. L. (SM)
Houghton, M. E. (A)
Hynes, E. A. (SM)
Martin, B. F. (A)
Ozarka, R. J. (A)
Sager, R. L. (A)
Saudinaitis, E. (A)
Sullivan, E. F. (M)
Swanson, C. W. (A)
Uhl, M. H. (M)
Whiting, R. F. (SM)

Berkeley (CHI-5)
Bratschun, R. C. (M)
Drobish, R. W. (A)
Eckmann, L. G. (M)

Berwyn (CHI-5)
Biss, M. W. (A)
Cermak, C. W. (M)
Fanta, F. A., Jr. (M)
Froberg, W. E. (M)
Glozer, A., Jr. (A)
Hughes, E. C. (M)
Jarrette, V. (SM)
Knop, C. M. (M)
Kovar, G. F. (M)
Kratochvil, R. A. (A)
Maginot, J. J. (M)
Mrazek, W. F. (M)
Overzet, J. K. (M)
Prentiss, J. G. (SM)
Russ, W. E. (M)
Schuetz, C. R. (A)
Sindelar, C. J. (M)
Skulsal, L. E. (A)
Sladek, N. J. (M)
Sumoski, A. W. (SM)

Bloomingdale (CHI-5)
Knechtel, R. E. (M)

Bloomington (CHI-5)
Moulic, W. E., Jr. (M)
Schweikert, W. R. (M)
Willett, J. C. (M)

Blue Island (CHI-5)
Damm, G. J. (A)
Engelland, G. C. (A)
Lamcha, F. J. (A)
Lawler, J. A. (M)
Quade, A. G., Jr. (M)

Broadview (CHI-5)
Becker, R. C. (M)
De Both, R. F. (M)
Gaag, W. J. (M)
Gray, R. O. (SM)
Rous, W. H. (A)
Soria, R. M. (F)
Van Cura, E. J., Jr. (A)
Wood, R. D. (M)

Brookfield (CHI-5)
Holouch, D. J. (M)
Lesko, L. W. (A)
Miller, J. O. (A)
Rutzler, H. E. (M)
Stephens, R. L. (A)
Vitous, J. P. (M)
Vuchetich, J. B. (A)

Calumet City (CHI-5)
Mahala, J. A. (M)
Oprisko, A. F. (A)

Carbondale (SL-6)
Harbison, J. L. (M)

Carpentersville (CHI-5)
McCay, J. T. (A)
McGann, W. E. (M)
Ross, K. B. (M)
Spiro, S. J. (M)

Cary (CHI-5)
Fuglestad, K. R. (M)

Champaign (CHI-5)
Albright, W. G. (SM)
Babcock, M. L. (M)
Bliss, R. W. (M)
Buenger, G. L. (M)
Calahan, D. A. (M)
Coleman, P. D. (M)
Cummins, R. L. (M)
Divilbiss, J. L. (M)
Ernst, E. W. (SM)
Fuller, R. S. (M)
Grosvenor, H. D. (M)
Hannah, C. B. (M)
Hardy, R. M. (M)
Harlan, J. R. (M)
Harpley, T. R. (M)
Hotchkiss, S. E. (M)
Huber, E. A. (M)
Kabrisky, M. J. (M)
Kaufman, B. R. (M)
Kirkwood, B. D. (M)
Leichner, G. H. (M)
Liu, R. W. (M)
Lo, Y. T. (M)
Mayes, P. E. (M)
Melman, M. (M)
Myers, R. L. (M)
Neal, J. P., III (M)
Nelson, G. L. (M)
Novick, R. (M)
Patton, W. T. (M)
Peterson, J. W. (M)
Reichelt, R. C. (M)
Skaperdas, D. O. (M)
Smith, R. S. (M)
Thompson, F. E. (M)
Wainscott, J. M. (M)
Whitson, R. M. (M)

Chicago (CHI-5)
Abegg, G. R. (A)
Addison, W. G. (M)
Adducci, A. J. (A)
Adler, R. (F)
Ahring, F. E. (A)
Aichhofzer, R. A. (M)
Aito, I. (M)
Akimoto, W. M. (M)
Akiinski, M. J. (A)
Albert, A. D. (M)
Alessio, S. A. (A)
Allibone, F. L. (M)
Alspaugh, K. E. (A)
Ambos, C. (M)
Anagnost, A. L. (A)
Anagnost, J. T. (SM)
Anderson, D. L. (M)
Anderson, R. C. (M)
Anderson, R. S. (A)
Anderson, R. H. (M)
Anderson, T. W., Jr. (M)
Anton, A. J. (A)
Apfelbaum, J. G. (M)
Arendt, J. R., Jr. (A)
Argall, G. J. (M)
Arny, T. W. (M)
Arndt, R. J. (M)
Arnow, C. L. (M)
Aronson, H. A. (M)
Arseneau, R. E. (M)
Ashenhurst, R. L. (M)
Attard, A. E. (M)
Avizienis, A. A. (M)
Balikov, M. H. (M)
Banach, F. G. (M)
Bass, S. (M)
Bates, W. J. (M)
Bauer, A. S. (M)
Beck, R. R. (M)
Becker, H. W. (M)
Becker, W. R. (M)
Beebe, C. W. (M)
Beier, L. W. (M)
Bell, I. I. (M)
Bell, K. R. (M)
Berg, A. A. (M)
Bergen, H. A. (M)
Berger, J. (SM)
Bernard, B. (A)
Bernat, L. (M)
Bialek, S. T. (M)
Biberman, L. M. (SM)
Bleszczad, E. S. (M)
Billie, R. L. (A)
Bird, E. H. (A)
Blahna, C. (SM)
Blinoff, W., Jr. (A)
Bilvice, S. L. (M)
Blomberg, R. C. (A)
Bloomenthal, S. (SM)
Bloomquist, L. A. (M)
Bluzat, C. R. (A)
Bodoh, A. G. (SM)
Borkovitz, H. S. (M)
Borovik, D. I. (M)
Bory, R. A. (M)
Bowen, J. L. (M)
Boyd, G. M. (M)
Boyill, L. O. (A)
Bracha, M. F. (M)
Branigan, J. T. (A)
Branscome, E. O. (A)
Brietze, F. (M)
Bristol, S. M. (M)
Brock, W. R. (M)
Brown, J. S. (SM)
Brown, L. E. (M)
Brugliera, V. G. (M)
Bubian, J. E. (M)
Buchholz, F. G. (M)
Burgwald, G. M. (M)
Burmeister, M. A. (M)
Buschke, H. A. (M)
Camillo, C. (SM)
Canell, G. P. (A)
Cappels, J. L. (SM)
Carlson, G. I. (M)
Carter, R. (A)
Casey, E. A. (A)
Cassettari, F. (M)
Ceretta, B. J. (A)
Chalmers, E. D. (M)
Chandler, J. F. (SM)
Chapman, R. H. (M)
Cherskov, J. S. (A)
Chittenden, G. W. (M)
Chiu, P. (M)
Chodash, E. M. (M)
Choncholas, J. J. (M)
Christensen, R. T. (M)
Churlin, E. (A)
Cinelli, G., Jr. (M)
Claras, C. W. (M)
Clardy, L. (M)
Clark, F. J., Jr. (M)
Clark, R. A., Jr. (M)
Cleary, M. P. (M)
Cleveland, V. K. (A)
Cody, R. W. (A)
Coglianese, C. J. (A)
Cohen, L. M. (M)
Cohen, T. A. (SM)
Cohn, C. M. (A)
Cohn, G. I. (SM)
Cohn, S. I. (SM)
Colbert, J. R. (M)
Colby, R. J. (A)
Cole, W. J. (M)
Cololan, J. (A)
Contos, P. G. (M)
Contri, A. (A)
Cook, R. H. (M)
Cooley, G. A., Jr. (A)
Cooper, H. K. (A)
Copeland, P. L. (M)
Cord, J. H. (M)
Correia, F., Jr. (M)
Coulter, W. H. (M)
Cox, C. R. (SM)
Cramer, G. T., Jr. (M)
Crampton, G. W. (M)
Crites, A. B. (A)
Crossley, R. C. (M)
Crumly, C. B. (SM)
Cunliffe, P. R., Jr. (M)
Dahlin, E. K. (M)
Dalling, J. L. (M)
Dalletos, S. A. (A)
Dalton, R. C. (M)
Daniels, H. B. (A)
Davidson, P. (A)
Davis, J. R. (M)
Dean, N. J. (SM)
Decho, K. R. (M)
De Cicco, J. (M)
De Haan, J. (A)
Deptuch, K. J. (A)
Desmares, P. C. J. (M)
Dezettel, L. M. (A)
Diederichs, J. K. (A)
Dirsa, E. F. (M)
Djordjevic, M. Z. (M)
Doland, G. D. (M)
Draus, A. R. (M)
Drozt, P. (A)
Du May, E. C. (A)
Duncan, C. W. (M)
Duncan, L. J. (A)
Dupuis, J. J. (M)
Ebstein, B. (M)
Edwards, G. I. (A)
Egan, A. (M)
Eldem, R. H. (A)
Eisenberg, H. (M)
Elam, J. G. (M)
Ellett, A. (SM)
Ellis, C. O. (M)
Ellison, R. M. (M)
Elsner, R. F. (M)
Eltgroth, M. J. (SM)
Eness, O. M. (M)
Engel, J. E. (M)
Engelbrecht, L. R. (M)
Epstein, M. (M)
Eul, E. A., Jr. (M)
Even, J. C., Jr. (M)
Fabsits, E. J., Jr. (A)
Fain, D. L. (A)
Fallucco, C. V. (A)
Feldman, J. R. (M)
Ferris, W. T. (M)
Fetterman, D. M. (M)
Fields, T. (SM)
Figel, W. G. (M)
Fillo, M. (A)
Fillos, R. P. (A)
Finlay, G. E. (A)
Fischer, A. J. (A)
Fix, W. G. (M)
Flannery, E. J. (M)
Flesher, G. T. (M)
Flocken, L. H. (SM)
Fluskey, C. J. (M)
Foecking, D. A. (M)
Foley, R. R. (M)
Fonte, G. (M)
Foss, H. (A)
Foster, G. E. (M)
Fotiadi, N. T. (A)
Frank, D. H. (M)
Franklin, C. W. (M)
Franklin, W. S. (SM)
Freeman, R. L. (SM)
Friedman, I. B. (M)
Fryberger, D. (M)
Frye, J. W. (A)
Fujimoto, J. J. (A)
Gallagher, F. H. (A)
Gallupol, A. J. (M)
Gamache, L. J. (SM)
Gardberg, J. (M)
Garner, D. L. (A)
Gassner, F. (A)
Gawel, E. W. (A)
Gayes, F. J. (M)
Genovese, A. N. (A)
Gens, H. J. (M)
Gentry, K. B., Jr. (M)
Gerber, H. L. (M)
Germain, J. (SM)
Gershon, J. J. (SM)
Gerson, I. V. (M)
Giacchetti, A. D. (M)
Gillette, R. F. (M)
Gjertsen, E. J. (A)
Glentzer, K. V. (SM)
Goldberger, H. (A)
Goldman, H. J. (A)
Goldstein, M. (M)
Goldsworthy, W. T. (A)
Goncharoff, N. (M)
Gordon, E. S. (SM)
Gore, E. M. (M)
Gottfried, P. (SM)
Gray, D. (M)
Graybeal, W. E. (A)
Greenebaum, E. N., Jr. (A)
Greenspan, P. (SM)
Greenstein, L. J. (M)
Greenstein, M. (A)
Grimme, H. J. (M)
Groll, R. A. (A)
Gross, J. F. (A)
Grosse, K. E. (A)
Grossman, W. S. (A)
Gudmundson, R. R. (A)
Guzzey, J. E. (M)
Haaland, C. M. (M)
Haas, Z. A. (A)
Hagey, W. C. (SM)
Halinton, H. (M)
Halligan, W. J. (M)
Halverson, S. L. (SM)
Hamilton, S. (A)
Hammond, W. H., Jr. (A)
Hamre, H. G. (M)
Hanan, J. P. (A)
Hanik, P. (M)
Hankin, R. B. (A)
Hansen, L. H. (M)
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Hansen, T. A. (SM)
Hansen, W. H. (M)
Hardy, H. C. (F)
Harigan, G. S. (SM)
Harris, E. F. (M)
Haslett, J. W. (M)
Hassler, E. B. (SM)
Hay, E. (A)
Hayes, H. D. (SM)
Heemans, C. J. (M)
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Henning, F. B., Jr. (A)
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Himmelstein, S. (M)
Hiralwa, D. S. (A)
Hjermstad, H. (M)
Hodge, B. (M)
Hoffman, H. E. (M)
Holaday, D. A. (M)
Holbach, R. R. (M)
Holpuch, C. J. (M)
Holubow, H. (M)
Horn, L. H. (SM)
House, B. T. (M)
Howe, J. K. (M)
Hughes, H. K. (M)
Hull, H. L. (SM)
Hunt, G. J. (M)
Hupert, J. J. (SM)
Hutson, D. E. (M)
Imerson, H. E. (A)
Indra, J. J. (A)
Ingram, C. (A)
Insel, C. H. (M)
Iwaoka, I. S. (M)
Jacob, F. N. (SM)
Jacobi, G. T. (SM)
Jacobsen, I. (A)
Jacobsohn, D. H. (M)
Jacobson, L. (M)
Janowiak, R. M. (M)
Jantsch, R. W. (M)
Jauniskis, K. P. (M)
Jenkinson, G. H. (M)
Jensen, K. A. (A)
Jeschke, D. R. (M)
Johnsen, N. B. (M)
Johnson, G. A. (M)
Johnstone, W. E. (M)
Jones, T. L. (M)
Jonic, B. B. (M)
Joy, W. F. (M)
Juchnevicius, V. H. (M)
Jung, F. T. (A)
Jurewicz, R. E. (M)
Kagan, J. P. (A)
Kahn, B. (A)
Kahn, L. (M)
Kale, G. W. (A)
Kamm, D. A. (M)
Kanellakos, D. M. (M)
Kantner, H. H. (M)
Kapoun, R. (M)
Karklys, J. (M)
Karpinski, E. W. (A)
Kazel, S. (A)
Keefe, J. T. (M)
Keller, W. P. (A)
Kelly, E. P., Jr. (M)
Kelsey, L. C. (A)
Kelso, A. F. (A)
Kennedy, J. P. (SM)
Kennedy, J. A. (M)
Kenney, M. W. (SM)
Kerney, W. E. (A)
Kiefer, J. C. (SM)
Kietzer, J. E. (M)
Kiheri, A. (M)
Kilburn, A. B. (M)
Kimbell, R. G. (M)
Kinder, W. J. (M)
Kingwill, H. S., Jr. (A)
Kirchner, L. P. (A)
Klees, W. B. (M)
Klein, M. (A)
Kloga, P. J. (M)
Klyce, B. H. (SM)
Knackstedt, G. (M)
Knuth, G. E. (A)
Koda, A. J. (A)
Koerner, F. A. (SM)
Kohn, E. B. (M)
Kohn, M. I. (A)
Kolbe, R. J. (A)
Kolberg, E. G. (M)
Kott, W. O. (SM)
Kotter, A. S. (A)
Kowitz, A. E. (SM)
Kowols, G. J. (A)
Kozlik, J. F. (M)
Kraitsik, N. I. (M)
Krakora, J. J., Jr. (SM)
Kre, P. S. (M)
Krefft, H. H. (M)
Kroll, J. B. (M)
Krstenansky, J. S. (A)
Krueger, R. M. (SM)
Krueger, W. F. (M)
Kruse, H. J. (A)
Kuhr, K. F. (A)
Kuhse, B. G. (M)
Kulosa, A., Jr. (A)
Kurinsky, J. S. (M)
Kurland, J. J. (A)
Kusner, W. J. (M)
Kvitek, G. L. (A)
Lagoes, P. N., Jr. (M)
Lange, J. R. (M)
Langstaff, R. H. (M)
Larney, J. L. (M)
Larson, R. J. (M)
Leahy, P. J. (M)
Leatherman, J. E. (A)

Lee, D. K. K. (M)
Lee, W. (A)
Leedy, H. A. (SM)
Lees, G. R. (C)
Lenci oni, C. C., Jr. (M)
Leitich, A. J. (M)
Leong, S. L. (M)
Leong, S. P. (M)
Leonhardi, J. O. (M)
Lesnick, R. N. (SM)
Leu, T. W. (M)
Levine, J. M. (A)
Lewin, N. L. (M)
Lewis, W. A. (SM)
Liberman, A. (SM)
Lieberman, M. D. (M)
Liepold, R. B. (M)
Linell, C. S. (A)
Liska, R. W. (M)
Liu, Y. (A)
Lizak, N. E. (A)
Loos, R. J. (M)
Lotsoff, S. N. (M)
Loverde, L. V. (M)
Loule, L. M. (M)
Lund, V. M. (M)
Luttgens, H. C. (SM)
Malone, P. P. (M)
Manos, G. P. (M)
Mansfield, R. (M)
Margaia, A. J. (M)
Marinakos, L. C. (M)
Marquedant, R. J. (M)
Marsland, H. W. (A)
Marszalek, H. L. (A)
Martin, C. B. (SM)
Martin, W. S. (M)
Martini, R. G. (M)
Marx, A. C. (M)
Masters, E. W. (SM)
Mateja, E. V. (A)
Matthews, L. E. (M)
Matzek, L. T. (SM)
May, R. L. (A)
McCall, T. C. (A)
McCarrell, S. G. (M)
McClelland, W. B. (M)
McDonald, D. C. (SM)
McDonnell, J. P. (A)
McDougall, D. S. (M)
McManus, J. E. (M)
McNamee, H. J. (M)
McNorton, S. L. (A)
Meehan, E. L. (A)
Meixner, E. J. (M)
Mercker, A. J. (M)
Merrill, H. S., Jr. (M)
Messinger, H. P. (M)
Meyers, F. (A)
Mikos, E. J. (M)
Miller, B. J. (SM)
Miller, C. G. (M)
Miller, C. H. (M)
Miller, E. L. (M)
Miller, M. (M)
Mills, G. G. (M)
Miska, J. K. (M)
Mitchell, F. R. (M)
Mitchell, J. F. (SM)
Mitchell, L. W. (M)
Mittelmann, E. (F)
Miyasaki, J. K. (A)
Molyneaux, R. J. (A)
Moon, R. J. (SM)
Montemayor, J. U. (M)
Moran, J. P. (A)
Morgan, G. M. (M)
Morganstern, A. L. (M)
Morris, L. P. (M)
Morrison, R. E. (M)
Mosak, J. L. (M)
Moynihan, J. F. (M)
Mueller, E. L. (M)
Mueller, F. L. (M)
Musal, H. M. (M)
Nail, J. J. (SM)
Nasereddin, T. S. (M)
Natkevicius, F. (M)
Neben, H. M. (SM)
Nelson, R. A. (A)
Nerwin, H. H., Jr. (M)
Ness, W. H. (M)
Newman, J. E. (M)
Nickel, D. F. (M)
Niederman, B. (SM)
Nieman, L. G. (M)
Niklas, W. F. (M)
Niman, G. J. (M)
Noskowicz, T. S. (M)
Novak, J. F. (M)
Novak, P. D. (M)
Obog, L. F. (M)
O'Brien, E. (M)
O'Connor, J. F. (A)
O'Connor, M. J. (M)
Oeste, R. A. (M)
Ohn, T. (M)
Oldfield, R. L. (A)
Olshan, S. (M)
Olson, G. A. (M)
O'Neill, R. M. (M)
Ono, G. A. (M)
O'Regan, M. E. (M)
Orr, B. B. (A)
Orvedahl, W. (M)
Ose, R. C. (A)
Ostrand, K. T. (A)
Oulmet, F. A. (M)
Overlie, P. T. (M)
Palm, H. A., Jr. (M)
Pantcall, N. (M)
Pankos, J. F. (A)
Pantaleone, W. N. (M)
Pape, L. W. (A)
Parchim, N. J. (M)
Park, G., Jr. (M)
Parkinson, J. A. (M)
Pawlus, J. (M)
Peach, L. C. (A)
Pearce, G. R. (M)
Pearl, B. (SM)
Pedersen, R. V. (M)
Peisker, R. F. (M)
Penman, S. (M)
Peterson, C. D. (M)
Peterson, J. W. (M)
Peterson, R. W. (M)
Peth, R. (M)
Pfaff, E. R. (SM)
Pfister, R. A. (M)
Phinney, T. W. (A)
Pinkowski, D. S. (M)
Pinnell, R. M. (A)
Pipes, C. P. (A)
Pimat, F. J. (M)
Plame, S., Jr. (SM)
Plice, G. W. (M)
Poczwardowski, S. J. (M)
Podlusky, M. V. (SM)
Pohl, R. G. (SM)
Popp, J. V. (M)
Posen, L. M. (M)
Powell, C. S. (M)
Powell, J. M. (M)
Prince, R. T. (M)
Pryst, T. S. (SM)
Pshaenich, A. L. (M)
Puldak, H. (M)
Quateman, M. H. (SM)
Quinn, J. (A)
Race, R. T. (A)
Radtke, J. F. (A)
Rafaels, U. (M)
Ramirez, L. (A)
Rapshys, W. (M)
Rasins, W. L. (A)
Rath, G. J. (A)
Ratliff, C. D., Jr. (A)
Ratzray, A. I. (M)
Rausch, W. D. (M)
Reichart, E. C. (M)
Reiling, G. E. (M)
Rekowski, M. J. (A)
Rennick, J. L. (SM)
Reszka, A. (M)
Rett, H. C. (M)
Ribner, M. (M)
Rice, P. (A)
Riddel, O. A. (M)
Rieger, W. H. (M)
Rini, J. S. (M)
Risby, F. A. (M)
Robins, H. M. (A)
Robinson, D. E. (A)
Rodriguez, A. E. (M)
Rogers, A. A. (M)
Ronning, H. (A)
Roschke, E. M. (SM)
Rose, G. C. (M)
Rose, L. L. (A)
Rosencranz, R. (M)
Ross, E. H. (SM)
Rosser, T. N. (SM)
Rossi, C. V. (M)
Rossi, J. B. (A)
Roszkowski, G. J. (A)
Rotter, A. (M)
Rounsaville, G. D. (M)
Rowe, T. L. (SM)
Roy, M. R. (A)
Ruby, E. S., Jr. (M)
Rupp, H. R. (M)
Rusnak, M. (M)
Russell, B. J. (M)
Ryan, L. J. (SM)
Ryan, M. J. (A)
Rychtytzkyj, G. G. (A)
Rymas, S. J. (A)
Sabel, C. L. (A)
Saffro, Y. L. (M)
Sakamoto, M. (M)
Saltzberg, T. (M)
Samock, C. J. (M)
Sances, A., Jr. (A)
Sandgren, G. E. (SM)
Saunders, H. O., Jr. (M)
Scarpelli, N. F. (M)
Scherer, P. J. (A)
Schleicher, G. P. (SM)
Schlesinger, W. A. (M)
Schlueter, A. W. (SM)
Schmidt, W. E. (M)
Schranz, R. J. (M)
Schrot, B. H. (SM)
Schuck, R. P. (M)
Schultz, P. D. (M)
Schultz, R. (A)
Schur, R. C. (M)
Schurak, K. M. (M)
Schwartz, B. S. (A)
Schwartz, J. (M)
Schwartz, S. L. (M)
Sciaky, A. M. (M)
Sciuba, J. L. (M)
Seehuser, J. E. (M)
Semmer, J. W. (M)
Shallcross, G. P. (M)
Shapira, F. M. (M)
Shaver, J. M., Jr. (M)
Shonerock, R. C. (M)
Shulman, A. (M)
Shutock, J. (A)
Sienkiewicz, S. V. (M)
Siff, A. W. (A)
Silbern, S. (M)
Sinclair, D. C. (A)
Sivin, L. (A)
Skowron, A. J. (A)
Sloan, A. C. (A)
Slupoizki, L. K. (M)
Slusser, W. S. (A)
Smith, E. E. (A)
Smith, H. E. (M)
Smith, S. B. (SM)
Smits, W. J. (M)
Smoots, C. W., Jr. (M)
Snick, J. A. (M)
Solomon, J. L. (SM)
Solomon, S. S. (M)
Sona, R. (M)
Sonkin, A. (A)
Sorsen, S. L. (A)
Soufal, F. H. (A)
Spano, A. (A)
Spaulding, R. W. (A)
Spisak, G. C. (M)
Splitt, F. G., Jr. (SM)
Stanula, W. F. (A)
Staral, R. (A)
Steinberg, E. E. (A)
Stemm, R. E. (M)
Stengel, C. W. (A)
Stern, M. (M)
Stettler, C. O. (M)
Stolcers, K. (A)
Stone, C. H. (SM)
Stonevic, V. R. (M)
Suson, I. (M)
Sussman, M. (A)
Suzuki, E. (A)
Suzuki, T. (M)
Swan, L. L. (A)
Swanson, W. G. (A)
Swinyard, W. O. (F)
Switzenberg, E. A, F. (M)
Sydejko, J. F. (A)
Szegho, C. S. (F)
Tado, S. T. (A)
Tanner, D. J. (A)
Teder, H. (M)
Tegmeyer, J. R. (A)
Tellefsen, H. E. (A)
Thomas, G. E. (M)
Thompson, J. E. (M)
Thompson, O. I. (SM)
Timmings, G. H. (SM)
Tlapa, J. A. (M)
Todd, S. R. (SM)
Tong, F. F. (M)
Toy, T. G. (A)
Treasure, E. J., Jr. (M)
Trittenbach, J. M. (SM)
Troller, T. F. (M)
Tucker, J. S. (A)
Tutle, E. G. (A)
Uelsmann, W. G. (M)
Ulaszek, J. J., Jr. (A)
Unger, E. E. (M)
Uyeda, M. M. (M)
Vaccaro, A. C. (M)
Valcik, L. (A)
Vance, G. (A)
Van Zeeland, W. A. (M)
Verbanec, W. R. (M)
Virva, J. J. (M)
Viskanta, V. Z. (M)
Vitt, R. J. (A)
Volpe, R. C. (M)
Vome, A. H. (M)
Vrzan, S. J. (A)
Wade, R. A. (M)
Wakabayashi, G. J. (M)
Wallin, C. (M)
Warczynski, R. G. (M)
Warren, C. S. (M)
Waska, W. E. (M)
Watkins, D. M. (A)
Webb, E. M. (A)
Weber, L. J. (SM)
Weberg, K. H. (M)
Wegener, J. S. (A)
Weinberg, H. J. (A)
Weisberg, A. M. (A)
Weise, D. (M)
Weisenburger, F. M. (M)
Weiss, P. A. (M)
Weissman, R. M. (SM)
Wendell, D. F. (M)
Wendt, J. A. (M)
Wessling, R. (M)
Westerlund, C. T. (M)
Western, C. (A)
Wexler, J. S. (M)
Weygandt, P. A. (M)
Weyrich, R. N. (M)
Whinna, E. W. (A)
Whitaker, W. A. (M)
White, L. E. (A)
White, R. J. (M)
White, R. L. (M)
Whitmer, M. H. (M)
Whitmore, R. C. (A)
Whitney, S. D. (A)
Wickline, B. D. (M)
Widoplets, W., Jr. (M)
Wiecherling, U. F. (A)
Wiedro, S. B. (A)
Wigglntun, R. J. (A)
Williams, J. J. (M)
Williams, R. P. (M)
Wilson, D. L. (M)
Winchell, W. L. (M)
Winter, G. L. (M)
Winters, H. M. (M)
Wisnowski, W. C. (M)
Wlassow, S. (M)
Wolken, I. L. (M)
Wollack, N. J. (M)
Wood, C. E. (M)
Woods, A. A. (M)
Woronowicz, E. M. (M)
Wrzepski, J. E. (M)
Wu, H. H. (M)
Yello, J. F. (M)
Yuen, P. C. (M)
Zalda, W. L. (A)
Zalter, R. (A)
Zaremba, R. E. (M)
Zilgalvis, A. (M)
Zimmerman, D. A. (A)
Zitkus, A. J. (A)
Zucker, H. (M)
Zuehls, E. J. (A)

Chicago Heights (CHI-5)
Vellender, G. C. (M)
Warner, D. L. (A)

Cicero (CHI-5)
Atkinson, J. E. (M)
Bielsik, F. J. (M)
Borowski, R. E. (A)
Brander, R. (M)
Cech, E. J. (M)
Dubauskas, S. (M)
Gritton, R. D. (A)
Herling, D. L. (M)
Jezek, J. E. (M)
Jucius, S. W. (M)
Padgett, W. J. (M)
Pochay, M. V. (A)
Slad, G. F. (A)
Stecca, A. J. (SM)
Swoboda, C. A. (A)
Tsimbidis, J. J. (M)
Vlach, G. (A)
Wein, F. (A)

Clarendon Hills (CHI-5)
Casey, P. J. (A)
Dawson, J. W. (M)
Dowding, F. G. (M)
Hargis, R. N. (M)
Klaperich, A. J. (M)
Knox, J. G. (M)
Marks, M. (SM)
Sayles, H. L. (A)
Valihora, S. M. (A)

Coal City (CHI-5)
Dix, F. W. (A)

Collinsville (SL-6)
Austin, L. S. (M)
Nochta, R. G. (M)
Roschke, T. H., Jr. (M)
Sobotka, H. J. (A)
Weber, J. E. (M)

Crystal Lake (CHI-5)
Falk, B. (A)
Hawkins, B. C. (M)
Smith, G. B. (A)
Wells, J. G. (M)

Danville (CHI-5)
Booth, R. C. (M)
Thiede, P. W. (M)
White, W. J. (A)

Decatur (CHI-5)
Abfalter, H. F. (SM)
Cupp, E. W. (M)
Dikinis, D. V. (M)
Hays, S. E. (M)
Koenig, H. G. (A)
Sarikas, R. H. (M)
Williams, D. A. (M)

Deerfield (CHI-5)
Barrett, A. M., Jr. (M)
Ehlers, M. W. (A)
Gertz, N. M. (A)
Haas, W. F. (A)
Le Brun, D. E. (SM)
Mirkin, M. (M)
O'Neal, C. D. (M)
Petzing, E. W. (M)
Phillips, W. E. (M)
Schlote, R. H. (M)

De Kalb (CHI-5)
Andersen, C. W. (SM)
Ritland, R. G. (M)
Tsao, P. Y. S. (M)

Des Plaines (CHI-5)
Adams, E. C. (M)
Allen, P. G. (M)
Beeson, W. E. (A)
Bendell, C. B. (M)
Boyd, D. M., Jr. (SM)
Bushman, S. F. (M)
Carr, R. W. (A)
Carver, R. L. (M)
Collins, F. V. (SM)
Dahlem, R. K. (A)
Doetling, J. H., Jr. (A)
Flege, E. E. (M)
Gifford, G. D. (A)
Githens, T. A. (SM)
Godawski, T. J. (A)
Hanen, R. K. (M)
Henrich, C. A. (A)
Herick, D. J. (M)
Himebrook, F. C. (M)
Krizanosky, A. (A)
Lassila, A. A. (A)
Laufenburger, H. A. (A)
Lentner, K. J. (M)
Loughran, R. H. (A)
Maine, C. P. (A)
Makinson, G. E. (M)
Meyers, K. W. (M)
Mitchell, T. E. (A)
Naslund, R. S. (M)
Nemec, E. F., Jr. (M)
Padgitt, K. W. (M)
Paluka, C. F. (SM)
Payne, R. A. (M)
Purkis, R. E. (M)
Rathbun, E. R., Jr. (M)
Sherman, J. (A)
Slack, M. J. (M)
Stanonis, A. F. (M)
Sundt, E. V. (SM)
Swanson, C. R. (M)
Utter, R. A. (A)
Von Fredersdorff, G. C. (SM)
Walding, E. C. (M)
Weinberg, M. (A)
Zimbler, F. B. (M)

Divernon (CHI-5)
Dozier, W. H. (A)

Dixon (CR-5)
Albright, L. E. (A)

Dolton (CHI-5)
Jezewski, J. E. (M)
Wajda, J. P. (M)

Downers Grove (CHI-5)
Bateman, L. A. (A)
Beggs, W. C. (A)
Brookshier, W. K. (M)
Courchene, H. B. (SM)
Daniels, R. E. (M)
Fitzsimmons, W. L. (A)
Frauens, W. R. (A)
Goertz, R. C. (M)
Harder, R. B. (M)
Hess, D. C. (M)
Johnson, A. R. (A)
Kamof, H. A. (SM)
Kikta, D. D. (A)
McDonell, W. J. (SM)
Miller, C. L. (A)
Miller, E. A. (SM)
Paul, J. M. (M)
Peckhart, M. A. (M)
Rohde, R. E. (M)
Sleth, H. P. (A)
Van Keulen, A. J. (M)

Duquoin (SL-6)
Rosenbaum, C. R. (M)

Dwight (CHI-5)
Seabert, F. (A)

East Dubuque (CHI-5)
Walsh, W. J. (M)

East St. Louis (SL-6)
Barnard, G. E. (M)
Bauer, F. W. (A)
Mutchek, J. H. (A)
Poston, H. J. (A)
Sirlak, R. V. (M)
Wagner, M. L. (M)
Wise, H. G. (SM)

Elgin (CHI-5)
Brandes, W. M., Jr. (M)
Crago, P. H. (M)
Kercher, M. K. (A)
Lang, C. W. (M)
Mitchell, R. M. (A)
Nemeth, W. E. (M)
Peterson, E. K. (SM)
Schimpf, R. G. (M)
Tackenberg, C. H. (M)
Walters, P. M. (M)

Elk Grove Village (CHI-5)
Flaherty, J. J. (M)
Fullerton, W. F. (M)
Hrbek, G. W. (M)
Pavlik, T. J. (M)
Robb, H. E., Jr. (M)
Teslik, J. A. (M)

Elmhurst (CHI-5)
Aberer, J. C. (M)
Anderson, W. J. (A)
Bajars, E. (A)
Balhorn, D. W. (A)
Bartlett, P. A. (SM)
Beck, V. R. (SM)
Beier, M. G. (SM)
Belville, J. R. (M)
Berg, H. (M)
Chelgren, A. E. (SM)
Cox, B. O. (M)
Curry, A. A. (SM)
Davis, J. (SM)
De Parry, T. (M)
De Shong, J. A., Jr. (SM)
Deterville, R. J. (M)
De Vries, A. J. (M)
Foot, N. J. (M)
Gula, H. E. (M)
Gurtz, V. J. (M)
Haines, D. G. (SM)
Hassel, K. E. (SM)
Huston, P. D. (A)
Irwin, H. H. (SM)
Janas, S., Jr. (M)
Johnston, R. H. (M)
Kearney, L. E. (M)
Keranen, E. W. (M)
Kocsis, L. L. (M)



Kutschke, E. F. (A)
Lahti, W. C. (M)
Liepeli, E. (M)
Liston, K. L. (A)
McGee, C. G. (M)
Mingle, R. F. (A)
Nettifee, G. R. (M)
Orme, D. T. (A)
Poel, L. R. (M)
Probeck, C. (SM)
Ramler, W. J. (M)
Rogers, C. H. (SM)
Ronzheimer, S. P. (SM)
Sandberg, E. L. (M)
Schultz, C. J. (M)
Shea, G. J. (M)
Smith, L. L., Jr. (M)
Spademan, C. F. (M)
Starek, R. A. (M)
Steiner, G. F. (M)
Troxel, R. E. (A)
Van Berkum, P. A. (M)
Vogt, A. L. (M)
Weber, V. F. (M)
Wellestat, C. E. (M)
Williams, J. T. (M)
Winemiller, H. R. (M)
Wray, W. C. (SM)

Elmwood Park (CHI-5)
Balsamello, J. (M)
Casper, R. (M)
Clark, D. K. (M)
Coon, W. B. (A)
D'Orio, A. F. (SM)
Griffith, F. W., II (SM)
Hilbert, F. H. (M)
Lane, M. E. (A)
Lindeman, R. J. (M)
Pakan, J. J. (M)
Walker, D. L. (M)
Wilson, M. J. (M)
Wolf, A. (A)

Energy (SL-6)
McSherry, J. H. (A)

Evanston (CHI-5)
Aagaard, J. S. (M)
Beam, R. E. (F)
Benjamin, H. J. (M)
Bennett, R. E. (M)
Bowman, J. R. (SM)
Brauer, H. H. (SM)
Brodwin, M. E. (M)
Brown, A. C. L. (M)
Brumbaugh, R. T. (SM)
Buckley, J. K. (A)
Cefelberg, R. D. (M)
Coulon, N., Jr. (M)
Demos, G. T. (M)
Endo, C. M. (A)
Fox, M. N. (M)
Frank, W. K., Jr. (M)
Frerichs, R. (SM)
Gage, D. S. (M)
Garbarino, H. L. (SM)
Goldstein, F. (M)
Gregory, E. C. (SM)
Haase, J. A. (M)
Handy, R. M. (A)
Hodgskiss, W. L. (M)
Hoecker, M. (M)
Hollander, A. (M)
Horwitz, S. J. (M)
Hupp, C. E. (A)
Jenness, R. R. (SM)
Jones, R. W. (SM)
Kao, L. (A)
Levine, M. B. (M)
MacDonald, W. F. (M)
Maltby, A. I. (A)
Maxon, E. K. (M)
Meyer, A. (A)
Moore, H. E. (M)
Murphy, G. J. (M)
Omer, R. J. (M)
Paradise, M. E. (SM)
Pinz, G. J. (M)
Pohl, A. E. (M)
Potter, J. D. (A)
Prisekin, C. (M)
Reichenbach, R. K. (M)
Riley, T. M. (M)
Rimawi, I. H. (M)
Rollefson, K. E. (SM)
Rubenstein, A. H. (A)
Rutkowski, C. (A)
Saberson, C. J. (A)
Schmidt, E. M. (M)
Schmidt, G. W. (M)
Schroeder, J. J., Jr. (M)
Shevick, P. (M)
Shure, S. N. (M)
Sobel, R. L. (M)
Speck, L. P., Jr. (M)
Stauverman, R. J. (A)
Sugarman, M. L., Jr. (SM)
Thacher, L. A. (A)
Toth, W. S. (M)
Vanjepmond, H. K. (A)
Van Ness, J. E. (SM)
Waude, R. S. (A)
Ziegler, G. E. (SM)

Evergreen Park (CHI-5)
Fiedler, A. R. (M)
Hirsch, A. (M)
Kostyal, S. P. (M)
Lux, G. R. (M)

Fairbury (CHI-5)
Eilers, C. G. (M)
Flossmoor (CHI-5)
Caywood, T. E. (M)

Forest Park (CHI-5)
Campbell, D. C. (M)
Fasick, R. C. (SM)
Hofman, W. J. (A)
Iffland, C. A. (A)
Kerney, R. W. (M)
Lysaught, T. F. (M)
Pallissard, J. W. (A)
Van Alstyne, D. E. (M)

Franklin Park (CHI-5)
Brewster, F. C. (SM)
Brockett, D. F. (M)
Johnson, J. H. (M)
Leysath, W. Q. (M)
Lucas, D. T. (M)
Miller, R. B. (M)
Passow, L. F. (A)
Schoeneck, W. H. (A)

Freeport (CHI-5)
Barker, V. S. (SM)
Coleman, J. J. (M)
Desai, G. R. (M)
Ebert, F. C. (M)
Greene, K. D. (A)
Harrington, J. (M)
Lincoln, J. K. (A)
O'Connell, G. (M)
Steinhoff, N. K. (A)

Galesburg (CHI-5)
White, J. H. (M)

Geneva (CHI-5)
Clarke, R. E. (M)
Gruen, H. E. (M)
Junkins, A. H. (M)
Robbins, R. W. (SM)
Soderquist, R. K. (M)
Winston, R. H. (SM)

Genoa (CHI-5)
Wylie, J. R. (A)

Glencoe (CHI-5)
Brown, J. E. (F)
Camras, M. (F)
Ferry, J., Jr. (A)
Heuer, C. H. (M)
Kurland, J. J. (A)
Michels, J. A. (M)
Miller, H. N. (M)
Spiegel, G. W. (M)
Thompson, C. W. N. (SM)
Whitman, M. R. (A)

Glen Ellyn (CHI-5)
Christensen, A. (SM)
Davis, R. H. (M)
Dyer, R. A. (M)
Faraone, J. N. (M)
Harris, B. J. (M)
Kidd, W. E. (SM)
Kleker, J. H. (A)
Knowles, H. S. (F)
Krieg, B. E. (M)
Lincicome, J. R. (SM)
Managan, W. W. (M)
Mayer, W. N. (M)
Mohler, R. D. (M)
Pearson, O. A. (M)
Pozdol, A. J. (M)
Rebeschini, L. C. (M)
Rees, W. L. (M)
Shelton, E. D. (M)
Shoebridge, R. C. (M)
Stewart, J. R. (SM)
Tingley, E. M., Jr. (M)
Whiteside, J. R. (A)
Woolsey, R. J. (M)

Glenview (CHI-5)
Aronson, A. B. (M)
Blyth, R. A. (M)
Bodnar, L. L. (M)
Burns, G. K. (SM)
Byrnes, W. P. (M)
Carlson, R. D. (M)
Carroll, P. F. (M)
Casciotti, R. J. (A)
Davis, G. L. (A)
Dunn, W. L. (F)
Fender, F. G. (A)
Flan, A. (M)
Fulenwider, J. E. (M)
Goss, C. G. (M)
Gough, G. L. (M)
Gross, E. J. (M)
Hayes, W. R. (M)
Holfsuemmer, M. A. (A)
How, F. B. (A)
Iversen, R. L. (M)
Jorgensen, C. M. (SM)
Kelley, W. A. (SM)
Leslie, W. G. (M)
Levin, H. (M)
Loh, G. M. (M)
Magnuski, H. (SM)
Magnuson, R. J. (M)
Masek, J. R. (A)
McFarland, R. B. (M)
Petersen, R. P. (SM)
Roberts, B. W. (M)
Schultz, W. A. (M)
Siwy, D. J. (M)
Slayton, R. D. (SM)
Turek, C. W. (M)
Godfrey (SL-6)
Boedy, D. D. (M)

Golf (CHI-5)
Boyajian, J. A. (SM)

Granite City (SL-6)
Galloway, J. V. (M)
Metcalf, W. L., Jr. (M)
Pender, P. S., Sr. (SM)
Wilson, D. P. (M)

Graystake (CHI-5)
Perkins, H. T. (M)

Great Lakes (CHI-5)
Bell, A. E. (M)
Brooking, C. P. (M)
Cormack, J. G. (M)
Fischer, D. W. (A)
Hudson, C. A. (A)
Jones, A. B. (SM)
Kasouf, G. (A)

Gurnee (CHI-5)
Smith, W. E., Jr. (A)

Harvey (CHI-5)
Swain, A. T. (M)
Swanson, J. O. (A)

Hazelcrest (CHI-5)
Berry, R. F. (A)
Brown, W. H. (A)
Evans, P. E. (M)

Highland Park (CHI-5)
Arnolt, A. K. (A)
Cherry, W. L., Jr. (M)
Durkee, C. E. (M)
Firestone, W. L. (SM)
Hart, J. W. (M)
Hirshberg, W. L., Jr. (M)
Kiver, M. S. (SM)
Lapin, S. P. (M)
Lee, W. W. (A)
Pepperberg, L. E. (SM)
Rockwood, C. H. (M)
Rose, J. K. (M)
Schaver, D. S. (SM)
Schwalm, W. A. (SM)
Weil, G. M. (M)
White, E. S. (SM)
Wolff, J. R. (M)

Highwood (CHI-5)
Grotti, R. D. (A)

Hinsdale (CHI-5)
Anderson, R. L. (M)
Biba, R. J. (A)
Brazda, J. C. (M)
Clark, J. M. (SM)
Disney, V. H. (SM)
Dumanowski, R. J. (A)
Glessner, F. W. (M)
Hemminger, D. H. (M)
Huisjen, A. J. (M)
Hummel, J. P. (M)
Jackson, A. S. (M)
Lane, C. R. (SM)
MacDonald, A. A. (SM)
Munn, R. J. (A)
Neely, O. P. (A)
Perkins, E. S. (SM)
Wesselman, E. (M)
Wickman, C. R. (M)

Hollywood (CHI-5)
Poll, V. M. (A)

Homewood (CHI-5)
Bickel, R. C. (M)
Bielenin, A. (A)
Bremigan, R. O. (M)
Crotty, R. E., Jr. (M)
Koeppen, W. J., Jr. (M)

Hoopeston (CHI-5)
Chorney, P. L. (M)

Ingleside (CHI-5)
Reese, K. E. (M)

Itasca (CHI-5)
Van Arrooy, P. H. (M)

Joliet (CHI-5)
Aschenbrenner, R. A. (M)
Maren, F. A. (A)
Margetis, W. R. (M)
Novy, J. F. (SM)
Schwerha, J. A. (M)
Shuba, J. P. (M)
Sperelakis, P. (M)

Kewanee (CHI-5)
Anderson, R. W. (M)
Jakobsons, A. (A)
Watts, C. A. (M)

Kilbourne (CHI-5)
Green, J. L. (M)

La Grange (CHI-5)
Allen, H. E. (SM)
Blumer, G. M. (M)
Collins, E. A. (M)
Fox, J. H. (M)
Geib, R. L. (M)
Gellatly, J. S. (SM)
Hohmann, C. R. (M)
Klkta, J. (A)
Knouf, R. J. (SM)
Lubin, M. (M)
Maier, R. H. (SM)
Medill, J. W. (M)
Miller, J. M. (SM)
Parker, R. J. (M)
Read, R. A., Jr. (M)
Schulz, E. H. (F)
Snelling, E. A. (SM)
Steiner, G. B. (M)
Stolke, D. A. (M)
Unroe, J. L. (A)

La Grange Park (CHI-5)
Abraham, J. (M)
Anderson, C. J. (M)
Bouska, J. F. (M)
Chambers, H. L. (M)
Frihart, H. N. (M)
Hajek, A. F. (M)
Kash, R. M. (M)
Kundrotas, A. P. (M)
Massey, J. (A)
May, F. D. (M)
Orwin, R. J. (M)
Vogele, F. C. (M)
Wehrle, R. (A)
Wolff, R. A., Jr. (M)

Lake Bluff (CHI-5)
Kramer, A. W. (M)
La Rose, A. P. (M)

Lake Forest (CHI-5)
Byrne, W. C., Jr. (M)
Faulks, H. R. (M)
Galitz, R. J. (A)
Peugh, W. E. (M)

Lake Villa (CHI-5)
Homer, W. F. (M)
Ruck, R. C. (M)
Weiss, J., Jr. (A)
Wood, D. H. (M)

Lake Zurich (CHI-5)
Freiheit, H. H. (A)
Ives, R. D. (SM)
Krueger, E. P. (A)

Lansing (CHI-5)
Bardeau, J. R. (A)
Huitema, R. L. (M)
Wells, J. F. (M)

La Salle (CHI-5)
Lemanski, A. B. (M)

Lemont (CHI-5)
Anderson, T. T. (M)
Braz, S. S. (M)
Connor, D. W. (M)
Lovoff, A. (SM)
Richards, H. K. (M)
Rockwood, C. C. (A)

Lenzburg (SL-6)
Krause, H. J. (A)

Le Roy (CHI-5)
Buchanan, G. J. (M)

Libertyville (CHI-5)
Bottorff, P. A. (M)
Bruna, R. F. (M)
English, W. C. (M)
Law, J. M. (A)
Reickert, E. A. (M)
Samelson, L. R. (A)

Lincolnwood (CHI-5)
Bigelow, J. F. (SM)
Dervishian, E. (M)
Fenton, M. J. (M)
Goldfus, S. M. (SM)
Herst, R. J. (M)
Kaluzna, I. J. (M)
Roberts, E. A. (SM)
Solfert, M. L. (M)
Waterman, H. C. (M)

Lisle (CHI-5)
McMahon, D. W. (A)
Prokes, P. H. (M)
Yeoman, S. J. (A)

Lockport (CHI-5)
Gorecki, G. S. (A)
Szegda, A. (M)

Lombard (CHI-5)
Abrath, C. E. (A)
Addy, J. R. (M)
Bartha, S. J. (A)
Berry, R. E. (M)
Borchardt, R. L. (M)
Buckley, G. F. (A)
Caldwell, J., Jr. (SM)
Carroll, J. J. (M)
Coryell, R. L. (A)
Curtis, R. H. (M)
Dunbar, E. A. (A)
Eichman, M. E. (M)
Espe, R. H. (M)
Fyler, G. W. (SM)
Grisanti, J. L. (A)
Grover, D. N. (M)
Holchkiss, C. S. (M)
Jackson, W. C. (SM)
Johnson, J. A. (M)
Laub, R. W. (A)
Lomasney, J. M. (SM)
Lopez, J. L. (M)
Martino, L. J. (A)
Mattingly, L. J. (A)
Novy, C. A. (M)
Orszula, N. R. (SM)
Ponon, J. D. (M)
Puhalski, D. (A)
Renskers, J. O. (SM)
Smith, A. P. (M)
Tschannen, R. F. (SM)
Williams, P. B. (SM)
Witt, C. E. (M)

London Mills (CHI-5)
Benson, L. G. (A)

Loves Park (CHI-5)
Eksten, D. G. (M)

Lyons (CHI-5)
Polich, W. J. (M)

Macon (CHI-5)
Fathauer, G. H. (SM)

Manteno (CHI-5)
Demmer, L. T. (M)

Marengo (CHI-5)
Arnold, R. M. (M)
Carroll, R. H. (A)
Lewis, H. A. (M)
Parnell, R. A. (M)
Van De Houten, R. S. (M)

Marion (SL-6)
Levesque, J. J. (A)
McCormick, J. E. (M)

Marissa (SL-6)
Church, C. J. (M)

Markham (CHI-5)
Mayoros, W. A. (A)

Matteson (CHI-5)
Feehery, J. T. (A)

Maywood (CHI-5)
Donaldson, R. J. (SM)
Douglas, R. P. (M)
Forst, P. P., Jr. (M)
Hall, H. R. (A)
Komm, P. M. (M)
Kroes, D. P. (M)
Laube, W. C., Jr. (M)
Lee, C. (M)
Bliss, G. B. (SM)
Del Camp, S. M. (F)
Little, T. P. (M)
Mages, L. J. (M)
Prine, D. W. (M)
Richards, H. F. (A)
Rohret, P. J. (M)

McHenry (CHI-5)
Longley, J. K. (A)
Palmer, F. J. (M)

Medinah (CHI-5)
Buchanan, J. B. (M)

Melrose Park (CHI-5)
Backhuber, R. A. (M)
Backman, K. E. H. (SM)
Bell, R. W. (M)
Carr, J. E., Jr. (M)
Cohoon, R. L. (M)
Craique, A. (A)
Early, J. M. (A)
Eckhardt, D. C. (M)
Hesser, C. B. (M)
Jaster, D. R. (A)
Kowalik, R. F. (M)
Kuchuris, G. F. (A)
Maza, G. M. (M)
McCarrell, R. H. (M)
Moulton, H. A. (M)
Nemcek, G. M. (A)
Paetow, H. O. (A)
Pape, A. E. (A)
Ravanesi, R. M. (M)
Rutka, E. P. (M)
Schwager, A. C. (M)
Volcoun, R. C. (A)
Zimmerman, J. (M)

Midlothian (CHI-5)
Browne, R. A. (M)

Modesto (CHI-5)
Launer, W. H. (M)

Mokena (CHI-5)
Book, E. G. (SM)
Collins, L. R. (A)

Moline (CR-5)
Oppenheimer, E. P. (M)
Parkhurst, J. E. (A)
Speth, R. L. (A)
Steffes, R. M. (A)

Monee (CHI-5)
Turner, J., Jr. (M)

Morrison (CHI-5)
Horvath, C. (M)
Van Osdol, R. L. (M)

Morton Grove (CHI-5)
Ackerman, N. A. (M)
Affrunti, A. J. (M)
Beneke, E. H. (M)
Bien, F. I. (M)
Burns, R. P. (A)
Cohn, J. (M)
Dal Corobbo, B. V. (M)
Dennis, R. J. (M)
Duvall, T. E. (A)
Frank, R. B. (M)
Gallagher, J. A. (SM)
Gillespie, N. R. (SM)
Hanberg, S. M. (M)
Kite, M. N. (M)
Lange, W. W. (M)
Michel, W. A. (M)
Neukuckatz, A. (A)
Neumark, J. (A)
ONendorf, W. T. (A)
Pinsley, R. S. (M)
Rahnert, R. G. (A)
Siegelman, A. (SM)
Smithana, D. R. (M)
Sokolov, J. (A)
Stastny, F. G. (SM)
Trowbridge, F. (A)
Vale, S. D. (M)
Wittkop, C. F. (M)
Wolter, F. A. (M)

Mount Olive (CHI-5)
Strien, G. W. (M)

Mount Prospect (CHI-5)
Bastian, E. (M)
Berg, H. O. (A)
Bernin, V. M. (M)
Bryner, D. B. (M)
Bull, R. W. (SM)
Burton, J. W. (M)
Carlson, O. V. (M)
Cromer, E. G. (M)
Czeropski, W. P., Jr. (M)
Denecke, W. C. (M)
Evans, K. T. (M)
Goldstein, R. (M)
Huber, R. H. (M)
Johnson, J. T. (M)
Krempel, F. M. (SM)
Mac Astill, R. B., Jr. (SM)
Mann, R. W. (A)
Medal, R. J. (M)
Mokate, G. M. (M)
Pierce, C. B. (M)
Ralph, J. T. (M)
Schumacher, J. H. (SM)
Shemanske, R. (M)
Stecker, J. W. (A)
Tempka, J. A. (M)
Wallace, H. S. (M)
Whalen, J. A. (A)

Mundelein (CHI-5)
Borg, A. N. (M)
Chudd, R. G. (M)
Mitchell, C. A. (M)
Nation, J. E. (A)
Nienaber, F., Jr. (M)
Pacholke, F. (SM)

Naperville (CHI-5)
Bouwman, B. J. (M)
Fancher, J. R. (M)
Hayworth, D. F. (SM)
Johnson, M. C. (M)
Nider, M. E. (M)

Nauvoo (CHI-5)
Smith, H. D. (M)

New Lenox (CHI-5)
Johanson, E. W. (M)
Whalen, J. F. (M)

Niles (CHI-5)
Bartimes, G. F. (M)
Berg, S. (M)
Borman, W. M. (M)
Brugliera, F. J. (SM)
Brumbach, J. F. (M)
Buri, F. J. (M)
Costello, L. B. (M)
Del Vento, J. M. (SM)
Feiss, C. L. (M)
Greenway, R. J. (SM)
Kahover, C. R. (A)
Kunchithapm, M. S. (M)
McMullen, C. W. (M)
Merrifield, L. A. (M)
Mountz, J. M. (M)
Pulles, J. H. (SM)
Schwarzenbach, E. E. (M)
Swain, J. E., Jr. (A)
Yahalom, J. Y. (M)

Normal (CHI-5)
Coe, C. L. (M)
Ewald, E. R. (M)
Johnston, J. L. (M)
Wilcox, S. R. (A)

Norridge (CHI-5)
Gehmlich, A. P. (A)
Lakowski, F. (M)
Petrovick, M. L. (M)

North Aurora (CHI-5)
McIlvaine, D. T. (M)

Northbrook (CHI-5)
Amdursky, M. E. (A)
Conway, P. W. (M)
Crimp, J. G. (SM)
Hill, C. F. (A)
Parke, S. A. (M)
Pivan, D. B. (SM)
Pospisil, J. F. (M)
Steel, F. R., Jr. (A)
Waller, E. E. (M)

North Chicago (CHI-5)
Cadby, G. G., Jr. (A)
Hudson, T. B., Jr. (A)
Unitis, E. R. (A)
Weirich, H. P. (A)
Youngquist, D. (M)

Northfield (CHI-5)
Clark, R. V. (M)
Green, L. F. (A)
Hechler, V., IV (M)
Larson, W. L. (SM)
Stahl, W. D. (M)

Northlake (CHI-5)
Ayers, J. W. (M)
Cawthon, E. F. (M)
Clark, D. E. (SM)
Deck, G. J. (A)
Dimmer, R. P. (SM)
Fetzner, R. W. (M)
Grace, J. W. (M)
Molnar, I. (SM)
Reklere, B. J. (M)

North Lake City (CHI-5)
Dolhar, J. L. (A)
Romano, S. S. (A)

North Pekin (CHI-5)
Milter, W. B. (A)

North Riverside (CHI-5)
Sklom, G. M. (A)

Oak Lawn (CHI-5)
Blevins, E. L. (A)
Cooke, K. R. (A)
Corcoran, V. J. (M)
Goedeke, R. C. (M)
Grace, B. J. (M)
Jann, E. G. (M)
Kasper, F. S. (M)
Martin, R. B. (A)
McCarthy, T. D., Jr. (M)
Poncinie, D. J. (A)
Scharding, R. M. (M)
Thomas, C. B. (M)

Oak Park (CHI-5)
Alliot, E., Jr. (M)
Anderson, C. M. (A)
Armstrong, M. M. (M)
Beal, J. (M)
Beitz, R. E. (SM)
Benson, R. W. (M)
Benzuly, H. J. (SM)
Bryan, R. H. (M)
Cotsworth, A., III (SM)
Delzell, R. P. (M)
Duffy, E. J. (M)
Dunlap, J. F. (M)
Fitch, W. M., Jr. (M)
Fockens, P. (M)
Fricke, L. L. (M)
Gammell, H. C. (A)
Garrigues, R. D. (M)
Goebel, E. S. (M)
Graziano, V. (SM)
Hartley, R. L. (M)
Henson, M. L. (M)
Heyda, K. C. (M)
Huenemann, R. C. (M)
Inde, W. M. (SM)
Jeffery, T. H. (M)
Knoblock, G. C. (A)
Kubly, K. E. (M)
Lamin, L. (M)
Larson, R. P. (M)
Le Baron, T. (M)
Lee, R. E. (M)
Lenox, W. S. (M)
Marsh, R. E. (SM)
Marsh, W. F. (A)
Martin, J. W., Jr. (M)
Martin, R. D. (A)
May, H. E. (SM)
McGrail, J. G. (A)
Mednieks, Z. (M)
Mehaffey, W. R. (SM)
Morawetz, F. (M)
Nissen, D. O. (M)
Nitschke, W. J. (M)
Oddsson, I. G. (A)
Redfield, S. L. (A)
Reed, J. H. (M)
Russell, W. D. (M)
Sinclair, J. C. (M)
Sinninger, D. V. (SM)
Smith, P. L. (A)
Sprunger, R. W. (M)
Staunton, J. J. J. (SM)
Thompson, D. H. (M)
Tyler, L. A. (M)
Van Scoyoc, J. N. (SM)
Ward, R. W. (M)
Wise, G. H. (M)
Yoder, R. S. (SM)
Zender, R. G. (SM)

Oblong (SL-6)
Kocher, D. G. (M)

O'Fallon (SL-6)
Schaefer, R. J. (A)

Orland Park (CHI-5)
Dienes, G. (M)
Green, R. E. (SM)
Morrison, P. (M)
Proctor, D. E. (A)
Streik, R. G. (A)
Weil, E. A. (A)
Woodbury, H. L. (SM)
Yang, R. F. H. (SM)

Ottawa (CHI-5)
Ftacek, J. J. (A)

Palatine (CHI-5)
Belschel, J. R. (A)
Currey, C. H. (M)
Curtiss, G. R. (M)
Kohout, R. J. (A)
Medek, J. D. (M)
Powers, J. S. (M)
Schreiner, L. W. (SM)
Thompson, R. T. (M)
Wood, R. E. (SM)

Palos Heights (CHI-5)
Brown, M. H. (A)
Sommerla, M. R. (A)

Palos Park (CHI-5)
Cairnes, W. E. (SM)
Lloyd, W. P. (M)

Park Forest (CHI-5)
Bond, M. E. (M)
Faklis, J. J. (A)
Hartman, R. B., II (M)
Otto, H. G. (M)
Schutt, V. L. (M)
Schwartz, E. S. (M)
Terrell, J. H. Jr. (M)
Vogt, A. R. (A)
White, O. (M)

Park Ridge (CHI-5)
Boe, R. E. (A)
Boesen, G. F. (M)
Bridges, J. E. (SM)
Brown, J. M. (M)
Clark, J. T. (SM)
Cortright, R. D. (M)
Crow, R. P. (M)
Daul, R. M. (M)
De Cola, R. (F)
Edwards, F. W. (M)
Erwood, J. (SM)
Farley, J. E. (M)
Farnsworth, G. W. (M)
Figlewicz, R. C. (A)
Griffith, B. G. (SM)
Hooper, W. D. (M)
Johnson, H. A. (A)
Kusack, W. P. (A)
Malinowski, S. (M)
Mroz, M. (SM)
Mueller, A. J. (M)
Parmet, B. S. (SM)
Passow, E. B. (SM)
Perry, J. T. (M)
Reukauf, D. C. (M)
Schorum, S. W. (M)
Schumacher, H. W. (A)
Shaw, J. R. (A)
Silver, J. F. (M)
Smith, P. S. (SM)
Stenerson, C. K. (M)
Thrun, A. G. (M)
Van Bosse, J. G. (M)
Weber, E. W. (M)
Williams, K. S. (M)
Wiszowaty, C. B. (M)

Peoria (CHI-5)
Bishop, J. W. (A)
Costa, P. J. (SM)
Pyle, G. A. (M)

Peoria Heights (CHI-5)
Ferre, G. E. (M)

Petcatonica (CHI-5)
Van Antwerp, M. C. (M)

Philo (CHI-5)
Hohn, F. E. (M)

Plainfield (CHI-5)
Hartzog, H. H. (M)

Plano (CHI-5)
Beetham, R. B. (M)

Prospect Heights (CHI-5)
Bergman, E. J. (A)
Carlson, E. V. (SM)
Jackson, J. J. (A)
Kongable, L. S. (M)
Lace, M. A. (M)
Stanton, G. L. (SM)
Wiecek, E. J. (M)
Young, L. A. (M)

Quincy (CHI-5)
Bush, R. S. (SM)
Butcher, J. H. (A)
Clarke, C. V., Jr. (M)
Cooper, R. L. (M)
Fortman, N. C. (M)
Hackbarth, H. R. (M)
Hartman, R. E. (M)
Hoyt, W. A. (M)
Jochem, N. L. (SM)
Reling, J. T. (M)
Straiman, H. G. (M)
Weibler, C. T. (SM)
Wilder, E. J. (A)

Riverdale (CHI-5)
Gregory, F. X. (M)

River Forest (CHI-5)
Devale, D. P. (M)
D'Orio, P. A. (SM)
Reale, E. P. (M)
Schultz, A. A. (M)

River Grove (CHI-5)
Bousky, S. (SM)
Green, L. H. (A)
Henke, W. G. (SM)

Riverside (CHI-5)
Ashby, A. T. (M)
Brooks, R. D. (SM)
Cihak, W. E. (A)
Gollhardt, R. W. (M)
Hajek, R. J. (M)
Kean, W. F. (SM)

Robinson (SL-6)
Moore, R. W. (A)

Rochester (CHI-5)
Kessler, W. D. (M)

Rockford (CHI-5)
Appelgren, J. W. (A)
Armstrong, J. E. (A)
Berglund, D. B. (M)
Bowie, D. L. (M)
Bullen, C. V. (M)
Bulliet, L. J. (A)
Campbell, R. H. (A)
Conrad, R. S. (SM)
Dempster, J. H. (M)
Falk, W. R. (M)
Hand, C. A. (M)
Hausvick, R. L. (M)
Johnson, T. W. (M)
Korns, J. M. (M)
Kyburz, U. L. (M)
Leber, D. A. (A)
Marcolini, V. H. (M)
Nosley, C. C. (M)
Peck, R. E. (M)
Peterson, C. G. (M)
Steiner, J. E. (M)
Swain, D. L. (M)
Tveit, T. J. (M)
Weiherman, R. J. (M)
Woolums, L. L. (A)

Rock Island (CR-5)
Elliott, H. R. (M)
Scott, A. R. (A)
Sinnett, R. J. (SM)
Stewart, T. L. (M)

Rolling Meadows (CHI-5)
Bonnell, D. W. (M)
Dunn, J. R. (A)
Panec, D. O. (M)
White, L. F., Jr. (M)
Wiencek, Z. (M)

Roselle (CHI-5)
Callahan, B. E. (M)
Goodrich, P. D. (M)
Gorton, L. W. (M)
Nakata, C. K. (SM)
Roenitz, R. K. (M)

Round Lake (CHI-5)
Meuer, A. (M)

St. Charles (CHI-5)
Block, A. F. (M)
Chodl, C., Jr. (M)
Hasker, L. E. (M)
Prescott, F. H., Jr. (M)
Small, G. L. (M)
Supitilov, M. C. (SM)
Taylor, E. H. (SM)
Wohlert, A. M. (M)
Wolhowe, M. V. (M)

Sandwich (CHI-5)
Hough, B. B. (M)

Savoy (CHI-5)
Wood, W. W. (M)

Schiller Park (CHI-5)
Offner, F. (SM)
Ranke, K. R. (M)

Scott AFB (SL-6)
Coward, R. W. (M)
Gane, C. E. (M)
Kevar, M. M. (SM)
Miles, V. J., Jr. (M)
Pratt, J. D. (A)
Tillery, J. H. (M)
Warren, W. E. (M)
Watts, H. T., Jr. (A)
Shirley (CHI-5)
Alley, R. P. (M)
Silvis (CR-5)
Ingwersen, J. T. (M)

Skokie (CHI-5)
Adams, R. A. (SM)
Adler, H. J. (SM)
Axelrod, L. R. (M)
Bard, R. E. (SM)
Carlson, D. A. (A)
Carter, R. W. (A)
Chesrow, A. F., Jr. (A)
Chulsky, I. (M)
Cooper, M. (M)
Cozzens, W. B. (SM)
Cudahy, M. J. (M)
Czuj, W. J. (M)
Ditthardt, A. R. (M)
Dols, J. M. (M)
Everett, J. E. (M)
Flower, W. (M)
Franke, J. L. (SM)
Franklin, H. B. (M)
Frantz, N. (A)
Fruth, H. F. (SM)
Gordon, D. (A)
Hemstreet, D. C. (A)
Jurians, G. F. (A)
Kalman, J. (M)
Kamlnsky, L. M. (M)
Lense, H. E. (SM)
Levine, W. E. (M)
Loizzo, V. J. (M)
Madden, J. J. (M)
Michals, R. A. (M)
Moskow, H. J. (M)
Moss, J. I. (A)
Mullen, R. L. (A)
O'Callaghan, J. J. (SM)
Osbom, R. L. (SM)
Pawlowski, F. L. (A)
Pichler, R. H. (A)
Raemer, H. R. (SM)
Rau, J. M. (M)
Royston, M. F. (SM)
Rzeczkowski, J. (M)
Saper, J. (M)
Schneider, L. L. (M)
Segal, A. A. (M)
Smith, J. (A)
Steinberg, P. S. (M)
Stiefel, P. (M)
Sussman, M. (M)
Tarantur, S. (M)
Thomas, R. G. (M)
Toback, P. L. (M)
Warnke, G. F. (M)
Wayne, H. A. (SM)
Welsz, W. J. (SM)
Wickstrom, S. T. (M)
Woods, H. (A)
Wright, F. R. (A)
Wynstock, S. (A)
Yefsky, S. A. (M)

South Beloit (CHI-5)
Nuber, S. E. (A)
Ripple, L. C. (M)

Sparta (SL-6)
Huss, J. W. (M)

Springfield (CHI-5)
Belanger, D. S. (A)
Boesdorfer, R. H. (A)
Bowers, T. N. (M)
Daughton, J. W. (M)
Hem, R. J. (A)
Leach, E. A. (SM)
McGee, K. (SM)
Oakes, R. E. (M)
Oram, D. K. (M)
Owens, D. A. (A)
Pline, R. A. (M)
Schulze, G. H. (M)
Siebert, J. A. (M)
Stock, B. L. (M)
Thomas, C. C. (M)
Vesper, M. C. (A)
Wilson, H. C. (M)

Sterling (CHI-5)
Drane, R. L. (M)

Strasburg (CHI-5)
Risser, F. G. (A)

Streator (CHI-5)
Bryan, A. R. (A)
Coverick, J. M. (A)
Doucette, J. T. K. (A)
Gotch, J. X. (A)
Healy, A. M. (A)

Stronghurst (CHI-5)
Avery, E. R. (A)

Summit (CHI-5)
Berberek, W. J. (A)
Findling, M. J. (M)

Taylorville (CHI-5)
Smith, W. D. (A)

Tinley Park (CHI-5)
Gyurko, J. E. (M)

Tolono (CHI-5)
Allen, C. R. (M)

Urbana (CHI-5)
Anner, G. E. (SM)
Askew, W. J., Jr. (M)



Auth, L. V., Jr. (M)
Bailey, A. D. (SM)
Bauman, P. A. (M)
Brearley, H. C., Jr. (M)
Brown, R. M. (M)
Burtness, R. W. (SM)
Costa, M. J. (A)
Crothers, M. H. (SM)
Cruz, J. B., Jr. (M)
Davidson, R. A. (M)
Deschamps, G. A. (F)
Dimond, J. (M)
Dougal, A. A. (M)
Dyson, J. D. (M)
Everitt, W. L. (F)
Fetz, G. H. (F)
Fry, W. J. (M)
Gaddy, O. L. (M)
Goldstein, L. (F)
Gooch, J. D. (M)
Guckel, H. (M)
Hakimi, S. L. (M)
Hayden, E. C. (M)
Hendricks, C. D., Jr. (M)
Hogan, J. J. (M)
Holshouser, D. F. (M)
Hudson, P. K. (SM)
Jensen, R. S. (M)
Joehlin, N. C. (M)
Jones, E. C., Jr. (A)
Jordan, E. C. (F)
Kenyon, R. J. (M)
Knoebel, H. W. (A)
Kopplin, J. O. (M)
Krone, H. V. (M)
Kuo, B. C. L. (M)
Loigren, L. E. (M)
Lohrenz, M. H. (M)
Mast, P. E. (M)
McVay, M. S. (SM)
Miller, W. E. (SM)
Mittra, R. (M)
Muerle, J. L. (M)
Murrell, T. A. (M)
Penhollow, J. O. (M)
Poppelbaum, W. J. (A)
Ray, S. R. (M)
Ricketts, L. W. (M)
Robertson, J. E. (M)
Sandquist, J. W. (A)
Schwarzlose, P. F. (SM)
Seib, K. L. (M)
Shively, R. R. (M)
Spuhler, H. A. (M)
Strain, R. J. (M)
Swartout, R. E. (SM)
Swenson, G. W., Jr. (SM)
Syn, W. M. (M)
Tennery, V. J. (M)
Tropdon, R. L. (M)
Tykociner, J. T. (SM)
Unruh, W. O. (M)
Van Valkenburg, M. E. (SM)
Voth, B. W. (M)
Wax, N. (M)
Webb, H. D. (SM)
Westlund, C. D. (SM)
Yeh, K. C. (M)

Villa Park (CHI-5)
De Rose, R. A. (M)
Fackenthal, D. F. (A)
Fernandez, D. T. (A)
Fletcher, E. J. (M)
Gorbunoff, A. (SM)
Mathews, C. A., Jr. (M)
Norberg, L. R. (M)
Rice, V. K., Jr. (M)
Rypkema, J. N. (SM)
Sebastian, R. W. (A)
Sparf, W. H. (M)
Todd, A. C. (SM)
Walters, A. R. (M)
Zaruba, E. J. (SM)

Virden (CHI-5)
Carr, H. E. (A)

Virginia (CHI-5)
Petefish, W. M., Jr. (M)

Washington (CHI-5)
Johnson, W. M. (A)
Overley, J. P. (A)
Planck, R. M. (M)

Waukegan (CHI-5)
Anderson, C. A. (M)
Angel, J. S. (M)
Beane, E. A. (M)
Bentivegna, J. T. (A)
Drews, G. E. (M)
Jensen, G. (M)
Kimmel, N. (A)
Krasovec, A. C. (A)
Nevin, M. E. (A)
Thiel, W. (A)

Waverly (CHI-5)
Mieher, R. L. (M)

Westchester (CHI-5)
Binkis, A. M. (M)
Floyd, E. C. (SM)
Frankart, W. F. (M)
Gabriel, R. R. (M)
Glyptis, N. (A)
Klokow, A. R. (A)
Kutrumanes, C. P. (M)
Morgan, R. E. (M)
Pecina, R. J. (M)
Potocki, E. A. (M)
Stones, A. E. (M)

West Chicago (CHI-5)
Hessler, O. G. (SM)
Hummel, H. J. (M)
Kaplan, M. L. (M)
Rullman, E. E., Jr. (A)
Scandora, A. E. (A)

Western Springs (CHI-5)
Bracken, J. F. (M)
Buster, W. V. (SM)
Dondanville, R. V. (SM)
Gray, G. E. (SM)
Hungerford, N. C. (A)
Kramer, K. (SM)
Scheldorf, M. W. (F)
Scott, W. S. (M)
Swanson, B. E. (M)
Turte, B. A. (M)
Valach, C. F. (M)
Wernecke, H. W. (A)

West Glenview (CHI-5)
Berkstresser, R. W. (M)

West Melrose Park (CHI-5)
Dietz, L. A. (A)

Westmont (CHI-5)
Jendrzejczyk, J. A. (A)

Wheaton (CHI-5)
Batts, R. L. (SM)
Calobrisi, P. (A)
Duncan, D. C. (M)
Emaus, J. L. (SM)
Frank, C. W. (M)
Gaskins, S. M. (M)
Hausten, D. R. (A)
Jensen, R. E. (M)
Jepson, M. R. (M)
Joyner, A. A. (SM)
Klem, R. F. (SM)
Matthews, G. D. (M)
Mayberry, B. T. (A)
Nelson, W. H. (M)
Olson, R. H. (SM)
Parker, N. W. (A)
Pye, H. C. (M)
Quist, W. G. (M)
Richelieu, C. C. (M)
Rohrer, C., Jr. (M)
Savage, L. E. (M)
Sawada, F. H. (SM)
Smith, R. H., Jr. (M)
Squires, E. G. (M)
Sullivan, J. F. (M)
Thompson, D. C. (M)
Upton, E. C., Jr. (M)
Van Slyck, W. S. (SM)
Venema, H. J. (SM)
Ward, A. G. (SM)
Willyard, C. H. (A)

Wheeling (CHI-5)
Higgs, J. A. (M)
Naber, J. S. (M)

Wildwood (CHI-5)
Jarvis, G. R. (M)

Wilmette (CHI-5)
Bell, J. F. (SM)
Bercaw, O. M., Jr. (M)
Bosshart, R. F. (M)
Canning, T. B. (A)
Cutlip, S. B. (M)
Di Cecio, S. A. (M)
Falls, E. L., Jr. (A)
Freeman, W. H. (M)
Karlin, R. A. (M)
Keller, E. A. (F)
Kline, L. M., Jr. (SM)
MacLean, N. W. (M)
McJohnston, C. A. (M)
Nicholls, W. C. (M)
Nordby, R. M. (SM)
Paglee, E. H. (M)
Papier, J. H. (M)
Piontkowski, E. F. (M)
Schnell, W. J. (SM)
Smith, E. L. (M)
Small, A. E. (SM)
Stewart, C. H., II (SM)
Stott, H. G. (A)
Thomas, L. R. (M)
Warshawsky, J. (M)
Wexler, J. S. (SM)

Winfield (CHI-5)
Teske, H. O. (M)

Winnetka (CHI-5)
Berglund, A. O., Jr. (M)
Carlson, G. R. (A)
Jarvis, K. W. (F)
Waterfall, F. E. (SM)

Winthrop Harbor (CHI-5)
McDowell, J. L. (M)

Wonder Lake (CHI-5)
Thompson, A. C. (M)

Wood Dale (CHI-5)
Gardner, R. O. (M)
Maidak, A. M. (M)

Woodstock (CHI-5)
Kiciak, C. J. (A)
Volz, R. A. (M)

Zion (CHI-5)
Albert, A. A. (A)

Angola (FT-W-5)
Gallihugh, J. T. (A)
Hanson, L. G. (A)
Southern, C. D. (A)
Westenhaver, M. E. (A)
Worden, L. E. (A)
Brock, E. W. (SM)
Carothers, F. S., Jr. (M)
Gardner, R. A. (A)
Heller, R. E. (M)
Holt, D. L. (M)
Merritt, D. E. (A)
Rath, G. A. (M)
Sensino, W. J. (M)
Snowden, J. L. (M)
Soeller, A. L., Jr. (M)

Arcadia (IND-5)
Nighternelser, K. W. (M)

Auburn (FT-W-5)
Capen, G. A. (M)

Aurora (CIN-4)
Achatz, R. V. (M)

Batesville (CIN-4)
Gruenloh, G. J. (A)

Beech Grove (IND-5)
Van Osdol, J. E. (M)

Bloomfield (IND-5)
Stone, H. R. (A)

Bloomington (IND-5)
Bahr, W. B. (M)
Chambers, M. W. (A)
Dixon, L. W. (SM)
Gribben, J. C., Jr. (A)
Hackemeyer, R. F. (A)
Kreps, J. E., Jr. (SM)
Lanyiey, H. M. (M)
Pres-l, B. (M)
Seaman, D. L. (M)
Siddons, G. F. (SM)
Svanascini, A. L. (SM)
Tarzian, S. (SM)
Winfield, W. S. (M)

Bluffton (FT-W-5)
Zeps, H. (A)

Chesterfield (IND-5)
Nisewander, E. L. (M)

Chesterton (CHI-5)
O'Connor, R. W. (A)
Olson, E. H. (A)

Cicero (IND-5)
Newby, H. D. (M)

Columbia City (FT-W-5)
Montague L. L. (M)

Columbus (IND-5)
Dugan, J. M. (M)
Harden, R. D. (A)
Keiter, L. P. (M)
Silva, A. D., Jr. (M)
Silva, L. F. (M)
Stambaugh, D. W. (M)

Crane (EO-5)
Finley, R. W. (M)

Crown Point (CHI-5)
Graeber, R. S., Jr. (M)
Haag, K. E. (A)
Skoog, R. E. (M)

Cumberland (IND-5)
Keeling, C. J. (M)

Danville (IND-5)
Behymer, D. E. (M)
Miller, W. E. (A)

East Chicago (CHI-5)
Nesbitt, E. P. (A)

East Gary (CHI-5)
Mundell, E. H. (A)

Elkhart (SB-M-5)
Best, J. G. (A)
Budd, W. H. (M)
Daily, A. M. (M)
Doty, J. S. (M)
Faber, W. M., Sr. (M)
Gaddie, G. E. (M)
Hazelwood, D. E. (M)
Houck, H., Jr. (A)
Kent, E. L. (SM)
Kieffer, G. H., Jr. (M)
Klingler, J. E. (A)
Krauss, S. L. (M)
Lindahl, H. C. (M)
McDonald, L. J. (M)
Moore, C. C. (M)
Osburn, C. M. (M)
Roberts, M. W. (M)
Smith, R. A. (A)
Turner, B. S. (M)
Vaksvik, A. J. (M)
Etna Green (IND-5)
Stackhouse, B. L. (A)

Evansville (EO-5)
Caraway, J. B. (SM)
Caster, M. S. (M)
Dufford, R. T. (SM)
Flackbert, W. D. (M)
Gehres, F. A. (SM)
Greeson, J. H. (A)
Hatfield, P. E. (M)
Hennel, J. R. (M)
Herendeen, O. V. (A)
Jardine, J. W. (M)
Kapoes, A. V. (A)
Koonce, C. W. (M)
Krueger, O. H. (A)
Major, J. R. (M)
Miegl, A. K. (SM)
Miles, K. G. (M)
Quirk, J. A. (A)
Schoene, R. L. (SM)
Schoeny, E. P. (A)
Stoltz, G. F. (M)
Williams, W. A. (SM)
Wintemheimer, C. G. (M)

Fort Wayne (FT-W-5)
Amos, B. (M)
Artman, R. L. (M)
Atwill, W. D. (M)
Bardonner, W. J., Jr. (M)
Barranger, J. P. (M)
Beach, H. W. (M)
Beaulieu, B. A. (A)
Bergstresl, R. G. (M)
Bireley, R. L. (M)
Blake, J. A. (A)
Blake, N. A. (M)
Borkowski, J. A. (A)
Brady, F. H. (M)
Broseghini, B. L. (M)
Cain, R. F. (M)
Casteel, B. G. (M)
Chambers, D. R. (M)
Clark, J. R. (SM)
Clements, L. E. (M)
Close, E. F. (M)
Coatney, A. E. (M)
Coles, D. K. (SM)
Collins, G. E. (SM)
Cronkwright, R. E. (M)
Curl, G. W. (A)
Dean, W. A. (A)
Decker, S. M. (M)
Dees, J. (M)
Di Loreto, C. D. (M)
Dreisbach, R. H. (M)
Durso, J. L. (M)
Dye, N. E. (M)
Edgbert, J. D. (SM)
Emery, R. C. (A)
Farnsworth, P. T. (F)
Feustel, E. A. (A)
Fisher, D. E. (A)
Folks, R. C. (A)
Fong, S. G. (SM)
Franchi, A. J. (A)
Freimann, F. (SM)
Garrett, L. A. (M)
Giesige, R. J. (A)
Giffin, G. S. (M)
Gotschall, W. O. (M)
Gough, L. E. (SM)
Grant, R. L. (SM)
Haddock, D. E. (M)
Hagan, W. K. (SM)
Hambrock, H. E. (M)
Hardwick, C. L. (SM)
Harmer, R. L. (M)
Harris, A. S. (M)
Harwood, F. E. (M)
Hedeen, F. D. (A)
Helmreich, L. W. (SM)
Hendryx, W. B. (M)
Herke, F. P., Jr. (M)
Hertzog, W. K. (M)
Hessler, J., Jr. (SM)
Hine, S. H. (A)
Holloway, T. D. (M)
Holmquist, J. A. (M)
Houser, N. W. (M)
Howe, D. R. (M)
Humphries, R. G. (M)
Jacobson, A. J. (M)
Jensen, C. W. (M)
Johnson, D. L. (A)
Johnson, L. (M)
Jones, R. B. (M)
Jung, D. H. (A)
Kast, S. L. (M)
Kaplan, R. (M)
Keller, V. L. (M)
Kendall, P. E. (SM)
Killie, O. (M)
Knarr, C. E. (M)
Koenig, E. W. (M)
Kuffel, L. A. (M)
La Fevre, L. M. (M)
Lawburgh, R. H. (M)
Loftin, R. A. (M)
Lovegren, P. B. (M)
Major, T. (M)
Manion, J. L., Jr. (M)
Manning, G. C., Jr. (A)
Marcinko, A. M. (M)
Martin, D. W. (SM)
Mason, C. F. (A)
Mast, J. G. (M)
Mast, P. L. (M)
Mayle, A. T., Jr. (SM)
Mayle, L. F. (SM)
McAuliffe, G. K. (M)
McFadden, J. H. (M)
McGregor, R. B. (M)
Meadows, H. R. (M)
Mensing, D. J. (M)
Miller, R. W. (M)
Mitchell, J. P. (A)
Mount, E. V. (M)
Muniz, R. (SM)
Murphy, L. W. (M)
Nelson, C. E. (M)
O'Connor, R. A. (M)
Pantazin, T. (M)
Pegg, B. B. (A)
Pinter, P. J. (M)
Plait, A. G. (SM)
Polhamus, J. R. (M)
Pritchard, H. T. (M)
Pufahl, E. R. (M)
Rasley, D. R. (SM)
Reals, L. J. (M)
Rexroad, R. A. (A)
Richards, C. A. (M)
Richards, G. A. (M)
Richeson, W. E. (M)
Robertson, G. D. (SM)
Robrock, B. K. (M)
Rodgers, P. D. (M)
Rogers, M. A. (M)
Roy, W. R. (M)
Russell, R. S. (M)
Rust, M. F. (M)
Sabo, J. (M)
Salinger, H. W. G. (F)
Sanders, R. W. (SM)
Schlansker, K. C. (SM)
Schneider, S. S. (SM)
Seiy, M. E. (SM)
Sharp, J. W. (SM)
Shaw, R. A. (M)
Shelton, G. B. (M)
Silvey, J. O. (SM)
Sinish, R. D. (SM)
Slick, E. P. (M)
Sloan, W. R. (A)
Smith, S. L. (A)
Snell, J. W. (A)
Southern, P. D. (M)
Stapleton, G. F. (M)
Stein, E. F. (M)
Stewart, C. W. (M)
Stewart, H. G. (M)
Stoakes, W. L. (M)
Summers, T. F. (A)
Swanson, E. S. (M)
Teetor, T. S. (A)
Thompson, J. L. (A)
Tieszen, D. J. (M)
Toohig, M. F. (M)
Torgrim, W. J. (M)
Torzyn, N. T. (M)
Trimarchi, J. (M)
Valentine, F. C. (M)
Von Berg, D. W. (M)
Wallace, C. E., Jr. (M)
Webster, S. K. (M)
White, E. A. (SM)
Wibel, D. (A)
Wible, P. E., Jr. (M)
Williams, W. J., Jr. (M)
Wolfgang, L. G. (M)
Wolk, T. E. (M)
Yope, J. R. (M)
Zbacnik, E. V. (M)
Zins, W. A. (M)

Fowler (IND-5)
Walovich, J. J. (M)

Franklin (IND-5)
Reuss, R. E. (M)

Galveston (IND-5)
Buehler, E. R. (A)
Miltower, A. R. (A)

Gary (CHI-5)
Barancyk, V. (A)
Borrowman, J. H. (M)
Buccicone, V. S. (M)
Donahey, H. E. (A)
Groberg, L. E. (A)
Hopkins, E. L. (A)
Ireland, R. P. (M)
Ratkay, S. (A)
Shirk, K. C. (M)
Theodore, J. A. (A)

Goshen (IND-5)
Corporon, R. P. (M)
Harrison, E. F. (A)

Grabill (FT-W-5)
Cleven, R. D. (M)
Phillips, T. H. (M)

Granger (SB-M-5)
Ammon, J. A. (A)
Rach, R. D. (A)

Greenwood (IND-5)
Marshall, C. L. (M)
Sisson, R. L. (M)

Griffith (CHI-5)
Vereb, A. J. (A)

Hagerstown (CIN-4)
Culy, G. E. (M)
Vanderbilt, V. C., Jr. (SM)

Hammond (CHI-5)
Dwyer, R. J. (M)
Janik, J. L. (M)

Hobart (CHI-5)
Loggie, T. W. (A)
Severson, M. L. (A)
Spangler, R. (A)

Hudson (FT-W-5)
Tressler, J. B. (M)

Huntertown (FT-W-5)
Carpenter, D. L. (M)
Ordas, A. F. (M)

Huntington (FT-W-5)
Fisher, C. C. (SM)
Kaufman, A. R. (M)
Smart, R. E. (A)
Terry, C. B. (M)

Indianapolis (IND-5)
Abrahamsen, J. M. (A)
Adams, J. C. (M)
Adams, R. L. (SM)
Alden, E. E. (M)
Aldred, E. D. (M)
Arbuckle, R. D. (M)
Arman, R. W. (M)
Arvin, M. J. (SM)
Axmann, G. F. (M)
Barrelle, R. J. (M)
Begeman, R. H. (M)
Bell, D. L. (A)
Bennett, W. H. (M)
Berfanger, J. A. (M)
Berlier, J. C., Jr. (M)
Berntsen, W. H. (M)
Blackledge, R. A. (A)
Booher, W. R. (M)
Bough, J. N. (A)
Braunlin, R. J. (A)
Brockway, R. M. (M)
Brodrick, L. G. (M)
Brown, W. K. (M)
Burley, F. E. (SM)
Butts, C. B. (A)
Carpenter, M. M., Jr. (M)
Carson, H. E. (SM)
Carter, C. O. (A)
Carter, H. A. (A)
Choopenning, R. B. (M)
Cobb, L. J. (M)
Cook, L. R. (M)
Cowan, M. A. (M)
Cruthers, R. F. (M)
David, C. E. (M)
Davidson, J. J. (M)
Davis, C. B. (M)
De Moss, J. F. (M)
De Voe, L. M. (M)
Drilling, N. G. (M)
Duke, A. D. (M)
Dumbacher, J. (M)
Engler, A. R. (M)
Ervin, E. E. (M)
Evans, A. G. (M)
Evans, P. A. (SM)
Everhart, C. W. (M)
Fagg, W. H. (M)
Fallowes, R. W. (A)
Fitch, H. E. (A)
Fitch, T. L. (M)
Forsee, G. B. (M)
Fraser, G. R. (SM)
French, A. B. (M)
Gamble, M. E. (SM)
Gary, A. H. (M)
Gelinas, R. (M)
Givan, D. E. (M)
Goodler, G. N. (M)
Gresham, S., Jr. (SM)
Hand, J. E. (M)
Harden, J. G. (SM)
Hayden, G. H. (M)
Hipskind, G. S. (M)
Hofeld, J. G. (M)
Holland, H. A. (A)
Hostetler, W. E. (M)
Hromada, J. C. (SM)
Huetten, C. (SM)
Johannessohn, N. A. (M)
Jones, R. D. (M)
Jordan, H. G. (M)
Kades, S. L. (M)
Kennedy, W. H. (M)
Kevlin, J. F. (M)
Knipp, C. W. (M)
Koepke, E. P. (A)
Kovalcik, E. (M)
Kraft, R. W. (M)
Lanning, W. E. (M)
Macnabb, V. C. (M)
Manning, W. L. (SM)
Marasco, F. A. (M)
Mason, D. E. (M)
Maxwell, J. W. (SM)
McInnis, R. D. (M)
McMinn, E. R. (M)
Moore, R. E. (M)
Montoya, E., Jr. (SM)
Morone, J. P., Jr. (SM)
Moyer, R. C. (SM)
Nelson, J. B. (A)
O'Brien, J. P. (M)
Olsen, R. C. (A)
Peden, J. E. (A)
Phillips, R. M. (M)
Pumett, L. J. (SM)
Raub, R. D. (M)
Reager, A. M. (M)
Resener, B. J. (M)
Roeschlein, E. R. (A)
Roys, H. E. (F)
Sauerteig, F. H. (M)
Schager, R. J. (M)
Schmitt, D. L. (M)
Schoch, H. B. (M)
Schramer, K. (A)
Schultz, A. J. (SM)
Schutz, E. A. (A)
Skinner, G. M. (M)
Slater, I. M. (SM)
Sorensen, R. L. (M)
Spencer, R. L. (M)
Stafford, W. C. (M)
Stanley, E. R. (M)
Stembel, J. E. (M)
Stuart, D. M. (SM)
Stuhlsarg, S. M. (M)
Sukup, J. P. (M)
Sweany, L. P. (M)
Tague, B. D. (SM)
Thomas, J. G. (M)
Thomas, J. W. (M)
Thom, W. D. (M)
Tudor, E. C. (M)
Tutauskas, L. (SM)
Tumbaugh, C. C. (M)
Tyler, R. D. (M)
Vangelakos, C. (M)
Vaughn, D. C. (M)
Viers, A. J. (M)
Walker, R. S. (M)
Welsh, L. F. (M)
Whitaker, R. O. (M)
White, B. J., Jr. (M)
Widriksis, I. (A)
Williams, J. E. (A)
Wisner, H. L. (SM)
Wolff, H. R. (SM)
Wulfekuhl, R. J. (M)
Wuster, W. L. (A)
Young, E. A. (A)
Yttre, S. T. (A)

Jasonville (IND-5)
Liston, W. S. (M)

Jonesboro (IND-5)
Konrad, R. J. (M)

Kokomo (IND-5)
Anderson, A. L. (M)
Atkinson, J. R. (M)
Bickel, S. O. (M)
Blossey, C. W. (M)
Brandon, W. S. (M)
Brinkerhoff, D. E. (M)
Brown, L. E. (A)
Brown, R. B. (M)
Bunch, D. L. (M)
Burkhardt, P. E. (M)
Calabro, J. E. (M)
Carlson, E. C. (A)
Carr, W. J. (M)
Chassin, C. A. (M)
Connor, W. E. (M)
Cory, C. D., Jr. (M)
Cory, N. L. (A)
Donohoe, F. J., Jr. (M)
Doversberger, K. W. (M)
Engle, D. E. (A)
Gerhardt, B. J. (M)
Guyton, J. H. (M)
Harmon, C. A. (M)
Heckert, W. F. (M)
Hein, P. H. (M)
Held, M. L. (M)
Jenkins, R. L. (M)
Jaumot, F. E., Jr. (SM)
Khan, F. R. (A)
Knolinski, R. E. (M)
Laitinen, L. K. (M)
Letsinger, W. C. (M)
Manahan, M. J. (SM)
Martin, D. W. (M)
Mason, J. M. (M)
McCaughan, H. M. (A)
Miller, R. F. (M)
Neltans, K. L. (M)
Nelson, D. L. (M)
Paskell, E. (A)
Prewitt, T. A. (M)
Price, M. R. (M)
Pyle, H. (M)
Reed, R. E. (A)
Rittmann, A. D. (SM)
Runyan, W. G. (M)
Rupprecht, E. G. (M)
Schaffner, J. S. (SM)
Schwarz, B. A. (F)
Shearer, J. E. (A)
Sieftken, R. M. (M)
Snead, J. R. (A)
Stahl, K. L. (M)
Stelzl, H. M. (M)
Thonan, J. E. (M)
Tulledge, C. O. (M)
Vogt, K. S. (M)
Votava, C. J. (M)
Wagner, R. F. (M)
Weber, J. W. (M)
Worthen, J. H. (M)
Wright, H. E. (M)

Lafayette (IND-5)
Adams, W. L. (M)
Evans, C. M. (M)
Evans, H. R. (M)
Freeman, S., Jr. (M)
Friedlaender, F. J. (M)
Geldmacher, R. C. (M)
Gibson, J. E. (M)
Halsey, M. R. (M)
Hancock, J. (M)
Kamal, A. K. (M)
Kline, R. M. (M)
Kozin, C. H. (M)
Landgrebe, D. (M)
Muhleman, C. E., III (M)
Murphy, R. D. (M)
Sabbagh, E. M. (SM)
Sage, A. P., Jr. (M)
Samuels, J. C. (M)
Schultz, F. V. (SM)
Seo, H. (M)
Sheppard, E. M. (M)
Shipley, P. P. (M)
Siskind, R. P. (SM)
Stanley, P. E. (M)
Tou, J. (SM)
Wade, W. D. (SM)
Wallman, W. B. (M)

La Porte (SB-M-5)
Evancich, E. (M)
Tuck, F. A. (A)

Lawrence (IND-5)
May, C. W. (M)

Lawrenceburg (CIN-4)
Gompf, R. H. (M)
Runyan, R. E. (M)

Logansport (IND-5)
Harrell, D. H. (M)
Munson, A. L. (A)

Marion (IND-5)
Ballard, D. C. (SM)
Benway, R. E. (M)
Ransom, D. J. (M)

Michigan City (SB-M-5)
Allinsky, J. W. (SM)
Bloss, R. P. (M)
Cook, R. W. (M)
Demercurio, C. D. (M)
Groendyke, R. W. (M)
Hillmann, R. E. (A)
Honda, M. (A)
Horvath, J. W. (A)
Kolster, W. K. (A)
Lee, W. (A)
Livingstone, J. K. (M)
Matter, L. E. (M)
Meadows, F. D. (SM)
Middleton, J. A. (M)
Page, O. D. (SM)
Rado, J. A. (SM)
Sievers, S. S. (M)
Spangler, S. T. (SM)
Taylor, D. E. (A)
Ware, L. E., Jr. (M)
Wenzinger, C. J., Jr. (M)

Mishawaka (SB-M-5)
Armstrong, C. N. (M)
Bigelow, A. F. (M)
Coontz, J. J. (M)
Cunningham, D. L. (M)
Eberlein, C. W. (M)
Haigh, R. B. (M)
Hansen, A. G., Jr. (M)
Henker, J. W. (M)
Janoslk, J. R. (M)
Koch, W. J. (A)
Kracman, M. (A)
Lawrence, W. G. (M)
Lottes, J. J. (M)
Marshall, R. E. (M)
Martin, J. B. (M)
McGuire, H. E. (M)
Miller, A. E. (A)
Neff, D. L. (A)
Omberg, A. C. (SM)
Patten, R. B. (A)
Paulsen, H. A. (M)
Paulson, E. E. (M)
Pitcher, R. M. (M)
Pless, L. C. (M)
Radebaugh, B. W. (M)
Schmiedefer, F. J., Jr. (M)
Splies, P. D. (M)
Sprouse, P. J. (M)
Steele, N. D., Jr. (M)
Turner, O. G. (M)
Vogtmann, H. W. (M)
Walenga, J., Jr. (M)
Whiffen, R. E. (SM)
Williams, L. K. (A)
Zimitch, D. C. (M)

Monroeville (FT-W-5)
Fouts, J. W. (M)

Mooresville (IND-5)
Fenimore, G. E. (SM)
Frederick, A. E. (M)

Muncie (IND-5)
Burton, D. A. (A)
Hayes, M. E. (A)
Ruff, D. O. (M)
Springer, G. P. (A)

Munster (CHI-5)
Miner, J. H. (M)
Roedel, J. (M)
Sane, J. M. (A)

Nappanee (SB-M-5)
Bammel, M. E. (A)
New Augusta (IND-5)
Cross, K. R. (A)

New Haven (FT-W-5)
Allen, R. E. (M)
Bennett, E. Y., Jr. (M)
Bryant, W. D. (M)
Buckley, J. E. (M)
Elden, G. E. (M)
Guichard, R. S. (M)
Hallmark, C. E. (SM)
Koppin, A. A. (M)
Murphy, F. J. (M)
Viterisi, D. P. (A)

North Kokomo (IND-5)
Dean, R. J. (A)

Notre Dame (SB-M-5)
Coomes, E. A. (SM)
Ellithorn, H. E. (SM)
Evers, A. J. (M)
Foecke, H. A. (A)
Hodes, I. (M)
Morgan, D. R. (M)
Morine, L. A. (M)
Riehm, C. E., Jr. (M)
Stauder, L. F. (M)

Orestes (IND-5)
Gilliam, D. W. (A)

Oriole (E 0-5)
Frakes, S. E. (A)

Osceola (SB-M-5)
Cox, P. G. (SM)
Ludwig, A. R. (M)
Moulton, G. E. (M)

Peru (IND-5)
See, W. E. (A)

Plainfield (IND-5)
Heim, K. E. (M)
Lightburne, D. N. (A)

Plymouth (SB-M-5)
Kennedy, P. R. (A)

Princeton (E 0-5)
Smith, Z. R. (M)

Richmond (CIN-4)
Maddox, R. D. (M)
Young, K. W. (A)

Roanoke (FT-W-5)
Krulee, R. L. (M)
Yoder, L. E. (M)

Russiaville (IND-5)
Fred, J. A. (M)

St. Meinrad (EO-5)
Ringeman, O. E. (M)

Shelbyville (IND-5)
Schnelder, G. F. (M)

Sheridan (IND-5)
Anderson, T. V. (A)
Neal, S. M. (M)

South Bend (SB-M-5)
Arthur, A. A. (M)
Baugh, R. G. (M)
Bezzell, H. L. (M)
Bedford, J. S. (M)
Beehler, L. A. (M)
Blong, V. J. (M)
Bowersox, F. L. (M)
Colten, J. L. (SM)
Cox, W. (A)
Crosby, E. L., Jr. (M)
De Jonge, E. H. (M)
De Ruyck, A. R. (M)
Durbin, H. M. (M)
Elliott, D. F. (M)
Falco, M. F. (SM)
Feaster, J. A. (M)
Firner, J. F. (M)
Frosch, R. A. (M)
Grant, J. H. (M)
Heller, D. M. (SM)
Hicks, C. S. (M)
Hoffman, C. H. (SM)
Hollis, R. H. (M)
Husung, D. (M)
Jacks, J. T. (M)
Jaffe, B. (A)
Kaiser, R. P. (M)
Kemph, K. R. (M)
Kepner, P. E. (M)
Kindt, N. O. (M)
Klimek, T. F. (M)
Kunz, W. J., Jr. (SM)
La Blanc, R. A. (M)
LaSalle, E. (M)
Leslie, C. B. (A)
Llepa, L. V. (M)
Link, A. G. (M)
Lopresti, P. V. (M)
Loring, L. W. (A)
Mansfield, K. I. (M)
Marz, P. A. (M)
Masteller, B. L. (M)
McWhorter, W. F. (M)
Metsker, W. E. (SM)
Miller, R. D. (M)
Modesitt, M. B. (M)
Mossman, R. B. (SM)
Nelson, D. F. (M)
Nymberg, R. J., Jr. (M)
O'Neil, A. R. (M)
Patterson, J. M. (A)
Pauwels, K. G. (A)
Puca, Q. J. (M)
Quigley, A. J. (M)
Root, R. E. (M)
Rushing, W. A. (M)
Scott, G. C. (M)
Shaffer, C. W., Jr. (A)
Slagal, R. P. (M)
Soleta, G. S. (M)
Stiling, T. O. (M)
Stouffer, R. C. (M)
Svorec, R. S. (A)
Ulery, E. L. (M)
Voss, J. R. (M)
Weiler, G. (M)
Weissert, R. K. (M)
West, E. B. (M)
Willard, D. C. (M)
Winkler, M. A. (SM)
Wissink, M. G. (M)
Witsken, C. H. (M)
Woelfle, R. M. (M)

Speedway (IND-5)
Hook, G. E. (M)
Schnell, S. A. (A)
Wacker, K. F. (A)

Tell City (EO-5)
Churchill, P. K. (SM)
Hammond, R. F. (SM)

Terre Haute (IND-5)
Bennett, L. W. (M)
McCracklin, R. E. (M)
Moench, H. A. (SM)
Smith, P. D. (M)

Union City (IND-5)
Resor, J. D. (M)

Valparaiso (CHI-5)
Baker, F. C. (A)
Bullis, E. E. (A)
Gast, D. A. (A)
Gray, M. F. (A)
Hiatt, H. E. (M)
Holt, J. G. (A)
Knudsen, A. R. (M)
Luecke, E. J. (M)
McCasland, G. R. (A)
Neville, W. G. (A)
Oldham, K. W. (M)
Patton, R. C. (A)
Shewan, W. (M)
Tindall, E. K., Jr. (A)
Vocke, M. C. (M)

Wabash (IND-5)
Thurlow, M. P. (M)

Waldron (IND-5)
Miller, D. C. (SM)

Washington (EO-5)
Creager, B. H. (M)

Waterloo (FT-W-5)
Hamman, H. L. (A)

West Lafayette (IND-5)
Beck, C. A. (A)
Bolle, D. M. (M)
Chang, J. J. (M)
Chang, Y. F. E. (M)
Cooper, G. R. (M)
Czarapata, A. H. (M)
Detraz, O. R. (M)
Donovan, R. F. (M)
Dumin, D. J. (M)
Eccles, W. J. (M)
El-Ablad, A. H. (M)
Flynn, M. J. (M)
Freeman, S., III (M)
George, R. H. (SM)
Grant, M. P. (M)
Happell, G. E. (SM)
Hayt, W. H., Jr. (SM)
Heim, H. J. (SM)
Hemdal, J. F. (M)
Hesselberth, W. M. (M)
Hotub, A. J. (M)
Hughes, G. W. (M)
Johnson, S., Jr. (M)
Jones, T. F., Jr. (SM)
Joseph, P. D. (M)
Kennerly, J. E. (M)
Kenyon, R. R. (M)
Levine, M. W. (M)
Machol, R. E. (SM)
Merchant, R. C. (M)
Myers, J. E. (M)
Ogborn, L. L. (M)
Pitt, P. E. (A)
Raible, R. H. (M)
Sims, S. D. (M)
Walter, E. R. (A)
Wininger, A. G. (M)
Wyman, R. H., Jr. (M)

West Salem (EO-5)
Maas, J. L. (A)

Whiting (CHI-5)
Torzewski, D. F. (M)

Winchester (IND-5)
Beynon, D. J. (M)

Winslow (EO-5)
Vaughan, J. D. (A)



Wolcottville (FT-W-5)
Hayworth, R. G. (A)

Woodburn (FT-W-5)
Bertsche, G. (M)

Zionsville (IND-5)
Woodruff, A. E. (M)

IOWA

Amana (CR-5)
Zimmerman, P. A. (A)

Ames (CR-5)
Ablin, H. L. (M)
Boasi, W. B. (M)
Bolie, V. W. (M)
Bowen, D. W. (M)
Camp, R. C. (M)
Cassell, W. L. (SM)
Coover, M. S. (SM)
Goss, J. E. (M)
Gowen, R. J. (M)
Griffin, J. E. (M)
Holland, G. E. (M)
Hoversten, E. V. (M)
Hughes, W. L. (M)
Long, F. M. (A)
Loupee, B. J. (M)
Mattson, R. H. (M)
McMechan, J. D. (M)
Morris, T. J., Jr. (M)
Pavlat, J. R. (M)
Pohm, A. V. (M)
Post, R. E. (M)
Read, A. A. (M)
Schauer, R. F. (M)
Stewart, R. M., Jr. (M)
Town, G. R. (F)
Triska, C. J. (M)
Ulstad, M. S. (M)
Zingg, R. J. (M)

Ankeny (CR-5)
Johnston, D. H., Jr. (M)

Bettendorf (CR-5)
Anvidson, P. G. (M)
Campbell, D. B. (M)
Fischer, L. A. (A)
Hutchison, R. P. (A)
Sergeant, J. V. (M)

Boone (CR-5)
Johnson, W., Jr. (M)

Burlington (CR-B-5)
Allen, J. W. (M)
Anderson, W. W. (M)
Applegate, J. A. (SM)
Bogart, P. M. (M)
Bos, L. W. (M)
Burham, F. P. (M)
Cherryholmes, C. D. (M)
Clark, H. L. (M)
Eck, E. J. (M)
Ehret, F. W. (A)
Ertz, C. S. (M)
Everett, T. D. (M)
Healey, N. B. (M)
Keser, P. D. (M)
McFarren, L. E. (SM)
Miller, R. C. (SM)
Moyers, W. D. (M)
Mullin, M. L. (M)
Peshock, M., Jr. (M)
Sylten, H. D. (SM)
Taylor, D. L. (M)
Wilcox, R. A. (M)
Winegard, J. R. (M)

Cedar Rapids (CR-5)
Abrams, H. T. (A)
Adelson, J. W. (M)
Anderson, A. E. (SM)
Anderson, J. E. (M)
Anderson, K. R. (M)
Anderson, M. V. (M)
Anderson, W. G. (M)
Andrade, E. A. (SM)
Andrews, E. J., Jr. (M)
Arens, R. P. (M)
Armstrong, M. E. (M)
Ayers, D. C. (M)
Babilius, J. (SM)
Ball, J. K. (M)
Beamer, C. M. (M)
Bellville, W. H. (M)
Benning, G. L. (A)
Beranek, W. J. (M)
Berry, D. G. (M)
Binger, K. B. (M)
Bishop, G. E. (M)
Born, A. S. (SM)
Bowles, C. H., Jr. (M)
Bradford, F. H. (A)
Brega, L. B. (A)
Britton, R. W. (SM)
Broadhead, S. L., Jr. (SM)
Brobst, J. D. (M)
Brower, H. P. (M)
Brown, H. R. (M)
Brown, K. L. (M)
Brown, S. E. (A)
Bruce, R. A. (M)
Bruene, W. B. (SM)
Burdick, L. R. (M)
Buroker, G. E. (M)
Burton, R. E. (M)
Cahalan, J. L. (M)
Cannoy, M. K. (M)
Caquelin, M. W. (SM)
Carroll, R. C. (M)
Carter, J. T., Jr. (M)
Cattoi, R. L. (SM)
Chadima, G. E., Jr. (M)
Christensen, A. A. (M)
Collins, A. A. (F)
Combellick, J. D. (M)
Conrad, E. R. (M)
Cope, W. F. (M)
Cory, T. S. (M)
Couillard, L. W. (SM)
Cowan, C. D. (M)
Cox, R. T. (SM)
Craft, L. M. (SM)
Craiglow, R. L. (M)
Cramer, R. L. (M)
Cribbs, R. D. (M)
Culp, J. C. (M)
Cummings, F. M. (M)
Curley, R. E. (A)
Dalton, J. L. (SM)
Decker, D. L. (M)
DeLong, V. R. (SM)
De Vries, H. G. (M)
Dietrich, F. J. (M)
Donaldson, R. V. (M)
Drabelle, J. M., Jr. (M)
Dubisky, M. J. (M)
Duff, R. E., Jr. (M)
Duhamel, R. H. (M)
Duncan, J. W. (SM)
Duncan, J. D. (M)
Dunn, R. S. (SM)
Durell, C. R. (M)
Eggert, C. F., Jr. (M)
Eichenberger, D. L. (M)
Elliott, W. S. (SM)
Engholm, K. J. (M)
England, L. C. (A)
Erickson, G. A. (A)
Essig, R. D. (SM)
Fedde, C. D. (M)
Fells, W. E. (M)
Finger, P. R. (M)
Fisher, R. J. (A)
Fletcher, K. L. (SM)
Flint, R. L. (M)
Ford, D. W. (M)
Fredrickson, D. L. (M)
Frey, H. B. (M)
Friedrichs, J. P. (M)
Fritze, E. H. (SM)
Fuller, R. C. (M)
Funston, S. S. (M)
Gallagher, D. C. (M)
Gallagher, R. B. (A)
Gaskill, H. V. (SM)
Gates, R. S. (M)
Gerks, I. H. (F)
Getzin, N. R. (M)
Glandon, A. E. (M)
Glynn, L. A. (M)
Goetz, J. L. (SM)
Goldman, B. M. (M)
Graham, N. L. (M)
Graves, W. H. (M)
Green, D. H. (A)
Greenlee, J. A. (A)
Greenwell, R. E. (M)
Grimm, D. K. (M)
Griswold, W. R. (M)
Habeger, E. A. (M)
Haines, G. L. (M)
Hamann, J. R. (M)
Hancock, J. R. (A)
Hannon, D. L. (M)
Hanson, R. W. (M)
Hattendorf, E. R. (M)
Heath, J. W. (M)
Hedgcock, W. T., Jr. (M)
Henesath, M. B. (M)
Hooker, C. (M)
Herreid, H. R. (M)
Herzog, W. E. (M)
Heston, J. L. (M)
Hieb, E. A. (M)
Hirvela, R. J. (M)
Hixenbaugh, G. P. (M)
Hlavaty, L. F. (M)
Hodge, R. M. (A)
Hodges, R. R., Jr. (M)
Hodgin, D. M., Jr. (SM)
Hograbe, H. J. (A)
Hogue, N. E. (SM)
Holec, V. P. (M)
Hootman, J. (M)
Hornbeck, S. J. (M)
Hoskinson, M. F. (M)
Hubbard, M. R. (SM)
Hudek, V. R. (SM)
Hungerford, L. D. (M)
Hykes, G. R. (M)
Innis, J. P. (M)
Jaycox, R. L. (M)
Johannes, J. V. (M)
Johnson, A. F. (M)
Johnson, D. E. (M)
Johnson, F. W. (M)
Johnson, L. E. (A)
Joy, H. H. (M)
Kennedy, J. M., Jr. (M)
Kennedy, W. A. (M)
Kidman, R. D. (M)
Kintzel, C. K. (M)
Kirkpatrick, C. H. (M)
Klehfoth, W. G. (M)
Koos, R. K. (M)
Kopf, H. A. (M)
Kopp, R. W. (M)
Kratzer, J. G. (M)
Krebs, D. W. (M)
Kuriger, W. L. (M)
Lang, E. E., Jr. (M)
Lerwick, R. R. (M)
Lieske, E. W. (M)
Loop, D. E. (M)
Ludvigson, M. T. (M)
Luiken, D. G. (M)
Maire, M. S. (M)
Malik, N. R. (M)
March, G. W. (M)
Marshall, F. C., Jr. (M)
Marston, R. J. (M)
Martin, E. L. (SM)
Martin, J. A. (M)
Martz, F. W. (A)
Mayer, P. A. (M)
Mc Connell, T. E. (SM)
Mc Creary, R. L. (SM)
McDaniel, I. V. (M)
McElroy, J. C. (SM)
McGraw, R. C. (M)
McInerney, J. F. (M)
McKinley, P. A. (SM)
McLaughlin, R. A. (M)
McLin, F. D. (M)
McMichael, R. W. (M)
Meier, J. C. (M)
Merritt, J. R. (M)
Metcalf, C. E. (M)
Meyer, A. W. (M)
Meyer, D. H. (SM)
Meyer, R. J. (M)
Mills, J. L. (M)
Minerva, V. P. (M)
Mollman, W. G. (SM)
Moody, J. M. (M)
Morrison, S. M. (SM)
Mortimore, R. L. (M)
Mortimore, T. N. (M)
Moseman, P. (A)
Most, N. S. (M)
Myers, G. G. (M)
Nelson, J. H. (M)
Newell, D. E. (M)
Nielson, J. (M)
Nims, J. K. (A)
Olson, R. L. (SM)
Oppedahl, C. A. (M)
Ore, F. R. (M)
Pappenfus, E. (SM)
Paul, J. L. (M)
Pearson, C. C. (A)
Perkins, A. N. (M)
Perry, V. G. (M)
Petitt, J. G. (M)
Phlegar, C. L., Jr. (M)
Pickering, R. F. (M)
Pierce, R. J. (SM)
Polashek, E. J. (A)
Rennekamp, E. E. (M)
Rexroad, W. D. (M)
Ringland, J. F. (A)
Rockwell, C. A. (M)
Rogers, P. H. (M)
Ruth, P. D. (M)
Salmon, R. F. (M)
Schuster, H. E. (M)
Scott, A. J. (M)
Secor, A. (M)
Sellers, G. W. (SM)
Sentl, E. C. (SM)
Simmons, W. J. (M)
Skar, R. C. (M)
Smith, H. D. (M)
Smith, J. W. (SM)
Snyder, R. E. (M)
Stambaugh, E. D. (A)
Steinacker, R. B. (M)
Stevens, D. R. (M)
Stewart, C. (SM)
Stockwell, G. M. (A)
Stover, H. A. (M)
Stryker, E. M., Jr. (M)
Swanson, R. A. (M)
Taylor, R. C. (A)
Thompson, P. (M)
Thran, D. P. (M)
Thurer, J. M. (A)
Tollefson, R. D. (SM)
Topf, P. A. (M)
Truesdell, R. M. (M)
Turner, J. F. (A)
Tweedt, O. C. (A)
Uhrik, R. L. (M)
Vander-Hamm, R. L. (M)
Van Engelhoven, C. A. (M)
Vanous, J. A. (SM)
Vaughn, K. E. (SM)
Vick, E. K. (SM)
Vinson, R. G. (M)
Vrbik, J. (A)
Wainwright, L. F. (M)
Wales, G. A. (M)
Waller, H. F. (M)
Weber, D. W. (SM)
Westcot, J. L. (SM)
Western, R. E. (M)
Wheeler, J. C., Jr. (A)
White, R. C. (M)
Wilkes, L. D. (M)
Wilson, J. A. (M)
Wilson, M. F. (SM)
Wilson, W. D. (M)
Windus, W. A. (M)
Winkle, S. E. (A)
Winters, R. K. (A)
Wright, K. F. (M)
Wulfsberg, A. H. (SM)
Wulfsberg, P. G. (SM)
Zinkus, J. V. (A)

Clarinda (CR-5)
Kelley, J. M. (A)

Council Bluffs (OM-L-5)
Davidson, S. (M)
Fuller, G. L. (A)
Meyermann, G. W. (A)
Otis, J. C. (A)
Palaka, J. R. (M)
Petersen, W. P. (A)
Smith, R. L. (A)
Stewart, A. C. (SM)

Danville (CR-5)
Anderson, D. A. (A)
Harris, D. L. (A)

Davenport (CR-5)
Andrews, L. W. (M)
Brown, G. G. (M)
Dove, D. E. (M)
Handel, N. E. (M)
Hayes, C. W. (M)
Hendrickson, H. T. (M)
Lenker, P. E. (A)
Lewis, R. W. (M)
Petersen, V. L. (M)
Pfannenstiel, D. A. (A)
Pollman, L. F. (A)
Shuda, D. G. (M)

Delmar (CR-5)
Jurgensen, V. L. (A)

Denver (CR-5)
Schumacher, M. W. (A)

Des Moines (CR-5)
Carmosino, M. J. (M)
Coleman, F. C. (A)
Dowell, R. J. (M)
Eastman, J. W. (M)
Harris, V. M. (A)
Houvenagle, T. L. (M)
Loyet, P. A. (SM)
Luther, R. E. (A)
Meek, W. J. (M)
Naney, R. P. (M)
Quentin, C. F. (M)
Rissler, H. D. (M)
Rothrock, R. B. (M)
Sharp, R. R. (A)
Stauffer, R. E. (M)
Tennant, O. A. (M)
Vitols, V. A. (M)

Fort Dodge (CR-5)
Fisher, B. (M)
Kreuger, G. B. (M)
Smith, O. H. (M)
Tunwall, C. S. (A)

Fort Madison (CR-5)
Seadler, S. E. (A)

Grinnell (CR-5)
Denny, W. B. (M)

Hiawatha (CR-5)
Berkovec, J. W. (M)
Dargis, A. A. (M)
Ericksen, P. N. (M)
Forrest, R. L. (M)
Griffin, N. J. (M)
Jackson, H. E., Jr. (M)
Myhre, P. K. (SM)
Wilkerson, J. L. (M)

Independence (CR-5)
Blank, W. A. (M)

Iowa City (CR-5)
Acer, J. W. (M)
Alton, E. D. (M)
Alwin, V. C. (A)
Chisman, J. A. (M)
Curtis, J. F. (A)
Edberg, R. A. (M)
Essler, W. O. (M)
Held, J. L. (M)
Hunter, T. A. (F)
Leiting, M. C. (A)
Lockwood, W. H. (A)
Massey, W. R. (A)
Maurer, R. J. (M)
McMillin, J. V. (M)
Melloh, A. W. (SM)
Menzer, C. H. (SM)
Small, A. M., Jr. (M)
Streib, W. J. (M)
Thissell, J. D. (M)
Van Allen, J. A. (F)
Ware, L. A. (SM)
Wood, D. L. (M)

Le Claire (CR-5)
Keefe, J. W. (A)

Luana (CR-5)
Landt, H. L. (A)

Marion (CR-5)
Acker, J. R. (M)
Baldwin, L. G. (M)
Baxter, C. W. (M)
Bergemann, G. T. (M)
Breed, W. M. (A)
Burkeville, J. M. (M)
Burnham, R. E. (A)
Cain, R. J. (M)
Canfield, R. E. (M)
Carney, C. S. (M)
Chihak, P. P. (M)
Coady, L. B. (M)
Damm, F. (SM)
Davison, W. W. (M)
Dawson, R. J. (M)
Day, W. E. (M)
Dedich, J. J. (M)
Entrikin, D. M. (M)
Fankhauser, J. E. (SM)
Follensbee, W. M. (M)
Frye, E. O. (SM)
Gjertson, R. D. (M)
Griffee, L. V. (M)
Hanson, H. L. (A)
Hart, R. W. (M)
Hirsch, H. D. (M)
Hotchkiss, J. H. (A)
Hudock, E. (SM)
Jessen, M. F. (M)
Kinley, K. S. (M)
Krogh, R. S. (M)
Lehman, H. W. (SM)
Leverington, R. D. (M)
Majerus, J. B. (M)
Mamer, G. R. (SM)
Mayer, A. F. (M)
McCune, H. K. (M)
McManis, D. L. (M)
McNeil, J. F. (M)
Michael, H. G. (M)
Moorhead, P. E. (M)
Nelson, G. D. (M)
Newhouse, V. L. (M)
Olson, R. E. (M)
Peterson, D. L. (A)
Pool, R. H. (M)
Read, E. F. (M)
Rodes, W. D. (SM)
Rooks, H. B. (M)
Schultz, E. L. (M)
Searl, E. P. (M)
Simpson, R. L. (A)
Smith, D. A. (A)
Smith, M. S. (SM)
Sprengeler, J. H. (M)
Stevens, H. (M)
Suebe, A. C., Jr. (A)
Tuthill, E. G. (M)
Van Tilbury, J. D. (SM)
Vitebsky, J. H. (M)
Walrath, H. D. (M)
Winter, L. E. (M)
Wise, R. S. (M)

Marshalltown (CR-5)
Christensen, P. M. (M)

Mason City (CR-5)
Christensen, R. A. (M)
Sawyer, R. E. (SM)

Mitchellville (CR-5)
Melloh, C. I. (M)

Mount Vernon (CR-5)
Hartong, G. S. (M)

Muscatine (CR-5)
Havercamp, R. P. (M)
Lister, E. C. (M)

Oelwein (CR-5)
McGinnis, S. E. (M)
Sawvelle, E. V. (M)

Oskaloosa (CR-5)
Northfield, W. E. (M)

Sioux City (OM-L-5)
Call, G. R. (A)
Chmelka, F. A. (M)
Lasensky, M. M. (M)
Scott, L. D. (A)
Smith, A. H. (M)

Solon (CR-5)
Chansky, W. C. (A)

Spencer (CR-5)
Tuttle, R. F. (A)

Toddville (CR-5)
Johnson, G. J. (M)
Vance, A. G. (M)

Walker (CR-5)
Yeoman, D. C. (A)

Waterloo (CR-5)
Tink, E. M. (M)

West Branch (CR-5)
Stuckten, R. A. (M)

West Burlington (CR-B-5)
Collins, J. H. (M)
Hunt, J. C. (M)
Kruse, E. A. (M)
Musolino, J. M. (M)
Saba, S. A. (M)
Wunnenberg, H. V. (A)

Whiting (OM-L-5)
Bearce, E. J. (A)

KANSAS

Abilene (MC-6)
Gay, G. L. (A)

Augusta (WIC-6)
Kohman, E. J. (M)

Belle Plaine (WIC-6)
Shore, A. L. (M)

Bethel (KC-6)
Andrews, L. G. (A)
Barnes, O. C. (M)

Boicourt (KC-6)
Witcher, J. F. (M)

Cherryvale (WIC-6)
McGinness, C. C. (M)

Colby (WIC-6)
Unruh, S. W. (A)

Derby (WIC-6)
Edwards, R. R. (M)
Egbert, D. E. (M)
Hickey, L. F. (A)
Knowlton, R. F. (M)
Long, F. C., Jr. (M)

Fort Leavenworth (KC-6)
Downing, J. P., Jr. (M)
Holcombe, W. H., Jr. (M)
Lamar, K. (M)
Laprad, Q. C. (M)

Gardner (KC-6)
Gault, W. E. (M)
Gay, W. D. (M)
Reed, D. M. (M)

Hays (WIC-6)
Chapman, D. C. (M)
O'Loughlin, J. B. (M)

Haysville (WIC-6)
Boyer, D. W. (A)
Cochran, J. J. (M)
Loman, J. W. (M)
Rhoten, C. J. (M)

Hiawatha (KC-6)
Legler, H. E. (A)

Hutchinson (WIC-6)
Cook, K. H. (M)
Kopels, I. (A)
Schwertfeger, A. W. (A)

Independence (WIC-6)
Johnson, R. W. (A)
Stedman, J. D. (A)
Swartz, G. A. (M)

Junction City (WIC-6)
Symons, F. E. (M)

Kansas City (KC-6)
Bowen, M. J. (A)
Carlson, M. A. (A)
Cooper, J. R. (A)
Crayczrall, K. S. (A)
Davies, J. I. (A)
Dellinger, C. E., Jr. (A)
Fischer, E. (M)
Fisher, G. F. (A)
Hoover, W. C. (A)
Jones, G. R. (M)
Molby, L. H. (M)
Pusch, J. H. (A)
Richards, A. (A)
Samuelson, D. S. (M)
Walton, C. (A)
Watt, E. M. (A)
Wilson, D. R. (A)

Lawrence (KC-6)
Butler, K. J., Jr. (M)
Cummings, A. J. (M)
Ellermeier, R. D. (M)
Frye, G. J. (M)
Garels, G. E. (M)
Habayeb, A. R. (M)
Hill, R. D. (M)
Lansdown, W. D. (M)
McDowell, J. F., Jr. (M)
Nahman, N. S. (SM)
Patterson, J. D. (M)
Pippert, R. F. (M)
Robb, D. D. (M)
Rummer, D. I. (M)
Shackelford, R. B. (A)
Shiner, H. W. (A)
Unz, H. (M)
Warfield, J. N. (SM)

Leavenworth (KC-6)
Vanderstaay, T. F., Jr. (A)
Whitlock, R. L. (A)

Leawood (KC-6)
Heyde, H. C. (M)

Lenexa (KC-6)
Wade, M. E. (M)

McConnell AFB (WIC-6)
McDonald, W. W. (M)

McPherson (KC-6)
Hedquist, T. G. (M)

Manhattan (KC-6)
Buttle, L. A., Jr. (A)
Childs, A. W. (A)
Dawson, S. L. (M)
Elrod, T. H. (M)
Halijak, C. A. (M)
Hegler, B. E. (M)
Ho, J. P. L. (M)
Kerchner, R. M. (SM)
Van Der Maas, G. J. (A)
Wilson, R. W. (M)

Merriam (KC-6)
Fayman, D. L. (M)
Walter, G. W. (M)

Mission (KC-6)
Ayres, R. C. (SM)
Broadbent, L. C. (M)
Broders, E. L. (A)
Curtis, G. L. (M)
Gleissner, B. F. (A)
Grey, T. G. (SM)
Guthrie, J. E. (M)
Miller, H. G. (SM)
Omer, C. L. (SM)
Robb, L. S. (M)
Wearth, A. W. (M)
Wilson, R. G. (A)

Morrowville (KC-6)
Woods, D. C. (A)

Mulvane (WIC-6)
Hink, K. G. (M)
Persels, D. M. (A)
Ruppe, K. E. (M)

Olathe (KC-6)
Spieker, D. A. (A)

Overland Park (KC-6)
Beougher, L. C. (M)
Betros, L. A. (M)
Christy, J. O. (M)
Dalton, R. C. (M)
Fetter, R. W. (SM)
Files, C. O. (M)
Gipple, C. A. (M)
Hyer, F. K. (M)
James, R. T. (M)
Kunde, W. W., Jr. (M)
Mayse, R. L. (M)
Patrick, D. J. (A)
Peppel, T. R. (A)
Rauch, E. L. (M)
Rudisill, R. R. (A)
Shipe, J. J. (A)
Shirley, J. N. (M)
Shotwell, D. M. (M)
Thorpe, H. G. (M)
Wagner, F. R. (M)
Webster, J. P. (M)

Parsons (WIC-6)
Tierney, P. V. (M)

Pittsburg (KC-6)
Nuckolls, R. G. (SM)

Prairie Village (KC-6)
Babbit, E. B. (M)
Chester, W. G. (M)
Crawford, R. A. (M)
Findley, L. D. (M)
Garmon, W. F. (M)
Grogger, G. M. (A)
Hadley, J. F. (M)
Hax, D. H. (SM)
Hoffman, G. R. (M)
Inderwiesen, F. H., Jr. (SM)
Johnson, D. E. (A)
Kennedy, J. L. (M)
Kroencke, E. A., Jr. (M)
Love, B. E. (M)
Martin, R. L. (SM)
Marx, T. I. (M)
Miller, C. V. (M)
Nigg, D. J. (M)
Petersen, G. B. (A)
Rollert, C. R. (M)
Sommerville, D. I. (M)
Tyler, S. R. (SM)
Van Zant, R. R. (M)
Zimmerman, R. S. (M)

Pratt (WIC-6)
Temaat, J. A. (A)

Salina (WIC-6)
Baer, M. T. (M)
Goldman, M. W. (M)
Kelley, D. B. (M)
Martz, M. P. (M)
Stucky, N. P. (M)

Sharon Springs (WIC-6)
Mantey, J. P. (M)

Shawnee (KC-6)
Goll, W. E. (M)
Jaedicke, E. R. (M)
Wilson, P. H. (A)

Topeka (KC-6)
Brown, E. B. (M)
Carriger, J. R. (A)
Costelow, J. A. (A)
Frazee, J. W. (M)
Grantham, R. B. (M)
Halliwell, B. J. (M)
Heitlinger, L. J. J. (M)
Joy, I. L. (A)
Mannell, L. H. (M)
Moran, E. J. (M)
Totten, G. A. (A)
Varvel, W. M. (M)
Voiles, G. E. (A)
Valley Center (WIC-6)
Cord, C. E. (A)
Depew, H. H. (A)

Wichita (WIC-6)
Aksamit, E. M. (M)
Allen, L. S. (M)
Andrews, B. (M)
Ayres, W. R. (SM)
Baresch, E. M. (M)
Barnes, L. S. (M)
Bereman, E. W. (A)
Brown, J. W. D. (M)
Brumley, G. (M)
Burnett, J. W. (M)
Burris, P. M. (M)
Byers, H. O. (M)
Carttar, G. L. (M)
Carver, T. W. (M)
Cunningham, J. C. (A)
Damaskos, N. J. (M)
Davis, H. C. (A)
Day, W. R. (M)
Dopp, V. S. (A)
Dunlap, M. E. (M)
Ege, H. D. (M)
Evans, J. D. (M)
Flowerday, W. L. (M)
Flucard, W. B. (M)
Francis, J. W. (M)
Gamm, C. J. (A)
Gandy, W. H., Jr. (M)
Garvin, C. W. (A)
Gerlach, P. D. (M)
Gozinsky, J. R. (M)
Hall, A. E. (M)
Harper, C. W. (M)
Harper, J. M. (M)
Harris, G. E. (A)
Hay, R. E. (A)
Hegey, C. E. (M)
Hinshaw, V. G. (A)
Hitchcock, H. L. (A)
Hutchison, D. P. (M)
Johnson, V. N. (M)
Johnson, W. R. (M)
Kallmann, G. T. (M)
Keene, A. W., Jr. (M)
Kinnaman, R. L. (A)
Klatz, W. K. (M)
Kraus, D. R. (A)
Lampl, M. B. (A)
Leighton, C. P. (M)
Little, H. H., Jr. (A)
Livingston, W. D. (M)
Louie, W. G. (M)
Lundgren, P. L. (M)
Magee, W. A. (M)
Maurer, N. A., Jr. (M)
McAlearney, P. H. (A)
McDonald, F. W. (M)
Mc Dougal, J. R. (M)
Mecke, R. M. (M)
Murphy, A. T. (M)
Murray, W. A. (M)
Newby, H. H. (M)
Nicholson, J. A. (M)
Oakes, J. W. (M)
Patterson, D. L. (M)
Patton, T. N., Jr. (M)
Piper, E. (M)
Prihar, Z. (SM)
Rogers, K. O. (M)
Rogers, L. W. (A)
Schneider, C. S. (M)
Schowalter, D. E. (M)
Schray, R. L. (M)
Sheppard, G. E. (M)
Simpson, L. F. (M)
States, D. M. (A)
Stephens, G. B. (A)
Strain, R. A. (A)
Studebaker, J. E., Jr. (A)
Swift, H. G. (M)
Thiel, J. E. (M)
Webb, D. O. (M)
Wencel, M. L. (M)
Williams, D. E. (A)
Ziegelbein, G. K. (M)
Zobrist, G. W. (M)

KENTUCKY

Bellevue (CIN-4)
Rohrer, R. S. (M)

Bowling Green (LOU-5)
Gott, A. M. (A)
Hendrick, R. J. (M)

Brookside (LOU-5)
Whitfield, J. E., Jr. (A)

Columbia (LOU-5)
Owens, L. M. (M)

Covington (CIN-4)
Dreyer, G. C. (M)
Munch, W., Jr. (M)
Rice, H. A. (M)
Schworer, R. J. (M)

Cumberland (LOU-5)
Cornett, R. (A)
Cornett, V. (A)

Danville (LOU-5)
Harper, D. N. (M)

Fern Creek (LOU-5)
Henson, C. E. (M)
Tiska, C. C. (M)

Fort Knox (LOU-5)
Wareham, W. S. (A)
Winterberger, H. P. (A)
Yeats, J. J., Jr. (M)

Fort Thomas (CIN-4)
Fischler, P. E. (M)
Fowler, N. B. (SM)
Sims, T. W. (A)
Stratman, J. W. (M)
Werrmann, C. A. (A)

Franklin (LOU-5)
Wakefield, F. H. (A)

Georgetown (LOU-5)
Calvert, J. W. (M)

Glasgow (LOU-5)
Sadler, C. C. (A)

Harlan (LOU-5)
Johnson, M. E. (A)

Henderson (EO-5)
Johns, W. D. (M)

Independence (CIN-4)
McGraw, H. E. (M)

Jeffersontown (LOU-5)
Hewitt, L. G. (M)
Lyle, I. W., Jr. (M)

Lexington (LOU-5)
Albanes, N. J. (M)
Allison, N. B. (M)
Beattie, H. S. (SM)
Boppess, R. L. (M)
Cates, J. A. (M)
Curry, J. W. (M)
Dally, H. J. (M)
Ebaugh, D. P. (M)
Erdman, B. K. (M)
Fackler, C. M., Jr. (M)
Gaines, D. E. (M)
Goldsberry, P. E. (M)
Haggard, T. Y. (M)
Helt, S. (M)
Hickerson, J. E. (M)
Johnson, B. A. (M)
Koppius, O. G. (M)
Lahr, R. J. (M)
Lasseter, T. A. (M)
Locklar, H. C. (M)
McDonald, W. L. (M)
Musto, T. L. (M)
Navarro, S. O. (M)
Perkins, N. K. (A)
Pray, E. B. (M)
Quillen, W. F. (M)
Rogers, F. L., Jr. (M)
Ross, B. (SM)
Thompson, R. L. (M)
Wayman, R. L. (M)
Wilford, M. O., III (M)
Wu, P. F. (M)
Yount, W. R. (A)

Louisville (LOU-5)
Berman, M. (M)
Betz, J. D. (M)
Blue, T. F., Jr. (M)
Childers, T. A. (M)
Covert, J. L. (M)
Eno, R. A. (M)
Fife, S. T. (SM)
Fitzmayer, L. H. (M)
Gates, S. H. (A)
Hase, W. F., Jr. (A)
Hope, C. R. (M)
Kelly, C. W., III (M)
Koller, O., Jr. (M)
Marven, E. L., Sr. (M)
Maynard, A. F. (SM)
McAfee, C. S. (A)
Morrison, W. J. (M)
Neher, B. (A)
Nevitt, R. G. (M)
Probst, M. C. (M)
Ryan, W. J. (M)
Scales, H. S. (A)
Skaggs, E. P. (A)
Smith, H. T. (M)
Sweets, F. M. (M)
Towner, D. W. (F)
Von Behren, W. P. (SM)
Weigel, F. W., Jr. (M)

Marion (EO-5)
Gass, C. A. (M)

Mayfield (EO-5)
Bruce, R. A. (M)

Middlesboro (LOU-5)
Folsom, F. L., Jr. (A)

Middletown (LOU-5)
Williams, L. A. (M)

New Albany (LOU-5)
Hawkins, J. G. (M)
Jennings, S. V. (M)

Newport (CIN-4)
Fields, G. S. (M)

Olive Hill (CIN-4)
Barker, E. E. (M)

Owensboro (EO-5)
Albrecht, C. E. (SM)
Barron, J. L. (A)
Bertke, H. J. (M)
Bond, E. G. (M)
Bowles, L. T., Jr. (SM)
Boxx, J. P. (M)
Bristow, S. C. (SM)
Bryant, J. A. (A)
Buren, W. E. (M)
Campbell, J. D., Jr. (M)
Carter, F. M. (A)
Carter, M. G. (SM)
Cirul, J. W. (M)
Connelly, J. M. (A)
Coomes, P. S. (M)
Cullen, W. F. (M)
Davis, L. B. (SM)
De Walt, K. C. (SM)
Dickerson, A. F. (SM)
Dillon, L. C. (M)
Dorris, R. M. (A)
Edwards, M. W. (SM)
Ellis, L. C. (M)
Freeman, H. H. (M)
Fitts, S. M. (SM)
Fritschel, E. H. (SM)
Graves, M. B. (M)
Groves, S. K. (SM)
Haase, A. P. (SM)
Hamilton, M. W. (M)
Hayes, F. L. (M)
Hopper, C., Jr. (SM)
Horne, O. P. (A)
Horton, C. E. (SM)
Hughes, R. M. (SM)
Jackson, J. E. (M)
Johnson, K. D. (SM)
Jolly, P. L. (M)
Jordan, J. D. (M)
Kimker, W. P., Jr. (M)
Lammers, D. E. (M)
Lattin, W. J. (M)
Le Clear, M. W. (SM)
Lemaster, S. W. (M)
Lemaster, W. H. (M)
Madole, J. F. (SM)
Maginn, L. J. (M)
Martin, J. E. (M)
McCool, C. D. (SM)
McKinnis, C. E. (SM)
Meyer, R. H. (M)
Mickey, D. D., Jr. (SM)
Millis, W. T. (SM)
Moe, R. E. (F)
Mullersman, F. H. (M)
Mumford, L. G. (M)
Oakes, W. S. (M)
Owen, L. D. (M)
Pennoyer, R. T. (SM)
Quirk, J. B. (SM)
Reynolds, C. L. (SM)
Rickerson, W. B. (M)
Robb, J. H. (A)
Roberts, L. E., Jr. (M)
Rush, J. S. (SM)
Russell, M. W. (M)
Seader, W. R. (M)
Shipley, W. U. (M)
Smith, H. D., Jr. (M)
Snyder, F. R. (M)
Somerville, J. R., Jr. (M)
Stephens, J. F. (SM)
Stephenson, E. L. (SM)
Taylor, C. L. (SM)
Trautwein, J. W. (M)
Tucker, J. C. (M)
Walker, R. J. (A)
Ware, C. M. (M)
White, R. G. (M)
Wink, J. B. (M)
Wofford, D. R. (A)
Wood, G. C. (M)

Paris (LOU-5)
Miller, L. W. (A)

Salvisa (LOU-5)
Gritton, D. M. (M)

Somerset (LOU-5)
Thompson, B. G. (A)

South Fort Mitchell (CIN-4)
Hughes, J. B. (M)
Merrell, C. H. (SM)
Reynolds, D. J. (M)
Schipper, R. J. (M)
Wayne, W. C., Jr. (M)

Stanley (EO-5)
Jackson, S. G. (M)

Walton (CIN-4)
Smith, A. W. (M)

LOUISIANA

Alexandria (NO-6)
Rust, D. E. (M)

Barksdale AFB (SHR-6)
Asendorf, J. A. (M)
Buckelew, W. F., Jr. (M)
Elchak, J., Jr. (M)
Tansel, D. C. (M)

Bastrop (NO-6)
Green, W. M., Jr. (M)

Baton Rouge (NO-6)
Campos, L. F. (M)
Haas, G. M. (M)
Kothman, E. B. (A)
Levy, C. D. (M)



McGowan, I. C. (M)
McLean, L. V. (SM)
Mobley, R. C. (A)
Nethken, R. T. (M)
Owen, W. E. (M)
Perry, G. H. (M)
Vinet, P. B., Jr. (M)

Belle Chasse (NO-6)
Hero, G. A., III (A)

Bossier City (SHR-6)
Carmichael, H. C. (A)
Culling, E. J. (M)
Laurents, B. W. (A)
Wagner, F. D., Jr. (M)

Centerville, (NO-6)
Young, R. L. (M)

Chalmette (NO-6)
Often, C. G. (A)

Chennault AFB (B-PA-6)
McCarty, R. F. (M)

De Quincy (B-PA-6)
Shackelford, L. R. (A)

Eunice (NO-6)
Cline, R. W. (M)

Franklinton (NO-6)
Reese, J. O., Jr. (M)

Golden Meadow (NO-6)
Brady, J. A., Sr. (A)

Houma (NO-6)
Guy, S. A. (M)
Hathaway, W. E. (A)
Segrest, B. C. (M)

Jennings (B-PA-6)
Bailey, C. L. (A)

Lacombe (NO-6)
Rust, J. J. (A)

Lafayette (NO-6)
Billingsley, L. H. (M)
Boudreaux, F. J. (SM)
Diaz-Romeu, G. (M)
Goss, W. C., Jr. (A)
Mayeux, R. (M)
Prejean, J. C. (M)
Wynne, M. P. (M)

Lake Charles (B-PA-6)
Burkett, A. C. (M)
Carmouche, C. L. (M)
Dreyer, R. F. E. (A)
Emerson, R. L. (A)
Fisher, S. R. (A)
Fuller, M. M., Jr. (M)
Maas, R. R. (M)
Moses, E. C. (A)
Neal, G. H. (A)
Senneville, L. O. (M)
Thomas, H. F., Jr. (A)
Vincent, R. S. (M)
Warner, R. D. (A)
White, R. A. (A)

Longville (B-PA-6)
Nelson, W. C. (A)

Mangham (NO-6)
Duncan, H. P. (M)

Maplewood (B-PA-6)
O'Shaughnessy, C. A. (M)

Metairie (NO-6)
Adkins, J. M. (M)
Chigoy, W. A. (M)
Dobbs, M. G. (SM)
Hulteen, C. K. (A)
Kirkley, D. E., Jr. (M)
Pedneau, W. F. (M)
Ritchey, L. C., Jr. (A)
Schiele, E. A. (A)
Tong, E. (M)
Tunis, I. L. (M)

Monroe (SHR-6)
Boyd, R. L. (M)

Natchitoches (SHR-6)
Bailey, B. H., Jr. (M)

New Iberia (NO-6)
Braquet, L. J., Jr. (M)
Sitomer, A. A. (A)

New Orleans (NO-6)
Allen, G. (A)
Atkins, R. E. (A)
Becker, H. C. (M)
Bloom, J. D., Jr. (SM)
Bordenave, L. R. (A)
Bullock, J. C. (M)
Coleman, J. L. (M)
Cronvich, J. A. (SM)
Dahlstrom, D. D. (M)
Delhom, L. A. (M)
Dowe, R. J. (M)
Dureau, L. D. (M)
Du Treil, L. J. N. (SM)
Duvoisin, P. F. (A)
Fahrmeier, M. L. (M)
Freeland, W. T. (M)
Freiberger, H. A. (M)
Gadsden, C. P. (A)
Gaston, M. H. (M)
Goldstein, M. (M)
Hammett, R. B. (M)
Hart, W. S. (M)
Heymann, H. (A)
Jacob, R. A. (M)
Jenkins, E. W., Jr. (SM)
Jesclard, G. P. (M)
Landry, A. P. (M)
Landry, N. R. (M)
Lebde, P. E. (F)
Lodato, J. S. (M)
Malm, J. F. (A)
Martin, G. I. (SM)
Mayoral, G. A. (SM)
Morris, J. C. (M)
Norris, C. H. (M)
O'Donnell, C. F. (M)
Otto, J. L. (M)
Pace, W. H., Jr. (M)
Peirce, G. H. (M)
Reid, P. Z., Jr. (M)
Reinhard, V. (M)
Riddle, L. G. (SM)
Robertson, J. L., Sr. (M)
Ruissel, G. A. (M)
St. Romain, J. B. (A)
Scheffler, F. A. (M)
Smith, E. S. (M)
Spencer, J. C. (SM)
Sperry, C. J., Jr. (SM)
Talbot, W. S. (A)
Woods, T. D. (M)
Wulff, F. A., III (M)
Yaclch, P. J. (M)

Oakdale (B-PA-6)
Marcantel, B. (M)

Ruston (SHR-6)
Cole, C. F., Jr. (A)
Johnson, D. L. (SM)
Steere, R. M. (SM)
Tarbutton, J. S. (SM)

Shreveport (SHR-6)
Amaltis, E. J. (A)
Ashe, H. B. (M)
Bains, R. W. (M)
Barton, M. C., Jr. (A)
Beard, E. M. (A)
Craig, W. H. (M)
Davis, J. R. (A)
Dilsler, W. F. (M)
Friedman, H. G. (A)
Garrett, E. D. (A)
Goff, R. J. (M)
Gordon, E. (M)
Herring, J. J., III (M)
Hitt, J. E. (A)
Hurley, L. (M)
Long, F. V. (SM)
MacFarlane, J. S. (A)
Maddox, C. H. (SM)
Nuttall, E. D. (SM)
Nuttall, J. E. (M)
Payne, R. C. (M)
Porter, H. R. (M)
Randolph, A. M. (M)
Rudisill, D. R. (A)
Scott, C. R. (M)
Scurlock, J. T. (M)
Strickland, E. C. (M)
Williams, L. T. (M)
Wilson, C. R. (M)
Womack, F. L. (A)
Woodard, T. A. (M)

Slidell (NO-6)
Bowen, L. M. (A)

Sulphur (B-Pa-6)
Albright, A. L. (M)
Mc Namara, J. E. (M)

Tallulah (NO-6)
Kontlzer, E. W. (M)

West Monroe (SHR-6)
Grantham, J. M. (M)
Steele, R. M. (M)

MAINE

Augusta (BOS-1)
Parker, R. H. (M)

Bangor (BOS-1)
Creamer, W. J. (SM)
Ferris, D. L. (M)
Libbey, W. M. (M)
Purvis, W. K. (A)
Rosenkranz, C. A. (A)
Schneider, H., Jr. (M)

Bath (BOS-1)
Collins, R. E. (M)
Whiteman, S. E. (A)

Brewer (BOS-1)
Dittes, R. E. (M)

Brunswick (BOS-1)
Craddock, A. L. (M)
Gulledge, D. B. (A)
Lacharite, P. H. (A)
Little, N. C. (M)

Calais (BOS-1)
Reynolds, J. C. (M)

Camden (BOS-1)
Tibbetts, G. C. (M)
Cape Elizabeth (BOS-1)
Gray, L. E., Jr. (M)

Caribou (BOS-1)
Adams, J. H. (M)

East Machias (BOS-1)
Davies, H. E. (M)

Eastport (BOS-1)
Lyon, G. H., II (A)

Falmouth Foreside (BOS-1)
Edwards, B. H. (M)

Freeport (BOS-1)
Hall, R. T. (M)

Gorham (BOS-1)
Chandler, V. H. (SM)

Harrison (BOS-1)
Carlson, A. W. (A)

Kennebunk (BOS-1)
Kotlewski, J. P. (M)

Lewiston (BOS-1)
Schunk, H. F. (M)

Lisbon Falls (BOS-1)
Porter, G. D. (A)

Loring AFB (BOS-1)
De Veaux, E. C. (M)
Miller, D. C. (M)

Machias (BOS-1)
Ankers, R. E., Jr. (M)

Moody (BOS-1)
Cunningham, T. R. (A)

Mount Vernon (BOS-1)
Ford, W. W. (M)

New Gloucester (BOS-1)
Brackett, M. (A)

Oakland (BOS-1)
Alfieri, H. A. (F)

Orono (BOS-1)
Bowles, L. W. (M)
Brown, C. M. (M)
Mac Farland, H. T. (A)

Portland (BOS-1)
Brewer, L. F. (SM)
Chandler, J. (M)
Hodgkins, R. W. (SM)
Johnson, P. A. (M)
Kozineski, W. (A)
Opp, R. D. (M)
Ottinger, G. L. (M)

Presque Isle (BOS-1)
Dearness, J. L. (A)

Randolph (BOS-1)
Newell, G. R. (A)

Raymond (BOS-1)
Marshall, J. R. (M)

Rockport (BOS-1)
Drisko, B. B. (M)

Saco (BOS-1)
Libby, J. L. (M)

Sanford (BOS-1)
Neal, R. A. (M)

Sebago Lake (BOS-1)
Browning, G. H. (F)

South Casco (BOS-1)
Shively, E. H. (M)

South Thomaston (BOS-1)
Makinen, D. A. (M)

Topsham (BOS-1)
Bohn, J. T. (M)
Hornby, D. A. (M)

Union (BOS-1)
Whitney, L. E. (M)

Waldoboro (BOS-1)
Cooney, J. R. (M)

Westbrook (BOS-1)
Athas, A. P. (M)

Wiscasset (BOS-1)
Kennedy, D. S. (M)

Woodland (BOS-1)
Henry, W. L. (M)

Yarmouth (BOS-1)
Brown, C. R. (M)

MARYLAND

Aberdeen (BAL-3)
Byrod, R. B. (M)
Frasher, M. M. (M)
Hallman, J. I. (M)
Hazelwood, C. E. (A)
Hodge, A. H. (M)
Hunsicker, J. E. (M)
Leeder, J. (M)
Long, P. C., Jr. (M)
Shuppert, G. W. (M)
Stoller, M. D. (M)
Terashi, T. (M)
Truell, F. (M)
Wolfe, C. W. (M)
Wrublewski, M (M)
Zancanata, H. W. (M)

Accokeek (W-DC-3)
Harris, F. H. (M)
Hayden, L. O. (M)
Rabb, J. W. (M)
Thornhill, A. F. (M)

Adelphi (W-DC-3)
Campbell, L. E. (M)
Carr, F. P., Jr. (M)
Cirincione, G. V. (M)
Davies, J. M. (M)
Hott, R. D. (M)
Hudson, L. B. (M)
Hulfish, W. S. (M)
Hutchinson, E. M. (M)
Jewell, J. J. (M)
Keating, T., Jr. (M)
Knodle, R. L. (M)
Lalos, S. C. (M)
McGraw, H. (M)
Navarro, R. C. (M)
Pan, P. M. (M)
Pedler, W. F. (M)
Richers, E. E. (M)
Ringenbach, M. E. (M)
Roberts, G. L., Jr. (M)
Sandorf, R. E. (M)
Schmidt, D. J. L. (M)
Schuhardt, W. F. (M)
Smith, L. G., Jr. (M)
Stead, N. A. (A)
Stogsdill, M. R. (M)
Thomas, E. (M)
Weeks, W. A., Jr. (M)
Wheelock, R. H. (M)
Wood, C. R., Jr. (M)

Andrew AFB (W-DC-3)
Leonard, W. E. (M)
Studebaker, M. E. (M)

Annapolis (BAL-3)
Albright, E. L. (M)
Allard, L. C., Jr. (M)
Baker, R. A. (A)
Bly, T. S. (M)
Bremer, J., Jr. (A)
Carr, R. W. (M)
Carter, W. G. (A)
Clark, T. H. (F)
Currier, J. L., Jr. (M)
Dalrymple, H. C. (M)
Daley, J. L. (M)
Day, J. T., Jr. (M)
Dick, D. N. (M)
Dickey, J. L. (M)
Dziedzic W. T. (M)
Eberhardt, F. J. (M)
Felk, R. L. (SM)
Friedel, J. E., Jr. (A)
Goodhue, W. W. (M)
Greenwell, R. F. (M)
Hemmick, K. S. (M)
Jacob, R. E. (M)
Johnson, N. C. M., Jr. (A)
Johnson, P., Jr. (A)
Leydorf, G. E. (M)
Lindow, I. L. (M)
Maher, P. D., III (M)
Maling, H. F., Jr. (M)
Meenahan, W. J. (M)
Mild, L. M. (M)
Poston, M. H. (M)
Quenstedt, R. E. (M)
Ray, H. B. (SM)
Sabbagh, H. A. (M)
Schuttig, L. A. (SM)
Seymour, C. P. (M)
Spalding, F. F. (M)
Wylde, R. J. (SM)

Arbutus (BAL-3)
Hiscox, H. W. (M)
Truske, T. N. (M)

Army Chemical Center (BAL-3)
Chalcraft, J. C. (A)

Arnold (BAL-3)
Gould, G. T., Jr. (SM)
Gregory, L. W. (SM)
Hamilston, H. A. (SM)
Parnell, W. S. (M)
Scarbro, R. L. (M)
Smith, K. W. (M)
Spink, P. G. (M)
Weaver, T. S. (M)
Yanko, R. J. (A)

Baldwin (BAL-3)
Church, G. W. (SM)
Claborn, K. D. (M)
Wentworth, F. L. (M)
Wolsey, L. G. (M)

Baltimore (BAL-3)
Abel, A. E. (SM)
Abell, C. S., III (M)
Albright, J. D. (M)
Aldwinckle, J. G. V. (M)
Alexander, R. B. (SM)
Allen, J. E. (M)
Allen, R. J. (M)
Allinder, R. H. (M)
Alpert, I. S. (M)
Amato, W. P. (A)
Andersen, A. (M)
Anikis, G. P. (M)
Aprahamian, J. (A)
Armstrong, J. E., Jr. (M)
Ashmead, H. E. (SM)
Ausfresser, H. D. (M)
Aviles, H. N. (A)
Aycock, H. T., III (M)
Bacchialoni, F. L. (M)
Bachmann, J. F. (SM)
Bacon, F. C. (M)
Baida, S. (M)
Bailey, R. T. (M)
Baker, R. H. (M)
Ballentine, R. (A)
Bamberger, J. E. (A)
Basil, I. T. (M)
Bath, C. C. (SM)
Bauer, H. A. (M)
Baughman, O. A. (M)
Becker, C. H. (M)
Becker, J. A. (SM)
Beckman, N. W. (M)
Beecher, G. L. (A)
Behm, G. T. (M)
Bell, J. L., Jr. (A)
Bender, W. W. (SM)
Bennett, J. W. (M)
Bentley, F. C. (M)
Bernstein, J. (SM)
Berry, A. E. (M)
Berry, J. R. (M)
Betsh, K. W. (SM)
Bickart, T. A. (M)
Billin, W. V. (A)
Blasbalg, H. (SM)
Blinchikoff, H. J. (M)
Bloom, L. (M)
Bloomer, T. M. (SM)
Blotzer, W. L. (A)
Boan, B. H. (A)
Boin, K. L. (M)
Bourget, J. A. (M)
Bowman, D. P. (M)
Boykin, J. R. (SM)
Briggs, M. R. (F)
Brown, D. (M)
Browning, J. B., Jr. (M)
Bucciero, J. (M)
Buck, J. R. (M)
Bullock, W. C. (SM)
Burn, J. M., Jr. (M)
Caldwell, E. E. (M)
Campas, W. (M)
Cantor, H. J. (A)
Caporin, E. A. (M)
Carlson, J. W. (M)
Carroll, T. J. (M)
Carter, C. E., Jr. (M)
Carter, J. C. G. (SM)
Cassedy, E. S., Jr. (M)
Castell, J. V. (A)
Cepol, J. (M)
Chamberland, M. H. (A)
Chamberlin, R. S. (M)
Chiarenza, P. P. (M)
Chipman, J. R. (M)
Choksy, N. H. (M)
Claus, O. R., Jr. (A)
Cleaves, W. E. (SM)
Clemson, D. B. (M)
Clifford, R. W. (M)
Clotworthy, J. H. (M)
Cochran, G. C. (M)
Cockaday, L. M. (M)
Cohen, H. A. (M)
Cohn, M. (M)
Cole, E. S. (M)
Cole, E. B., Jr. (SM)
Cole, R. C. (M)
Colpoys, G. T. (M)
Conklin, W. S. (M)
Conley, P. (SM)
Content, E. J. (SM)
Covington, M. G., Jr. (M)
Crew, J. B., Jr. (M)
Cromer, O. M. (M)
Crotty, W. J., Jr. (M)
Crutchfield, R. C., Jr. (M)
Csepely, J. A. (SM)
Dailing, C. J. (M)
Dalton, D. A. (M)
Damghajian, H. R. (M)
Dantzig, H. P. (SM)
Darr, J. E. (M)
Davies, E. R. (A)
Davis, J. W. (M)
Davis, R. E., Jr. (M)
Dax, P. R. (M)
Deise, L. F. (M)
Denburg, D. L. (M)
Der, C. F. (M)
Desi, G. R. (M)
De Socio, G. (SM)
De Ved, G. R. (M)
Dickens, L. E. (M)
Dimitriou, G. (M)
Dornbach, W. R. (SM)
Doss, H. C. (M)
Dozier, J. W. (A)
Dreisbach, B. J. (M)
Drenning, J. W. (M)
Dunn, J. E. (M)
Eckels, A. E. (M)
Edmiston, W. H. (M)
Edwards, R. L., Jr. (M)
Egger, C. P. (M)
Ehrlinger, R. J. (SM)
Elseman, W. F. (M)

Ekstrom, J. L. (M)
Ellert, C. A. (M)
Engert, M. (M)
Epstein, J. M. (M)
Evans, R. F. (M)
Evans, R. E. (M)
Fainberg, J. (M)
Fallon, G. P. (SM)
Farkas, I. (A)
Farkas, J. (M)
Farmer, W. C., Jr. (A)
Farrell, T. W. (M)
Fellerman, K. D. (M)
Fenichel, I. (M)
Ferg, A. P. (A)
Ferris, H. (M)
Fialkowski, F. A. (M)
Fine, C. E. (M)
Finke, R. S. (M)
Finlayson, J. A. (M)
Fischbach, J. T. (A)
Fischer, P. P. (M)
Fitta, E. R. (M)
Fitzhugh, H. S., II (M)
Flaherty, J. M. (M)
Fleishman, S. R. (M)
Fletcher, G. (A)
Flink, T. O. (M)
Floam, J. S. (A)
Foerster, R. P. (M)
Foley, T. P. (A)
Foster, J. W. S., Jr. (A)
Fox, R. C. (M)
Frankenfield, C. C. (M)
Frazier, W. E. (M)
Friedmann, D. C. (M)
Fruge, F. J. (M)
Furrow, M., Jr. (M)
Gage, D. D. (SM)
Galway, W. G. (M)
Garbutt, H. E. (A)
Garove, F. P. (A)
General, J. (SM)
Gensler, P. L. (M)
Gessner, U. (A)
Gilbert, G. B., Jr. (M)
Giller, M. (M)
Gilmore, C. D. (M)
Gilmore, D. B. (M)
Giordano, J. R. (M)
Gisriel, J. W., Jr. (A)
Giuliano, M. N. (M)
Gladding, E. B. (SM)
Glaser, E. M. (M)
Glover, C. C. (M)
Glucksman, R. M. (SM)
Golf, J. D. (M)
Goodloe, R. R. (M)
Gore, W. C. (SM)
Grabinski, R. J. (M)
Graf, H., Jr. (M)
Grauling, C. H., Jr. (M)
Green, E. E. (A)
Greenslit, C. L. (SM)
Griffiths, W. W., Jr. (M)
Groszer, A. J., Jr. (A)
Gunter, F. B. (SM)
Hack, J. (A)
Hagan, F. R., Jr. (A)
Hagelgans, E., Jr. (M)
Hallo, M. (SM)
Hall, O. C. (M)
Hall, R. J. (M)
Hall, S. R. (M)
Haller, E. J. (A)
Ham, D. W. (M)
Hamburger, F., Jr. (F)
Hamburger, T. (A)
Hamby, J. O. (M)
Hancock, E. C. (M)
Hankey, R. L. (M)
Hanna, R. E. (M)
Harper, J. T. (M)
Harper, M. J. (M)
Harris, B. L. (M)
Harris, H. W. (M)
Harris, J. F. (SM)
Harrison, W. E., Jr. (M)
Hartka, J. J. (M)
Hartley, H. F., Jr. (SM)
Hauck, V. D. (SM)
Hauf, J. C., III (A)
Hayden, H. P. (M)
Hayden, L. E. (M)
Haynes, F. B. (SM)
Heck, J. R. (SM)
Hemphill, A. (M)
Henderson, R. J. (SM)
Hennessey, J. E. (M)
Henry, R. M., Jr. (M)
Herrmann, R. H. (A)
Hill, D. E. (M)
Hirsch, B. S. (A)
Hoddinott, E. V. (M)
Hodges, F. P. (M)
Hoge, H. H. (M)
Hoffman, J. H. (M)
Hofman, J. G. (M)
Holzgang, W. F. (M)
Hooke, J. T. (A)
Hoos, W. R. (M)
Horsman, J. O. (A)
Hotz, M. (M)
Houghton, R. B. (M)
Houston, G. P., III (SM)
Houston, J. A. (SM)
Huard, G. P. (M)
Huckins, C. E. (M)
Huether, C. W. (M)
Huffman, H. R., Jr. (A)
Huggins, W. H. (F)
Humphrey, A. L., Jr. (A)
Hunt, V. R. (SM)
Hunt, W. W. (M)
Inman, A. D. (A)
Jackson, H. L. (SM)
Jaconinl, O. J. (M)
Jenkins, J. L. (M)
Jenks, J. C. (M)
Jensen, A. S. (SM)
Jett, E. K. (F)
Johnson, M. P. (M)
Johnson, W. J., Jr. (A)
Jones, B. R. (M)
Jones, L. G. F. (SM)
Jones, M. L. (SM)
Jones, O. J., Jr. (SM)
Jones, R. K. (M)
Jones, R. E. (M)
Kalman, R. E. (A)
Kammerman, P. E. (A)
Kampmeyer, R. A. (A)
Karns, L. W. (M)
Katz, M. (A)
Katz, R. E. (SM)
Keary, H. F. (M)
Kegel, A. G. (SM)
Kelly, L. J., III (A)
Kelly, R. J. (M)
Kempf, R. A. (M)
Kenny, B. C. (M)
Kernan, P. (SM)
Kerr, D. W. (M)
Kerr, D. E. (M)
Kiley, W. H., Jr. (M)
Kilgore, G. R. (F)
King, J. H., Jr. (M)
King, R. H. J. (M)
Kinn, P. (F)
Kircher, C. J. (M)
Kitces, S. (M)
Klein, G. I. (SM)
Klein, S. A. (M)
Kline, C. R. (M)
Knight, R. M. (M)
Kogan, A. J. (M)
Konigsberg, R. L. (M)
Kott, M. A. (M)
Kowarsky, L. S. G. (SM)
Kowalski, E. W. (M)
Kramp, J. J. (M)
Kratz, G. L. (M)
Kraybill, M. E., Jr. (M)
Kreutzberg, J., Jr. (M)
Krick, J. B. (M)
Krowl, G. W. (M)
Krushinski, W. (A)
Kudo, F. M. (M)
Kumm, W. H. (M)
Kunstadt, G. H. (SM)
Kvarda, J. C. (M)
La Bree, C. T. (M)
Laing, J. T. (M)
Lamb, W. G. (M)
Lande, A. J. (M)
Lau, C. B. (A)
Lauderdale, L. K. (M)
Laufer, E. A. (M)
La Vean, G. E. (M)
Lavin, H. D. (M)
Lawler, W. T. (M)
Laws, J. D. (M)
Lawson, E. J. (SM)
Leahy, F. N. (A)
Leap, G. A. (A)
Lee, F. G. (M)
Lee, M. (M)
Lefkowitz, P. (M)
Lenz, G. (A)
Levine, R. J. (M)
Levine, S. (SM)
Levy, D. S. (M)
Lieske, R. W. (A)
Limansky, I. (SM)
Lindemann, H. B. (M)
Linder, H. S. (M)
Linder, R. A. (M)
Linsenbardt, A. E. (M)
Lisbin, M. (M)
Little, D. G. (F)
Lomax, S. E. (SM)
London, C. (SM)
Longuemare, R. H., Jr. (M)
Lord, P. H. (M)
Lory, H. J. (M)
Lowney, S. W. (A)
Lubbert, G. L. (M)
Lynch, D. S. (SM)
Lynch, T. J. (M)
Mac Kenzie, J. E. (SM)
Mackes, D. V. (M)
Mackey, J. E. (A)
Mackey, W. M. (A)
Maczka, F. W., Jr. (M)
Mahoney, D. F. (M)
Malloy, J. J. (M)
Mann, W. C. (M)
Marchese, J. F. (M)
Marella, A. B. (M)
Margolin, P. (SM)
Marlany, L. J. (M)
Markham, A. S. (SM)
Marshak, B. (M)
Marshall, P. J., Jr. (A)
Martin, G. H. (M)
Martin, J. A. (M)
Masters, H. M. (M)
Mauro, E. A. (A)
Maxwell, D. J. (M)
Maxwell, R. F., Jr. (SM)
May, H. A. (M)
Mayer, R. H. (M)
McAdie, C. H. (M)
McClure, C. B., Jr. (M)
McCombe, D. H. (M)
McElveen, R. R. (M)
McIver, D. A. (M)
McIver, N. E. (M)
McMullen, C. G. (SM)
McNally, H. R., Jr. (A)
McPherson, L. G. (M)
Mealey, R. M. (A)
Menchey, C. R. (M)
Meren, L. F. (M)
Messner, R. W. (M)
Mester, J. C. (A)
Meyers, G. S. (A)
Michel, A. (M)
Mikuckis, J. S. (A)
Milberger, W. E. (M)
Millar, R. I., Jr. (M)
Miller, C. F. (M)
Miller, I. M. (M)
Miller, L. A. (M)
Minner, A. (A)
Misey, J. J. (M)
Mohr, G. A., Jr. (M)
Molz, K. F. (SM)
Momberger, J. F. (M)
Mongold, G. E., Jr. (M)
Moore, C. R., Jr. (A)
Moore, D. D., Jr. (M)
Moorhead, H. R. (M)
Moose, C. R. (M)
Mordecai, M. J. (M)
Morris, E. W. (M)
Morris, V. B., Jr. (M)
Mosher, R. A. (M)
Mott, O. B. (M)
Mueller, E. J. (A)
Mueller, M. M. (M)
Mueller, R. R. (M)
Mulling, L. C. (M)
Mullins, F. G., Jr.(SM)
Mullis, J. W. (M)
Murphy, M. R. (M)
Murray, J. B. (M)
Mutch, J. J. (M)
Nale, L. J. (M)
Natchioloisky, M. (M)
Naughton, D. J. (M)
Nelson, S. B. (M)
Newcomb, W. H., Jr. (A)
Newton, C. E., Jr. (M)
Nickels, H. L., III (M)
Nims, A. A., Jr. (SM)
Nobles, C. E. (SM)
Nolen, J. C. (M)
Nooper, C. G. (A)
Norris, R. N. (A)
Norris, V. L. (A)
Nussear, G. A. (M)
O'Donnell, R. J. (SM)
Ogg, F. C., Jr. (SM)
Ogland, J. W. (SM)
Olson, W. R. (M)
O'Neill, L. A. (M)
Opdycke, G. L. (M)
Orr, R. V. (M)
Osborne, E. F. (M)
Oster, E. W., Jr. (A)
Owens, T. W. (M)
Owra, W. M. (M)
Papanicolaou, N. M. (M)
Park, A. R. (M)
Parks, H. L. (A)
Parr, J. W. (M)
Parrish, W. F. (SM)
Parsley, H. W., Jr. (M)
Parsons, D. W. (A)
Paskalakis, L. G. (M)
Pearce, J. M. (SM)
Pearre, S., Jr. (M)
Pecci, A. C. (M)
Penabad, J., Jr. (A)
Perlin, A. I. (M)
Peters, H. J. (M)
Peterson, R. E. (M)
Pezza, A. T. (A)
Phillips, B. E. (SM)
Pipkin, J. E. (M)
Pipkin, R. F. X. (M)
Plante, K. L. (M)
Podraza, G. V. (M)
Poehler, T. O. (M)
Potter, D. R. (M)
Pridgen, W. L. (M)
Pruess, W. C. (M)
Puckett, H. R., Jr. (M)
Pula, T. J. (SM)
Pulford, W. M. (M)
Pulitano, F. J. (M)
Quigley, W. W. (M)
Raab, J. S. (M)
Rainal, A. J. (M)
Rakoske, D. T. (M)
Ralston, G. (SM)
Rambo, S. I. (SM)
Ramey, E. H., Jr. (A)
Randall, J. L. (M)
Ransom, J. R. (M)
Rasch, C. F., Jr. (A)
Raynes, H. D. (M)
Real, P. (M)
Rebsch, D. L. (M)
Renwick, W. H., Jr. (M)
Restivo, F. S. (M)
Rhodes, W. H. (SM)
Richard, R. H. (SM)
Richardson, W. R. (M)
Riley, R. N. (M)
Roedel, S. (M)
Rogers, M. (M)
Rohner, A. J. (M)
Rosen, A. A. (M)
Rosenberg, H. C. (M)
Rosenblatt, H. (M)
Rosenblum, I. I. (M)
Rosenzweig, S. (M)
Roulston, N., Jr. (M)
Roush, R. G. (SM)
Royce, H. W. (M)
Ruehl, G. C., Jr. (M)
Rupe, J. W. (M)
Rutstein, H. S. (A)
Rutter, F. J. (SM)
Ryan, C. C. (M)
Rybicki, R. J. (M)
Sachs, H. A. (M)
Sachs, L. H. (M)
Safren, H. G. (M)
Salcedo, R. V. (M)
Sammons, F. L. (M)
Sample, D. R. (A)
Sanford, G. A. (M)
Sanford, R. W. (M)
Sanner, G. E. (M)
Sargent, C. R. (M)
Sarratt, E. R. (M)
Sarris, R. A. (A)
Savage, A. J. (M)
Schattke, C. H. (M)
Scheffel, A. G. (M)
Schell, E. L., Jr. (M)
Scheneman, E. E. (SM)
Schillo, T. B. (SM)
Schubert, C. J., Jr. (M)
Schulkin, M. (SM)
Schullery, E. D. (A)
Schulmeyer, R. M. (M)
Schutz, H. (SM)
Scott, C. E. (M)
Scott, D. H. (SM)
Scott, D. M. (A)
Scott, J. K. (M)
Seach, R. R. (M)
Sefton, H. B., Jr. (M)
Segal, M. (M)
Seidl, R. H. (A)
Seman, A. E., Jr. (M)
Shagam, E. M. (M)
Shannon, H. H. (M)
Shapiro, G. (M)
Shawker, C. H. (M)
Shepard, R. H. (A)
Shepherd, J. H., Jr. (M)
Shirey, D. C. (M)
Shoenberger, G. C. (M)
Showalter, G. L. (M)
Sichelstiel, B. A. (SM)
Siedband, M. P. (M)
Sieron, E. M. (M)
Silva, F. A. (M)
Silver, P. W. (M)
Simpson, I. L. (A)
Sims, D. S. (SM)
Sinsky, A. I. (M)
Slattery, J. J. (F)
Sluss, W. C., Jr. (M)
Smith, E. L., Jr. (M)
Smith, E. G., Jr. (M)
Smith, H. B. (M)
Smith, J. W. (M)
Smith, R. J. (M)
Smoot, W. L. (A)
Smythe, D. S. (A)
Solley, J. D. (M)
Solomon, D. E. (M)
Sones, W. K. (M)
Soroka, B. (M)
Spear, J. R. (M)
Spencer, P. H. (M)
Spicer, W. T. (M)
Spintman, D. A. (M)
Steckel, T. G., Jr. (M)
Steel, H. W. (M)
Steele, R. C. (M)
Stefan, R. S. (M)
Stefanik, T. M. (M)
Stein, L. E. (M)
Steinweg, D. H. (M)
Stout, G. (SM)
Strickler, J. D. (M)
Strull, G. (M)
Stull, K. S., Jr. (M)
Sukhia, D. E. (M)
Sussman, S. M. (M)
Tabisz, S. C. (M)
Taragin, S. (M)
Tashjian, D. R. (SM)
Tates, R. (M)
Taylor, J. S. (M)
Taylor, M. (M)
Thomas, A. G. (A)
Thomas, J. F. (M)
Thompson, E. H. (M)
Thompson, F. J. (A)
Thompson, J. E. (M)
Tice, D. P. (M)
Tickler, E. M. (A)
Tischler, M. (M)
Tisdale, S. E. (A)
Titus, C. K. (M)
Todes, R. S. (M)
Tomey, T. B. (M)
Trinter, V. E. (SM)
Tunell, J. C. (M)
Turlington, T. R. (A)
Tuttle, L. (M)
Tylor, H. L. (SM)
Ulrick, W. J. (M)
Uncapher, E., Jr. (A)
Urbanski, E. T. (M)
Van Horn, J. M. (M)
Van Leer, S. S. (A)
Vavrina, T. G. (M)
Veazie, C. E. (A)
Vester, B. H., Jr. (SM)
Vierling, H. D. (M)
Voot, G. L. (M)
Vore, M. P. (M)
Wagner, J. L. (M)
Walch, R. C., Jr. (M)
Walker, B. F. (M)
Wallace, H. E. (A)
Walls, A. B. (M)
Washburn, F. L., Jr. (M)
Waters, R. H. (M)
Watson, J. G. (M)
Wayt, H. J. (M)
Webb, G. N. (M)
Weber, D. J. (M)
Weinberg, N. L. (A)
Weitz, M. R. (M)
Weldon, J. W. (M)
Wenig, J. (M)
Wentz, J. L. (M)
Wexler, M. P. (M)
Wharton, H. R. (M)
Wheeler, M. S. (M)
Whitcomb, M. F. (A)
White, B. (A)
Whitney, A. (SM)
Wiley, L. G. (M)
Wilkinson, R. J. (M)
Willey, R. E. (M)
Williams, A. D. (A)
Wilner, J. T. (SM)
Wolf, F. H. (M)
Wolfe, B. (M)
Wolfe, R. E. (M)
Wood, C. H., Jr. (M)
Woodard, W. W. (SM)
Woppman, G. H. (M)
Worrell, E. A. (M)
Worth, P. A. (M)
Wyble, J. J. (M)
Yaffe, T. H. (SM)
Yakupkovic, R. S. (M)
Yeich, V. B. (A)
Yorganjian, J. J., Jr. (M)
Young, L. (SM)
Younkins, G. D. (A)
Zacharczuk, B. (M)
Zamoyta, J. A. (M)
Zeman, P. A. (A)
Zimmerman, E. G. (M)
Zimmerman, S. E. (M)
Zindler, G. F. (M)
Zukauskas, P. J. (A)
Zweier, I. (M)

Bel Air (BAL-3)
Davis, J. M., Sr. (M)
Delaney, R. P. (M)
Hanks, H. C., Jr. (SM)
O'Connor, W. A., Jr. (M)
Sander, W. E. (M)

Beltsville (W-DC-5)
Akerley, J. F. (M)
Biggerstaff, W. F. (M)
Beyer, G. L., Jr. (M)
Butler, P. (M)
Conn, J. R. (M)
Dew, N. R. (A)
Doong, H. (M)
Dyer, J. W. (M)
Fritkin, G. A. (M)
Headrick, J. M. (M)
Kitscher, C. (M)
Lines, S. R. (M)
Pal, S. M. (M)
Tsao, T. K. (A)

Berwyn Heights (W-DC-3)
Pincus, R. (M)
Schroeder, K. F. (M)
Walton, W. W. (M)

Bethesda (W-DC-3)
Affelder, C. (SM)
Abern, C. R. (M)
Andelson, R. P. (A)
Andrews, W. J. (SM)
Apolenis, C. J. (M)
Apstein, M. (F)
Ameth, A. P., Jr. (SM)
Arsen, C. (M)
Astin, A. V. (F)
Baluta, R. E. (M)
Batten, J. C., Jr. (M)
Baxter, L. L. (A)
Becker, C. H. (M)
Bedford, P. L. (M)
Berman, M. (M)
Birochak, E. (M)
Boese, W. C. (SM)
Bowman, R. L. (SM)
Brown, J. R. (M)
Burke, M. L. (M)
Burnett, B. B. (M)
Bush, G. P. (SM)
Cahn, L. (M)
Cannon, R. E., Jr. (M)
Carley, W. S. (SM)
Carpenter, R. J. (M)
Clark, J. M. (M)
Cochran, L. D. (SM)
Coffey, N. F. (M)
Cooke, W. S. (M)
Cowgill, D. E. (SM)
Curtis, H. W. (M)
De Court, H. F. (SM)
Diehl, L. G. (A)
Distad, M. F. (SM)
Dittbemer, D. L. (M)
Dougherty, J. G., Jr. (M)
Drews, W. A. (M)
Dunn, W. F. (M)
Edlen, G. G. (M)
Edwards, N. P. (M)
Elboum, R. D. (M)
Farley, J. J. (M)
Fey, H. F. (M)
Finch, J. B. (M)
Finnegan, F. J. (SM)
Fischer, J. R. (M)
Frank, W. F. (A)
Franta, A. L. (M)
French, J. C. (M)
Friedman, D. C. (M)
Garrard, R. F. (M)
Gerharz, R. J. (SM)
Gerlach, H. W. A. (SM)
Gerwin, H. L. (SM)
Glimn, A. F. (M)
Gnau, D. V. (M)
Gore, M. R. (M)
Gorman, T. A., Jr. (M)
Goumas, N. P. (M)
Grant, C. R. (SM)
Grantham, R. E. (SM)
Grimm, R. E. (M)
Guarino, P. A. (SM)
Hamlin, J. E. (M)
Hartz, J. E. (SM)
Hedrich, A. L. (SM)
Held, J. C. (M)
Heller, G. G. (M)
Henry, J. H. (M)
Hiney, R. A. (A)
Hoff, R. S. (SM)
Hurley, H. C. (M)
Jackson, W. E. (F)
Jenkins, K. A. (M)
Jenkins, M. (M)
Jodon, F. R. (A)
Johnston, R. W. (SM)
Kaiser, J., Jr. (SM)
Kambouris, G. N. (M)
Keery, W. J. (M)
Kirsch, R. A. (M)
Kirshner, J. M. (A)
Klima, W. M. (M)
Krahe, L. R. (SM)
Landis, P. E. (SM)
Lanier, H. F. (SM)
Lee, H. P. (A)
Liddel, U. (F)
Liss, F. T. (M)
Mac Nair, E. A. (A)
Mahaffey, G. N. (M)
Mann, D. O. (SM)
Marthens, A. S. (M)
Mather, D. I. (SM)
Mazziotti, F. (M)
McBirney, H. R. (M)
McDowell, W. E. (M)
Mc Fall, R. W. (SM)
McReynolds, O. J. (SM)
Meade, K. R. (M)
Meissner, P. (M)
Messenheimer, A. D. (M)
Mickey, L. (SM)
Millbranth, D. R. (A)
Miller, J. W. (SM)
Moore, J. W. (SM)
Morris, A. D. (M)
Murphy, R. E. (A)
Nigro, J. P. (M)
Noble, F. W. (SM)
O'Brien, V. T. (M)
Osborn, M. E. (A)
Palmer, E. F. (A)
Parkhurst, R. A. (M)
Pearce, H. D. (A)
Pepper, W. H. (M)
Pfund, C. E. (M)
Portmann, P. A. (M)
Premo, D. A. (M)
Queen, J. L. (M)
Ream, D. L. (A)
Richards, A. P. (SM)
Ridenour, W. S. (A)
Roddy, V. S. (M)
Rudijier, J. J., Jr. (M)
Rutz, E. M. (SM)
Saunders, W. K. (M)
Savage, J. W. (M)
Sawitz, P. H. (M)
Seymour, G. B. (M)
Shapiro, S. (M)
Shaull, J. M. (SM)
Sherrick, D. C. (M)
Shirley, J. R. (SM)
Siller, J. (M)
Skinner, J. A. (SM)
Smith, A. E. (M)
Smith, K. A. H. (M)
Snodgrass, W. F. (M)
Sommer, H. (M)
Stewart, J. L. (M)
Stinchfield, J. M. (SM)
Stoller, M. J. (M)
Stone, J. L. (M)
Tal, J. Y. (M)
Taylor, P. E., Jr. (M)
Thomas, T. L. (A)
Thompson, R. H. (A)
Timm, R. S. (SM)
Tomokins, J. E. (M)
Tripp, A. E. (A)
Trippel, W. G. (A)
Trump, B. C. (A)
Vanarsan, F. P. (A)
Walters, C. S. (A)
Ware, R. S. (A)
Weaver, W. C. (M)
Webb, A. L. (M)
Weinschel, B. O. (SM)
Weiss, H. R. (M)
Wheeler, L. B. (M)
White, J. J. (A)
Williams, D. (SM)
Williams, W. K. (M)
Wilson, C. A. (M)
Wilson, C. B. (SM)
Winick, A. B. (M)
Winter, C. W., Jr. (M)
Wolbarsht, M. L. (A)
Wolfand, D. (M)
Wright, W. E. (A)
Yost, W. E., Jr. (SM)

Bladensburg (W-DC-3)
Kuzminsky, I. (M)
Spayth, F. J. (M)

Bowie (W-DC-3)
Nowick, W. (M)
Robertson, R. E. (A)

Brookeville (W-DC-3)
Femiano, D. J. (M)
Lundquist, G. A. (M)

Brooklandville (BAL-3)
Lankford, N. B. (M)

Burtonsville (W-DC-3)
Claypool, W. S. (M)
Herbert, L. G. (M)
Klebler, J. W. (M)
Peterson, R. E. (M)
Pickering, R. W. (M)
Waltz, W. R. (M)

California (W-DC-3)
Browne, W. M. (SM)

Cambridge (BAL-3)
Heister, W. D. (A)
Holdt, D. H. (M)
Massey, W. S. (M)

Capitol Heights (W-DC-3)
Fawcett, C. W. (M)

Catonsville (BAL-3)
Arakelian, G. P. (M)
Behter, R. J. (SM)
Boenning, C. B. (SM)
Booth, J. D. (SM)
Bowen, J. R. (M)
Bush, A. G., Jr. (M)
Calhoon, C. D., Sr. (M)
Chapin, E. W. (SM)
Cole, D. P. (A)
Craig, M. E. (M)
Des Lauriers, E. L. (A)
Francis, J. P. (M)
Getz, W. W. (A)
Hoffman, H. C., Jr. (SM)
Jacob, M. I. (SM)
Johnson, J. W. (M)
Kinsman, W. D. (M)
Lambert, H. R. (M)
Mattern, J. (M)
Meyer, A. W. (SM)
Nickerson, P. E. (M)
Raven, R. S. (SM)
Reyes, J. A. (M)
Ruth, H. O. (M)
Singel, J. B. (SM)
Sprague, C. H. (M)
Taylor, C. J. (M)
Tyaack, F. H. (M)
Whatley, E. C., Jr. (SM)

Chesapeake Beach (BAL-3)
Grosvenor, A. C. (SM)
Read, L. C. (SM)

Cheverly (W-DC-3)
Beegle, D. H. (SM)
Brincka, J. J. (M)
Davis, R. E. (M)
Franks, H. J., Jr. (M)
Gill, A. B. (A)
Gipe, R. C. (A)
Grayson, R. R. (M)
Raskhodoff, N. M. (M)
Sly, R. D. (M)
Smith, C. V. L. (SM)
Upton, C. R. (M)
Waldo, G. V. (M)
Whitney, F. G. (M)
Young, C. E. (M)

Chevy Chase (W-DC-3)
Ainsworth, E. F. (A)
Alexander, S. N. (F)
Bay, Z. L. (SM)
Blumberg, M. (M)
Caldwell, C. M. (SM)
Caporale, P. (SM)
Carter, H. J. (SM)
Caswell, G. L. (SM)
Clapper, H. T. (A)
Conlon, J. M. (M)
Crago, R. P. (SM)
Engel, F. H. (SM)
Felker, E. A. (M)
Gordon, D. I. (SM)
Herson, J. L. (M)
Hutchins, W. R. (SM)
Ikelman, G. J. (A)
Jervis, E. R. (SM)
Kelley, G. W., Jr. (M)
Larsen, P. J. (SM)
Lavier, E. C. (M)
Little, J. L. (M)
McIntosh, K. H. (A)
McKay, R. L. (SM)
McKenna, J. R. (A)
Mills, M. H. (SM)
Moon, R. F. (M)
Morey, F. C. (M)
Morse, M. S. (SM)
Neal, P. L. (SM)
Ohlsson, A. (A)
Regola, F. (SM)
Rittman, W. R. (M)
Rockwell, P. (SM)
Saito, S. (M)
Schlegelmilch, R. O. (SM)
Schnoor, K. G. (A)
Seymour, H. A. (SM)
Tellman, H. A. (SM)
Titus, D. C. (M)
Voyles, J. E. (SM)
Weaver, C. B., Jr. (M)
Whitman, J. A. (M)
Wilcomb, E. F. (SM)
Williams, S. B. (F)
Young, E. W. (A)
Zimmerman, H. S. (M)

Chillum (W-DC-3)
Epstein, A. M. (SM)
Marcotte, P. G. (M)
Turner, W. R. (M)
Wilson, R. R., Jr. (A)

Church Hill (BAL-3)
Milne, J. W. (M)

Clarksville (BAL-3)
Bush, G. B. (M)
Ellis, R. T., Jr. (M)
Howard, K. M., Jr. (M)
Johnson, J. L. (SM)

Clinton (W-DC-3)
Conner, L. M. (M)
Hartman, J. D. (M)
Kennedy, C. A., Jr. (M)
Rasmussen, A. R. (M)

Cockeysville (BAL-3)
Chandler, C. E. (M)
Clapsaddle, A. B. (M)
Damall, E. B. (M)
Flago, D. G. (A)
Healey, D. J., III (M)
Hurley, W. A. (M)
Jackson, E. L., Jr. (M)
McComas, A. D., Jr. (SM)
Sartorlo, D. R. (M)
Torelli, G. D. (A)
Weis, R. W. (SM)

College Park (W-DC-3)
Anderson, N. S. (M)
Barton, R. (M)
Blich, J. N. (M)
Boyd, J. E. (A)
Buescher, R. H. (SM)
Corcoran, G. F. (F)
Gandy, C. L. (M)
Ginnings, R. M. (M)
Hahn, W. R., Jr. (M)
Haynes, J. M. (A)
Heisler, K. G., Jr. (M)
Hudgins, J. L., Jr. (M)
Jones, H. C. (SM)
Koch, C. F. (M)
Lepper, W. E. (M)
Lewis, J. K. (SM)
Mack, W. F. (M)
Marshall, F. S., Jr. (M)
Masek, R. C. (SM)
Morgan, R. (M)
Munson, F. E. (A)
Paden, D. R. (M)
Payne, E. B. (SM)
Pelizer, K. E. (M)
Price, H. W., Jr. (M)
Reed, H. R. (F)
Rickerson, D. M. (SM)
Rutelli, J. P. (SM)
Rybon, J. C. (M)
Smith, C. J. (M)
Starbuck, F. (M)
Svanholm, J. K. V. (SM)
Sweeney, J. S. (M)
Thompson, D. G. (SM)
Tumbull, H. A. (SM)
Walter, R. J. (A)
Weber, J. (F)
Woolhiser, W. E. (M)
Wyman, F. E. (M)

Cresaptown (PIT-4)
Bjerke, O. H. (M)

Crisfield (BAL-3)
Lawson, W. M., Jr. (M)

Crownsville (BAL-3)
Brown, T. A. (A)
Germain, R. C. (M)
Martin, G. E. (M)
Rawle, J., III (A)
Willner, W. H. (A)

Cumberland (PIT-4)
Duckworth, J. J. (M)
Graim, R. J. (A)
Stem, H. (SM)

Damascus (W-DC-3)
Campbell, W. S. (M)
Frelenmuth, W. L. (SM)

Deer Park (W-DC-3)
Mirlick, C. B. (SM)

Derwood (W-DC-3)
Raser, E. J. (M)
Stokes, R. G. (SM)
Dickerson (W-DC-3)
Wuertenberg, W. E. (A)

District Heights (W-DC-3)
Lauman, E. O. (M)

Dundalk (BAL-3)
Colvin, R. (M)
Montague, W. P. (SM)

Easton (BAL-3)
Anapol, J. (M)
Wightman, P. E. (M)

East Riverdale (W-DC-3)
Hockensmith, R. P. (M)
Owen, E. A. (SM)
Retsky, H. (A)
Skaggs, G. A. (M)

Edgewater (BAL-3)
Fox, L. F. (A)
Rosenberry, W. W. (SM)
Sneider, R. R. (A)

Edgewood (BAL-3)
Ring, H. (A)

Edmonston (W-DC-3)
Cannon, R. A. (M)

Elkridge (BAL-3)
Bean, L. M. (M)

Ellerton (W-DC-3)
Alexander, F. C. (SM)

Ellicott City (BAL-3)
Brady, C. L. (SM)
Barlow, A. D. (M)
Barnhart, E. F. (M)
Crocker, G. M. (M)
Duff, J. S. (A)
Dullinger, A. G., Jr. (A)
Fegely, W. D. (M)
Fischer, F. W. (SM)
Fisher, S. G. (M)
Frattali, F. A. V. (M)
Frazier, R. M., Jr. (M)
Froggatt, J. W., Jr. (M)
Griffith, B. H., Jr. (SM)
Henry, F. E. (M)
Hogue, G. E. (M)
Hutchinson, J. O. (M)
Jones, H. H., Jr. (A)
Jones, L. S. (M)
Kimball, L. L. (M)
Lees, R. E. (M)
Leister, R. E. (SM)
Mabry, F. S. (SM)
McDonough, J. T. (M)
Meier, W. M. (M)
Mortimer, T. S. (M)
Reis, H. J. (M)
Rhys, T. L. A. (M)
Sima, R. L. (M)
Tharp, N. B. (SM)
Ulman, L. J. (M)
Valenzuela, G. R. (M)
Wehr, K. C. (M)
Windley, W. D. (M)
Ziegler, R. E. (M)

Ferndale (BAL-3)
Bell, J. E. (M)
Kelley, B. E. (M)
Neau, O. T. (M)

Forest Hill (BAL-3)
Barthel, D. R. (M)

Fort Holabird (BAL-3)
Curtis, R. E. (M)

Fort Meade (BAL-3)
Barlow, H. C. (SM)
Barton, J. H. (M)
Bishop, F. W. (M)
Bosley, H. L. (M)
Buchanan, J. W. (M)
Burpess, A. G. (M)
Guyton, J. A. (M)
Haverstock, J. W., Jr. (M)
Kunkle, A. J. (M)
Leonard, H. Q., Jr. (M)
Ragonese, L. J. (M)

Frederick, (W-DC-3)
Alexander, N. E. (SM)
Beecher, D. W. (M)
Brimer, C. P. (A)
Cunningham, T. P. (A)
Daugherty, E. J. (M)
Hankey, I. L. (M)
Kolsrud, E. R. (M)
Lockwood, E. H. (SM)
Martin, J. T. (M)
Miller, L. F. (A)
Price, O. I., Jr. (M)
Roughan, J. V. (M)
Shaw, N. C. (M)
Staley, I. B. (M)
Thompson, R. C. (M)
Young, E. D. (M)

Fullerton (BAL-3)
Andrews, W. R. (M)
Dixon, R. P. (M)
Friesser, J. M. (M)
Murphy, R. E. (M)

Fulton (BAL-3)
Rooney, W. R. (SM)
Gaithersburg (W-DC-3)
Johnson, R. N. (M)
Moran, W. R. (A)
White, J. W. (M)
Yorden, W. W. (M)

Gambrills (BAL-3)
Schaub, B. H. (SM)

Garrett Park (W-DC-3)
Bigelow, H. L., Jr. (M)
Clayton, A. (M)

Glenarm (BAL-3)
Brownell, D. C. (M)
Cordry, B. L. (SM)
Hershfield, S. (SM)
Manson, P. S. C. (M)
Packard, R. F. (M)
Smith, D. W. (SM)
Solker, R. A. (M)
Sturtevant, C. E. (SM)
Wilkie, R. R. (M)
Wood, L. E. (M)

Glen Burnie (BAL-3)
Aasen, M. D. (M)
Abel, P. F. (M)
Andreatta, J. H. (M)
Arnett, O. (A)
Arnold, D. E. (M)
Bevan, W. R. (M)
Bickel, C. A. (M)
Bolt, C. A., Jr. (M)
Boykin, C. R. (M)
Brannon, D. L. (M)
Brown, E. A. (M)
Buoymaster, N. W. (M)
Burr, W. E. (M)
Castruccio, P. A. (SM)
Clany, M. C. (M)
Crossen, M. W. (M)
Demougeot, G. M. (A)
Devlin, R. P. (M)
Donaldson, R. W., Jr. (M)
Driggers, B. H. (A)
Dunn, J. E. (M)
Eckstein, G. (SM)
Ewanus, W. (SM)
Finkelpearl, I. M. (M)
Franks, W. R. (M)
Goodman, A. B. (A)
Goutden, D. E. (M)
Hale, L. N. (M)
Hamburger, J. (M)
Hockett, S. H., Jr. (M)
Holbrook, M. R. (M)
Jentillet, A. (M)
Jones, E. E. (M)
Kirchmier, T. M. (M)
Koether, G. H., Jr. (M)
Lisiecki, M. (A)
Mackey, J. F. (M)
Manies, L. H. (M)
Marble, T. F. (M)
McBride, J. F. (A)
Meunier, M. B. (A)
Montague, D. I. (A)
Morsfield, A. W. (M)
Musk, H. A. (M)
Parris, W. J. (M)
Pearson, J. L. (A)
Pitts, F. T. (M)
Ptath, R. H. (M)
Popodi, A. E. (SM)
Ragot, R. L. (M)
Range, M. A. (M)
Raymond, W. F. (M)
Riggs, H. K. (M)
Sorrell, P. A. (M)
Stebbins, W. J. (M)
Stewart, N. H. (SM)
Svensson, E. L. (A)
Thompson, G. A. (A)
Tomlinson, C. C. (SM)
Tribble, H. L. (M)
Tuznik, R. H. (M)
Wallace, G. R. (M)
Walker, B. J. (M)
Walsh, D. W. (M)
Weisman, J. (M)
White, J. E. (M)
Sullivan, J. D. (M)

Glencoe (BAL-3)
Levatich, J. L. (M)

Greenbelt (W-DC-3)
Becker, C. M. (A)
Hanyok, A. (A)
Hess, F. R. (A)
Jones, G. R. (M)
O'Connor, T. M. (A)
Salzberg, I. M. (M)
Zanin, B. P. (M)

Hagerstown (W-DC-3)
Fuller, B. K. (M)
Hess, R. E. (A)
Martow, W. C., Jr. (M)
Maycock, J. C. (M)
McIntire, G. W. (A)
Reynolds, A. J. (M)
Schick, L. M. (M)

Hampstead (BAL-3)
Sultenger, J. E., Jr. (M)

Hanover (BAL-3)
Evans, G. E. (M)
Granger, W. E. (M)
Quinn, B. O. (M)
Strong, J. L. (A)
Uzunoglu, V. (M)

Havre De Grace (BAL-3)
Bryant, W. L. (M)
Klair, G. R. (M)
Putnam, R. E. A. (M)
Richard, V. W. (M)
Weik, M. H., Jr. (M)

Highland (BAL-3)
Carruth, D. E. (M)
Tribe, P. (A)
Marlow, D. R. (M)

Hillcrest Heights (W-DC-3)
Beatrez, R. (A)

Hyattsville (W-DC-3)
Adams, T. E. (M)
Balderston, J. M. (M)
Bartlett, R. C. (M)
Binstock, L. (M)
Blackham, D. K. (M)
Blanks, R. T., III (M)
Blum, H. C. (A)
Boenning, W. R. (M)
Bogora, G. F. (M)
Burns, J. C. (A)
Chadwell, W. L. (M)
Chase, R. H. (M)
Chernikoff, H. (M)
Chu, Y. (SM)
Cohen, C. L. (M)
Cooper, H.W., III (SM)
Coyle, R. J. (A)
Crawford, G. D. (M)
Didra, W. E. (A)
Dowd, J. F. (A)
Evans, W. H. (M)
Fadden, B. J. (M)
Flaherty, J. B., Jr. (M)
Flanagan, J. D. (M)
Florescu, S. G. (A)
Futcher, C. S. (A)
Gayer, F. M. (SM)
Garner, W. E. (M)
Gites, J. W. (SM)
Gouge, J. R., Jr. (M)
Gray, J. C., Jr. (M)
Greenhouse, S. C. (M)
Greenwald, S. (M)
Grim, R. R. (M)
Hannon, J. R. (M)
Harjess, R. E. (M)
Hausman, A. H. (M)
Hepfer, J. W. (M)
Hickey, R. E. (M)
Hicks, H. H. (M)
Higgins, R. E. (M)
Hoffman, B. F. (M)
Hogan, G. D. (M)
Holden, S. E. (A)
Hoober, W. P. (M)
Houser, H. R. (M)
Hutchinson, F. W. (M)
Izard, C. B. (M)
Johnson, P. T. (M)
Jones, J. J. (M)
Kaln, J. (M)
Keller, T. B., Jr. (A)
Krawczewicz, S. T. (M)
Kretchmar, P. R. (M)
Kulikowski, E. F. (SM)
Lane, T. B., Jr. (M)
Levin, W. S. (M)
Moltrup, G. R. (M)
Moody, W. R. (M)
Morse, W. R. (SM)
Muller, R. M. (M)
Mysing, J. O. (M)
Nace, P. E. (M)
Oelke, P. O. (M)
Orr, G. M. (M)
Pamphilon, L. E. (SM)
Pendleton, T. A. (M)
Pike, W. N. (M)
Popowsky, W. J. (M)
Potts, R. B. (M)
Pritchard, J. C. (M)
Rayburn, R. A. (M)
Reich, B. W. (M)
Reuss, M. L., Jr. (M)
Richie, S. M. (SM)
Rivera, E. R. (M)
Robinson, C. H. (M)
Rogal, S. J. (A)
Ryals, J. W. (A)
Ryan, D. C., Jr. (A)
Sennewald, P. F. (M)
Shawe, M. E. (M)
Shrader, J. R. (M)
Siahatgar, S. (A)
Silverstein, A. (M)
Sorensen, G. L. (M)
Starobin, A. F. (M)
Stuntz, J. W. (M)
Summers, C. R. (M)
Sumpter, E. J. (A)
Thwaites, D. F. (M)
Tippett, J. T. (M)
Tolliver, J. S. (M)
Valkenburg, E. P. (M)
Wang, J. C. H. (M)
White, C. D., Jr. (M)
White, J. W. (A)
Wood, W. H. (M)
Yaplee, B. S. (M)

Indian Head (W-DC-3)
Eisminger, T. I. (M)
Henderson, J. E. (M)
Ryon, J. C. (M)
Squire, R. K. (M)

Jessups (BAL-3)
Wiesner, J. C. (M)

Joppa (BAL-3)
Marcroft, H. C. (SM)
Smith, H. E. (M)

Kensington (W-DC-3)
Abernathy, J. C. (A)
Alldredge, L. R. (M)
Anderson, W. H. (M)
Becker, W. E., Jr. (M)
Bell, W. S. (M)
Burcham, D. P. (SM)
Carpenter, R. C. (M)
Cooperman, J. I. (M)
Davis, J. J. (A)
Doring, R. C. (A)
Edward, C. E. H. (A)
Gaston, G. I. (M)
Gibson, T. J. (M)
Hekimian, N. C. (M)
Hiltz, F. F. (M)
Horton, B. M. (SM)
Hulse, W. H. (M)
Joseph, H. M. (SM)
Kaiser, J. A., Jr. (M)
Kaiser, Q. C. (M)
Klein, J. (A)
Landau, R. M. (M)
Laug, O. B. (M)
Lee, P. H. (SM)
Lilly, R. G. (M)
Mac Gillivey, D. R. (M)
Meadows, L. A. (SM)
Michelsen, P. F. (M)
Miller, F. B. (A)
Mitoma, E. Y. (M)
Morse, A. O. (M)
Notz, W. A. (M)
Ostaff, W. A. (SM)
Palmer, L. C. (M)
Peters, M. W. (M)
Petrie, G. W., III (SM)
Porreca, G. (M)
Radabaugh, E. L. (M)
Riblet, H. B. (SM)
Rosenberg, R. S. (M)
Ross, J. A. (A)
Schappals, E. A. (SM)
Segal, B. R. (M)
Shepperd, I. J. (M)
Spinks, A. W. (M)
Spriggs, J. O. (M)
Sprinkle, M. C. (M)
Utrecht, F. W. (A)
Waters, W. E., Jr. (M)
Wears, L. R. (A)
Webster, E. M. (F)
West, E. B. (M)
Wetmore, G. C. (M)
Whipple, L. G. (A)
Woodside, G. E., Jr. (M)
Yaffee, P. (SM)

Kingsville (BAL-3)
Davis, H. P (SM)
Frazier, R. V. (M)
Pullen, K A., Jr. (SM)

Landover (W-DC-3)
Bradley, J. W. (M)
Fisher, R. H. (M)
Rowe, J. J. (A)

Landover Hills (W-DC-3)
Dixon, T. O. (SM)
Painter, J. E. (M)
Peters, P. E. (M)

Lanham (W-DC-3)
Andrick, C. A. (A)
Hengen, J. G., Jr. (M)
Henry, V. F. (M)
Lyon, E., III (M)
Pickett, W. S. (A)
Pielmeier, G. R. (M)
Powers, E. W. (SM)
Sera, F. (M)
Van Lunen, R. D. (M)
Wagner, R. B. (M)
Wilson, E. B. (M)

Lansdowne (BAL-3)
Travers, J. F., Jr. (M)

La Plata (W-DC-5)
Richardson, K C. (M)

Laurel (W-DC-6)
Adkins, L. R., Jr. (M)
Asquith, C. F. (M)
Bell, H. P. (A)
Beydler, W. W. (M)
Blanchard, M. K. (M)
Boone, J. V. (M)
Clifton, R. B. (M)
Collier, W. W. (M)
Craig, A. G. (M)
Callaway, E. N. (M)
Gustafson, C. E. (A)
Hughes, W. E. (M)
Keefer, R. E. (M)
May, C. (M)
McCartney, W. B. (M)
Meares, C. W. (A)
Medley, M. C. (M)
O'Connor, G. S. (SM)
Parsons, P. H. (M)
Pless, R. L. (M)
Porter, F. K. (M)
Roberts, W. K. (M)
Romaine, W. R. (M)
Schreyer, S. D. (M)
Shinn, E. N. (A)
Straughn, J. B. (M)
Trouard, R. L. (M)
Van Loon, K. (M)
Wigle, T. A. (M)

Lexington Park (W-DC-3)
Bartels, W. S. (SM)
Bolland, P. E. (A)
Hopkins, P. L. (M)
Jenkins, D. A. (M)
Leopard, G. W. (SM)
Lupton, A. O. (M)
Norkus, B. S. (M)
Stockwell, E. J. (M)

Linthicum (BAL-3)
Coulter, E. L. (M)
Crosby, G. E. (M)
Fisk, W. J. (M)
Hardesty, S. J. (A)
Hrybyk, W. L. (M)
Kuehn, H. S. (SM)
Mederer, S. J. (M)
Porter, H. D. (A)
Ramsay, J. H. (M)
Rustad, L. W. (M)

Linthicum Heights (BAL-3)
Baltz, C. K. (M)
Blas, G. H., Jr. (M)
Cichanowicz, H. J. (M)
Collins, Z. L. (SM)
De Andrade, W. C. (M)
Dyer, E. F. (M)
Easson, C. S. (A)
Eastland, F. M. (M)
Faber, J. P. (M)
Garrett, C. L. (M)
Goetz, L. P. (SM)
Heyser, L. S. (M)
Hill, W. W., III (M)
Hughes, T. R. (M)
Lee, R. (F)
Lee, R. E. (M)
Lungo, A. J. (M)
Mera, S. M. (A)
Mims, J. H. (A)
Newhouse, P. D. (M)
Rogers, C. H. (M)
Rossi, A. D. (M)
Teiller, J. (M)
Ward, G. M. (M)
Wolf, J. E. (M)
Wolf, S. (M)
Zrubek, W. E. (M)

Lutherville (BAL-3)
Ackerman, W. W. (A)
Albin, F. I. (M)
Allison, D. M. Jr. (SM)
Biddlecomb, R. W. (M)
Bliss, W. R. (M)
Brockway, A. L., Jr. (M)
Brower, G. H. (SM)
Carpenter, J. W. (M)
Carpenter, L. B. (M)
Cunningham, F. J. (M)
Eby, J. T. (M)
Freeland, A. F. (SM)
Grandinetti, A. F. (M)
Hart, E. D. (SM)
Hayes, E. G. (M)
Henck, E. D. (M)
Hom, W. R. (M)
Howard, B. F., Jr. (M)
Jackson, J. H. (M)
Jaklitsch, F. J. (M)
Kent, L. L. (M)
Kochevar, H. J. (M)
Maurer, D. S. (M)
Noll, R. E. (M)
Phillips, W. D. (M)
Ralston, W. P. (M)
Rausa, G. J. (M)
Reed, W. L., Jr. (M)
Roberts, C. O., Jr. (M)
Roberts, H. D. (A)
Scanga, W. A. (SM)
Schoenwetter, H. K. (M)
Senger, F. A. (M)
Tewksbury, J. M. (M)
Toll, H. D. (M)
Washburn, H. H. (M)
Weems, C. M., Jr. (M)
Wild, T. A. (SM)
Williams, R. L. (M)

Mayo (BAL-3)
Williams, W. S. (M)

Middle River (BAL-3)
Purner, R. C. (A)

Millersville (BAL-3)
Dempsey, M. E. (M)

Mount Airy (BAL-3)
Nikirk, H. S. (M)

Mount Rainier (W-DC-3)
Arndt, R. C. (M)
Bacon, J. K. (M)
Clark, J. G. (M)
Greenhouse, L. (M)
Hurley, C. N. (A)
Kurtzman, S. P. (M)
Sheltelman, H. D. (M)

Mount Savage (PIT-4)
Keene, D. E. (M)

North Chevy Chase (W-DC-3)
Redler, W. M. (SM)

North Linthicum (BAL-3)
Albright, R. K. (A)
Axelby, G. S. (SM)
Butala, E. F. (A)
Hamer, E. G. (SM)
Houston, D. R. (M)
Mack, K. M. (M)
Pape, R. B. (M)
Temple, J. M. (SM)

North Severna Park (BAL-3)
Bartram, J. F. (SM)
Christie, C. J. (SM)

Odenton (BAL-3)
Perko, E. M. (M)

Olney (W-DC-3)
Mader, L. W. (A)

Owings Mills (BAL-3)
Buehler, G. V. (M)
Carter, A. J., Jr. (A)
Kahl, F. A. (SM)
Karpa, P. (A)
Luchi, R. D. (M)
Weingarten, M. (SM)
Wilson, C. L. (A)

Pasadena (BAL-3)
Myers, J. A. (A)
Shepherd, S. G., Jr. (A)
Sullins, T. R. (M)
Yost, H. J. (M)

Patuxent River (W-DC-3)
Huff, M. S. (M)
Lamm, L. M. (A)
Ottensmeyer, R. M. (M)

Phoenix (BAL-3)
Bennighof, R. H. (SM)
Cook, A. R. (A)
Davis, R. J. (SM)
Gambrill, R. D. (M)
Johnson, P. S. (M)
Munson, L. A. (M)
Randall, M. W. (M)

Pikesville (BAL-3)
Barrack, C. M. (SM)
Clark, M. C. (M)
Fleishman, L. S. (M)
Gilbert, E. M. (M)
Jacobson, J. M. (SM)
Kasinoff, H. A. (M)
Krause, S. R. (A)
Kravetz, H. T. (M)
Marie, C. S. (M)
Rosenthal, R. E. (A)
Schrank, H. E. (SM)
Wright, R. E. (M)

Point of Rocks (W-DC-3)
Loucks, I. H. (SM)

Potomac Heights (W-DC-3)
Bissett, E. B. (M)

Prince Frederick (BAL-3)
King, B. (A)

Randallstown (BAL-3)
Broady, S. N. (SM)
Burns, J. E. (M)
Dokas, J., Jr. (M)
Henry, G. L. (M)
Lennard, J. K. (M)
Mayhew, J. A., Jr. (A)
Moskowitz, C. (M)
Robinson, J. M. (A)

Reisterstown (BAL-3)
Borisky, A., Jr. (M)
Duncan, R. S. (A)
Franchell, W. R. (M)
Georgallis, P. C. (M)
Haischer, D. H. (A)
Lacis, J. G. (M)
Thomas, C. Y. (M)
Webb, W. R. (M)
Wilkins, D. E. B. (A)

Relay (BAL-3)
Reynolds, D. W. (M)

Riderwood (BAL-3)
Ellen, S. T. (M)
Hammond, J. W. (M)
Pruitt, A. F. (M)

Riverdale (W-DC-3)
Costanza, F. V. (M)
Hargraves, J. F. (M)
MacDougall, S. S. (M)
Oliverio, A. D. (M)
Raffel, J. M. (M)
Smith, J. C., Jr. (A)
Sturdevant, W. H. (M)
Withrow, W. E. (M)

Rockville (W-DC-3)
Achard, F. H., Jr. (M)
Aucremanne, M. J. (M)
Austin, J. H. (A)
Bacon, E. J. (M)
Barnard, G. L. (A)
Beck, W. L. (M)
Benjamin, R. P. (A)
Biser, M. H. (SM)
Bowman, J. E. (A)
Brodie, A. H. (M)
Bruns, H. B. (M)
Brush, J. W. (M)
Burnside, E. D. (M)
Cohen, G. S. (M)
Cole, W. M., Jr. (M)
Copeland, A. L. (M)
Crew, B. L. (M)
Deely, B. M., Jr. (M)
Dellasanta, O. (M)
De Ville, W. W. (M)
Dozier, J. J., Jr. (A)
Dye, J. E. (M)
Eisenberg, R. M. (M)
Elan, F. E. (M)
Fetridge, P. V. S. (A)
Fitzgerald, R. T. (M)
Frizzell, O. E. (M)
Gammill, R. A., Jr. (M)
Gardenhour, A. J., Jr. (M)
Garver, R. V. (M)
Geranis, A. J. (M)
Gilland, H. W. (A)
Gleason, R. J. (SM)
Haltiwanger, J. C. (A)
Hansmann, A. C. (M)
Hardin, C. D. (M)
Harris, E. M. (A)
Hazlett, W. T. (M)
Heilprin, L. B. (M)
Hillstrom, W. B. (M)
Hoffman, L. (M)
Horton, T. R. (M)
Insley, R., Jr. (A)
Jones, R. E. (M)
Jones, R. H., Jr. (M)
Kelley, J. R. (M)
Kelly, J. J. (M)
Kendall, F. H., Jr. (M)
Kennedy, H. J. (M)
Kenney, W. D. (M)
Kingsbury, J. L. (M)
Klamm, G. E. (M)
Knight, D. E. (M)
Kough, B. L. (M)
Lang, E. T. (M)
Larson, R. C. (M)
Lehman, J. E. (M)
Luke, G. W., Jr. (M)
Marsden, C. P., Jr. (M)
Martin, G. (SM)
McCall, T. D. (M)
McGolrick, J. E. (M)
Morison, C. T. (A)
Noelcke, C. L., Jr. (SM)
Norris, R. F. (M)
Oldani, C. M. (M)
Olewine, W. P. (M)
Paradis, R. J. (M)
Parkison, E. R. (A)
Poor, V. D. (M)
Rapalus, H. W. (M)
Roccati, A. J. (A)
Rolfe, R. G. (M)
Ruffino, L. V. (M)
Salemo, J. (SM)
Self, C. T. (A)
Sledge, O. D. (SM)
Soeger, G. U. (M)
Sulzer, P. G. (F)
Swanekamp, J. E. (M)
Swanson, E. E. (M)
Teres, B. W. (A)
Tynan, W. A. (M)
Udelson, B. J. (M)
Van Allen, L. N. (M)
Veras, C. F. (M)
Viera, F., Jr. (A)
Wagner, T. C. G. (M)
Walker, H. C. (M)
Waters, J. A., Jr. (M)
Watkins, C. F. (M)
Watkins, P. L. (M)
Welker, R. A. (M)
Whitlock, M. B., Jr. (A)
Whybrew, J. W. (M)
Wochholz, H. F. (M)

Rogers Heights (W-DC-3)
Dodgson, J. G. (M)

Ruxton (BAL-3)
Fell, T. T. (M)
Martin, A. C. (M)

Saint Michaels (BAL-3)
Lewis, G. (F)

Salisbury (BAL-3)
Gillis, C. L. (M)

Seabrook (W-DC-3)
Ellis, D. G. (A)
Frame, R. H. (A)
Gray, J. W. (M)
Pate, J. D. (M)
Roman, J. (M)
Skaggs, J. W. (A)
Sutton, J. C., II (M)

Severn (BAL-3)
Blouch, D. H. (M)
Burdett, G. L. (M)
Heitman, E. H., Jr. (A)

Severna Park (BAL-3)
Adams, L. C. (M)
Bauman, R. E. (A)
Bellman, B. M. (M)
Burger, R. M. (M)
Butler, H. J. (M)
Chapman, R. W. (M)
Coleman, S. D., Jr. (M)
Field, G. C. (M)
Frame, T. E. (M)
Gedance, A. R. (M)



Glatt, M. A. (M)
Grant, D. L. (M)
Gray, M. G. (M)
Hastings, M. S. (M)
Hayes, M. E. (SM)
Heckman, E. H. (M)
Hetrich, G. R. (M)
Hoffman, C. P. (A)
Horn, R. E. (M)
Huddleston, F. J. (SM)
Jones, W. N. (SM)
Koenig, P. E. (SM)
Lawton, H. D. (M)
Le Febre, D. C. (A)
Mathieu, R. E. (M)
McConnell, V. (A)
McKechnie, J. S. (SM)
Miller, C. J. (SM)
Mooney, D. H., Jr. (SM)
Mooney, M., Jr. (A)
Moore, R. A. (M)
Munro, J. R. (M)
Myers, F. S., Jr. (M)
Parody, C. L. (M)
Praeger, W. C. (M)
Roeder, J. R. (M)
Schmidt, R. J. (M)
Shafer, M. W. (SM)
Thompson, J. E. (M)
Valenta, M. F. (SM)
Van Duzer, K. W., Jr. (M)
Wasson, H. M. (M)
Wilbur, J. W. (M)
Wilson, B. J. (M)
Winter, G. W. (M)
Wood, K. E. (M)
Young, A. F. (M)

Shady Side (BAL-3)
Barnes, L. L. (A)
Wickman, M. (M)

Silver Spring (W-DC-3)
Abramovich, M. N. (SM)
Alde, R. O. (A)
Allen, U. L., Jr. (M)
Andersen, S. F., Jr. (M)
Anderson, H. W. (SM)
Anderson, H. C. (M)
Anspacher, W. B. (SM)
Applebaum, A. (M)
Armistead, W. H., Jr. (M)
Ashour, G. B. (A)
Austin, H. R. (M)
Bailey, A. W. (A)
Baldini, D. P. (A)
Barley, J. R. (A)
Barnard, E. H. (M)
Barse, G. R. (A)
Barylski, M. W. (M)
Bassett, R. S. (M)
Baughn, C. E. (M)
Beach, E. H. (M)
Beaulieu, A. J. (A)
Beck, E. A. (M)
Beckham, J. M. (M)
Bellmore, M. (M)
Bengston, P. S. (M)
Bennets, P. L. (M)
Berliner, J. (SM)
Bernard, R. L. (M)
Bernstein, B. (M)
Blanco, D. R. (SM)
Biosca, L. F. (M)
Blackburn, C. A. (M)
Blackwell, W. C., Jr. (A)
Blair, C. R. (SM)
Blankenship, A. C. (M)
Blevins, H. R. (M)
Blumberg, W. J. (M)
Bond, M. L. (SM)
Bonwit, K. S. (M)
Bonwit, S. E. (M)
Bowman, H. A. (M)
Boyle, D. R. (M)
Braum, C. M. (SM)
Breslauer, A. F., Jr. (M)
Bricout, P. A. (M)
Brimberg, M. M. (SM)
Brittle, D. F. (M)
Brooks, J. W. (M)
Brown, C. W. (SM)
Brownstein, H. (SM)
Bryan, S. (SM)
Buckingham, S. A. (M)
Buckley, R. O. (A)
Byer, D. L. (M)
Caggiano, V. J. (M)
Calhoon, T. C. (M)
Cancro, C. A. (M)
Cannady, P. F. (A)
Cantor, J. M. (M)
Chambre, C. S. (M)
Chandler, H. G. (M)
Channell, E. C. (M)
Chapin, H. E. (M)
Cheston, T. C. (SM)
Chwastyk, A. M. (M)
Clark, J. F. (SM)
Cohen, J. (M)
Collins, J. R. (M)
Collins, J. (M)
Cook, F. W. (M)
Cooper, H W. (SM)
Coscarelli, E. (M)
Cosman, A. (M)
Costolo, C. L., Jr. (A)
Costrell, L. (SM)
Cote, A. J., Jr. (M)
Cotts, A. C. (SM)
Craig, P. M., Jr. (M)
Crisafulli, D. M. (M)
Crone, J. L. (SM)
Cummings, K. C. (M)
Davies, G. L. (SM)
Davis, G. W. (M)
Dean, F. A. (M)
Deitz, J. (SM)
De Luca, L. A. (A)
Demaree, G. A. (M)
Diambra, H. M. (A)
Dippell, R. E., Jr. (M)
Dobbins, B. D. (M)
Dudeney, P. N. (M)
Dunkelman, L. (A)
Durkovic, J. E. (SM)
Du Teil, R. Z. (M)
Dye, R. E. (M)
Early, D. M. (A)
Emch, G. F. (A)
Eshleman, P. W. (M)
Evans, T. R. (M)
Ewing, J. H. (M)
Fairhurst, N. T. (M)
Ferree, H. B. (A)
Fink, C. (M)
Finkel, A. (M)
Fischer, E. H. (M)
Fischer, W. (A)
Fischman, M. (M)
Fisher, C. A. (M)
Fisher, E. M. (M)
Fitzgerald, J. P. (M)
Flato, M. (M)
Flyer, I. N. (SM)
Freeburger, B. P. (A)
Freeman, J. J. (SM)
Friedman, S. N. (M)
Fullen, W. E. (M)
Fund, S. R. (SM)
Funkhouser, R. E., Jr. (M)
Gadbois, G. A. (M)
Gale, M. (A)
Garberson, J. R. (A)
Gaynor, N. (M)
Geist, J. C. (SM)
Gibson, H. T. (M)
Gilbert, J. N. (SM)
Glassco, P. B. (SM)
Glorioso, A. R. (M)
Godsey, W. J. (M)
Goldberg, H. (F)
Goldfarb, B. J. (SM)
Goldstein, G. D. (M)
Gordon, S. H. (M)
Gorozdos, R.E. (M)
Gould, W. I., Jr. (M)
Gray, W. M. (M)
Greene, C. R., Jr. (M)
Greenspon, M. E. (A)
Gridley, J. J. (M)
Grimes, T. J., Jr. (M)
Guida, J. A. (SM)
Hacker, P. S. (M)
Halev, I. (SM)
Halvorsen, H. W. (A)
Hamblen, J. W. (M)
Hanel, R. A. (A)
Hann, J. D. (M)
Hardy, A. O. (A)
Harrison, C. W. (M)
Harrison, C. J. (SM)
Harrison, H. (SM)
Heil, M. M. (M)
Heller, A. (M)
Herider, E. D. (M)
Hermach, F. L. (M)
Herman, J. (SM)
Hibbard, W. D., Jr. (M)
Hickley, T. J. (SM)
Hickok, C. H. (A)
Hiltner, R. P. (A)
Hirschel, L. R. (M)
Hoadley, J. C. (SM)
Hoffman, C. W. (M)
Hogan, D. L. (SM)
Holbrook, R. O. (SM)
Hollis, J. L. (SM)
Holt, A. W. (M)
Hooper, E. T. (M)
Horner, J. E. W. (A)
Hosea, M. E. (M)
Huber, C. E. (M)
Huber, R.C. (M)
Hunker, W. (M)
Hurlburt, E. H. (SM)
Inscoe, R. A. (M)
Jackson, E. H., Jr. (M)
Jacobs, G. (SM)
Jaques, C. M. (A)
James, J. L. (M)
Jesurun, M. M. (M)
Johannessen, H. R. (M)
Johnston, T. F. (M)
Jordan, S. A., Jr. (SM)
Josephson, G. C. (M)
Joslow, J. (M)
Kanter, J. I. (M)
Karl, C. R. (M)
Karp, M. A. (SM)
Katz, I. (SM)
Kelton, G. (SM)
Kimball, J. J., Jr. (M)
King, C. L. (M)
King, R. G. (M)
King, W. P. (SM)
Kirkland, G. I. (M)
Klein, B. (M)
Klein, M. H. (M)
Klink, G., Jr. (A)
Knowles, R. B. (M)
Koutsandreas, J. D. (M)
Kraus, R. W. (M)
Krebs, W. N. (M)
Krels, A. L. (M)
Krelthen, A. (SM)
Kreitzer, H. M. (M)
Krupen, P. (SM)
Kuck, J. H. (SM)
Laine, R. O. (M)
Latson, F. W. (M)
Laughlin, C. R., Jr. (A)
Le Blanc, R. E. (A)
Lebowitz, P. H. (A)
Lee, F. N. (A)
Lee, J. D. (M)
Lefkowitz, H. (M)
Lelbowitz, R. C. (M)
Leitma, G. (A)
Leonard, F. M. (M)
Leslie, C. B. (M)
Levin, A. (A)
Levine, G. (M)
Levine, S. (A)
Levy, I. J. (M)
Liben, W. (SM)
Liberman, R. A. (M)
Looney, H. C. (M)
Love, R. G. (M)
Lubore, S. H. (M)
Lun, M. J. (M)
Machlin, A. (M)
Mack, S. J. (A)
Mackenzie, C. M. (M)
Mallin, J. A. (M)
Maloney, R. S. (M)
Man, E. M., Jr. (M)
Marsh, D. S. (M)
Marshburn, C. E. (SM)
Martin, K. H. (SM)
Massey, A. P. (SM)
Mawhood, S. A. (M)
May, G. L. (M)
McCarthy, L. J., Jr. (M)
McDonald, L. W. (A)
McDuffie, G. E., Jr. (M)
McKeel, P. D. (SM)
McLaurin, T. S. (A)
Meltzer, A. C. (M)
Mengel, J. T. (SM)
Merchant, W. J. (SM)
Mesiera, J. R. (M)
Miller, E. R. (A)
Miller, T. H. (SM)
Mitchell, F. O. (A)
Montgomery, J. D. (M)
Morris, C. S. (M)
Mozer, E. B. (A)
Moye, C. L. (SM)
Mullendore, R. E. (M)
Munson, H. B. (SM)
Munson, J. C. (SM)
Myrick, J. C. (M)
Nagrant, J., Jr. (M)
Nagy, A. W. (SM)
Nalley, W. M. (M)
Nathanson, F. E. (M)
Needand, F. (M)
Nellis, R. E. (M)
Newman, N. (A)
Nisson, C. J. (M)
Norvell, J. B. (M)
Nucci, E. J. (SM)
Oakes, J. B. (M)
Ober, H. E. (SM)
O'Hara, J. J., Jr. (M)
Olin, I. D. (M)
Oliver, M. E. (M)
Otto, W. C., Jr. (M)
Page, C. H. (F)
Palasky, E. C. (M)
Pales, J. C. (M)
Parker, M. J. (SM)
Parks, J. N. (A)
Paul, A. W. (M)
Pear, C. B., Jr. (M)
Perritte, J. L. (M)
Perry, D. W. (A)
Pettyjohn, J. G., Jr. (M)
Phelps, R. W. (M)
Pincus, S. (M)
Plotkin, G. N. (M)
Pollow, C. H. (M)
Poritzky, S. B. (M)
Preisman, A. (F)
Prentiss, S. R. (M)
Proudley, R. E. (A)
Pugh, T. A. (SM)
Pugh, M. E. (M)
Puorro, T. A. (M)
Qualkinbush, D. N. (A)
Quick, G. R. (M)
Randolph, J. P., Jr. (SM)
Rappaport, G. (F)
Rattner, S. (SM)
Ray, H. A., Jr. (SM)
Reagen, E. J. (M)
Redden, M. S., Jr. (M)
Reed, H. C. (A)
Regnier, R. C. (A)
Rice, L. W. (M)
Robertson, T. M. (SM)
Robinson, R. O. (SM)
Rogers, A. L. (A)
Rolinski, A. J. (M)
Rosenberg, J. D. (M)
Rosenhall, M. (A)
Ross, R. R. (M)
Rotkin, I. (SM)
Rowland, R. W. (M)
Rozanski, R. R. A. (M)
Rueger, L. J. (SM)
Sasse, J. (M)
Schmidt, B. H. (M)
Schroeder, A. J. (A)
Schuchard, E. A. (M)
Schulman, J. R. (M)
Schweitzer, A. J. (A)
Scillian, G. L. (SM)
Scott, R. J. (M)
Seaton, J. W. (M)
Segal, R. L. (M)
Settersten, R. A. (M)
Shade, K. E. (A)
Shapiro, G. (SM)
Shaw, H. F. (M)
Sheppard, T. W. (M)
Shuck, L. G., II (A)
Silverman, S. (SM)
Simms, A. (A)
Simon, A. (M)
Simons, D. E. (SM)
Sloan, R. F. (M)
Small, H. (M)
Smith, C. B. (M)
Smith, C. N. (A)
Smith, D. D. (SM)
Smith, R. A. (M)
Smith, J. V. (A)
Smith, W. J. (M)
Smittenaar, C. H. (M)
Smollett, R. J. (M)
Snow, C. E. (M)
Soler, A. (M)
Solow, M. (M)
Sparks, R. A. (M)
Spenser, C. W. (M)
Spetner, L. M. (SM)
Spicer, W. H., Jr. (M)
Spool, J. (M)
Staake, D. D. (SM)
Stanton, O. J. (SM)
Stein, M. (M)
Stott, W. T. (M)
Strasser, T. J. (A)
Street, H. W. L. (A)
Sullivan, J. J. (M)
Sures, A. H. (SM)
Sutton, E. D. (M)
Tate, R. T. (M)
Taylor, R. E. (SM)
Taylor, W. O. (M)
Terrell, R. L. (M)
Thews, R. F. (M)
Thompson, J. A. (M)
Thompson, R. E. (A)
Toense, E. R. (A)
Toense, R. A., Jr. (M)
Tolos, G. (M)
Torpy, D. J. (M)
Toth, E. (F)
Tregldga, A. C. (SM)
Unkenholz, W. C. (M)
Upchurch, L. M., Jr. (M)
Van Brunt, F. (M)
Vann, W. L. (M)
Varhus, H. H. (M)
Vest, S. E. (M)
Vlias, E. T. (M)
Walmwright, R. A. (M)
Wales, R. O. (M)
Walker, D. L. (M)
Walsh, G. W. (M)
Walters, F. M., III (M)
Watters, L., Jr. (M)
Ware, R. B. (M)
Warren, S. M. (M)
Watson, R. D. (SM)
Webster, K. R. (M)
Weichbrod, J. (SM)
Weinberger, A. (M)
Weinstein, M. S. (M)
Weiser, S. (A)
Weitzel, R. L. (M)
Westerfield, E. E. (M)
Wetmore, G. B. (M)
White, A. C. (M)
White, N. (SM)
White, P. E. P. (M)
Willard, J. M. (M)
Williams, E. M. (SM)
Williams, V. L. (M)
Williams, W. E., Jr. (SM)
Willis, F., Jr. (SM)
Wilow, M., Jr. (M)
Wilte, J. (M)
Wolff, J. J., Jr. (M)
Worsley, C. C. (A)
Worsley, G. (SM)
Wyman, R. C. (M)
Yates, W. A. (SM)
Yeager, J. (M)
Yost, C. F. (M)
Young, J. D. (SM)
Young, N. C., Jr. (M)

Simpsonville (BAL-3)
Bartlett, O. H. Jr. (M)
Morris, G. T. (M)
Worden, H. W. (M)

Sparks (BAL-3)
Macnichol, E. F., Jr. (M)

Spencerville (W-DC-3)
Smith, W. L. (SM)

Springfield (W-DC-3)
Doyle, E. M. (M)

Stevensville (BAL-3)
Wise, H. J. (SM)

Suitland (W-DC-3)
Chapdelaine, A. J. (A)

Takoma Park (W-DC-3)
Ackerman, C. E. (SM)

Temple Hills (W-DC-3)
McClannan, Q. B. (M)

Timonium (BAL-3)
Baker, D. A. (M)
Barbour, C. W., Jr. (SM)
Beste, F. J., Jr. (M)
Brown, W. R., Jr. (M)
Colvin, J. W. (M)
Davison, F. A. (M)
Dawson, S. R. (SM)
Diersing, C. B., Jr. (M)
Faber, D. C. (M)
Franz, W. J. (M)
Fuller, W. C., Jr. (M)
Garrison, C. P., Jr. (M)
Green, N. (M)
Greenhouse, H. M. (M)
Hart, A. C. (M)
Hatcher, J. H. (M)
Hendershot, J. H. (M)
Hoffmanner, G. H. (M)
Jensen, J. (M)
Jones, W. R. (A)
Jory, W. H. (M)
Karpinski, A. L. (M)
King, D. D. (F)
Lee, R. A. (M)
Macalady, B. D. (M)
MacGlashan, D. W. (M)
Madren, P. L., Jr. (M)
Martin, J. W. (M)
McClay, W. C. (M)
Mills, L. R., Jr. (M)
Mitchell, D. L. (A)
Monaco, M. (M)
Neel, L. L. (M)
Novak, A. J. W. (M)
Petrou, N. V. (SM)
Pribble, N. F. (M)
Redifer, J. L. (M)
Reel, G. M. (M)
Rice, C. I. (SM)
Roode, R. J. (A)
Scherbarth, R. A. (M)
Shelor, E. G., Jr. (M)
Skolnik, M. I. (SM)
Smeltzer, R. F. (A)
Spencer, R. C. (F)
Strickroth, G. J. (SM)
Vanderlipp, R. R. (M)
Varone, R. A. (SM)
Visher, W. A. (SM)
Wedel, J. O., Jr. (A)
Weidner, E. J. (M)
Wiltse, J. C., Jr. (SM)
Zahalka, L. B. (SM)
Zutkoff, A. I. (A)

Towson (BAL-3)
Bang, B. A. (M)
Barclay, A. S. (M)
Barnes, A. E. (M)
Barnhill, R. B. (M)
Bauer, R. J. (M)
Beachler, L. W. (M)
Bittman, L. R. (M)
Brach, J. P., Jr. (M)
Brugger, R. D. (M)
Bulik, C. (M)
Campbell, W. O. (M)
Chrisman, D. W. (SM)
Clark, M. C. (M)
Clevenger, G. W. (M)
Coon, R. W. (M)
Cosby, J. R. (M)
Cull, D. E. (M)
Donovan, W. H. (M)
Eaton, T. T. (SM)
Edwards, R. B. (M)
Esher, J. R., Jr. (SM)
Frome, M. K. (M)
Gebhardt, R. C. (M)
Gibson, R. L. (A)
Graffis, L. F. (SM)
Gruenberger, H. S. (M)
Hafstrom, W. F. (M)
Hall, H. S. (M)
Hanmei, A. E. (M)
Hammond, J. W. (SM)
Hartwigsen, C. K. (M)
Hatfield, G. I. (M)
Henthorn, J. E. (SM)
Hoffman, P. A. (SM)
Hollis, T. W., Jr. (A)
Houck, J. W. (A)
Hulce, R. L. (M)
Johnson, C. M. (SM)
Johnson, G. M. (M)
Jones, W. M. (A)
Kaltenbacher, D. M. (M)
Killion, R. H. (SM)
Kimer, E. O. (SM)
Kittel, R. P. (SM)
Kwiatkowski, S. W. (A)
Laning, W. A. (M)
Larkins, E. B. (M)
Lilibridge, J. R., Jr. (M)
Lindenthal, M. W. (A)
McDade, J. G. (A)
McEntyre, D. E. (M)
Meador, A. B., Jr. (M)
O'Meara, W. J. (M)
Pavelka, C. F. (M)
Petersen, D. R. (SM)
Phalen, F. W. (M)
Pickens, R. A. (M)
Pratt, A. (SM)
Purinton, H. G. (M)
Randolph, G. W. (M)
Riggs, R. N. (SM)
Robinson, D. C. (M)
Rubis, C. J. (M)
Ruth, J. K. (M)
Scheiner, S. R. (SM)
Schmitt, M. J. (A)
Shagena, J. L., Jr. (M)

Shepherd, R. T. (M)
Silbert, W. C. (M)
Sinclair, A. L., III (M)
Slavin, M. (M)
Snyder, M. G. (M)
Stauffer, R. L. (M)
Stephenson, J. O. (M)
Stoddard, H. R. (A)
Sudia, A. T. (M)
Swartz, J. A. (M)
Talaat, M. E. (A)
Taylor, J. H. (SM)
Taylor, W. R. (M)
Thomas, C. E., Jr. (M)
Thomas, R. K. (SM)
Tribble, K. E. (M)
Tschiegg, M. D. (A)
Vana, C. J. (M)
Vergara, W. C. (SM)
Vinson, R. R. (M)
Walter, G. M. (SM)
Watson, T. E. (M)
Weaver, R. C., Jr. (M)
White, G. R. (SM)
Whitney, M. E. (SM)
Wilkinson, R. L. (A)
Wolff, L. H. (A)
Yates, L. R. (M)

University Park (W-DC-3)
Burke, J. K. (M)
Coker, R. H. (M)
Prival, H. G. (M)

Valley Lee (W-DC-3)
Gardner, J. C. (M)

Welcome (W-DC-3)
Lamm, C. M., Jr. (A)

West Hyattsville (W-DC-3)
Almquist, J. F. (A)
Benfield, D. G. (M)
Bitz, E. A. (M)
Ferrara, A. A. (A)
Fink, W. G. (M)
Headrick, W. C. (M)
Kessler, S. (A)
Khu, E. B. C. (M)
La Pointe, J. C (SM)
Luscombe, J. P. (M)
Mah, T. F. (A)
Marzetta, L. A. (M)
Mitchell, G. S. (M)
Pittard, G. S., Jr. (M)
Quigley, C. E. (M)
Roberts, P. M. (M)
Rothschild, S. (M)
Sacks, J. (SM)
Schwartz, R. J. (M)
Wolff, E. A. (M)

Westminster (BAL-3)
Holmes, T. R. (A)
Morgan, R. H. (M)

West Severna Park (BAL-3)
Cowan, K. D. (A)
Heazel, V. M., Jr. (M)
Pincoffs, P. H. (M)

Wheaton (W-DC-3)
Brewer, J. T. (M)
Cook, T. B. (M)
Cottrell, J. E., Jr. (M)
Doctor, N. J. (M)
Fowlkes, J. C. (M)
Frederick, C. L., Jr. (A)
Gragnani, O. J. (M)
La Fever, R. C. (A)
Lepkowski, M. J. (A)
Luff, F. T. (M)
Marks, M. M. (SM)
Molcan, J. F. (A)
Moseley, J. C., Jr. (M)
Paris, H. B., Jr. (M)
Patton, R. E. (M)
Peters, J. (M)
Snow, R. F. (A)
Thomson, D. M. (M)
Van Hoesen, R. W. (A)
White, D. R. J. (SM)

Wheaton Heights (W-DC-3)
Baechtel, A. R. (M)

White Marsh (BAL-3)
Francis, J. P. (A)
Schultz, R. L. (A)
Wintle, M. R., Jr. (M)

Williamsport (W-DC-3)
Britner, R. O., Jr. (M)

MASSACHUSETTS

Abington (BOS-1)
Mielke, E. S. (A)
Murphy, P. V. (M)
Pihl, G. E. (SM)

Acton (BOS-1)
Casey, R. F. (A)
Packard, L. E. (F)
Sawyer, C. E. (M)
Searle, R. W. (A)
Sletten, C. J. (M)
Smith, B., Jr. (SM)
Swanson, S. C. (M)

Adams (WM-1)
McRae, W. J. (A)
Starsiak, R. S. (A)
Zabawa, E. P. (A)

Allston (BOS-1)
Allen, D. F. (M)
Beck, L. J. (M)
Belkin, A. (A)
Cohen, S. (M)
Finkelstein, A. B. (M)
Gordon, E. N. (M)
Knoll, A. L. (M)
Max, S. M. (M)
Schwartz, C. J. (A)
Wolf, S. M. (A)

Amesbury (B-MV-1)
Hambleton, P. N. (SM)

Amherst (WM-1)
Agarwal, P. D. (SM)
Herchenreder, H. (M)
Laerstadius, J. E. (M)
Langford, J. W., Jr. (M)

Andover (B-MV-1)
Adams, J. E. (M)
Cadran, L. R. (M)
Denault, D. R. (M)
Elowe, E. N. (M)
Fadden, J. J. (M)
Finley, A. D. (M)
Garfield, O. R. (SM)
Gerin, J. H., Jr. (M)
Gregory, N. (M)
Helstein, J. T. (M)
Hensel, W. G. (SM)
Hooson, R. W. (A)
Jordan, D. R. (M)
King, R. A. (M)
Koch, A. A. (M)
McFarland, F. H. (A)
Merritt, L. P. (M)
Monks, G. G., Jr. (A)
Pelc, J. I. (M)
Poulin, D. J. (M)
Roch, M. E. (M)
Rounds, W. A. (A)
Roundy, G. H. (A)
Salvo, R. A. (M)
Sanders, R. W. (M)
Terranova, D. S. (M)
Turner, V. D. (M)
White, E. F. (A)
White, J. R. (SM)
Williams, R. P. (M)
Wilson, R. S. (M)
Word, J. A. (SM)
Yeiter, M. R. (M)

Arlington (BOS-1)
Abell, G. R. (M)
Ames, B., Jr. (M)
Amstutz, S. R. (M)
Astulfi, S. O. (A)
Bachman, W. S., Jr. (M)
Bagnall, J. J., Jr. (SM)
Bailey, D. L. (M)
Barrie, T. H. (M)
Bartell, W. W. (M)
Bartz, C. T. (M)
Bates, R. H. T. (M)
Ben-Or, Y. (M)
Binsack, J. H. (M)
Bogart, R. M. (M)
Boland, J. N. (M)
Bouck, W. P. (M)
Campbell, D. J. (A)
Castelli, J. P. (M)
Chang, S. H. (SM)
Chapman, P. W. (M)
Chisholm, V. T. (M)
Cole, B. R. (M)
Collins, W. E. (M)
Cosman, B. J. (M)
Craven, R. B. (M)
Curry, W. C. (M)
Davis, E. S. (M)
Defandorf, J. P. (M)
Delaney, W. P. (M)
De Lisle, J. E. (M)
Diblase, V. L. (M)
Finke, H. E. J. (M)
Forgie, J. W. (M)
Gano, J. J. (SM)
Graham, E. A., Jr. (M)
Graham, J. W. (M)
Gronberg, F. T. (M)
Gustaff, A. J. (M)
Hadlock, C. F. (SM)
Haire, P. F. (M)
Hansen, J. T. (M)
Harmer, J. D. (SM)
Harrington, W. L. (A)
Hathaway, F. R., Jr. (A)
Hattery, W. V. (M)
Hawkins, R. S. (M)
Hofmann, E. J. (A)
Hofstetter, E. M. (M)
Jarvis, A. B. (M)
Katzenelson, J. (M)
Kelly, J. A. (M)
Kermeits, N. P. (M)
Kiessling, P. W., Jr. (M)
Knight, H. M. (M)
Kyropoulos, L. (M)
Laughlin, M. J. (M)
Lin, C. S. (M)
Lyon, H. A. (M)
Mager, H. (M)
Maguire, J. N. (M)
McCabe, H. P. (M)
McCann, J. F. (A)
McFarlane, R. A. (M)
McKendree, J. D. (M)
Mills, A. L., Jr. (M)
Mueller, R. W. (M)
Myers, E. N. (M)
Nuttall, A. H. (M)
Panosian, A. H. (M)
Parker, R. R. (M)
Pasho, E. I. (M)
Pechacek, R. E. (M)
Perry, K. E. (A)
Pierce, J. A. (F)
Pine, E. (SM)
Plotts, E. L. (SM)
Plousslos, G. (M)
Powers, R. A. (M)
Rowe, A. J. (M)
Sauber, J. W. (SM)
Schreuer, W. (SM)
Schwenge, F. C. (M)
Shannon, J. R. (A)
Sheridan, W. F. (A)
Soron, H. I. (M)
Stephenson, L. (M)
Sutahian, H. S. (M)
Sylvia, T. R. (M)
Tam, N. K. H. (M)
Tassinari, S. P. (M)
Theiss, C. M. (M)
Tilton, C. S. (SM)
Trunflo, A. P. (M)
Von Recklinghausen, D. R. (M)
Wagner, C. A. (M)
Warren, R. M. (A)
Watson, P. C. (M)
Witt, R. P. (M)
Zantos, N. G. (M)

Arlington Heights (BOS-1)
Cleveland, L. (M)
Lamson, H. W. (F)

Ashby (BOS-1)
Dallin, E. B. (SM)

Ashland (BOS-1)
Beck, L. C. (A)
Boughnou, T. R. (M)
Bulting, F. P. (M)
Cook, W. J. (M)
Deluski, E. F. (M)
Distler, R. C. (M)
Feather, J. E. (M)
Greene, P. B. (M)
Lipinoga, L. (M)
Mercer, C. D., Jr. (M)
Pathe, J. F. (SM)
Petterutl, A. J. (M)
Prager, M. (M)
Russell, J. T. (SM)
Sonnabend, J. S. (M)
Spellos, J. S., Jr. (M)
Temple, A. H. (M)
Zeller, H. R., Jr. (M)

Attleboro (BOS-1)
Allen, D. J. (A)
Athanas, D. (M)
Bliampkis, E. E. (M)
Boulanger, H. J. (M)
Flanagan, C. D. (M)
Gustafson, D. W. (A)
Logan, C. A. (M)
Puleston, R. B. (A)
Thornhill, J. W. (SM)
Vetter, E. O. (M)

Auburn (BOS-1)
Beschle, R. G. (M)
La Brie, R. H. (M)
Smith, J. G. (M)

Auburndale (BOS-1)
Campbell, E. G. (M)
Day, P. F. (M)
Finneran, W. J. (M)
Harper, S. D. (SM)
Ingalls, R. P. (M)
Janis, P. (SM)
Karsh, H. (M)
Merrill, B. (M)
Mott-Smith, J. C. (M)
Owen, J. Q. (M)
Ryan, C. E. (M)
Talambiras, R. P. (M)

Avon (BOS-1)
Chappell, I. C. (A)
Hourihan, A. M. (M)

Babson Park (BOS-1)
Riblet, H. J. (F)

Ballard Vale (B-MV-1)
Zink, A. J., Jr. (SM)

Bedford (BOS-1)
Adolph, E. H. (M)
Alexander, A. M. (A)
Alexander, R. M. (M)
Altenbach, R. K. (M)
Anderson, E. E. (M)
Angus, R. B., Jr. (SM)
Arsenault, J. R. (M)
Ashenfelter, T. E. (M)
Baker, A. L. (M)
Baker, R. H. (M)
Band, H. E. (SM)
Barabush, A. (M)
Barker, H. R., Jr. (M)
Beaublen, D. J. (M)
Beaumariage, D. C. (M)
Bennett, G. E. (M)
Bishop, W. B. (M)
Brindley, W. E. (M)
Brown, D. M. (M)
Brown, R. B., III (M)
Bruck, D. B. (M)
Burbo, J. H. (M)
Canty, W. J. (M)
Capen, E. B. (M)
Carr, K. L. (M)
Claflin, R. E., Jr. (M)
Congdon, W. H. (SM)
Crandell, P. A. (SM)
Despathy, R. G. (M)
Devine, F. J. (M)
De Vita, A. J. (M)
Donovan, C. (M)
Drew, D. B. (A)
Duncan, R. D. P. (M)
Earsy, R. M. (M)
Edson, W. F., Jr. (M)
Engel, P. F. (M)
Fernald, R. A. (M)
Ferri, A. J., Jr. (M)
Field, W. G. (M)
Fischer, H. L. (M)
Fonoroff, B. (M)
Fricks, R. E. (M)
Friedman, M. (M)
Gentuso, E. J. (M)
Gianino, P. D. (M)
Gicca, F. A. (M)
Gindsberg, J. (SM)
Goldberg, S. H. (M)
Grabka, G. J. (M)
Hammond, G. H. (SM)
Hanks, E. C., Jr. (M)
Harrington, C. F., Jr. (M)
Harrison, J. R. (M)
Harwood, A. (M)
Hawes, A. R. (SM)
Healy, B. H. (A)
Heany, K. F., Jr. (M)
Heart, F. E. (M)
Heckscher, J. L. (M)
Hicks, W. J. (M)
Hinckley, K. M. (M)
Holtzman, I. D. (M)
Horley, A. L. (M)
Ingrao, H. C. (M)
Jelalian, A. V. (M)
Johnston, P. C. (M)
Jones, G. C. (M)
Jones, H. I., Jr. (M)
Jurglelewicz, S. S. (A)
Keenan, J. A. (M)
Kent, A. J. (A)
Kimball, J. A. (M)
Konkle, K. H. (M)
Kwiatkowski, T. F. (A)
Leonard, F. J. (M)
Libby, W. B. (M)
Lipke, D. W. (M)
Long, W. H. (M)
Lovell, R. W. (M)
Maier, G. H. (A)
Manasse, R. (M)
Marshall, R. C. (M)
May, W., Jr. (A)
McCurley, E. P. (M)
McKersie, A. D. (M)
McMurtrie, D. L. (SM)
Morgan, T. J. (M)
Morin, J. O. (M)
Mudgett, W. L. (M)
Muller, E. S., Jr. (M)
Nixon, D. S., Jr. (M)
O'Neil, W. K. (M)
Orange, A. S. (M)
Owen, P. H. (M)
Passera, A. L. (M)
Peeler, J. D. M. (M)
Perkins, J. F., Jr. (M)
Perry, B. A. (SM)
Procunier, R. W. (M)
Pulliam, S. B. (M)
Rand, J. C. (A)
Rasmussen, J. E. (M)
Reinecke, H., Jr. (M)
Rey, T. J. (SM)
Rodman, A. K. (M)
Romano, A. (A)
Sauer, J. S. (M)
Sen, H. K. (SM)
Shapiro, M. L. (M)
Sherburne, A. E. (M)
Skidmore, D. (M)
Skinner, L. V. (SM)
Smith, C. L. (SM)
Smith, W. C. (M)
Starr, E. A. (M)
Stees, H. S., Jr. (A)
Stevens, R. T. (SM)
Swanson, D. W. (M)
Sykes, C. A. (M)
Tetley, W. H. (M)
Thomson, W. M. (M)
Thornton, D. P. (M)
Vail, W. A. (M)
Vance, W. H., Jr. (M)
Ward, J. H. R., III (A)
Warner, E. R. R. (M)
Wepsner, W. G. (M)
Wilkes, H. A. (M)
Willis, J. T. (M)
Wold, D. C. (A)
Woodruff, M. W. (M)
Wulfsberg, K. N. (M)

Belmont (BOS-1)
Adler, E. (M)
Albert, B. (M)
Barry, J. G. (SM)
Berry, W. O. (A)
Bistany, F. A. (A)
Bjork, A. P. (M)
Blackburn, J. F. (M)
Brown, R. M. (M)
Chatterton, E., Jr. (M)
Cox, W. W. (M)
Crews, J. B. (M)
Crosby, R. C. (M)
Cullington, E. H. (M)
Davidson, D. (M)
Deuitch, D. E. (M)
Dolbear, B. L. (SM)
Dudley, B. (SM)
Duncan, N. L. (M)
Eddy, F. N. (A)
Edgerton, H. E. (F)
Fernandes-Rivas, L. A. (A)
Freed, C. (M)
Gram, H. R., Jr. (M)
Gray, H. L. (A)
Gray, P. E. (M)
Handy, R. A. (A)
Hellenbrand, C. M. (M)
Hildebrand, J. G., Jr. (M)
Hobbs, J. D. (SM)
Hunt, F. V. (F)
Jacomb, R. A. (M)
Klein, J. A. (M)
Klemperer, H. (A)
Kondi, S. E. (M)
Lawson, J. S., Jr. (SM)
Levi, P. R. (M)
Levison, W. H. (M)
Looney, W. P. (A)
Lovenstein, A. J. (SM)
Luscher, R. W. (A)
Macrakis, M. S. (A)
Mercer, W. R. (SM)
Nestine, F. W., Jr. (M)
O'Day, M. D. (M)
Peters, A. T. (A)
Reed, J. (SM)
Reinties, J. F. (SM)
Restaino, A. D. (M)
Richardson, A. S. (M)
Rines, R. H. (SM)
Ringer, M. (M)
Robinson, J. (M)
Saulnier, J. E. (M)
Saunders, A. C. W. (M)
Seaver, W. H. (M)
Stein, J. (A)
Taber, R. N. (M)
Taft, W. C. (M)
Toman, K. (M)
Travia, J. S. (M)
Wagner, R. W. (M)
Walker, L. H. (M)
Ward, H. R. (A)
Woodin, E. A. (A)
Woodward, R. H. (M)

Berkshire (WM-1)
Lord, R. W. (M)

Berlin (BOS-1)
Krackhardt, R. H. (A)

Beverly (B-MV-1)
Barton, L. F. (M)
Biggs, O. H. (M)
Broderick, D. C. (M)
Brown, N. J. (M)
Buset, K. (M)
Carbrey, E. J., Jr. (M)
Dillaby, E. F. (SM)
Dodds, W. (SM)
Ferris, P. A. (M)
Finneault, W. L. (M)
Foss, D. W. (M)
Galluzzi, N. P. (M)
Ghen, W. R. (M)
Gstteiger, K. E. (M)
Gustafson, E. M. (A)
Hangstefer, J. B. (M)
Juhola, C. (SM)
King, F. N. (M)
Kraeuter, L. D. (M)
Krinsky, B. D. (M)
Leach, F. A. (M)
McCarthy, H. J. (SM)
Norwood, R. D. (M)
O'Brien, C. A. (M)
Peckover, P. A. (M)
Perron, R. R. (M)
Pierce, D. H. (M)
Ploss, A. G. (M)
Prescott, G. A. (A)
Preston, A. C. (M)
Robb, B. V. R. (A)
Rudenberg, H. G. (SM)
Safran, L. (M)

Billerica (BOS-1)
Anderson, J. E. (A)
Chamley, E. (A)
Danko, J. J. (M)
Dion, A. (M)
Dixon, L. H., Jr. (M)
Gallagher, R. D. (M)
Harvey, W. M., Jr. (M)
Higgins, W. T. (M)
Hogan, W. D. (M)
Masi, J. L. (M)
Nickless, H. C. (A)
Norviel, H. D. (SM)
Sequera, T. C. (M)
Slenker, S. (M)
Williamson, R. S. (M)

Bolton (BOS-1)
Mechlin, R. N. (M)
Slade, C. B. (M)
Wilson, H. M. (SM)

Boston (BOS-1)
Albersheim, W. J. (F)
Alexander, C. S., Jr. (M)
Alford, A. (F)
Anastos, E. G. J. (M)
Bailey, R. B. (A)



Baird, H. S. (A)
Baimsfather, R. R. (M)
Bakalar, D. (M)
Balf, G. F. (M)
Baptiste, G. F. (A)
Bardfield, M. L. (M)
Baron, R. C. (M)
Bean, W. S. (M)
Belvin, F. (M)
Berg, N. E. (M)
Berman, J. (M)
Blitz, D. (M)
Bopp, R. W. (M)
Bordewieck, R. W. (A)
Bosler, R. B. (A)
Brannon, M. (M)
Brettler, B. J. (M)
Brilliant, M. B. (M)
Bruni, D. J. (M)
Byck, D. M. (M)
Carpenter, R. O'B. (M)
Cestari, V. M. (M)
Chandler, C. H. (SM)
Chopra, A. (A)
Christian, J. W., Jr. (M)
Copos, E. M., Jr. (M)
Dantas, C. E. (M)
Darsch, C. G., Jr. (M)
Detrick, D. M. (M)
De Wolf, N. (M)
Doane, R. C. (A)
Doman, D. B. (M)
Dougherty, J. D. (A)
Dunn, A. E. (M)
Eaton, L. G. (M)
Edie, J. L. (M)
Erlman, W. M. (M)
Essigmann, M. W. (SM)
Evans, R. R. (M)
Farnsworth, E. P. (SM)
Fenter, W. S. (A)
Fernandez, L. E. (A)
Friedman, M. S. (A)
Gagnon, W. J. (M)
George, G. F. (M)
Germeshausen, K. J. (SM)
Glanoukos, W. A. (M)
Goldberg, H. B. (M)
Goldsmith, B. P. (M)
Goldstien, S. (M)
Graham, F. E. (M)
Green, B. (M)
Grossimon, H. P. (A)
Grumman, G. S. (A)
Gunders, E. (M)
Guterman, S. S. (SM)
Haberstroh, A. (SM)
Hagoolan, N. D. (M)
Hague, W. M., Jr. (M)
Hallenstein, N. A. (M)
Hamilton, S. R. (M)
Hardsog, H. N. (SM)
Hartman, R. H. (M)
Hayes, C. J. (A)
Heinz, J. M. (M)
Hertan, P. L. (A)
Hetherington, J. S. (M)
Hicken, C. (M)
Hillier, J. A., III (A)
Hobson, J. E. (F)
Hoeke, F. W. (M)
Horlick, P. H. (M)
Hughes, A. M. (M)
Hussein, J. A. (A)
Imus, H. O., Jr. (M)
Janak, J. F. (M)
Jensen, J. W. (M)
Johnson, C. L. (M)
Jones, R. E. (SM)
Jones, R. N. (A)
Kaminski, W. A. (M)
Kantor, G. (M)
Kaszynski, E. A. (M)
Katz, L. (M)
Kearsley, W. A. (M)
Keiner, R. C. (A)
Kennedy, T. G. (A)
Kerk, C. T. (M)
Kilroy, H. P. (M)
Kim, Y. S. (M)
Kimball, V. L., Jr. (SM)
Klein, R. D. (M)
Kosteckl, W. (M)
Kreindel, B. (A)
Ladd, R. E. (M)
Lambropoulos, D. (M)
Landers, R. L. (A)
Lee, R. C. (M)
Lee, S. W. (M)
Lewis, G. A. (M)
Liszewski, T. M. (M)
Littleboy, H. S. (SM)
Loewenthal, M. (M)
Lutz, M. W. (M)
Maguire, H. T. (A)
Malm, R. F. (M)
Mark, D. H. (A)
Metro, A. C. (M)
Miller, H. E. (M)
Murachver, J. (M)
Myers, J. M. (M)
Nay, J. N. (M)
Offner, M. M. Y. (M)
Owen, S. (M)
Palmer, R. T. (M)
Perron, R. T. (M)
Phelps, L. I. (A)
Pote, W. J. (M)
Poveda, H. (A)
Ramler, D. A. (A)
Randall, D. S. (A)
Rhodes, J. S. (M)
Richman, P. L. (M)
Rines, D. (M)
Rivers, R. A. (M)
Roberts, L. W. (SM)
Roche, C. E. (M)
Rynard, J. P. (A)
Schindler, J. A. (A)
Schmitt, J. W. (M)
Schochet, J. R. (A)
Schwartz, S. (SM)
Scolamiero, D. M. (M)
Scott, R. E. (M)
Seville, A. R. (M)
Shortell, A. V., Jr. (M)
Siegel, R. C. (M)
Smith, A. D. (M)
Smith, T. B. (M)
Soule, W. J. (M)
Stack, E. J. (A)
Stanfield, R. B. (A)
Stone, S. G. (A)
Tisdale, J. W. (A)
Toperzer, R. S. (M)
Verzuh, F. M. (M)
Wagner, P. S. (M)
Wayne, G. H. (SM)
Weingarten, J. (M)
Wilson, G. M. (A)
Winn, H. L. (M)
Winston, A. W. (M)
Wozencraft, J. M. (SM)
Zeldes, P. (M)
Zraket, C. A. (SM)

Boxford (B-MV-1)
Anderson, A. F. (M)
Fulton, R. O. (A)
Kuczun, C. G. (M)

Braintree (BOS-1)
Brennan, J. E. (M)
Gorsuch, W. F. (M)
Murphy, A. L. (M)
Myrbeck, E. R. (SM)
St. Andre, G. O. (M)

Bridgewater (BOS-1)
Hlavacek, A. R. (M)
Wilber, L. C. (M)

Brighton (BOS-1)
Altshuler, E. E. (M)
Baker, H. R. (M)
Ballantine, J. H. (M)
Brandt, P. W. (M)
Carpenter, D. P. (M)
Chan, N. C. H. (M)
Demeo, P. P. (M)
Desmond, W. C., Jr. (M)
Forys, E. L. (M)
Gillis, J. E. (M)
Girard, S. S., Jr. (A)
Greenwood, J. R. (A)
Hanopol, L. (M)
Healy, T. J., Jr. (M)
Hertz, D. (M)
Huquan, A. J. (M)
Jacob, F. (M)
Kaufman, L. J. (M)
Larkin, J. D. (M)
Leonard, T. V. (A)
MacDonald, F. D. (A)
MacMillan, A. J. (M)
Malizia, J. P. (M)
Margolin, M. C. (M)
Martin, F. H. (M)
Masse, D. J. (A)
Merchant, J. (M)
Montanari, R. E. (M)
Moskowitz, F. (SM)
Romano, D. S. (SM)
Rotman, W. (M)
Schwartz, R. J. (M)
Seligman, R. I. (M)
Sullivan, D. R. (M)
Talley, W. K. (M)
Tsacoyeanes, C. W. (M)
Weisel, R. L., Jr. (M)
Welner, G. (M)
Yurt, X. (M)

Brockton (BOS-1)
Bianco, F. P. (M)
Bryant, R. L. (M)
Capozzi, A. J. (A)
Casey, A. A., Jr. (M)
Craig, A. G., Jr. (M)
Dulskis, R. (M)
Ewell, R. M., Jr. (A)
Fortier, O. V. (M)
James, P. G., Jr. (A)
Kurpis, G. P. (M)
Loughlin, B. J. (A)
Mazeiko, C. K. (M)
Price, C. W. (A)
Ronis, W. J. (M)
Rousseau, A. J. (M)
Rubin, H. L. (A)
Samoson, E. J. (A)
Shuck, T. L. (M)
Swanson, H. A. (M)
Tang, A. Y. C. (A)
Uses, E. P. (M)
Ward, A. G. (M)
Wetzell, H. B. (M)

Brookline (BOS-1)
Ackerman, R. L., Jr. (M)
Andreika, J. T. (M)
Anfenger, E. (M)
Blanchard, B. F. (M)
Bloom, J. H. (M)
Bow, B. H. (M)
Chernikoff, L. (A)
Cohler, E. U. (SM)
Crystal, M. I. (M)
De Mattos, R. F. (M)
Doctor, D. E. (A)
Donnelly, R. S. (M)
Douglass, A. M. (M)
Eichacker, P. G. (A)
Feinstein, N. B. (M)
Frewald, W. J. (A)
Globus, L. A. (M)
Goldman, D. J. (M)
Green, A. I. (M)
Hart, W. H. (M)
Hodgkins, D. H. (M)
Irons, F. H. (M)
Kaplan, B. J. (M)
Kline, D. C. (M)
Kodis, R. D. (SM)
Lachmann, G. E. G. (M)
Lichtblau, N. S. (A)
Margolin, J. (M)
Miller, A. (SM)
Neuburger, A. (M)
Neumann, H. D. (M)
Parks, J. T. (M)
Patraiko, J. (M)
Peluso, D. J. (A)
Polayes, M. B. (A)
Proman, J. N. (A)
Reichner, A. J. (M)
Rush, M. (M)
Schwartz, J. A. (M)
Segel, H. P. (A)
Shapiro, A. R. (M)
Shotz, N. E. (M)
Sikoryak, W. J. (A)
Silver, R. (M)
Sudduth, W. B. (M)
Talmon, E. (M)
Weiner, M. M. (M)
Zabludowsky, A. (M)

Burlington (BOS-1)
Allen, J. L. (M)
Biamonte, R. L. (M)
Boucher, G. F. (M)
Boudreau, J. M. C. (M)
Brenner, B. A. (M)
Brown, C. J. (M)
Carruthers, C. W. (M)
Chambers, W. C. (M)
Clougherty, J. F. (M)
Collins, J. A. (M)
Collins, R. B., Jr. (M)
Cook, C. G. (M)
Corrigan, J. P. (M)
Cushman, G. F. (M)
Czerwonka, H. V. (A)
Dion, D. F. (A)
Doolin, F. L. (M)
Dunlevie, J. B. (M)
Elane, B. (A)
Ellis, W. R. (M)
Favaloro, C. J. (M)
Fuller, R. L. (M)
Gerrig, E. (A)
Gibson, R. E. (M)
Gill, M. S. (A)
Granger, C. E. (M)
Harris, F. S. (SM)
Harris, R. G. (M)
Hennessey, T. J. (M)
Hergenrother, R. M. (M)
Hopkins, C. H. (A)
Jolly, J. B. (M)
Kidd, J. W. (A)
Lally, R. D. (M)
Lind, J. N. (M)
Lund, R. W. (A)
MacKenzie, K. R. (M)
Mark, R. B. (A)
Markow, E. W. (SM)
Marino, P. F. (M)
McCully, R. G. (A)
Meredith, M. (M)
Morrison, C. D. (M)
Murano, L. (M)
Myers, O. C., Jr. (M)
Neidorf, E. (M)
Nelson, R. A. (M)
Nevins, J. L., Jr. (M)
Nickerson, D. E. (A)
Nygard, J. C. (M)
Peterson, D. E. (M)
Preston, J. L. (M)
Rasmanis, E. (A)
Reece, D. L. (A)
Rudolph, H. W., Jr. (M)
Sample, J. G. (M)
Sandholm, R. G. (M)
Schmidt, W. G., Jr. (M)
Schoenberger, W. J. (SM)
Schorr, M. G. (SM)
Scotney, J. H. (M)
Seamens, R. C., Jr. (SM)
Sferrino, V. J. (M)
Sievers, W. E. (M)
Silva, C. C., Jr. (M)
Smith, W. A., Jr. (SM)
Smyth, R. R. (SM)
Sorli, G. B. (M)
Sullivan, J. L. (A)
Teich, W. W. (SM)
Thomassen, N. E. (M)
Uhlir, A., Jr. (SM)
Wade, G. (SM)
Werner, C. P. (A)

Buzzards Bay (BOS-1)
Anderson, R. W. (A)
Clarke, J. M. (M)
Pierce, W. E. (SM)

Cambridge (BOS-1)
Adams, G. J. (SM)
Adler, R. B. (F)
Advani, G. T. (M)
Aiken, H. H. (F)
Akhurst, D. O. (M)
Alonso, R. L. (A)
Altschuler, S. (M)
Anderson, A. H. (M)
Apsokardos, E. (A)
Baker, L. (M)
Ball, J. H. (M)
Ball, J. A. (M)
Baruch, J. J. (M)
Basch, M. W. (M)
Batchelder, L. (F)
Beinhocker, G. D. (M)
Benders, D. R. (M)
Benfield, A. E. (SM)
Berg, H. C. (A)
Bers, A. (M)
Bertolini, A. (M)
Bixby, H. O. (SM)
Bloembergen, N. (SM)
Blood, B. E. (A)
Bolt, R. H. (SM)
Bose, A. G. (M)
Bowles, E. L. (F)
Bradsoles, S. (M)
Brown, G. S. (F)
Brown, L. D. (M)
Brouwer, C. (M)
Burdine, B. H. (M)
Bussgang, J. J. (SM)
Cairns, H. E. (M)
Calingaert, P. (M)
Caplan, D. (M)
Carpenter, C. H. (M)
Centanni, F. A. (M)
Chaffee, E. L. (F)
Clapp, R. E. (M)
Coffey, C. S. (M)
Cogdell, J. R. (M)
Cohen, M. L. (M)
Cole, A. D. (M)
Comstock, D. F., Jr. (M)
Congleton, W. L. (M)
Cook, J. H. (SM)
Cooper, P. W. (M)
Corey, B. W. (A)
Cox, H. N. (A)
Crawford, C. H. (M)
Crousel, L. E. (M)
Davidson, G. A. (M)
De Felice, F. J., Jr (M)
De Marco, V. R. (M)
Dennis, J. B. (M)
Dietrich, C. W. (M)
Dobbins, R. W. (A)
Donovan, A. C. (M)
Downing, R. E. (M)
Draper, C. S. (F)
Duda, R. O. (M)
Eastham, M. (F)
Elbert, J. D. (M)
Elias, P. (F)
Elkind, J. I. (M)
Epstein, H. D. (M)
Fallows, E. M. (A)
Fano, R. M. (F)
Field, M. D. (M)
Fitzgerald, J. J. (SM)
Gaposchkin, E. M. (M)
Gibson, C. T. (M)
Glassmeyer, J. M. (M)
Godfrey, E. R., Jr. (SM)
Goldstein, M. H., Jr. (M)
Gordon, B. M. (M)
Grande, D. I. (A)
Gray, D. A. (M)
Gray, T. S. (SM)
Greene, D. (A)
Greenough, H. V., Jr. (M)
Grim, W. M., Jr. (M)
Grossi, M. D. (M)
Guillemin, E. A. (F)
Hagan, T. C. (M)
Hamilton, D. H., Jr. (A)
Hanley, L. D. (M)
Hardy, J. W. (SM)
Haring, D. R. (M)
Harney, P. J. (M)
Harris, S. M. (M)
Hathaway, G. M. (A)
Haus, H. A. (SM)
Hazen, H. L. (SM)
Heller, P. N. (M)
Hersh, J. F. (M)
Hickman, R. W. (SM)
Hill, A. G. (F)
Hilliard, H. C., Jr. (M)
Hillman, H. D. (M)
Hills, F. B. (M)
Hirsch, H. R. (M)
Hollisian, H. C. (A)
Hom, R. N. G. (M)
Hopkins, A. L., Jr. (M)
Howard, D. J. (M)
Howard, R. A. (M)
Hubbard, M. M. (SM)
Humphrey, W. M. (M)
Huss, W. N. (M)
Iverson, K. E. (A)
Johnson, K. R. (M)
Jokinen, R. A. (M)
Jones, M. A. (M)
Jones, R. V. (M)
Kaln, R. Y. (M)
Kane, J. J. (A)
Kay, A. F. (M)
Keller, C. C. (A)
Kellogg, W. C. (M)
Kennedy, F. (SM)
Kerwin, E. M., Jr. (SM)
Kessler, J. A. (SM)
Khambaty, M. B. (M)
King, R. W. P. (F)
Kinner, H. R. (M)
Klepper, D. L. (M)
Knight, G., Jr (M)
Kohlenberg, A. (SM)
Koso, D. A. (M)
Kotliar, A. (M)
Kramer, J. D. R., Jr. (M)
Krasny, L. M. (M)
Kusko, A. (SM)
Kyhl, R. L. (M)
Laase, T. D. (A)
Langberg, E. (M)
Lawler, E. L. (M)
Laynor, J. E. (M)
Lee, Y. W. (SM)
Lees, S. (M)
Leonhard, J. (M)
Lerner, R. M. (SM)
Levin, M. J. (M)
Lewis, E. T. (M)
Lincoln, A. J. (M)
Longo, P. (M)
Lovell, B. W. (M)
Lyman, F., Jr. (M)
MacDonald, J. S. (M)
Mack, R. B. (A)
Maling, G. C., Jr. (A)
Malme, C. I., Jr. (M)
Malono, W. R. (M)
Margolin, B. (M)
Marill, T. M. (M)
Mason, S. J. (F)
Mason, W. (M)
Matz, C. H. (M)
Maurer, H. E. (M)
McCulloch, W. S. (SM)
McGowan, E. A. (M)
Menzel, D. H. (SM)
Michaelis, M. (SM)
Michelini, R. D. (M)
Mimno, H. R. (F)
Minsky, M. L. (M)
Molzeau, C. J. (A)
Moo, C. A. (M)
Mooers, C. N. (M)
Narendra, K. S. (M)
Noone, G. (A)
North, D. K. (A)
Nottingham, W. B. (F)
Oddson, J. K. (M)
Oettinger, A. G. (M)
Ooden, S. (M)
Olsson, E. A. (M)
Overton, D. A. (M)
Owens, R. H., Jr. (A)
Pandisclo, A. A. (M)
Pastan, H. L. (M)
Peake, W. T. (M)
Peavey, R. D. (M)
Pinckney, R. P. (M)
Plourde, J. S. (M)
Pompian, S. D. (M)
Powers, D. A. (M)
Prasad, S. (M)
Pugh, A. L., III (M)
Puotinen, D. A. (M)
Ramsey, W. H. (M)
Randell, T. C. (M)
Raney, W. P. (M)
Remillard, W. J. (A)
Renick, R. C. (SM)
Richmond, H. B. (F)
Rigby, S. (M)
Robichaud, A. W. (M)
Robinson, K. W. (M)
Rodgers, F. A. (M)
Roehrig, J. R. (SM)
Ronat, E. E. (M)
Rosen, G. (M)
Rosenblith, W. A. (SM)
Russell, L. (A)
Salerno, J. (M)
Salton, G. (M)
Sarles, F. W., Jr. (M)
Schlavone, F. J. (M)
Schmitt, H. J. (A)
Schwab, W. C. (M)
Schwarzkopf, D. B. (M)
Scott, A. C. (M)
Sears, N. E., Jr (M)
Selser, E. C. (M)
Semon, W. L. (SM)
Shapiro, L. D. (M)
Shiels, P. B. (A)
Siebert, W. M. (M)
Sklar, S. J. (M)
Sloan, G. H. (M)
Smith, L. R. (A)
Smith, M. K. (A)
Smullin, L. D. (F)
Solomonoff, R. J. (M)
Soohoo, R. F. (SM)
Spencer, R. H. (M)
Spinrad, R. J. (M)
Spitzer, E. (M)
Sponsler, J. W. (A)
Stata, R. S. (M)
Stevens, H. C. (M)
Stevens, K. N. (M)
Strandberg, M. W. P. (F)
Stratton, J. A. (F)
Susskind, A. K. (M)
Sutro, L. L. (M)
Thomas, W. L. (A)
Townsend, R. L. (M)
Trantman, H., Jr. (M)
Traxel, D. E. (M)
Tucker, C. E. (SM)

Shepherd, R. T. (M)
Silbert, W. C. (M)
Sinclair, A. L., III (M)
Slavin, M. (M)
Snyder, M. G. (M)
Stauffer, R. L. (M)
Stephenson, J. O. (M)
Stiddard, H. R. (A)
Sudia, A. T. (M)
Swartz, J. A. (M)
Talaat, M. E. (A)
Taylor, J. H. (SM)
Taylor, W. R. (M)
Thomas, C. E., Jr. (M)
Thomas, R. K. (SM)
Tribble, K. E. (M)
Tschiegg, M. D. (A)
Vana, C. J. (M)
Vergara, W. C. (SM)
Vinson, R. R. (M)
Walter, G. M. (SM)
Watson, T. E. (M)
Weaver, R. C., Jr. (M)
White, G. R. (SM)
Whitney, M. E. (SM)
Wilkinson, R. L. (A)
Wulff, L. H. (A)
Yates, L. R. (M)

University Park (W-DC-3)
Burke, J. K. (M)
Coker, R. H. (M)
Prival, H. G. (M)

Valley Lee (W-DC-3)
Gardner, J. C. (M)

Welcome (W-DC-3)
Lamm, C. M., Jr. (A)

West Hyattsville (W-DC-3)
Almquist, J. F. (A)
Benfield, D. G. (M)
Bitz, E. A. (M)
Ferrara, A. A. (A)
Fink, W. G. (M)
Headrick, W. C. (M)
Kessler, S. (A)
Khu, E. B. C. (M)
La Pointe, J. C (SM)
Luscombe, J. P. (M)
Mah, T. F. (A)
Marzetta, L. A. (M)
Mitchell, G. S. (M)
Pittard, G. S., Jr. (M)
Quigley, C. E. (M)
Roberts, P. M. (M)
Rothschild, S. (M)
Sacks, J. (SM)
Schwartz, R. J. (M)
Wolff, E. A. (M)

Westminster (BAL-3)
Holmes, T. R. (A)
Morgan, R. H. (M)

West Severna Park (BAL-3)
Cowan, K. D. (A)
Heazel, V. M., Jr. (M)
Pincoffs, P. H. (M)

Wheaton (W-DC-3)
Brewer, J. T. (M)
Cook, T. B. (M)
Cottrell, J. E., Jr. (M)
Doctor, N. J. (M)
Fowlkes, J. C. (M)
Frederick, C. L., Jr. (A)
Graonani, O. J. (M)
La Fever, R. C. (A)
Lepkowski, M. J. (A)
Luff, F. T. (M)
Marks, M. M. (SM)
Molcan, J. F. (A)
Moseley, J. C., Jr. (M)
Paris, H. B., Jr. (M)
Patton, R. E. (M)
Petes, J. (M)
Snow, R. F. (A)
Thomson, D. M. (M)
Van Hoesen, R. W. (A)
White, D. R. J. (SM)

Wheaton Heights (W-DC-3)
Baechtel, A. R. (M)

White Marsh (BAL-3)
Francis, J. P. (A)
Schultz, R. L. (A)
Wintle, M. R., Jr. (M)

Williamsport (W-DC-3)
Britner, R. O., Jr. (M)

MASSACHUSETTS

Abington (BOS-1)
Mielke, E. S. (A)
Murphy, P. V. (M)
Pihl, G. E. (SM)

Acton (BOS-1)
Casey, R. F. (A)
Packard, L. E. (F)
Sawyer, C. E. (M)
Searle, R. W. (A)
Sletten, C. J. (M)
Smith, B., Jr. (SM)
Swanson, S. C. (M)

Adams (WM-1)
McRae, W. J. (A)
Starsiak, R. S. (A)
Zabawa, E. P. (A)

Allston (BOS-1)
Allen, D. F. (M)
Beck, L. J. (M)
Belkin, A. (A)
Cohen, S. (M)
Finkelstein, A. B. (M)
Gordon, E. N. (M)
Knoll, A. L. (M)
Max, S. M. (M)
Schwartz, C. J. (A)
Wolf, S. M. (A)

Amesbury (B-MV-1)
Hambleton, P. N. (SM)

Amherst (WM-1)
Agarwal, P. D. (SM)
Herchenreder, H. (M)
Laestadius, J. E. (M)
Langford, J. W., Jr. (M)

Andover (B-MV-1)
Adams, J. E. (M)
Cadran, L. R. (M)
Denault, D. R. (M)
Elowe, E. N. (M)
Fadden, J. J. (M)
Finley, A. D. (M)
Garfield, O. R. (SM)
Gerin, J. H., Jr. (M)
Gregory, N. (M)
Heislein, J. T. (M)
Hensel, W. G. (SM)
Hooson, R. W. (A)
Jordan, D. R. (M)
King, R. A. (M)
Koch, A. A. (M)
McParland, F. H. (A)
Merritt, L. P. (M)
Monks, G. G., Jr. (A)
Pelc, J. I. (M)
Poulin, D. J. (M)
Roch, M. E. (M)
Rounds, W. A. (A)
Roundy, G. H. (A)
Salvo, R. A. (M)
Sanders, R. W. (M)
Terranova, D. S. (M)
Turner, V. D. (M)
White, E. F. (A)
White, J. R. (SM)
Williams, R. P. (M)
Wilson, R. S. (M)
Word, J. A. (SM)
Yeiter, M. R. (M)

Arlington (BOS-1)
Abell, G. R. (M)
Ames, B., Jr. (M)
Amstutz, S. R. (M)
Astulli, S. O. (A)
Bachman, W. S., Jr. (M)
Bagnall, J. J., Jr. (SM)
Bailey, D. L. (M)
Barrie, T. H. (M)
Bartell, W. W. (M)
Bartz, C. T. (M)
Bates, R. H. T. (M)
Ben-Or, Y. (M)
Binsack, J. H. (M)
Bogart, R. M. (M)
Boland, J. N. (M)
Bouck, W. P. (M)
Campbell, D. J. (A)
Castelli, J. P. (M)
Chane, S. H. (SM)
Chapman, P. W. (M)
Chisholm, V. T. (M)
Cole, B. R. (M)
Collins, W. E. (M)
Cosman, B. J. (M)
Craven, R. B. (M)
Curry, W. C. (M)
Davis, E. S. (M)
Defandorf, J. P. (M)
Delaney, W. P. (M)
De Lisle, J. E. (M)
Dibiase, V. L. (M)
Finke, H. E. J. (M)
Forgie, J. W. (M)
Gano, J. J. (SM)
Graham, E. A., Jr. (M)
Graham, J. W. (M)
Gronberg, F. T. (M)
Gustaff, A. J. (M)
Hadlock, C. F. (SM)
Haire, P. F. (M)
Hansen, J. T. (M)
Harmer, J. D. (SM)
Harrington, W. L. (A)
Hathaway, F. R., Jr. (A)
Hattery, W. V. (M)
Hawkins, R. S. (M)
Hofmann, E. J. (A)
Hofstetter, E. M. (M)
Jarvis, A. B. (M)
Katzenelson, J. (M)
Kelly, J. A. (M)
Kennedy, N. P. (M)
Kiesling, P.W., Jr. (M)
Knight, H. M. (M)
Kyropoulos, L. (M)
Laughlin, M. J. (M)
Lin, C. S. (M)
Lyon, H. A. (M)
Mager, H. (M)
Maguire, J. N. (M)
McCabe, N. P. (M)
McCann, J. F. (A)
McFarlane, R. A. (M)
McKendree, J. D. (M)
Mills, A. L., Jr. (M)
Mueller, R. W. (M)
Myers, E. N. (M)

Nuttall, A. H. (M)
Panosian, A. H. (M)
Parker, R. R. (M)
Pashe, E. I. (M)
Pechacek, R. E. (M)
Perry, K. E. (A)
Pierce, J. A. (F)
Pine, E. (SM)
Plotts, E. L. (SM)
Ploussios, G. (M)
Powers, R. A. (M)
Rowe, A. J. (M)
Sauber, J. W. (SM)
Schreuer, W. (SM)
Schweppe, F. C. (M)
Shannon, J. R. (A)
Sheridan, W. F. (A)
Soron, H. I. (M)
Stephenson, L. (M)
Sutahlan, H. S. (M)
Sylvia, T. R. (M)
Tam, N. K. H. (M)
Tassinari, S. P. (M)
Theiss, C. M. (M)
Tilton, C. S. (SM)
Trunflo, A. P. (M)
Von Recklinghausen, D. R. (M)
Wagner, C. A. (M)
Warren, R. M. (A)
Watson, P. C. (M)
Witt, R. P. (M)
Zantos, N. G. (M)

Arlington Heights (BOS-1)
Cleveland, L. (M)
Lamson, H. W. (F)

Ashby (BOS-1)
Dallin, E. B. (SM)

Ashland (BOS-1)
Beck, L. C. (A)
Boughrou, T. R. (M)
Bulting, F. P. (M)
Coots, W. J. (M)
Defaski, E. F. (M)
Dilcher, R. C. (M)
Father, J. E. (M)
Greene, P. B. (M)
Lipinoga, L. (M)
Mercer, C. D., Jr. (M)
Pathe, J. F. (SM)
Petterdi, A. J. (M)
Prager, M. (M)
Russell, J. T. (SM)
Sonnabend, J. S. (M)
Spellos, J. S., Jr. (M)
Temple, A. H. (M)
Zeller, H. R., Jr. (M)

Attleboro (BOS-1)
Allen, D. J. (A)
Athanas, D. (M)
Billamptis, E. E. (M)
Boulanger, H. J. (M)
Flanagan, C. D. (M)
Gustafson, D. W. (A)
Logan, C. A. (M)
Puleston, R. B. (A)
Thornhill, J. W. (SM)
Vetter, E. O. (M)

Auburn (BOS-1)
Beschle, R. G. (M)
La Brie, R. H. (M)
Smith, J. G. (M)

Auburndale (BOS-1)
Campbell, E. G. (M)
Day, P. F. (M)
Finneran, W. J. (M)
Harper, S. D. (SM)
Ingalls, R. P. (M)
Janis, P. (SM)
Karsh, H. (M)
Merrill, B. (M)
Mott-Smith, J. C. (M)
Owen, J. Q. (M)
Ryan, C. E. (M)
Talambiras, R. P. (M)

Avon (BOS-1)
Chappell, I. C. (A)
Hourihan, A. M. (M)

Babson Park (BOS-1)
Riblet, H. J. (F)

Ballard Vale (B-MV-1)
Zink, A. J., Jr. (SM)

Bedford (BOS-1)
Adolph, E. H. (M)
Alexander, A. M. (A)
Alexander, R. M. (M)
Altenbach, R. K. (M)
Anderson, E. E. (M)
Angus, R. B., Jr. (SM)
Arsenault, J. R. (M)
Ashenfelter, T. E. (M)
Baker, A. L. (M)
Baker, R. H. (M)
Band, H. E. (SM)
Barabush, A. (M)
Barker, H. R., Jr. (M)
Beaubien, D. J. (M)
Beaumariage, D. C. (M)
Bennett, G. E. (M)
Bishop, W. B. (M)
Brindley, W. E. (M)
Brown, D. M. (M)
Brown, R. B., III (M)
Bruck, D. B. (M)
Burbo, J. H. (M)

Canty, W. J. (M)
Capen, E. B. (M)
Carr, K. L. (M)
Claflin, R. E., Jr. (M)
Congdon, W. H. (SM)
Crandell, P. A. (SM)
Despathy, R. G. (M)
Devine, F. J. (M)
De Vita, A. J. (M)
Donovan, C. (M)
Drew, D. B. (A)
Duncan, R. D. P. (M)
Earsy, R. M. (M)
Edson, W. F., Jr. (M)
Engel, P. F. (M)
Fernald, R. A. (M)
Ferri, A. J., Jr. (M)
Field, W. G. (M)
Fischer, H. L. (M)
Fonoroff, B. (M)
Fricks, R. E. (M)
Friedman, M. (M)
Gentuso, E. J. (M)
Gianino, P. D. (M)
Gicca, F. A. (M)
Gindsberg, J. (SM)
Goldberg, S. H. (M)
Grabka, G. J. (M)
Hammond, G. H. (SM)
Hanks, E. C., Jr. (M)
Harrington, C. F., Jr. (M)
Harrison, J. R. (M)
Harwood, A. (M)
Hawes, A. R. (SM)
Healy, B. H. (A)
Hearn, K. F., Jr. (M)
Heart, F. E. (M)
Heckscher, J. L. (M)
Hicks, W. J. (M)
Hinckley, K. M. (M)
Holtzman, I. D. (M)
Horley, L. (M)
Ingrao, H. C. (M)
Jelalian, A. V. (M)
Johnson, P. C. (M)
Jones, G. C. (M)
Jones, H. I., Jr. (M)
Jurgielewicz, S. S. (A)
Keenan, J. A. (M)
Kent, A. J. (A)
Kimball, J. A. (M)
Konkle, K. H. (M)
Kwiatkowski, T. F. (A)
Leonard, F. J. (M)
Libby, W. B. (M)
Lipke, D. W. (M)
Long, W. H. (M)
Lovell, R. W. (M)
Maier, G. H. (A)
Manasse, R. (M)
Marshall, R. C. (M)
May, W., Jr. (A)
McCurley, E. P. (M)
McKersie, A. D. (M)
McMurtrie, D. L. (SM)
Morgan, T. J. (M)
Morin, J. O. (M)
Mudgett, W. L. (M)
Muller, E. S., Jr. (M)
Nixon, D. S., Jr. (M)
O'Neil, W. K. (M)
Orange, A. S. (M)
Owen, P. H. (M)
Passera, A. L. (M)
Peeler, G. D. M. (M)
Perkins, F., Jr. (M)
Perry, B. A. (SM)
Procunier, R. W. (M)
Pulliam, S. B. (M)
Rand, J. C. (A)
Rasmussen, J. E. (M)
Reinecke, H., Jr. (M)
Rey, T. J. (SM)
Rodman, A. K. (M)
Romano, A. (A)
Sauer, H. S. (M)
Sen, H. K. (SM)
Shapiro, M. L. (M)
Sherburne, A. E. (M)
Skidmore, D. (M)
Skinner, L. V. (SM)
Smith, C. L. (SM)
Smith, W. C. (M)
Starr, E. A. (M)
Stees, H. S., Jr. (A)
Stevens, R. T. (SM)
Swanson, D. W. (M)
Sykes, C. A. (M)
Tetley, W. H. (M)
Thomson, W. M. (M)
Thornton, D. P. (M)
Vail, W. A. (M)
Vance, W. H., Jr. (M)
Ward, J. H. R., III (A)
Warner, E. R. R. (M)
Weppner, W. G. (M)
Wilkes, H. A. (M)
Willis, J. T. (M)
Wold, D. C. (A)
Woodruff, M. W. (M)
Wulfsberg, K. N. (M)

Belmont (BOS-1)
Adler, E. (M)
Albert, B. (M)
Barry, J. G. (SM)
Berry, W. O. (A)
Bisbiny, F. A. (A)
Bjork, A. P. (M)
Blackburn, J. F. (M)
Brown, R. M. (M)
Chatterton, E., Jr. (M)
Cox, W. W. (M)
Crews, J. B. (M)

Crosby, R. C. (M)
Cullington, E. H. (M)
Davidson, D. (M)
Deuitch, D. E. (M)
Dolbear, B. L. (SM)
Dudley, B. (SM)
Duncan, N. L. (M)
Eddy, F. N. (A)
Edgerton, H. E. (F)
Fernandes-Rivas, L. A. (A)
Freed, C. (M)
Gram, H. R., Jr. (M)
Gray, H. L. (A)
Gray, P. E. (M)
Handy, R. A. (A)
Hellenbrand, C. M. (M)
Hildebrand, J. G., Jr. (M)
Hobbs, J. D. (SM)
Hunt, F. V. (F)
Jacomb, R. A. (M)
Klein, J. A. (M)
Klemperer, H. (A)
Kondi, S. E. (M)
Lawson, J. S., Jr. (SM)
Levi, P. R. (M)
Levison, W. H. (M)
Looney, W. P. (A)
Lovenstein, A. J. (SM)
Luscher, R. W. (A)
Mazrakis, M. S. (A)
Mercer, W. R. (SM)
Nesline, F. W., Jr. (M)
O'Day, M. D. (M)
Peters, A. T. (A)
Reed, J. (SM)
Reinties, J. F. (SM)
Restaino, A. D. (M)
Richardson, A. S. (M)
Rines, R. H. (SM)
Ringer, M. (M)
Robinson, J. (M)
Saulnier, J. E. (M)
Saunders, A. C. W. (M)
Seaver, W. H. (M)
Stein, J. (A)
Taber, R. N. (M)
Taft, W. C. (M)
Toman, K. (M)
Travia, J. S. (M)
Wagner, R. W. (M)
Walker, L. H. (M)
Ward, H. R. (A)
Wooolin, E. A. (A)
Woodward, R. H. (M)

Berkshire (WM-1)
Lord, R. W. (M)

Berlin (BOS-1)
Krackhardt, R. H. (A)

Beverly (B-MV-1)
Barton, L. F. (M)
Biggs, O. H. (M)
Broderick, D. C. (M)
Brown, N. J. (M)
Buset, K. (M)
Carbrey, E. J., Jr. (M)
Dillaby, E. F. (SM)
Dodds, W. (SM)
Ferris, P. A. (M)
Finneault, W. I. (M)
Foss, D. W. (M)
Galluzzi, N. P. (M)
Ghen, W. R. (M)
Gsteiger, K. E. (M)
Gustafson, E. M. (A)
Hangstefer, J. B. (M)
Juhola, C. (SM)
King, F. N. (M)
Kraeuter, L. D. (M)
Krinsky, B. D. (M)
Lesch, F. A. (M)
McCarthy, H. J. (SM)
Norwood, R. M. (M)
O'Brien, C. A. (M)
Peckover, P. A. (M)
Perron, R. R. (M)
Pierce, D. H. (M)
Ploss, A. G. (M)
Prescott, G. A. (A)
Preston, A. C. (M)
Robb, B. V. R. (A)
Rudenberg, H. G. (SM)
Safran, L. (M)

Billerica (BOS-1)
Anderson, J. E. (A)
Charnley, E. (A)
Danko, J. J. (M)
Dion, A. (M)
Dixon, L. H., Jr. (M)
Gallagher, R. D. (M)
Harvey, W. M., Jr. (M)
Higgins, W. T. (M)
Hogan, W. D. (M)
Masi, L. (M)
Nickless, H. C. (A)
Norviel, H. D. (SM)
Sequera, T. C. (M)
Slenker, S. (M)
Williamson, R. S. (M)

Bolton (BOS-1)
Mechlin, R. N. (M)
Slade, C. B. (M)
Wilson, H. M. (SM)

Boston (BOS-1)
Albersheim, W. J. (F)
Alexander, C. S., Jr. (M)
Alford, A. (F)
Anastos, E. G. J. (M)
Bailey, R. B. (A)



Baird, H. S. (A)
Balmsfather, R. R. (M)
Bakalar, D. (M)
Ball, G. F. (M)
Baptiste, G. F. (A)
Bardfield, M. L. (M)
Baron, R. C. (M)
Bean, W. S. (M)
Belvin, F. (M)
Berg, N. E. (M)
Berman, J. (M)
Blitz, D. (M)
Bopp, R. W. (M)
Bordewieck, R. W. (A)
Bosler, R. B. (A)
Bramson, M. (M)
Brettler, B. J. (M)
Brilliant, M. B. (M)
Bruni, D. J. (M)
Byck, D. M. (M)
Carpenter, R. O'B. (M)
Cestari, V. M. (M)
Chandler, C. H. (SM)
Chopra, A. (A)
Christian, J. W., Jr. (M)
Copos, E. M., Jr. (M)
Dantas, C. E. (M)
Darsch, C. G., Jr. (M)
Detrick, D. M. (M)
De Wolf, N. (M)
Doane, R. C. (A)
Doman, D. B. (M)
Dougherty, J. D. (A)
Dunn, A. G. (M)
Eaton, L. G. (M)
Edie, J. L. (M)
Ertman, W. M. (M)
Essigmann, M. W. (SM)
Evans, R. R. (M)
Farnsworth, E. P. (SM)
Fenter, W. S. (A)
Fernandez, L. E. (A)
Friedman, M. S. (A)
Gagnon, W. J. (M)
George, C. F. (M)
Germeshausen, K. J. (SM)
Gianoukos, W. A. (M)
Goldberg, H. B. (M)
Goldsmith, B. P. (M)
Goldstien, S. (M)
Graham, F. E. (M)
Green, B. (M)
Grossimon, H. P. (A)
Grumman, G. S. (A)
Gunders, E. (M)
Guterman, S. S. (SM)
Haberstroh, A. (SM)
Hagopian, N. D. (M)
Hague, W. M., Jr. (M)
Hallenstein, N. A. (M)
Hamilton, S. R. (M)
Hardsog, H. N. (SM)
Hartman, R. H. (M)
Hayes, C. J. (A)
Heinz, J. M. (M)
Herlan, P. L. (A)
Hetherington, J. S. (M)
Hieken, C. (M)
Hillier, J. A., III (A)
Hobson, J. E. (F)
Hoeke, F. W. (M)
Horlick, P. H. (M)
Hughes, A. M. (M)
Hussein, J. A. (A)
Imus, H. O., Jr. (M)
Janak, J. F. (M)
Jensen, J. W. (M)
Johnson, C. I. (M)
Jones, R. E. (SM)
Jones, R. N. (A)
Kaminski, W. A. (M)
Kantor, G. (M)
Kaszynski, E. A. (M)
Katz, L. (M)
Kearsley, W. A. (M)
Kelner, R. C. (A)
Kennedy, T. G. (A)
Kerk, C. T. (M)
Kilroy, H. P. (M)
Kim, Y. S. (M)
Kimball, V. L., Jr. (SM)
Klein, R. D. (M)
Kostecki, W. (M)
Kreindel, B. (A)
Ladd, R. E. (M)
Lambropoulos, D. (M)
Landers, R. L. (A)
Lee, R. C. (M)
Lee, S. W. (M)
Lewis, G. A. (M)
Liszewski, T. M. (M)
Littleboy, H. S. (SM)
Loewenthal, M. (M)
Lutz, M. W. (M)
Maguire, H. T. (A)
Malm, R. F. (M)
Mark, D. H. (A)
Metro, A. C. (M)
Miller, H. E. (M)
Murachver, J. (M)
Myers, J. M. (M)
Nay, J. N. (M)
Offner, M. M. Y. (M)
Owen, S. (M)
Palmer, R. T. (M)
Perron, R. T. (M)
Phelps, L. I. (A)
Pote, W. J. (M)
Poveda, H. (A)
Ramler, D. A. (A)
Randall, D. S. (A)
Rhodes, J. S. (M)
Richman, P. L. (M)

Rines, D. (M)
Rivers, R. A. (M)
Roberts, L. W. (SM)
Roche, C. E. (M)
Rynard, J. P. (A)
Schindler, J. A. (A)
Schmitt, J. W. (M)
Schochet, J. R. (A)
Schwartz, S. (SM)
Scolamiero, D. M. (M)
Scott, R. E. (M)
Seville, A. R. (M)
Shortell, A. V., Jr. (M)
Siegel, R. C. (M)
Smith, A. D. (A)
Smith, T. S. (M)
Soule, W. J. (M)
Stack, E. J. (A)
Stanfield, R. B. (A)
Stone, S. G. (A)
Tisdale, J. W. (A)
Toorerzer, R. S. (M)
Verzuh, F. M. (M)
Wagner, P. S. (M)
Wayne, G. H. (SM)
Weingarten, J. (M)
Wilson, G. M. (A)
Winn, H. L. (M)
Winston, A. W. (M)
Wozencraft, J. M. (SM)
Zeldes, P. (M)
Zraket, C. A. (SM)

Boxford (B-MV-1)
Anderson, A. F. (M)
Fulton, R. O. (A)
Kuczun, C. G. (M)

Braintree (BOS-1)
Brennan, J. E. (M)
Gorsuch, W. F. (M)
Murphy, A. L. (M)
Myrbeck, E. R. (SM)
St. Andre, G. O. (M)

Bridgewater (BOS-1)
Hlavacek, A. R. (M)
Wilber, L. C. (M)

Brighton (BOS-1)
Altshuler, E. E. (M)
Baker, H. R. (M)
Ballantine, J. H. (M)
Brandt, P. W. (M)
Carpenter, D. P. (M)
Chan, M. C. H. (M)
Demeo, R. P. (M)
Desmond, W. C., Jr. (M)
Forys, E. L. (M)
Gillis, J. E. (M)
Girard, S. S., Jr. (A)
Greenwood, J. R. (A)
Hanopol, L. (M)
Healy, T. J., Jr. (M)
Hertz, D. (M)
Huquan, A. J. (M)
Jacob, F. (M)
Kaufman, L. J. (M)
Larkin, J. D. (M)
Leonard, T. V. (A)
MacDonald, F. D. (A)
MacMillan, A. J. (M)
Malizia, J. P. (M)
Margolin, M. C. (M)
Martin, F. H. (M)
Masse, D. J. (A)
Merchant, J. (M)
Montanari, R. E. (M)
Moskowitz, F. (SM)
Romano, D. S. (SM)
Rotman, W. (M)
Schwartz, R. J. (M)
Seligman, R. I. (M)
Sullivan, D. R. (M)
Talley, W. K. (M)
Tsacoyeanes, C. W. (M)
Weigel, R. L. (M)
Welner, G. (M)
Yurt, X. (M)

Brockton (BOS-1)
Bianco, F. P. (M)
Bryant, R. L. (M)
Capozzi, A. J. (A)
Casey, A. A., Jr. (M)
Craig, A. G., Jr. (M)
Dulskis, R. (M)
Ewell, R. M., Jr. (A)
Fortier, O. V. (M)
James, P. G., Jr. (A)
Kurpis, G. P. (M)
Loughlin, B. J. (A)
Mazeiko, C. K. (M)
Price, C. W. (A)
Ronis, W. J. (M)
Rousseau, A. J. (M)
Rubin, H. L. (A)
Sampson, E. J. (A)
Shuck, T. L. (M)
Swanson, H. A. (M)
Tang, A. Y. C. (A)
Uses, E. P. (M)
Ward, A. G. (M)
Wetzell, H. B. (M)

Brookline (BOS-1)
Ackerman, R. L., Jr. (M)
Andreika, J. T. (M)
Anfenger, E. (M)
Blanchard, B. E. (M)
Bloom, J. H. (M)
Bow, B. H. (M)
Chernikoff, L. (A)

Burlington (BOS-1)
Allen, J. L. (M)
Biamonte, R. L. (M)
Boucher, G. F. (M)
Boudreau, J. M. C. (M)
Brenner, B. A. (M)
Brown, C. J. (M)
Carruthers, C. W. (M)
Chambers, W. C. (M)
Clougherty, J. F. (M)
Collins, J. A. (M)
Collins, R. B., Jr. (M)
Cook, C. G. (M)
Corrigan, J. P. (M)
Cushman, G. F. (M)
Czerwonka, H. V. (A)
Dion, D. F. (A)
Doelin, F. L. (M)
Dunlevie, J. B. (M)
Elane, B. (A)
Ellis, W. R. (M)
Favaloro, C. J. (M)
Fuller, R. L. (M)
Gerrig, E. (A)
Gibson, R. E. (M)
Gill, M. S. (A)
Granger, C. E. (M)
Harris, F. S. (SM)
Harris, R. G. (M)
Hennessey, T. J. (M)
Hergenrother, R. M. (M)
Hopkins, C. H. (A)
Jolly, J. B. (M)
Kidd, J. W. (A)
Lally, R. D. (M)
Lind, J. N. (M)
Lund, R. W. (A)
MacKenzie, K. R. (M)
Mark, R. B. (A)
Markow, E. W. (SM)
Marino, P. F. (M)
McCully, R. G. (A)
Meredith, M. D. (M)
Morrison, C. D. (M)
Murano, L. (M)
Myers, O. C., Jr. (M)
Neidorf, E. (M)
Nelson, R. A. (M)
Nevins, J. L., Jr. (M)
Nickerson, D. E. (A)
Nygard, J. C. (M)
Peterson, D. E. (M)
Preston, J. L. (M)
Rasmanis, E. (A)
Reece, D. L. (A)
Rudolph, H. W., Jr. (M)
Sample, J. G. (M)
Sandholm, R. G. (M)
Schmidt, W. G., Jr. (M)
Schoenberger, W. J. (SM)
Schorr, M. G. (SM)
Scotney, J. H. (M)
Seamens, R. C., Jr. (SM)
Sferrino, V. J. (M)
Sievers, W. E. (M)
Silva, C. C., Jr. (M)
Smith, W. A., Jr. (SM)
Smyth, R. R. (SM)
Sorli, G. B. (M)
Sullivan, J. L. (A)
Teich, W. W. (SM)
Thomassen, N. E. (M)
Uhlir, A., Jr. (SM)
Wade, G. (SM)
Werner, C. P. (A)

Buzzards Bay (BOS-1)
Anderson, R. W. (A)
Clarke, J. M. (M)
Pierce, W. E. (SM)

Cambridge (BOS-1)
Adams, G. J. (SM)
Adler, R. B. (F)
Advani, G. T. (M)
Aiken, H. H. (F)
Akhurst, D. O. (M)
Alonso, R. L. (A)
Altschuler, S. (M)
Anderson, A. H. (M)
Apsokardos, E. (A)
Baker, L. (M)
Ball, J. H. (M)
Ball, J. A. (M)
Baruch, J. J. (M)
Basch, M. W. (M)
Batchelder, L. (F)
Beinhocker, G. D. (M)
Benders, D. R. (M)
Benfield, A. E. (SM)
Berg, H. C. (A)
Bers, A. (M)
Bertolini, A. (M)
Bixby, H. O. (SM)
Bloembergen, N. (SM)
Blood, B. E. (A)
Bolt, R. H. (SM)
Bose, A. G. (M)
Bowles, E. L. (F)
Bradspies, S. (M)
Brown, G. S. (F)
Brown, L. D. (M)
Broxmeyer, C. (M)
Burdine, B. H. (M)
Bussgang, J. J. (SM)
Cairns, H. E. (M)
Calingaert, P. (M)
Caplan, D. (M)
Carpenter, C. H. (M)
Centanni, F. A. (M)
Chaffee, E. L. (F)
Clapp, R. E. (M)
Coffey, C. S. (M)
Cogdell, J. R. (M)
Cohen, M. L. (M)
Cole, A. D. (M)
Comstock, D. F., Jr. (M)
Congleton, W. L. (M)
Cook, J. H. (SM)
Cooper, P. W. (M)
Corey, B. W. (A)
Cox, H. N. (A)
Crawford, C. H. (M)
Crousel, L. E. (M)
Davidson, G. A. (M)
De Felice, F. J., Jr. (M)
De Marco, V. R. (M)
Dennis, J. B. (M)
Dietrich, C. W. (M)
Dobbins, R. W. (A)
Donovan, A. C. (M)
Downing, R. E. (M)
Draper, C. S. (F)
Duda, R. O. (M)
Eastham, M. (F)
Elbert, J. D. (M)
Elias, P. (F)
Elkind, J. I. (M)
Epstein, H. D. (M)
Fallows, E. M. (A)
Fano, R. M. (F)
Field, M. D. (M)
Fitzgerald, J. J. (SM)
Gaposchkin, E. M. (M)
Gibson, C. T. (M)
Glassmeyer, J. M. (M)
Godfrey, E. R., Jr. (SM)
Goldstein, M. H., Jr. (M)
Gordon, B. M. (M)
Grande, D. I. (A)
Gray, D. A. (M)
Gray, T. S. (SM)
Greene, D. (A)
Greenough, H. V., Jr. (M)
Grim, W. M., Jr. (M)
Grossi, M. D. (M)
Guillemin, E. A. (F)
Hagan, T. G. (M)
Hamilton, D. H., Jr. (A)
Hanley, L. D. (M)
Hardy, J. W. (SM)
Haring, D. R. (M)
Harney, P. J. (M)
Harris, S. M. (M)
Hathaway, G. M. (A)
Haus, H. A. (SM)
Hazen, H. L. (SM)
Heller, P. N. (M)
Hersh, J. F. (M)
Hickman, R. W. (SM)
Hill, A. G. (F)
Hilliard, H. C., Jr. (M)
Hillman, H. D. (M)
Hills, F. B. (M)
Hirsch, H. R. (M)
Hollisian, H. C. (A)
Hom, R. N. G. (M)
Hopkins, A. L., Jr. (M)
Howard, D. J. (M)
Howard, R. A. (M)
Hubbard, M. M. (SM)
Humphrey, W. M. (M)
Huss, W. N. (M)
Iverson, K. E. (A)
Johnson, K. R. (M)
Jokinen, R. A. (M)
Jones, M. A. (M)
Jones, R. V. (M)
Kaln, R. Y. (M)
Kane, J. J. (A)
Kay, A. F. (M)
Keller, C. C. (A)
Kellogg, W. C. (M)
Kennedy, F. (SM)

Kerwin, E. M., Jr. (SM)
Kessler, J. A. (SM)
Khambaty, M. B. (M)
King, R. W. P. (F)
Kinner, H. R. (M)
Kiepper, D. L. (M)
Knight, G., Jr (SM)
Kohlenberg, A. (SM)
Koso, D. A. (M)
Kotliar, A. (M)
Kramer, J. D. R., Jr. (M)
Krasny, L. M. (M)
Kusko, A. (SM)
Kyhl, R. L. (M)
Laase, T. D. (A)
Langberg, E. (M)
Lawler, E. L. (M)
Laynor, J. E. (M)
Lee, Y. W. (SM)
Lees, S. (M)
Leonhard, J. (M)
Lerner, R. M. (SM)
Levin, M. J. (M)
Lewis, E. T. (M)
Lincoln, A. J. (M)
Longo, P. (M)
Lovell, B. W. (M)
Lyman, F., Jr. (M)
MacDonald, J. S. (M)
Mack, R. B. (A)
Maling, G. C., Jr. (A)
Malme, C. I., Jr. (M)
Malone, W. R. (M)
Margolin, B. (M)
Marill, T. M. (M)
Mason, S. J. (F)
Mason, W. (M)
Matz, C. H. (SM)
Maurer, H. E. (M)
McCulloch, W. S. (SM)
McGowan, E. A. (M)
Mentzel, D. H. (SM)
Michaels, M. (SM)
Michelini, R. D. (M)
Mimno, H. R. (F)
Minsky, M. L. (M)
Moizeau, C. J. (A)
Moo, C. A. (M)
Mooers, C. N. (M)
Narendra, K. S. (M)
Noone, G. (A)
North, D. K. (A)
Nottingham, W. B. (F)
Oddson, J. K. (M)
Oettinger, A. G. (M)
Ogden, S. (M)
Olsson, E. A. (M)
Overton, D. A. (M)
Owens, R. H., Jr. (A)
Pandisclo, A. A. (M)
Pastan, H. L. (M)
Peake, W. T. (M)
Peavey, R. D. (M)
Pinckney, R. P. (M)
Plourde, H. S. (M)
Pomplan, S. D. (M)
Powers, D. A. (M)
Prasad, S. (M)
Pugh, A. L., III (M)
Puotinen, D. A. (M)
Ramsey, W. H. (M)
Randell, T. C. (M)
Raney, W. P. (M)
Remillard, W. J. (A)
Renick, R. C. (SM)
Richmond, H. B. (F)
Rigby, S. (M)
Robichaud, A. W. (M)
Robinson, K. W. (M)
Rodgers, F. A. (M)
Roehrig, J. R. (SM)
Ronat, E. E. (M)
Rosen, G. (M)
Rosenblith, W. A. (SM)
Russell, L. (A)
Salerno, J. (M)
Salton, G. (M)
Sarles, F. W. Jr. (M)
Schiavone, F. J. (M)
Schmitt, H. J. (A)
Schwab, W. C. (M)
Schwarzkopf, D. B. (M)
Scott, A. C. (M)
Sears, N. E., Jr (M)
Seiser, E. C. (M)
Semon, W. L. (SM)
Shapiro, L. D. (M)
Shiels, P. B. (A)
Siebert, W. M. (M)
Sklar, S. J. (M)
Sloan, G. H. (M)
Smith, L. R. (A)
Smith, M. K. (A)
Smullin, L. D. (F)
Solomonoff, R. J. (M)
Soohoo, R. F. (SM)
Spencer, R. H. (M)
Spinrad, R. J. (M)
Spitzer, E. (M)
Sponsler, J. W. (A)
Stata, R. S. (M)
Stevens, H. C. (M)
Stevens, K. N. (M)
Strandberg, M. W. P. (F)
Stratton, J. A. (F)
Sussklnd, A. K. (M)
Sutro, L. L. (M)
Thomas, W. L. (A)
Townsend, R. L. (M)
Trankman, H., Jr. (M)
Troxel, D. E. (M)
Tucker, C. E. (SM)

Tucker, J. A. (M)
Turner, A. S. (M)
Valley, G. E., Jr. (F)
Van Cleff, H. H., Jr. (A)
Vander Velde, W. E. (M)
Van Meter, D. (SM)
Van Rennes, A. B. (SM)
Vilbig, F. (SM)
Vourgourakis, E. J. (M)
Ward, J. E. (M)
Wasserman, R. (M)
Webster, F. A. (A)
Westphal, W. B. (M)
White, D. C. (SM)
White, S. A. A. (A)
Whiteside, H. (M)
Wiener, F. M. (SM)
Wiesner, J. B. (F)
Wildes, K. L. (SM)
Willenbrock, F. K. (M)
Williams, F. E. (M)
Wissmann, H. B. (M)
Woodson, H. H. (M)
Woodward, C. E. (M)
Wright, W. D. (SM)
Young, F. M. (SM)
Youtz, P. (M)
Yu, K. N. (M)
Zacharias, J. R. (SM)
Ziv, J. (A)

Canton (BOS-1)
Blumenthal, S. P. (A)
Buckley, E. F. (SM)
Burgoyne, C. L. (M)
Burr, G. S. (M)
Cahill, T. C. (A)
Callahan, R. J. (M)
Cuning, W. R. (M)
Dorian, J. M. (M)
Dunleavey, F. S. (M)
Keller, A. L. (M)
Kohnke, A. P., Jr. (M)
Slawsby, N. (M)
Volk, M. C. (A)
Wissenbach, F. O. (A)

Carlisle (BOS-1)
Brennan, D. G. (SM)
Davis, J. C. (M)
Maiech, R. G. (M)
Parke, N. G., III (M)
Rifkin, M. (M)
Root, W. L. (SM)

Charlestown (BOS-1)
Gibbons, J. F. (M)
Michell, A. P. (A)

Charlton (BOS-1)
Gunter, R. C., Jr. (SM)

Chelsea (BOS-1)
Barooshian, C. T. (M)
Gallant, R. M. (A)
McCarthy, B. D. (M)
Rosen, S. (M)
Scudney, B. V. (M)
Sokolove, M. G. (M)

Cheshire (WM-1)
Leonard, S. C. (SM)

Chelmsford (B-MV-1)
Ajello, E. M. (M)
Brooking, B. M. E. (M)
Cetanuk, W. K. (A)
Chutchian, Z. S. (M)
Craft, A. M. (M)
Davis, W. C. (M)
Dolan, J. A. (M)
Drury, W. H. (M)
Duffey, W. B. (M)
Dunne, T. P. (M)
Einfalt, J. R. (M)
Hynek, D. P. (M)
Jones, C. M. (M)
Kahan, S. D. (A)
Kellett, J. D. (M)
Kerr, S. A. (M)
Larson, R. P. (M)
Lund, W. E. (A)
Manahan, G. F. (M)
Manahan, J. F. (M)
Manty, W. A. (SM)
Marcotte, A. G. (A)
Martin, R. A. (M)
McCormack, T. L. (M)
McLaughlin, J. R. (M)
Micol, R. L. (M)
Mohr, M. C. (M)
Myers, W. D. (M)
Olson, R. E. (SM)
Palmer, W. F. (SM)
Sanderson, A. E. (M)
Smithson, G. (SM)
Strom, J. A. (M)
Toth, W. E. (M)
Turner, T. D. (M)
Wade, C. E. (SM)
Wallace, N. E. (A)

Chestnut Hill (BOS-1)
Bezuszka, S. J. (M)
Blanchard, R. L. (SM)
Cooper, G. (M)
De Mambre, J. A. (A)
Frank, W. I. (M)
Gansler, J. S. (M)
Golembe, S. N. (M)
Gould, L. A. (M)
Jordan, K. L., Jr. (M)
McFarlan, R. L. (SM)
O'Neil, R. E., Jr. (M)
Richards, P. I. (A)
Rosenberg, A. E. (A)
Schiffman, M. M. (M)
Sheehan, J. A. (A)
Strimling, W. E. (M)
Zieper, S. M. (M)

Chicopee (WM-1)
O'Connell, F. P. (M)
Zdeb, S. E. (M)

Chicopee Falls (WM-1)
Amata, J. F., Jr. (M)
Dutchinos, J. (M)
Grooms, W. G. (A)

Clinton (BOS-1)
Surprenant, A. H. (A)

Cochituate (BOS-1)
Bean, O. E. (M)
Benoit, G. F. (M)
Billio, L. S. (SM)
Brown, K. E. (M)
Donner, J. B. (SM)
Falgen, I. M. (SM)
Higgins, W. F. (SM)
Johnson, S. L. (M)
Krasnick, B. (M)
Kroenert, J. T. (SM)
Kurth, H. H. (SM)
Locher, J. P., III (M)
Lucas, E. J. (M)
Marcley, W. E. (M)
Sharaf, H. M. (M)
Taylor, H. P. (M)
Wilkinson, C. W. (M)

Cohasset (BOS-1)
Ainslie, H. W., Jr. (M)
Copson, D. A. (M)
Massa, E. A. (SM)
Palmiter, R. B. (SM)
Rowland, H. J. (SM)

Concord (BOS-1)
Allison, R. F. (M)
Anderson, H. E. (M)
Blemson, G. A. (M)
Blacksmith, P. Jr. (M)
Borton, J. T., Jr. (M)
Bosch, F. M. (M)
Burley, R. M. (A)
Buxton, E. T., Jr. (M)
Cayouette, R. L. (A)
Chu, G. Y. (M)
Connelly, M. E. (M)
Cottle, H. D. (A)
Craig, J. W., Jr. (M)
Daniels, R. (A)
Davenport, W. B., Jr. (F)
Dickson, A. W. (M)
Dolan, R. P., Jr. (M)
Doran, R. W. (M)
Drake, W. W., Jr. (M)
Edelberg, S. (M)
Ehrenfried, A. D. (SM)
Entticknap, R. G. (SM)
Fitzmorris, M. J., Jr. (M)
Forrester, J. W. (F)
Gaffney, J. (M)
Gunn, K. C. C. (M)
Harper, R. (M)
Heuchling, T. P. (SM)
Hollingsworth, L. M. (SM)
Holtje, M. C. (SM)
Kelley, F. L. (A)
Kelly, J. D. (M)
Kilham, L. F., Jr. (SM)
Kirshner, H. J. (A)
Kline, J. (SM)
Lambert, J. C. (A)
Levine, J. I. (M)
Logemann, H., Jr. (SM)
Lush, M. J. (M)
Macdonald, W. S. (M)
Mack, R. A. (M)
Marsh, H. S. (M)
Martin, L. H. (A)
McCouch, G. P. (SM)
Middleton, D. (F)
Newman, P. (SM)
Patterson, R. F., Jr. (M)
Penfield, H. (M)
Roberts, G. T. (M)
Rotondo, P. A. (M)
Ruze, J. (SM)
Seamans, J. O. (M)
Slade, M. G. (M)
Smith, R. L. (M)
Snay, R. J. (M)
Stevens, J. W. (M)
Sullivan, D. L. (M)
Teele, J. H. (M)
Temme, D. H. (M)
Tuttle, W. N. (F)
Tyler, V. M., II (M)
Ursch, R. R. (M)
Vance, P. R. (A)
Walen, R. S. (A)
Walker, J. R. (M)
Watt, C. W., Jr. (SM)
Wiegand, R. F. (M)
Wingate, S. A. (M)
Zorzy, J. (M)

Dalton (WM-1)
Allen, J. J. (M)
Long, J. H. (M)
Schuler, R. L. (M)
Shupe, R. H. (M)
Van Patten, R. A. (M)

Danvers (B-MV-1)
Andrews, R. W. (A)
Bevitt, W. D. (M)
Birnie, B. A. (M)
Brandt, I. L. (M)
Carter, G. E., Jr. (M)
Carter, G. W. (M)
Caskin, D. D. (A)
Chernyshov, V. N. (M)
Cotter, W. L. (A)
Cumminos, J. R. (M)
Delacy, E. M. F. (M)
Dibiase, A. F. (M)
Dinsmore, C. H. (M)
Dirks, L. H. (M)
Dominick, F. J. (M)
Farmer, J. W. (SM)
Frohock, W. S. (M)
Gahagan, J. W. (A)
Gibson, R. E. (M)
Hecht, B. P. (M)
Hull, J. A. (A)
Kern, R. H. (M)
Koen, F. T. (M)
Kowalski, R. M. (M)
Record, F. A. (M)
Sokolov, D. A. (M)
Soliotis, P. J. (A)
Stanley, K. O. (M)
Weinburg, E. F. (A)
Wroblewski, T. (SM)
Yee, T. G. (M)

Dedham (BOS-1)
Dobija, R. J. (M)
Fiola, W. J. (M)
Hastings, T. M., Jr. (M)
Kearns, T. M. (M)
Levesque, P. J. (M)
Mackley, F., Jr. (M)
Spadoni, E. R. (A)
Tahan, E. N. (SM)

Dennis (BOS-1)
Zopatti, R. C. (M)

Dorchester (BOS-1)
Broderick, R. T. (A)
Castellani, A. E. (M)
Cochrane, D. O. (M)
Colombo, C. M. (M)
Cudmore, A. F. (M)
Czechowski, E. W. (M)
Devine, W. L. (A)
Docherty, E. E. (A)
Donato, P. A. (M)
Donovan, W. C. (M)
Fox, R. M. (A)
Galante, E. T. (M)
Goldstein, D. S. (A)
Gray, E. L. (A)
Hadjiyannis, S. S. (M)
Hartford, W. J. (M)
Katakowsky, C. B. (M)
Kamenski, S. A. (A)
Krinsky, M. L. (M)
Meister, M. (A)
Mikulece, T. E. (M)
Morris, J. P. (A)
Nenortas, K. (M)
Renner, G. W. (M)
Shear, H. (A)
Sims, B. S. (M)
Tessari, V. P. (M)
Tursky, B. (A)
Waggett, J. A. (M)
Wartski, H. (M)
Waterman, C. I. (M)

Dover (BOS-1)
King, J. G. (M)
Melancon, L. (M)
Olivier, R. M. R. (M)

Dracut (B-MV-1)
Fairweather, D. R. (M)

Dudley (BOS-1)
Swana, M. R. (A)

East Boston (BOS-1)
Berni, L. W. (M)
Capobianco, A. A. (M)
Cunha, J. A. (A)
D'Entremont, A. O., Jr. (M)
Welling, A. J. (M)

East Braintree (BOS-1)
Bixby, W. L. (M)

East Brookfield (BOS-1)
Houlihan, R. P. (M)

Easthampton (WM-1)
Gnacek, W. J. (M)
Mesh, T. J. (SM)

East Lynn (BOS-1)
Kazules, A. J. (M)

East Natick (BOS-1)
Ewen, H. I. (SM)

East Walpole (BOS-1)
Ackerman, S. (M)

East Weymouth (BOS-1)
Fufton, L. G. (M)
Karalan, E. (A)
McLaughlin, A. J. (M)

Egypt (BOS-1)
Frank, L. G. (M)
Versoy, I. R., Jr. (M)

Everett (BOS-1)
Gantt, E. D. (M)
Klewicz, F. A. (M)
Massaro, R. P. (M)
Murphy, T. F. (A)
Newell, B. C. (A)
Veal, J. E. (M)

Fairhaven (BOS-1)
Bailey, W. M. (F)
Robinson, W. M. (SM)

Fall River (BOS-1)
Buchan, R. (A)
Buchanan, J. R. (M)
Buckley, A. E., Jr. (A)
De Matos, H. V. (M)
Desilets, D. J. (M)
Horvitz, S. (A)
Migneault, R. G. (M)
Roy, J. R. (M)
Ryan, J. E. (A)

Falmouth (BOS-1)
Clancy, J. E. (M)
Jayson, E. L. (M)
Johnston, A. T. (M)
Landry, S. G. (M)
Le Roy, R. C. (M)
Smith, B. M. (M)

Fayville (BOS-1)
Dunnet, W. J. (M)
Pouliot, L. J. (A)

Feeding Hills (WM-1)
Call, S. S. (A)

Fitchburg (BOS-1)
Arthur, G. M. (M)
Lundberg, R. E. (M)
Moran, J. M. (SM)
Snyder, D. C. (M)

Foxboro (BOS-1)
Bristol, E. H. (M)
Gansenberg, V. G. (M)
Spector, F. L. (M)
Sturgeon, S. S. (M)
Terrell, G. C. (M)
Wells, C. H. (A)

Framingham (BOS-1)
Abdun-Nabi, Z. (M)
Abrams, S. M. (M)
Appleman, M. A. (M)
Archambault, R. E. (M)
Ashley, C. L. (M)
Aykanian, A. A. (M)
Bartlett, D. D. (M)
Beals, E. H. (M)
Bloedorn, A. R. (M)
Bond, E. E. (SM)
Bothwell, T. P. (M)
Breitbord, J. L. (M)
Brown, R. R. (M)
Brundage, E. J. (M)
Caldicott, J. K. (M)
Caswell, C. F. (M)
Chen, C. H. (M)
Clough, R. H. (A)
Clymas, G. (A)
Coker, G. F. (M)
Coppernoll, R. W. (M)
Cron, A. C. (M)
Daly, R. H. (M)
Davis, E. A. (M)
Denman, J. G. (M)
Dinman, S. B. (M)
Dushman, (M)
Eakman, S. L. (M)
Earl, R. J. (M)
Fangmann, G. (A)
Fimlaid, E. O., Jr. (M)
Florida, M. S. (M)
Forglone, E. A. (M)
Garber, T. A. (A)
Gilmore, A. R. (M)
Ginsberg, I. (A)
Greenfield, S. E. (M)
Gutwill, L. A. (M)
Hamilton, W. H. (M)
Hoffer, J. M. (M)
Hoogasian, H. (M)
Horton, W. P. (M)
Irish, F. E., Jr. (M)
Jamieson, J. B., Jr. (M)
Johnson, A. B. (M)
Kaitin, R. L. (A)
Kates, R. (M)
Kopelan, B. G. (M)
Kross, V. (M)
Lacey, N. F. (A)
Lemack, A. G. (M)
Lewis, W. P. (M)
Lindberg, J. E. (M)
Long, F. (M)
Luklanov, R. E. (M)
MacDougall, J. S. (M)
Malihot, P. J. (M)
Mann, R. C. (M)
McMurtray, H. W. (A)
Mercurio, J. F., Jr. (M)
Meretsky, P. L. (M)
Michelson, M. (SM)
Miller, M. M. (M)
Morey, R. F. (M)
Nathan, P. M. (M)
Nearman, G. M. (M)
Nordquist, P. J. (M)
O'Gorman, J. B. (SM)
Patlughi, J. F., Jr. (A)
Peterman, J. H. (M)
Postema, G. B. (M)
Randles, W. C. (M)
Redmond, J. G. (M)
Remington, R. C. (M)
Rosen, L. (SM)
Rubinovitz, J. I. (SM)
Salow, S. R. (A)
Salzberg, E. (A)
Sawyer, D. S. (A)
Scott, P. R., Jr. (M)
Scyocurka, S. (A)
Senecal, T. P. (M)
Sherman, D. (M)
Spirl, G. J. (M)
Szymczak, R. S. (A)
Tenenholtz, R. (M)
Tober, H. (M)
Traub, A. C. (M)
Ungvary, R. L. (M)
Vandervelden, C. G. (M)
Vartanian, V. (M)
Walbridge, C. E. (M)
Welsman, J. B. (A)
Wychorski, H. J. (M)
Yaten, S. (M)
Youkstetter, F. (M)
Zusman, A. G. (M)
Zwerling, M. (A)

Framingham Center (BOS-1)
Charasz, J. G. (M)
Danforth, W. C., Jr. (A)
Driscoll, W. G. (SM)
Gerdes, J. W. (M)
Gilman, E. (M)
Hadfield, B. M. (SM)
Hurlbut, W. A. (A)
Iffland, J. J. (SM)
Keleher, A. E., Jr. (M)
Rocheleau, G. S. (M)
Schwartz, E. R. (A)

Franklin (BOS-1)
Brennan, A. T. (A)
Deerfield, A. J. (A)

Gardner (BOS-1)
Neunherz, R. K. (M)

Georgetown (B-MV-1)
Gammle, J. (M)
Petraitis, A. J. (M)

Gleasondale (BOS-1)
Harley, R. W. (M)

Gloucester (B-MV-1)
Donovan, L. J. (M)
Duffy, J. M. (A)
Hammond, J. H., Jr. (F)
Klistes, P. J. (M)
Landry, D. H. (M)
Moore, A. S. (A)
Paschal, H. A. (M)
Poole, J. F. (A)
Purington, E. S. (SM)
Short, J. A., Jr. (A)

Great Barrington (WM-1)
Hemmes, R. T. (M)

Greenbush (BOS-1)
Brooks, G. W. (M)

Greenwood (BOS-1)
Wheeler, D. R. (M)

Groton (BOS-1)
Graves, C. C. Jr. (M)
Pineo, V. C. (M)
Thibeau, C. E. (A)
Woodsum, S. P. (M)
Young, K. A. (SM)

Groveland (B-MV-1)
Bradley, H. L. (M)

Hamilton (B-MV-1)
Boise, E. B. (A)
Gysan, R. L. (A)
Hagan, R. A. (M)
Hammann, R. K. (M)
Nichols, H. F., Jr. (A)
Rowlands, E. R. (M)
Street, E. L. (M)

Hanover (BOS-1)
Barkley, H. B., Jr. (M)
Jacobson, R. E. (M)
McGrath, J. L. (M)

Hanover Center (BOS-1)
Hyland, R. C. (A)

Hanscom AFB (BOS-1)
Russell, C. C. (M)

Harvard (BOS-1)
Burton, G. L. (M)
Goldstein, S. J., Jr. (M)
Hammett, T. F. (M)
Hynes, R. T. (M)
Lee, R. F. (M)
Schramm, M. W., Jr. (M)
Strang, D. B. (SM)
Whitfield, W. D. (M)

Haverhill (B-MV-1)
Atwood, D. J., Jr. (M)
Babigian, A. A. (A)
Feldman, E. J. (SM)
George, J. O. (M)
Krawiec, J. P. (M)



Santarelli, M. J. (M)
Servetnick, J. (M)
Wilson, W. W., Jr. (SM)

Hawthorne (BOS-1)
Nichols, N. P. (M)

Haydenville (WM-1)
Curtis, L. F. (SM)

Hingham (BOS-1)
Broster, G. S. (M)
Cary, T. R., Jr. (M)
Craigie, S. M. (SM)
Hall, I. A. (M)
Lewis, R. W. (M)
Massa, F. (F)
Massa, F., Jr. (A)
Pinel, A. F. (A)
Pratt, F. (M)
Wolk, W. W. V., Jr. (M)
Wood, J. O. (M)

Hinsdale (WM-1)
Wheeley, E. A. (M)

Holbrook (BOS-1)
Stone, I. M. (M)
Swift, W. H., Jr. (M)
Wisneski, W. F. (M)
Worobey, E. (M)

Holden (BOS-1)
Andreasen, I. (M)
Wise, D. P. (SM)

Holliston (BOS-1)
Barr, G. M. (M)
Bowers, D. M. (M)
Dutton, R. H. (A)
Foster, H. (M)
Gordon, R. R. (SM)
Gronosky, C. F. (M)
La Shomb, S. D. (A)
Miller, M. S. (M)
Nobles, F. L. (A)
Peters, J. D., Jr. (A)
Sharpe, D. (A)
Thomas, H. J., Jr. (A)
Valpey, R. S., Jr. (M)
Wyckoff, R. L. (M)

Holyoke (WM-1)
Hampson, F. W. (A)
Junkins, C. E., Jr. (A)
King, F. H. (M)
Marek, L. W. (A)
Marek, M. B. (A)
Paszko, H. A. (A)
Wernick, H. (M)

Hopedale (BOS-1)
Sample, R. F. (M)
Tinkham, M. E. (A)

Hopkinton (BOS-1)
Brooks, R. A. (M)
Dilg, G. C. (M)
Fraleigh, R. V. (M)
Moylan, J. D. (M)

Hudson (BOS-1)
Burdick, G. E. (M)
Cleary, R. W. (A)
Dobrowolski, E. P. (A)
Pauplis, L. M. (M)

Hyde Park (BOS-1)
Barrett, J. F. (M)
Burke, W. T. (M)
Kuperstein, M. S. (A)
Martin, T. H. (M)
Nucefora, M. A. (M)
Piccirilli, A. T. (M)
Silberg, P. A. (SM)
Vickerson, A. H. (A)

Ipswich (B-MV-1)
Baker, J. R., Jr. (M)
Coggins, D. I. (M)
Mavroides, W. G. (M)
McMillan, E. B. (SM)
Plaisted, A. H. (A)
Rice, D. H. (M)
Sweetser, L. R. (M)

Islington (BOS-1)
Hedlund, D. A. (M)
Saltmarsh, H. J. (A)

Jamaica Plain (BOS-1)
Arenberg, D. L. (M)
Beaudette, C. G. (M)
Christo, V. S. (A)
Pengeroth, P. P. (A)
Roat, W. F. (M)
Vadala, C. J. (A)

Lakeville (BOS-1)
Hancock, J. D. (M)

Lanesboro (WM-1)
Mackson, D. J. (M)
Miles, R. J. (A)

Lawrence (B-MV-1)
Ameen, S. J. (M)
Augeri, J. J. (M)
Blanchette, C. F. (M)
Callahan, J. F. (M)
Chakmanian, J. A. (A)
Hanley, J. J. (M)
Kauders, E. (A)
Kugelman, F. (M)
Labbe, L. P. (M)
Lennon, A. W. (A)
Meekins, M. C. (M)
Mercer, B. H. (A)
Michaud, R. P. (M)
Papas, J. (M)
Petrella, A. J. (M)
Ratynski, M. V. (SM)
Talbot, R. R. (A)
Tosone, A. M. (M)
White, W., Jr. (A)

Lee (WM-1)
Klos, E. R. (M)

Leicester (BOS-1)
Day, L. R. (M)

Lenox (WM-1)
De Tolly, G. E. B. (A)
Fleischer, K. M. (M)
Sears, C. B. (M)

Leominster (BOS-1)
Gottlieb, D. C. (M)
Ross, H. E. (M)

Lexington (BOS-1)
Abel, W. G. (M)
Aldrich, F. W., Jr. (M)
Allen, T. J., Jr. (M)
Alton, B. D., Jr. (M)
Appleman, C. B. (SM)
Arden, D. N. (M)
Arnold, K. F. (SM)
Atchison, J. H., Jr. (M)
Axelbank, M. (M)
Barch, P. E. (M)
Barker, D. B. (M)
Bartee, T. C. (M)
Bean, R. H. (M)
Benkley, F. G., Jr. (M)
Berg, R. S. (M)
Blake, C. (M)
Blatt, H. (A)
Block, A. V. (M)
Bolinder, E. F. (SM)
Booth, A. T., Jr. (M)
Bosinoff, I. (M)
Bougas, A. C. (M)
Bragar, P. (M)
Bramley, F. A. (M)
Brick, D. B. (SM)
Brown, C. J. (M)
Brown, J. H. (M)
Budd, A. E. (M)
Burgess, L. M. (M)
Burwen, R. S. (SM)
Button, K. J. (SM)
Byers, W. F. (M)
Carlson, W. K. (M)
Chao, S. K. (M)
Chute, D. H. (M)
Clark, A. (M)
Clark, D. L. (M)
Clark, J. F. (M)
Clark, W. A., Jr. (A)
Clough, J. F. (A)
Coburn, W. K. (SM)
Cohen, M. S. (M)
Cohen, S. H. (M)
Colbourne, R. H. (SM)
Crane, J. D., Jr. (M)
Crowther, T. S. (M)
Currier, J. R., Jr. (M)
Curry, G. R. (M)
Daggett, N. L. (M)
Dalrymple, G. F. (M)
Dearborn, F. K. (M)
Demetrick, J. S. (SM)
Densler, J. P. (M)
Dentler, C. E. (M)
Dinozzi, A. D. (M)
Domenichini, C. P. (SM)
Downing, J. L. (M)
Doyle, W. (SM)
Drouilhet, P. R., Jr. (M)
Dumanian, J. A. (M)
Eisenstadt, B. M. (M)
Elliott, W. G. (M)
Fallick, C. E. (A)
Falor, O. K. (M)
Farley, B. G. (M)
Farr, C. W. (A)
Feehan, J. D. (M)
Feuerstein, E. (M)
Foundas, G. J. (M)
Fowle, E. N. (M)
Fox, H. M. (M)
Frankovich, J. M. (M)
Frantz, G. R. (SM)
Frazer, J. F. (M)
Freeman, L. D. (M)
Freimer, M. L. (M)
Friedman, A. L. (M)
Fritsch, P. C. (M)
Galejs, J. (M)
Galvin, A. A. (M)
Gardner, W. L. (SM)
Glick, A. L. (M)
Globe, S. (SM)
Godwin, C. J., Jr. (M)
Gold, B. (SM)
Goldberg, H. (M)
Goldberg, S. (M)
Goldstein, I. (M)
Gray, H. L., Jr. (M)
Grayzel, A. I. (M)
Guditz, E. A. (M)
Guppy, J. W., Jr. (M)
Guy, D. V. (M)
Hackenberger, R. B. (A)
Hadley, F. P. (M)
Hall, W. M. (SM)
Halpern, J. (M)
Hanley, J. E. (M)
Hannon, R. J. (SM)
Harcher, A. J. (M)
Haroules, G. G. (M)
Harrington, J. V. (SM)
Hauser, W. H. (M)
Hawthorne, E. I. (SM)
Hay, N. (A)
Hazel, F. P., Jr. (M)
Heiligmann, F. R. (A)
Hirman, L. E. (A)
Holden, W. E. (M)
Holman, W. E. (M)
Horowitz, S. (M)
Huang, C. (SM)
Huffman, D. A. (M)
Hufton, C. D. (A)
Hurney, P. A., Jr. (M)
Hyde, G. M. (M)
Jackman, W. L. (M)
Jackson, W. D. (SM)
James, J. C. (M)
Jeffery, L. R. (A)
Jenkinson, J. V. (A)
Jervis, E. W., Jr. (SM)
Johnson, B. F. (M)
Johnston, R. C. (M)
Kang, K. J. (M)
Keeping, K. J. (M)
Kendall, R. (SM)
Key, E. L. (M)
Kilbourn, W. A. (M)
Kingston, R. H. (SM)
Kinnard, K. F. (M)
Klein, G. A. (M)
Knauss, H. C. (SM)
Knubbe, H. (M)
Koffman, H. J. (M)
Kohler, H. M. (M)
Kolker, M. (M)
Kostriza, J. A. (M)
Kramp, K. M. (M)
Kriegsman, B. A. (M)
Kuhn, B. G. (M)
Kushner, H. J. (M)
Labitt, M. (M)
Labonte, R. C. (M)
Lambert, J. R. (M)
Lane, J. F., Jr. (M)
Lehr, C. G. (SM)
Lemnios, W. Z. (SM)
Lerner, H. A. (M)
Levi, C. A. (M)
Levy, L. S. (M)
Locke, R. V., Jr. (A)
Lyon, W. W. (A)
Maartmann-Moe, R. (M)
MacDonald, D. A. (M)
Mack, C. L., Jr. (M)
Masters, G. E. (M)
Mayer, R. P. (M)
McConnell, S. G. (A)
McCue, J. J. G. (SM)
McCully, G. R. (M)
McGinn, J. F. (M)
McLeod, W. W., Jr. (M)
Mikulski, J. J. (A)
Miller, S. J. (M)
Mitchell, J. L. (M)
Moore, R. L. (SM)
Morelli, A. (M)
Mullen, J. P. (M)
Naka, F. R. (SM)
Nelson, E. A. A. (A)
Neumann, L. (M)
Nowatt, A. Q. (M)
Nichols, B. E. (M)
Nilssen, R. H. (M)
Nordhal, J. G. (M)
Northrop, P. A. (M)
Nugent, W. R. (M)
O'Neil, S. J. (M)
Osepchuk, J. M. (M)
Paananen, R. A. (A)
Packard, R. H. (M)
Paojian, W. N. (SM)
Parker, A. C. (M)
Parker, H. H. (A)
Pascalar, H. G. (M)
Paton, C. D. (M)
Pease, R. L. (SM)
Peck, C. B., III (M)
Peterson, H. P. (M)
Petroph, A. (M)
Phillips, J. H. (M)
Pierce, J. N. (M)
Pilkington, E. J. (M)
Plemenos, F. A. (M)
Plumridge, R. F. (M)
Pollins, P. (M)
Prasinos, N. (M)
Prescott, R. S. (M)
Pryor, J. G. (M)
Pullis, F. D. (A)
Purinton, R. M. (SM)
Quist, T. M. (M)
Radford, W. H. (F)
Raffel, J. I. (M)
Rauscher, H. C. (A)
Rediker, R. H. (SM)
Reiffen, B. (M)
Reinitz, A. (M)
Rickert, D. F. (M)
Ring, W. F. (M)
Roberts, W. (M)
Roche, J. F. (M)
Rosato, F. J. (SM)
Santelmann, W. F., Jr. (M)
Schapiro, H. A. (M)
Scharfman, H. (M)
Schenk, P. J. (SM)
Searcy, J. B. (M)
Seed, R. G. (M)
Selikson, B. (A)
Sheldon, E. J., Jr. (M)
Sherman, H. (SM)
Silverman, E. (M)
Slade, H. L. (M)
Sokol, G. M. (SM)
Sovaiko, F. M. (M)
Spearin, F. W., Jr. (M)
Spiegel, J. (A)
Sproul, R. W. (M)
Strassberg, D. D. (M)
Sussman, J. P. (M)
Tanner, W. E. (M)
Terkanian, H. (M)
Therrien, H. J. (M)
Thomas, J. (M)
Tillman, J. E. (A)
Tobin, F. H., Jr. (M)
Towle, D. M. (M)
Trimgale, S. R. (A)
Uskavitch, C. W. (M)
Vanderburgh, A., Jr. (M)
Vasileff, H. D. (SM)
Walter, C. M. (M)
Warnock, H. P. (M)
Wathen-Dunn, W. (SM)
Weatherbee, W. H. (M)
Webster, A. L. (A)
Weiss, H. G. (SM)
Weiss, W. R., Jr. (M)
Wells, W. I. (M)
Whitney, D. B. (M)
Willey, F. G. (M)
Williams, S. B. (SM)
Wilson, P. B., Jr. (M)
Wolf, E. W. (SM)
Wolfe, R. (M)
Wong, G. W. (SM)
Woodward, J. H. (SM)
Yakutis, A. J. (M)
Yewell, P. G. (SM)
Zieman, H. E. (M)
Zucker, F. J. (M)

Lincoln (BOS-1)
Atchley, D. W., Jr (M)
Caswell, J. R. (M)
Edmonds, D. S., Jr. (M)
Fraser, R. M. (SM)
Fullerton, A. L., Jr. (SM)
Long, L. B. (M)
Scott, H. H. (F)
Wang, A. (SM)

Linwood (BOS-1)
Harper, B. J. (M)

Littleton (BOS-1)
Chu, L. J. (F)
Curran, G. B. (M)
Engquist, S. T. (M)
Gallagher, P. N. (M)
Goldstein, K. S. (M)
Hollis, C. C. (M)
Ignatowicz, J. B. (M)
Klein, L. (M)
Mayer, D. F. (M)
McElroy, T. R. (M)
Meyers, D. E. (M)
Nielsen, R. S. (A)
Nixon, N. E. (M)
Paquette, N. A. (M)
Root, H. G. (M)
Stockebrand, T. C. (A)
Wall, R. B. (M)
Ward, R. W. (A)

Littleton Common (BOS-1)
Cooper, J. B. (M)

Longmeadow (WM-1)
Bassett, E. D. (M)
Cohen, M. (M)
Dorshimer, R. C. (M)
Gostyn, E. (M)
Houck, S. C. (A)
Lutz, L. E. (M)
Wellman, P. H., Jr. (M)

Lowell (B-MV-1)
Aslanian, A. (M)
Depolito, M. J. (A)
Dukakis, S. G. (M)
Karas, N. V. (M)
Kinwin, G. J. (M)
Landry, L. H. (M)
Michaels, A. G. (M)
Mingins, C. R. (SM)
Nicoll, P. A. (M)
Staples, L. E. (M)
Tallent, G. R. (M)
Tyros, G. (A)
Vacherot, M. G. (M)
Vilcans, J. (M)
Zygadlo, F. (M)

Ludlow (WM-1)
Prescott, C. W. (A)

Lynn (BOS-1)
Ajootian, G. (A)
Andrews, H. J. (A)
Auger, E. P. (M)
Baldwin, T. H. (M)
Barnes, D. J. (M)
Cotter, J. J. (SM)
Cuozzo, D. (M)
Demrow, R. I. (M)
Deradourian, C. (A)
Eklund, A. M. (M)
Fierston, S. A. (M)
Goon, A. (M)
Haggis, J. C. (A)
Hunt, R. F. (M)
Keenan, J. H., Jr. (A)
Saraglow, C. (M)
Thistle, L. J. (M)
Whittaker, H. F., Jr. (M)

Lynnfield (BOS-1)
Gray, D. J. (M)
Kremheller, W. G. (M)
Lapham, E. G. (SM)
Leavy, P. M., Jr. (M)
Quayle, G. (M)
Zimmerman, H. J. (SM)

Lynnfield Center (BOS-1)
Alberts, H. C. (M)
Benkus, P. D. (M)
Brown, D. C., Jr. (M)
Clapp, C. W. (M)
Gates, A. F. (M)
Hunter, W. H. (M)
Nettleton, E. L. (M)
Perkins, K. C. (M)
Schmidt, R. A. (M)
Trenholme, W. M. (SM)

Magnolia (B-MV-1)
Martin, J. E. (M)
Swanson, G. W. (A)

Malden (BOS-1)
Amis, C. W. (M)
Breen, P. T. (M)
Brown, W. G., Jr. (M)
Buckley, J. P. (M)
Cutler, C. I. (M)
Deranian, M. (A)
Durante, A. C. (M)
Fast, S. (SM)
Fenton, L. F. (SM)
Frusztajer, B. B. (M)
Goldberg, S. D. (A)
Greenberg, S. A. (M)
Gurman, B. S. (M)
Harris, H. (A)
Hughes, A. D. (M)
Kinzinger, W. C. (M)
Linell, A. E. (A)
Lydiard, C. E. (A)
Lyon, R. E. (M)
Micale, V. A. (A)
Morgenstern, D. L. (M)
O'Brien, A. E., Jr. (M)
Oxman, M. H. (M)
Ricupero, P. C. (M)
Shear, L. (M)
Shelton, C. H. (M)
Sitomer, J. L. (M)
Skoda, G. J. (A)
Sloan, E. L., Jr. (M)
Tepper, M. (M)
Thompson, R. H. (M)
Tortorella, A. (A)
Weiner, E. D. (A)
Williams, E. E. (M)
Zigelbaum, J. G. (A)

Manchester (B-MV-1)
Falconer, S. (A)
McCorrison, P. B. (M)
Taft, E. A., Jr. (A)
Wolfe, R. W. (M)

Manomet (BOS-1)
Martin, R. N. (M)

Mansfield (BOS-1)
Leon, B. J. (M)
Sabin, E. A. (M)

Marblehead (BOS-1)
Bach, R. E., Jr. (M)
Chun, H. H. (M)
Grant, E. F. (SM)
Harvey, N. L. (F)
Irwin, T. D., Jr. (M)
Johnson, S. L. (A)
Kilham, R. E. (SM)
Mills, E. D. (M)
Roberts, F. B. (SM)
Slang, J. L. (M)
Stromeyer, C. F. (M)

Marion (BOS-1)
Ayer, W. H. (M)
Francis, S. A. (M)
MacLean, W. F., Jr. (M)
Smiley, E. L. (M)

Marlboro (BOS-1)
Boyle, D. A. (M)
Clark, F. E. (M)
Danis, P. H. (M)
Davidson, F. T. (M)
Doane, D. A. (M)
Fay, F. H. (M)
Macdonald, C. A. (M)
Osborne, W. B. (M)
Outten, R. E. (A)
Richer, P. J. (A)
Smith, R. V. (M)

Mattapan (BOS-1)
Arabian, J. H. (M)
Barlas, J. P. (M)
Breen, M. R. (M)
Cooper, R. S. (M)
Ellis, B. E. (M)
Fertig, K. (M)
Hannon, J. J. (A)

Matarazzo, T., Jr. (A)
Millen, S. G. (A)
Shnidman, D. A. (M)
Siegal, E. F. (M)
Tobey, H. M. (M)

Mattapoisett (BOS-1)
Anselmo, A. B. (A)
Collins, J. L. (SM)

Maynard (BOS-1)
Adair, R. P., Jr. (M)
Best, R. L. (M)
Billups, R. R. (M)
Borish, M. L. (M)
Campbell, B. D. (M)
Chapell, H. F. (M)
De Turris, J. M. (M)
Dworshak, F. C. (M)
Dyett, E. G., Jr. (M)
Freier, L. J. (M)
Hettich, R. E. (M)
Kemp, J. A. (M)
Killian, J. D. (M)
Lund, R. T. (A)
O'Hare, W. S. (M)
Olsen, K. H. (A)
Pomper, V. H. (SM)
Priest, W. C. (M)
Seay, W. B. (M)
Walsh, J. J. (M)

Medfield (BOS-1)
De Clue, J. L. (M)
Hurd, P. A. (M)
Jacobs, C. E., Jr. (M)
Jewell, R. L., Jr. (M)
Meader, P. W. (M)
Reardon, A. P. (M)
Tetreault, N. E. (M)
Walker, C. E. (M)
Westborn, A. C., Jr. (SM)

Medford (BOS-1)
Belinski, A. M. (A)
Brady, J. T. (M)
Carter, S. P. (M)
Connolly, G. E. (M)
Di Silva, C. F. (A)
Fiorello, E. A. (M)
Hayes, J. J. (M)
Hobbs, C. F. (SM)
Holmy, J. C. (M)
Howell, A. H. (SM)
Kosowsky, D. I. (M)
Lofgren, F. W. (SM)
Menzies, R. W. (A)
Michitson, P. A. (M)
Murphy, J. A. (M)
Nawrocky, R. J. (M)
Pike, A. L. (M)
Rago, K. A. (M)
Rollins, J. A. (M)
Rosen, G. (M)
Russell, A. D. (M)
Schell, A. C. (M)
Stevens, W. J. (SM)
Twombly, D. D. (M)
White, D. H. (M)

Melrose (BOS-1)
Berg, R. (M)
Broderick, R. F. (M)
Carbin, R. A. (M)
Christenson, E. C. (A)
Decker, F. R. (M)
Gradijan, J. R. (M)
Greene, R. D. (M)
Harrington, E. W. (M)
Hassett, F. C. (M)
Hefni, I. (M)
Houlding, N. (SM)
Jenkins, R. J. (A)
Kapteyn, P. (A)
Klane, C. H. (M)
Kotowski, J. P. (M)
Lewis, E. W. (A)
MacDowell, R. F. (M)
McCoubrey, A. O. (SM)
McGeoch, C. R., Jr. (M)
Meader, R. B. (M)
Moroenstern, J. C. (A)
Morton, G. E. (A)
Mrose, J. E. (M)
Orenberg, A. (M)
Rogers, W. S. (A)
Rowell, W. G. (M)
Schurgin, S. M. (M)
Snell, C. T. (M)
Stadler, F. W. (M)
Wong, W. G. (M)
Young, N. H. (A)

Melrose Highlands (BOS-1)
Braden, R. S. (A)

Mendon (BOS-1)
Parkinson, K. L. (A)

Methuen (B-MV-1)
Baron, R. N. (M)
Buck, R. E. (M)
Callahan, C. A. (M)
Chontoian, P. (SM)
Glodfelter, W. K. (M)
Kennedy, W. F. (M)
Ryan, J. W., Jr. (A)
Simoes, C. R. (A)
Woodburn, E. S., Jr. (M)

Middlefield (WM-1)
Vreeland, J. B. (M)

Middleton (B-MV-1)
Hayden, P. C. (A)

Milford (BOS-1)
Kurlansky, S. (A)

Millis (BOS-1)
Allen, R. S. (M)
Bannister, L. H. (M)
Biagiotti, R. J. (A)
May, F. G. (A)
Sanders, E. W. (SM)
Yarbrough, S. L. (SM)

Milton (BOS-1)
Arnold, C. E. (M)
Baker, B. H. (M)
Bradshaw, D. B. (M)
Day, W. J. (M)
Emery, R. A. (M)
Gerber, A. (M)
Jeffries, D. (SM)
Malmberg, R. A. (A)
Menadier, P. T. (A)
Metcalfe, I. J. (M)
Mullen, J. A. (SM)
O'Connell, J. J., Jr. (M)
Paterson, R. F. (M)
Scheffler, E. C. (M)
Shnitzler, R. K. (M)
Spitz, H. S. (A)
Sternick, S. H. (M)
Wernick, D. H. (A)
Wilkie, L. E. (A)

Minot (BOS-1)
Mongeau, R. A. (M)

Nabnasset (BOS-1)
Russell, E. D. (M)

Nahant (BOS-1)
Frohman, E. D. (M)
McFadyen, R. J. (M)

Nantucket (BOS-1)
Brown, H. W. (M)

Natick (BOS-1)
Balekdjian, K. (M)
Batcheller, A. (SM)
Benson, R. A. (M)
Bittel, M. M. (SM)
Blaisdell, A. A. (M)
Bram, J. M. (M)
Brosnahan, R. E., Jr. (M)
Carson, C. H. (A)
Cashen, J. F. (M)
Channing, W., Jr. (A)
Chapin, J. W. (M)
Child, J. W. (M)
Devane, M. E. (M)
Dixon, R. A. (M)
Driscoll, J. F. (M)
Driscoll, V. (M)
Fenzel, F. A. (M)
Geier, W. (SM)
Greim, R. E. (A)
Hamilton, R. L. (M)
Harden, C. M. (M)
Harel, A. (M)
Hilliard, I. W. (SM)
Hunt, D. G. (M)
James, F. E. (M)
Jones, W. C., Jr. (M)
Kamens, B. R. (SM)
Kane, J. (M)
Kessel, B. (M)
Kobel, T. A. (M)
Kopelman, J. (A)
Korenberg, S. (SM)
Korn, S. J. (M)
Levin, M. H. (SM)
Lockhart, H. H. (M)
Long, R. G. (M)
Luftman, A. S. (M)
Lyford, J. C. (A)
Maffoy, T. J., Jr. (A)
Malpass, D., Jr. (M)
Marston, G. H. (M)
McLean, A. S. (A)
Meyer, M. A. (M)
Nord, R. F. (M)
Nye, J. H. (M)
O'Keefe, B. J. (SM)
Platt, H. J. (SM)
Porter, A. D. (M)
Repella, N. (SM)
Rosenthal, M. L. (M)
Rubin, R. (M)
Saad, T. S. (SM)
Savell, R. E. (M)
Schontzler, J. G. (M)
Shedd, E. F., Jr. (M)
Sheppard, L. E. (M)
Sobel, H. S. (M)
Sutter, F. J. (M)
Towle, W. C. (M)
Washington, L., Jr. (M)
Weiss, B. J. (M)
Whigham, T. J. (M)
Whitcraft, W. A., Jr. (SM)
White, D. J. (M)
White, M. M. (M)
Wilde, R. E. (A)
Yelsey, A. (A)
Zens, R. G. (M)
Zicko, C. (M)
Zimmer, J. T. (M)

Needham (BOS-1)
Adams, H. E. (A)
Alden, J. M. (A)
Alessi, P. A. (M)
Alpert, E. (M)
Ayoub, M. A. (M)
Baldwin, P. K. (SM)
Bello, P. A. (M)
Bullard, A. H., Jr. (M)
Child, P. J. (M)
Cohen, J. J. (M)
Cook, J. C. (M)
Craig, R. B. (M)
Cross, H. H. (SM)
Dawson, W. F. (M)
De Miglio, F. J. (M)
Dench, E. C. (SM)
Dewing, J. B. (A)
Digan, T. E. (M)
Dinowitz, E. E. (M)
Duffy, M. P. (SM)
Eckhardt, D. L. (SM)
Goldberg, O. D. (SM)
Grablec, J. J. (M)
Hadge, E. (M)
Handly, E. J. (M)
Henry, J. M. (M)
Hill, D. G. (M)
Hosterman, C. W. (M)
Hurd, W. H. (M)
Jablonski, R. W. (A)
Kadet, J. (SM)
Keane, L. M. (M)
Keay, D. M. (M)
King, C. M. (M)
Kinne, G. B. (M)
Landall, L. B. (M)
Landman, L. (M)
Lang, K. T. (M)
Leiner, F. C. (A)
Lowe, M. E. (SM)
Mahoney, T. F. (M)
McManus, R. O. (M)
Mednick, R. (M)
Milkie, R. W. (A)
Morris, I. L. (M)
Nelson, C. (M)
Newman, D. J. (M)
Page, F. W. (M)
Parker, M. S. (M)
Pratt, R. E. (M)
Pyle, E. L. (M)
Rattman, W. J. (M)
Ross, C. H. (M)
Rote, W. A. (SM)
Rymsha, A. F. (M)
Sargent, H. P., Jr. (A)
Sherry, M. E. (M)
Smith, H. J. (M)
Stacy, J. E. (SM)
Steen, J. R. (F)
Taylor, R. W. (M)
Tiffany, G. B. (M)
Trueworthy, G. G. (A)
Turner, J. L. (SM)
Ullman, H. A. (M)
Walker, L. G. (SM)
Weston, W. E. (A)
Whipple, R. L. (M)
Wolfe, J. A. (M)
Wolfson, A. H. (SM)
Wong, M. S. (SM)
Wyke, A. A. (M)

Needham Heights (BOS-1)
Abbott, W. G. (M)
Barber, W. D. (M)
Brodhead, W. M. (M)
Cowperthwait, F. N., Jr. (A)
Crocker, D. C. (A)
Crowley, D. J., Jr. (M)
Dean, F. R. (M)
Dolan, F. J. (M)
Fernald, O. H. (SM)
Fuller, H. W. (M)
Futran, S. M. (M)
Gitelman, E. (M)
Harris, H. G., Jr. (M)
Herre, J. (M)
Joseph, D. F. (M)
Labitt, B. H. (M)
Lazuk, A. V. (SM)
MacNeil, G. E. (A)
Nolan, W. (A)
Pucel, R. A. (M)
Rubinfien, D. (M)
Seifert, R. E. (M)
Smith, H. A. (A)
Sokal, M. O. (SM)
Spencer, G. R. (M)
Stanney, W. J. (M)
Works, A. R. (M)

New Bedford (BOS-1)
Collins, E. D. (A)
Da Cruz, A. M. (M)
Dahl, H. (A)
Goldstein, A. C. (M)
Gonsalves, L. M. (M)
Grad, P. P. (A)
Hunt, H. J., Jr. (A)
Klemm, G. H. (A)
Milner, J. J. (A)
Peirce, C. C. (M)
Picard, H. E. (M)
Pickett, J. H. (M)

Newbury (B-MV-1)
Christiansen, D. (SM)
Wright, M. E., III (M)

Newburyport (B-MV-1)
Andrews, A. H. (M)
Hodge, T. P. (M)
Lynch, R. E. (M)
O'Keefe, J. D. (M)
Todd, E. P., Jr. (M)

Newton (BOS-1)
Aarons, J. (M)
Arnold, W. F. (M)
Aronow, S. (M)
Austin, C. S. (M)
Beedle, R. H. (M)
Blitzer, S. D. (SM)
Bucher, K. H. (A)
Carey, W. M., Jr. (M)
Cerier, M. M. (M)
Cho, Y. (M)
Coolidge, C. A., Jr. (M)
Dean, W. B. (A)
Eachus, J. J. (SM)
Golahny, Y. (M)
Gold, N. (M)
Gruber, S. (M)
Gutman, A. S. (A)
Hafer, T. W. (M)
Heaton, M. W. (A)
Herzberg, R. F. (M)
Higgins, J. E. (M)
Hobbs, F. W. (A)
Israel, D. R. (SM)
Kincaid, M. M. (SM)
Kotsaftis, C. J. (A)
Kraemer, J. H. (M)
Kundert, W. R. (M)
Lagnado, I. (M)
Leverton, W. F. (SM)
Lourie, N. M. (M)
Madeson, A. H. (M)
Malone, M. H. (A)
Martel, C. W. (SM)
McCormack, R. L. (SM)
McNear, J. W. (M)
Medoff, J. L. (A)
Plaisance, S. F. (M)
Pollen, L. K. (M)
Pote, A. J. (F)
Rajasekhar, P. S. (M)
Rockwood, A. C. (F)
Rubin, M. D. (M)
St. George, P. W. (M)
Sheingold, D. H. (M)
Spinks, J. M. (M)
Stasey, C. M. (M)
Sturdy, R. H. (A)
Stutsman, P. W. (M)
Urbanetti, J. J. (A)
Weill, G. R. (M)
Whelden, J. W. (M)
Whirry, W. F. (M)
Wilson, R. D. (SM)
Wright, R. E. (M)
Zimbel, N. S. (M)

Newton Center (BOS-1)
Bloom, L. J. (M)
Brawley, H. E., Jr. (M)
Burke, A. W. (M)
Cudlitz, S. (M)
Heasly, C. C., Jr. (M)
Hersh, A. I. (M)
Hill, D. C. (M)
Kellner, R. L. (M)
Krim, N. B. (M)
Linsky, A. B. (M)
Lippincott, S. (M)
Low, W. C. (M)
MacGregor, N. (A)
Mandell, A. (SM)
Meltzer, M. I. (M)
Mintzer, L. (SM)
Moakler, E. J. (M)
Riceman, S. (M)
Robinson, S. (A)
Rothstein, J. (SM)
Saret, J. (M)
Schlueter, P. J. (M)
Sear, H. (A)
Segal, S. (M)
Smith, M. D. (M)
Stein, S. (SM)
Tafapolsky, B. (M)
Woo, W. D. (SM)

Newton Highlands (BOS-1)
Balmuth, N. (M)
Bates, B. (M)
Boehme, R. M. (M)
Dorfman, J. (M)
Fallows, R. S. (M)
Friree, F. L. (M)
Holst, W. F. (M)
Kahn, W. M. (M)
Leonard, R. R. (M)
Muckenhoupt, F. W. (M)
Osman, M. S. (M)
Patton, J. E. (M)
Ramamoorthy, C. V. (M)
Sawyer, P. B. (M)
Sclegienny, J. (M)
Seitz, M. E. (M)
Stolze, W. J. (SM)
Strohmeier, W. (M)
Ward, W. W. (M)
Watts, R. N. (M)
Wise, N. (M)
Wolfson, A. A. (M)
Yamins, H. G. (M)

Newton Lower Falls (BOS-1)
Grossman, M. C. (M)
Mork, R. P. (M)

Newton Upper Falls (BOS-1)
Dokken, G. O. (M)
Macdonald, C. J. (A)
Smith, L. C. (SM)

Newtonville (BOS-1)
Adams, R. E. (M)
Altman, N. G. (M)
Arnum, M. (M)
Blanton, H. E. (SM)
Broadbridge, R. E. (M)
Brown, B. D. (M)
Edwards, B. G., III (M)
Goldberg, W. L. (A)
Gravel, C. L. (M)
Hayes, C. J. (A)
Moore, G. M., Jr. (M)
O'Hara, F. J. (M)
Oszy, A. J. (M)
Roossin, N. (M)
Sheingold, L. S. (SM)
Smith, D. C. (M)
Woodward, C. A. (A)

Norfolk (BOS-1)
Gibson, C. W. (A)
Leverone, A. A. (M)
Wilson, S. J. (A)

North Abington (BOS-1)
Stucke, E. A. (A)

North Adams (WM-1)
Aimi, B. R. (M)
Allison, W. M. (SM)
Brafman, H. E. (M)
Caruccio, F. (M)
Cushman, N. (SM)
Devey, G. B. (M)
Dorst, S. (M)
Henry, A. L. (M)
Hooks, A. K. (M)
Lamoureaux, R. A., Jr. (A)
Lazier, W. A. (M)
Leavitt, J. D. (M)
Lehovec, K. (F)
Mead, E. S. (A)
Mulford, J. E. (M)
Novacek, W. G. (M)
Peterson, R. C. (M)
Provencher, W. C. (A)
Purpura, E. (A)
Raina, K. A. (M)
Robinson, P. (M)
Sprague, J. L. (M)
Sprague, R. C. (SM)
Tiezzi, A. A. (SM)
Tremblay, G. V. (M)
Tyler, R. H. (A)
Wellcome, F. L., Jr. (M)

Northampton (WM-1)
Clark, D. B. (M)
Combie, A. A. (A)
Hart, D. M. (A)
King, A. D. (M)

North Andover (B-MV-1)
Anderson, R. E. (M)
Anderson, V. H. (A)
Backard, E. M. (A)
Banton, W. E. (SM)
Berger, U. S. (SM)
Bowman, J. W. (A)
Carroll, G. L. (A)
Coleman, S. B. (SM)
Custer, C. J. (M)
Eberhart, E. K. (SM)
Edwards, P. G. (F)
Friis, R. W. (SM)
Graham, R. S. (SM)
Greene, P. J. (M)
Griffiths, H. D. (M)
Hallenbeck, F. J. (SM)
Hollins, C. G. (M)
Kerwien, A. E. (SM)
King, F. H. (M)
Koerner, L. F. (M)
Monell, F. B. (SM)
Owens, C. D. (SM)
Penick, D. B. (SM)
Perkins, E. H. (SM)
Pomeroy, A. F. (SM)
Pustarfi, H. S., Jr. (A)
Sagaser, D. D. (M)
Sandsmark, P. I. (M)
Simmonds, T. H., Jr. (M)
Simon, H. (M)
Smith, R. S. (M)
Somers, L. (M)
Stansel, F. R. (SM)
Sykes, R. A. (F)
Taylor, E. R. (M)
Thulin, C. W. (SM)
Wells, H. G., Jr. (M)
Williams, O. L. (M)
Yaeger, R. E. (M)
Yeutter, C. S. (M)

North Attleboro (BOS-1)
Bliss, B. J. (A)
Scanlon, W. C. (M)

North Beverly (BOS-1)
Briggs, R. S. (M)

North Billerica (BOS-1)
Callahan, B. J., Jr. (M)
Crist, A. H. (M)
Videberg, J. I. (SM)

Northboro (BOS-1)
O'Brien, H. F. (A)
Wiedenbauer, G. J. (M)

Northbridge (BOS-1)
Swidrak, T. C. (M)

North Chelmsford (B-MV-1)
Benjamin, C. R. (M)
Pecs, K. K. (M)
Prue, H. W. (A)



North Dartmouth (BOS-1)
Burbank, R. W., Jr. (A)
Kahn, L. (SM)
Simmons, F. A. (M)

North Dighton (BOS-1)
Sadowski, J. J. (M)

North Easton (BOS-1)
Allen, L. W. (M)
Ames, D. (M)
Anderson, A. L. (M)
Dudley, T. C. (M)
Govela, J. F. (A)
McIver, J. D. (M)

North Egemont (WM-1)
Christman, I. H. (A)

North Natick (BOS-1)
Getter, C. M. (M)
Randolph, R. V. (M)

North Quincy (BOS-1)
Fassino, E. G. (M)

North Randolph (BOS-1)
Flaherty, F. E., Jr. (M)

North Reading (B-MV-1)
Donnelly, F. E., Jr. (M)
Hankless, L. B. (M)
Karels, L. E. (M)
Millen, J. (M)
Pratt, H. J., Jr. (M)
Rex, F. J., Jr. (M)
Ross, T. C. (M)
Rubin, S. (A)
Van De Stadt, W. (M)

North Scituate (BOS-1)
Creaser, C. W., Jr. (M)

North Truro (BOS-1)
Boren, B. C., Jr. (M)

North Westport (BOS-1)
Cardozo, D. J. (A)

North Weymouth (BOS-1)
Battista, V. J. (M)
Copeland, R. C. (M)

North Wilmington (BOS-1)
Barcroft, R. W. (M)
Bloom, M. I. (M)
Bryn, S. L. (A)
Duffy, J. F. (M)
Gunning, F. A. (A)
Halloran, T. W. (M)
Zaino, A. L. (A)

North Woburn (BOS-1)
Goldberg, W. P. (M)

Norwell (BOS-1)
Cann, J. D. (A)
Dawson, J. W. (F)
Harris, C. C. (SM)
Hills, W. L. (M)
Maglathlin, R. N. (SM)
Zamboto, D. A. (M)

Norwood (BOS-1)
Arnstein, P. B. (M)
Baker, J. L. (M)
Bazzy, W. (M)
Burns, H. S. (M)
Close, H. N. (A)
Cronan, P. H. (M)
Erb, D. R. (M)
Fitzgerald, T. J., Jr. (M)
Flaherty, J. J. (M)
Glynn, J. J. (M)
Gronroos, E. (A)
Hennessey, C. W. (A)
Jedrychowski, J. L. (SM)
Johnson, H. A. (M)
Kleps, E. W. (A)
Larsen, R. L. (M)
Mantinson, R. M. (M)
McDonough, J. C. (M)
Monahan, A. M. (M)
Primpas, L. V. (M)
Race, H. C. (M)
Smith, R. D. (SM)
Staller, J. J. (SM)
Stone, I. C. (M)
Thaxter, J. H., Jr. (M)
Trask, D. B. (M)
Tucker, J. E., Jr. (M)
Winitzer, A. J. (M)

Nutting Lake (BOS-1)
Bacon, R. R. (M)

Orange (BOS-1)
Mellon, R. E. P. (M)

Orleans (BOS-1)
Long, H. S. (A)
Long, J. B., Jr. (M)

Otis (WM-1)
Santos, P. J. (M)

Otis AFB (WM-1)
Craig, W. H., Jr. (M)
Forbes, D. F. (M)
Shannon, P. D. (M)

Palmer (WM-1)
Calkins, D. F. (M)

Paxton (Bos-1)
Alexander, D. C. (SM)
Stannard, G. E. (M)

Peabody (B-MV-1)
Alexander, H. C. (M)
Callely, J. A., Jr. (A)
Chernek, R. A. (M)
Cohen, T. J. (M)
Dodge, R. B. (A)
Giuffrida, J. (M)
Grayton, R. F. (M)
Horlick, A. M. (A)
Lapointe, J. A. (M)
Madore, R. J. (M)
Maguire, W. M. (SM)
O'Brient, E. J., Jr. (M)
Pinkstaff, J. R. (M)
Savage, J. E. (M)
Senges, W. (M)
Shapiro, I. (A)
Shapiro, J. M. (M)
Sheldon, D. L. (M)
Sowyrda, J., Jr. (M)
Stern, A. J. (M)

Pepperell (BOS-1)
Wood, R. (SM)

Pinehurst (BOS-1)
Megow, W. F., II (A)

Pittsfield (WM-1)
Ackerson, R. D. (M)
Arulfo, R. (M)
Borgese, A. J. (M)
Boyajian, A. (SM)
Canfield, E. B. (M)
Casek, S. J. (M)
Chertok, S. L. (M)
Claschini, W. (M)
Cohen, R. S. (M)
Conover, W. B. (M)
Corman, D. (M)
Davis, A. J. (M)
Degenhardt, R. N. (M)
Druschel, W. H. (M)
Egan, W. E. (M)
Ferguson, J. V. (M)
Forman, A. H., Jr. (SM)
Fox, E. D. (M)
Hannabach, J. (M)
Hardy, E. R. (A)
Harris, L. B. (M)
Hitt, M. L. (M)
Hucko, H. (M)
Landers, J. J. (M)
Luoma, R. A. (M)
Mackey, E. F. (M)
Musbach, M. W. (M)
Neff, J. W. (M)
Neubert, W. E. (M)
Newsham, C. D. (M)
Patch, R. J. (M)
Peterson, G. R. (SM)
Petkofsky, L. (M)
Pierce, J. L. (M)
Podolsky, L. (F)
Reynolds, W. J. (M)
Ringlee, R. J. (M)
Samsel, R. W. (M)
Shepard, B. R. (SM)
Sienkiewicz, H. S. (A)
Stitt, T. D. (M)
Tanigawa, G. (M)
Tanner, E. G. (M)
Tichenor, W. B. (M)
Vaida, S. J. (M)
Velkers, G. D. (A)
Wakefield, W. F. (M)
Wiley, R. J. (M)
Wright, W. D. (A)

Plainville (BOS-1)
Hammer, R. P. (A)
Negus, L. E. (M)

Plymouth (BOS-1)
Roy, A. G., Jr. (M)

Quincy (BOS-1)
Brown, R. S. K. (A)
Burak, M. (M)
Della Lucca, L. E. (M)
Dewey, W. P. (A)
Grass, A. M. (M)
Hagman, H. B. (SM)
Kelleher, R. B., Jr. (M)
Kramer, R. (M)
Langeller, G. P. (M)
Loomis, G. L. (SM)
McAuley, J. A. (M)
McLaughlin, W. C. (M)
Obreza, W. S. (A)
Osgood, R. C. (M)
Tetrick, C. J. (M)
Tsao, C. K. H. (M)
Woodley, G. V. (M)

Randolph (BOS-1)
Bartell, A. D. (A)
Heaton, L. B. (A)
Kaiser, J. A. (A)
Klabis, R. A. (M)
Ludwig, D. R. (M)
Mann, A. M. (M)
Pascluto, R. D. (M)
Rice, K. L. (A)
Roeber, F. W. (M)
Trott, J. E., Jr. (M)
Wolf, S. H. (A)

Reading (BOS-1)
Alter, R. S. (M)
Baranofsky, J. J. (M)
Benson, E. D. (A)
Blottman, J. B., Jr. (M)
Brown, W. T. (A)
Butcher, S., Jr. (M)
Caywood, R. W. (SM)
Collins, R. M. (M)
Danehy, R. T. (M)
Dratch, J. E. (A)
Ellis, C. E., Jr. (M)
Fasciano, E. R. (A)
Freeman, R. I. (A)
Gates, E. K. (M)
Girlunas, J. J. (M)
Grande, G. C. (M)
Guy, H. D. (SM)
Hulburt, H. J., Jr. (M)
Johansen, D. E. (M)
Lenz, C. E. (SM)
Leslie, M. B. (M)
Loesch, B. (M)
Morrison, D. A. (M)
Murray, R. B. (M)
Nichols, R. P. (A)
O'Brien, J. A. (SM)
Parsons, R. L. (M)
Rienzo, J. J., Jr. (M)
Robbins, L. W. (A)
Rosenthal, R. E. (A)
Sattet, A. P. (M)
Skitzki, P. (M)
Smith, W. R. (M)
Spongberg, R. C. (M)
Taylor, N. H. (SM)
Vant, L. M. (M)
Weinroth, S. A. (M)
Wood, A. F. (M)
Zerfas, G. J. (A)
Zitzow, H. P. (M)

Revere (BOS-1)
Abel, F. (M)
Carrabes, M. J. (M)
Coleman, D. A. (M)
Freedman, I. M. (M)
Harwood, E. (A)
Martel, R. J. (A)
Mastromarino, J. A. (A)
Murphy, J. A. (M)
Pauszenbach, D. R. (A)
Romino, L. P. (M)
Siegel, M. (M)
Sofia, A. J. (M)
Tranfaglia, T. E. (A)
Vecchia, E. F. (A)
Williams, A. H. (M)

Rockland (BOS-1)
Conley, F. M. (M)
Kaupo, D. R. (M)
Linney, F. J., Jr. (A)
Maslson, C. J., Jr. (M)
Thayer, W. D. (M)
Westhaver, R. O. (M)

Rockport (B-MV-1)
Betts, M. D. (M)
Johnson, L. F., Jr. (M)
Wendell, E. N. (F)

Roslindale (BOS-1)
Amante, J. J. (A)
Catalano, A. L. (M)
Di Giorgio, J. A. (M)
Goodway, J. T. (M)
Hamilton, S. J. (A)
Murray, J. P. (A)
Parmagian, H. R. (A)
Saunders, J. H. (M)

Rowley (B-MV-1)
Cannon, J. H. (M)
Jackson, A. R. (M)
McKinley, J. J. (A)
Potts, T. J., Jr. (SM)

Roxbury (BOS-1)
Goldman, H. N. (A)
Magnani, B. J. (A)
Marcellus, Brother (M)
Metten, W. H. (M)
Pengeroth, I. E. (M)
Reynolds, J. H., Jr. (A)
Roch, Brother (M)
Samuels, F. A. (M)
Tomass, J. (A)
Walker, R. M. (SM)

Rutlands Heights (BOS-1)
Clark, G. L. (A)

Salem (B-MV-1)
Clark, W. H., Jr. (M)
Helns, H. (A)
Jackson, W. E. (M)
Olbrych, J. E. (M)
Rainville, L. P. (A)
Rotstein, J. (M)
Sofoliuk, A. (M)
Wiederhold, P. R. (A)

Salisbury (B-MV-1)
Gholson, A. H. (M)

Sandwich (BOS-1)
McCoy, J. F. (M)
Williams, A. (M)

Saugus (BOS-1)
Atkins, E. R. (A)
Bailey, A. D. (M)
Bertram, M. E. (M)
Bradbury, R. A. (M)
Cummings, W. C. (M)
Cunningham, J. E. (M)
Marie, C. G. (A)
Morley, R. A. (M)
Moulton, W. D. (M)
Sheltman, F. I. (M)
Williams, A. R. (M)

Saxonville (BOS-1)
Baker, T. E., Jr. (M)
Beling, T. E. (A)
Breslow, D. H. (A)
Brody, G. H. (M)
Brunelly, J. J., Jr. (M)
Carter, L. W. (M)
Crossley, W. P. (M)
Elliot, R. R. (M)
Engman, G. E. (M)
Floyd, W. B. (M)
Goldman, E. M. (M)
Gorman, R. K. (M)
Hevesh, A. H. (SM)
Hilar, E. P. (M)
Hosmer, B. E. (M)
Kem, D. R. (A)
Kokidko, A. (M)
Levy, M. R. (M)
Mannette, R. T. (M)
Ponte, A. G. (M)
Riegelhaupt, N. H. (M)
Rubin, L. S. (M)
Sebestyen, G. S. (M)
Spergel, P. (M)
Sullivan, L. T. (M)
Tittlebaum, B. M. (M)
Waltzer, B. (A)

Scituate (BOS-1)
Lemmon, W. S. (SM)
Williams, H. G. (SM)

Seekonk (BOS-1)
Blake, D. L. (M)
Landesberg, M. M. (M)

Sharon (BOS-1)
Bartlett, E. R. (M)
Brestick, H. L. (M)
Carey, J. S. (A)
Clements, W. S. (M)
Cushman, R. W. (A)
Gault, R. M. (M)
Goldrosen, J. J. (M)
Holik, F. J. (M)
Kessinger, H. E. (M)
Laschever, N. L. (SM)
Lerner, H. E. (A)
Press, M. (SM)
Rochefort, J. S. (SM)
Rosenthal, M. H. (A)
Sallen, M. J. (M)
Zeuli, E. A. (A)

Sherborn (BOS-1)
Hiller, E. R. (M)
Rockwell, C. F. (M)
Saunders, W. F. (A)

Shrewsbury (BOS-1)
Cowan, B. (A)
Harrington, E. W. (A)

Somerset (BOS-1)
Graef, R. L. (M)
Ironfield, R., Jr (M)

Somerville (BOS-1)
Batz, J. J. (M)
Bradley, C. L. (M)
Cagliuso, G. G. (M)
Clark, R. A. (M)
Fitzgerald, W. D. (M)
Gaudet, F. G. (M)
Giddings, O. M. (M)
Giusti, A. (A)
Kostas, P. D. (M)
La Pape, B. F. (A)
Mathewson, A. (M)
Mazzola, P. C. (M)
McNamara, W. E. (A)
Noonan, J. T. (A)
Pantazelos, P. G. (M)
Paze, P. T. (M)
Pennington, F. J., Jr. (A)
Phillips, D. R. (M)
Simmons, A. J. (SM)
Solomon, A. N. (A)
Solonese, E. E. (M)
Thomas, K. J. (M)
Torras, F. (M)
Vaccaro, P. (M)
Ventura, R. A. (A)
Zullo, W. J. (M)

South Acton (BOS-1)
Boole, R. A. (M)
Fadiman, J. R. (M)
Ferguson, J. B. (M)
Gerhardt, R. H. (M)
Harris, M. R. (M)
Hendrie, G. C. (M)
Herskovitz, S. B. (M)
Janvrin, W. A., Jr. (SM)
Kehoe, A. V. (M)
MacMullen, A., Jr. (M)
Matheson, A. I. (M)
Meldrum, L. W. (A)
Micciolli, A. R. (M)
Moritz, C. (M)
Pfeiffer, H. F. (M)
Pickering, R. L. (M)
Varley, H. W. (M)
Walsh, W. P. (M)
Young, B. L. (M)

South Berlin (BOS-1)
Beuregard, W. G. (M)

Southboro (BOS-1)
Borghetti, J. C. (A)
Dobson, A. M. (A)

South Boston (BOS-1)
Karosas, R. (M)
Stevens, E. F. (M)
Vitkus, P. L. (M)
Zikas, A. J. (M)

South Braintree (BOS-1)
Goodwin, R. C. (M)
Hirtle, A. C. (M)

Southbridge (BOS-1)
Beguin, F. P. (SM)
Bergmann, S. M. (M)
Chace, H. E. (A)
Frey, H. B., Jr. (M)
Tillyer, E. D. (SM)
Wells, J. M. (SM)

South Chatham (BOS-1)
O'Day, A. C. (A)

South Dartmouth (BOS-1)
Davis, S. L. (SM)
Fitzsimmons, T. J. (M)
Golengaul, C. (A)
Hoover, H. H., Jr. (A)
Underwood, J. S. (A)

South Egremont (WM-1)
Borg, W. N. (M)

South Hamilton (BOS-1)
Carr, E. G. (M)
Hamlin, W. O. (A)
Peek, S. C. (M)
Ryan, H. G. (SM)
Wiggin, W. R. (M)
Wolfskill, J. R. (SM)

South Hingham (BOS-1)
Bird, W. S. (A)

South Lincoln (BOS-1)
Faran, J. J. Jr. (SM)
Gibbs, N. E. (M)
Gross, T. A. O. (M)
Jorgensen, S. W. (M)
Row, R. V. (A)
Shansky, D. (M)
Smulowicz, B. (SM)
Stevens, F. R. (M)
Willis, A. H. (M)

South Sudbury (BOS-1)
Blanchard, J. M. (M)
Bobroff, D. L. (M)
Caldwell, R. J. (SM)
Cohen, H. I. (M)
Duncan, K. W. (M)
Fickett, M. M. (M)
Gronemeier, H. J. (A)
Haworth, L. D. (M)
Houghton, R. W. (M)
Johnson, R. N. (M)
Kirkland, R. E. (M)
McAleer, H. T. (M)
Ostroff, E. D. (M)
Paska, R. A. (A)
Warner, G. L. (M)
Waters, R. A. (SM)

South Weymouth (BOS-1)
Cook, W. M. (M)
Coughlin, J. J. (A)
Hill, H. F. (M)
Howes, B. S. (M)
Matteson, D. W. (M)
McMonagle, D. B. (M)
Stefanowicz, S. S. (A)

Springfield (WM-1)
Andrews, W. J. (A)
Bushey, R. A. (M)
Bookman, R. E. (SM)
Cameron, J. A. (M)
Castillo, P. S., Jr. (A)
Cushino, T. F. (M)
Dideum, M. A. (A)
Donner, W. (A)
Fratar, F. J. (M)
Glista, E. M. (M)
Huntoon, V. J. (A)
Hyfantis, J. F. (M)
Keams, R. F. (M)
Kitty, F. J. (M)
Laliberte, E. J. (M)
Lyman, J. R. (A)
Monqeen, R. J. (M)
Paris, D. A. (M)
Penk, C. (A)
Richardson, H. M. (SM)
Salame, G. (M)
Salmond, D. A. (A)
Townsend, G. R. (M)
Zinchuk, M. (M)

Stoneham (BOS-1)
Anderegg, J. S. (M)
Bassett, J. D. (SM)
Bird, G. L., Jr. (A)
Boyd, H. R. (SM)
Burke, N. W. (M)
Cayer, R. E. (M)
De Agazio, E., Jr. (M)
Herrera, J. C. (M)
Jamgochian, E. (SM)

Krahn, H-J. (M)
Lucy, R. F. (M)
Norlund, B. (M)
Perry, B. D. (M)
Riska, G. G. (M)
Rojak, F. A. (M)
Sorbye, K. E. (M)
Stone, M. L. (M)
Westbrook, E. P. (M)
Williams, J. J. (M)

Stoughton (BOS-1)
Bennett, H. W. (SM)
Giuda, H. W. (M)
Litchfield, P. O. (A)
McDonnell, J. Q. (M)
McGarvey, J. P. (A)
Nichols, R. F. (M)
Ostis, J. N. (M)
Ross, B. F., Jr. (M)
Scripture, F. R. (SM)

Stow (BOS-1)
Carbary, E. M. (M)
Corzine, R. H. (A)
Guiney, R. J. (A)
Mong, R. C. (M)
Olson, K. H. (M)

Sturbridge (BOS-1)
Fish, J. W. (M)

Sudbury (BOS-1)
Bahlkow, A. P. (M)
Bell, J. W. (SM)
Borts, R. B. (SM)
Bradley, G. G. (M)
Branche, J. R. (M)
Burgarella, J. P. (M)
Burke, E. J. (M)
Byington, R. E. (M)
Chase, D. G. (M)
Coullard, J. B. (SM)
Crocker, C. F. (M)
Dahlstrom, R. D. (M)
Earnshaw, W. A. (M)
Edwards, L. C. (M)
Ellinthorpe, A. W. (M)
Emerson, W. P. (A)
Falkowitz, M. (M)
Frelm, E. G. (M)
Gibbon, H. T. (M)
Guethlein, V. J. (M)
Hall, P. R. (M)
Hallett, J. L., Jr. (M)
Hamm, G. M. (SM)
Hand, S. E. (SM)
Hathaway, S. W. (SM)
Kalisky, A. (A)
Kaliszewski, T. (M)
Keith, W. W. (M)
Kile, R. L. (M)
Kirshner, D. R. (SM)
Kozloff, J. (M)
Laforge, L. H., Jr. (SM)
Lloyd, J. W. F. (M)
Mackin, R. N., III (M)
Martinengo, R. D. (M)
Mazzarese, N. J. (M)
McCarthy, D. J. (M)
McColl, D. R. S. (SM)
McCoy, A. M., Jr. (M)
McCullough, J. H. (A)
Mundo, C. J., Jr. (SM)
Partridge, G. R. (M)
Petrishen, J. (A)
Plum, L. W. (M)
Reach, R. W., Jr. (SM)
Sherman, D. A. (M)
Sims, J. C., Jr. (SM)
Smith, A. H., Jr. (M)
Steudel, F. (M)
Stratton, J. C. (M)
Stromsted, E. A. (M)
Thomas, E. K. (M)
Thomas, H. H. (SM)
Throckmorton, K. L. (M)
Waldman, A. (A)
Ward, R. L. (M)
Wargo, J. J. (M)
Watson, J. C., Jr. (M)
Wellock, R. R. (M)
Whelpton, J. P. (M)
Willey, J. C. (M)

Sunderland (WM-1)
Garbiel, R. L. (M)

Sutton (BOS-1)
Tuttle, H. W., III (A)

Swampscott (BOS-1)
Berman, I. (SM)
Crane, J. J. (M)
Ludlam, W. A. (M)
Manna, E. E. (M)
Miasnick, J. D. (M)
Quint, A. S. (M)
Strongylos, M. L. (A)
Von Damm, C. A. (M)
Whitehouse, T. S. (M)
Williams, R. (M)
Williamson, R. J. (M)

Taunton (BOS-1)
Johnson, H. A. (SM)
Snell, C. R., Jr. (A)
Wengal, S. G. (M)

Templeton (BOS-1)
Aukstikalnis, T. J. (A)

Tewksbury (B-MV-1)
Brent, P. (A)
Chaff, A. N. (M)
Cohen, A. (SM)
Gregg, B. (M)
Goldstein, A. L. (M)
Leitner, M. (A)
McCarthy, J. D. (A)
Schumacher, W. A. (SM)
Wholey, L. T. (A)

Topsfield (B-MV-1)
Armstrong, J. H. (M)
Gage, G. H. Jr. (M)
Goddard, C. T. (SM)
Harrington, E. C. (M)
Heaton, R. G. (M)
Henderson, G. R. (M)
Jansen, J. J. (M)
McKenney, G. M., Jr. (M)
Norton, G. A. (M)
Wimpy, E. K. (SM)

Townsend (B-MV-1)
Morey, P. E. F. (M)

Turo (BOS-1)
Wagner, P. E. (A)

Tyngsboro (B-MV-1)
Bagley, P. R. (M)
Du Bois, W. E. (M)
Spindell, F. A. (SM)

Uxbridge (BOS-1)
Tancrell, R. H. (M)

Waban (BOS-1)
Altman, J. L. (M)
Antman, M. A. (SM)
Apelbaum, J. H. (M)
Berg, A. L. (A)
Berman, G. M. (M)
Berner, A. S. (M)
Ellis, R. H. (M)
Friedman, B. L. (M)
Hall, R. E. (M)
McDade, H. J. (A)
Mofenson, J. (SM)
Parisi, F. E. (M)
Rudnick, S. L. (M)
Salzer, E. (M)
Scotch, Norman (A)
Spencer, P. L. (F)
Troll, J. H. (SM)
Ward, A. E. (SM)

Wakefield (BOS-1)
Baker, W. F. (M)
Blanco, J. F. (SM)
Burnett, E. F. (A)
Ciccierella, C. (M)
Clark, N. F. (M)
Cook, O. L. (SM)
Coulthard, J. J. (M)
Farkas, A. I. (A)
Gagnon, R. L. (M)
Gallagher, P. (A)
Gardella, C. E. (M)
Haas, E. W. (M)
Heft, E. J. (M)
Hirshberg, L. H. (A)
Howe, S. E. (A)
Jacobs, R. (M)
Jennings, H. F. (A)
Johnnen, C. F. (M)
Johnson, B. H. (A)
Koss, N. A. (SM)
Lasch, K. B. (M)
Lynch, E. E. (SM)
Navon, D. H. (M)
Pawlowski, B. J. (SM)
Peel, A. R. (A)
Peters, S. J. (M)
Peterson, D. G. (M)
Pruvenok, A. J., Jr. (M)
Reid, E. (M)
Rich, E. S. (SM)
Rosenbaum, R. N. (M)
Slusher, W. E. (M)
Somerset, S. J. (M)
Stein, H. (SM)
Sterl, D. G. (M)
Verdooren, H. W. (M)
Weersing, N. O. (A)
Wefald, K. O. (M)

Walpole (BOS-1)
Brown, G. J. (M)
Davis, W. F. (A)
Esthimer, W. F. (M)
Fisher, R. E. (M)
Lord, J. S. (A)
Soderstrom, R. E. (M)
Taylor, K. A. (M)
Vagge, A. A. (M)

Waltham (BOS-1)
Applegate, C. E. (SM)
Aron, N. (SM)
Arslan, H. (M)
Ashford, F. L. (M)
Bartlett, R. P. (M)
Black, G. (A)
Booth, A. E. (M)
Both, W. A. (M)
Brady, J. P. Jr. (SM)
Bress, C. (M)
Brown, D. F. (M)
Brunton, D. A. (A)
Bushey, D. O. (M)
Callahan, T. T. (A)
Carstolu, J. (SM)
Chapman, D. J. (M)
Charles, R. E. (SM)
Chernosky, E. J. (M)
Chittenden, K. M. (M)
Colten, B. (SM)
Conover, J. C. (M)
Cooperstein, M. (M)
Coronii, S. C. (SM)
Crosby, R. E. (M)
Crosthwait, J. L. (M)
Da Mocogno, N. G. (M)
Daniel, F. H. (A)
Delano, A. B. (M)
Devereux, J. G. (A)
Di Lorenzo, B. A. (M)
Dombrowski, G. E. (M)
Dukat, F. M. (SM)
Dunbar, E. E. (M)
Dunlap, W. C. Jr. (SM)
Ehrlich, S. L. (M)
Englund, E. T. (A)
Etkind, I. J. (M)
Faulkner, W. H. Jr. (SM)
Feinberg, I. (M)
Filipov, A. M. (M)
Findels, W. J. (M)
Fine, N. M. (M)
Flad, F. R. (M)
Forbes, E. J. (A)
Forderhase, R. S. (M)
Foster, R. P. (A)
Fownes, R. F. (A)
Funke, R. W. (M)
Gibson, S. K. (M)
Gildea, H. (M)
Gillen, R. M. (A)
Gostenhofer, G. (M)
Grace, P. A. (M)
Granger, E. A. (M)
Greene, A. H. (M)
Gross, H. G. (SM)
Grund, J. B. (SM)
Hall, H. S. (SM)
Hamant, D. (M)
Hannon, S. (SM)
Haselton, E. F. (M)
Hines, P. P. (A)
Hoar, G. W. (M)
Hobby, J. L. (A)
Hostbjor, A. (M)
Huntley, W. F. (M)
Jackson, S. R. (M)
Jacobs, R. M. (M)
Johnson, A. C. (M)
Johnson, E. P., Jr. (M)
Jones, R. V., Jr. (M)
Jones, W. T., Jr. (M)
Joyal, M. W. (M)
Kaufman, L. (M)
Kee, R. C. (M)
Kellson, J. (SM)
Kelly, T. J. (M)
Kersey, J. L., Jr. (M)
Knapp, G. P. (SM)
Knight, M. C. (M)
Koskinen, G. K. (M)
Landow, I. S. (M)
Langmuir, D. B. (A)
Lavine, J. M. (SM)
Leavitt, W. A., Jr. (A)
Lester, D. R. (M)
Leuenberger, F. (M)
Lyon, E. F. (M)
MacMaster, G. H. (A)
Maher, C. E. (M)
Manley, H. J. (A)
McGregor, D. F. (A)
Melanson, F. J. (M)
Milano, U. (M)
Mitchell, D. A. (M)
Morgenthaler, F. R. (M)
Morley, H. B. (M)
Murray, P. C. (M)
Naylor, T. K. (M)
Nelder, F. V. (M)
Nelson, R. E. (M)
Nielsen, C. E., Jr. (M)
O'Brien, D. G. (M)
Parkinson, G. B. (A)
Pearson, A. L. (M)
Peters, C. J. (M)
Pick, G. G. (M)
Plumb, D. R. (M)
Pollack, D. (SM)
Price, B. F. (M)
Principlotta, M. A. (M)
Randall, J. E. (M)
Ratts, B. H. (SM)
Rea, W. W. (SM)
Reed, R. D. (M)
Regan, W. T. (A)
Reifel, H. (M)
Rex, R. A. Jr. (M)
Ricard, A. J. (M)
Ricciardi, F. (M)
Rittenburg, S. E. (M)
Rogers, T. F. (SM)
Russo, J. R. (M)
Sallen, R. P. (M)
Saltzberg, W. (M)
Sandler, G. H. (M)
Sands, M. M. (M)
Santangelo, J. (SM)
Saunders, N. B. (SM)
Schantz, J. D. (SM)
Schiff, G. W. (M)
Schrimpf, H. W. (A)
Schwartz, R. T. (M)
Sedik, J. J. (M)
Shafer, C. G. (M)
Shaw, G. J. (M)
Silverstein, M. F. (M)
Skowron, J. F. (A)
Smith, G. K. (M)
Soltes, A. S. (M)
Sookikian, V. (M)
Stauffer, F. K. (M)
Stickley, C. M. (M)
Stockman, H. (SM)
Stoddard, J.C. (M)
Stoddard, R. D. (M)
Stoddart, H. F. (M)
Stone, H. S. (M)
Storer, J. E. (SM)
Stratoti, A. R. (M)
Taylor, K. A. (M)
Terry, G. H. (A)
True, W. A. (SM)
Vacca, R. H. (SM)
Vafiades, B. C. (M)
Vielehr, J. E. (M)
Welchman, W. G. (SM)
Welles, S. B. (SM)
Welts, J. (M)
Wilson, E. F. (SM)
Windsor, R. B. (SM)
Winsor, D. L. (M)
Zeender, R. J. (SM)
Zettler, W. R. (M)
Zimmer, W. (M)

Watertown (BOS-1)
Ayakian, A. (M)
Averill, R. J. (M)
Barnes, R. P., Jr. (M)
Belounqie, L. W. (A)
Browness, C. (M)
Brooks, P. R., Jr. (M)
Brooks, R. O. (M)
Bussell, N. H. (M)
Capralos, J. (A)
Chacran, J. J. (M)
Champeny, J. C. (M)
Christopher, N. S. (A)
Clements, D. F. (M)
Colby, G. V., Jr. (M)
De Shon, H. C. (M)
Epstein, D. J. (M)
Field, R. F. (F)
Fulton, D. A. (A)
Giallongo, S. J. (A)
Gines, H. (M)
Griffin, W. J. (M)
Gunshor, R. L. (M)
Haase, K. H. (M)
Harrison, R. J. (SM)
Hart, J. C. (M)
Havstad, J. W. (M)
Hood, L. F. (M)
Kahalan, C. H. (M)
Kasparian, G. D., Jr. (M)
Kasparian, K. D. (A)
Lambert, T. A. (M)
Lazarkis, P. J. (M)
Lechner, R. J. (A)
Lenhardt, L. J. (M)
Leonard, M. V. (A)
Little, E. P. (M)
Lorant, C. R. (M)
Lowenstein, H. L. (A)
Mallumian, L. (A)
Marcus, G. H. (M)
Massey, J. L. (M)
McLaughlin, R. J. (M)
Mulock, L. E. (M)
Newcomb, R. E. (M)
Olson, R. E. (A)
Pearlman, A. R. (M)
Perloff, G. (M)
Pettersen, R. J. (M)
Polinsky, A. L. (M)
Rawlinson, P. E. (M)
Read, V. H. (A)
Reichard, R. W. (M)
Riceman, E. A. (M)
Riley, W. E. (A)
Robinson, M. P. (M)
Roche, T. E., Jr. (M)
Salvatore, J. (M)
Samson, E. W. (SM)
Schnall, E. (M)
Schneider, C. R. (A)
Schwartz, R. (M)
Smith, D. H. (M)
Smith, L. R. (M)
Teager, H. M. (M)
Tierney, J. (M)
Wang, S. C. (M)
Weinstein, I. J. (M)
White, D. P. (M)
Wilder, F. H., Jr. (M)
Willim, D. K. (M)
Withers, W. C., Jr. (M)

Waverly (B-MV-1)
Daly, W. G., Jr. (M)

Wayland (BOS-1)
Allen, D. C. (A)
Allgood, B. L. (M)
Alvi, S. M. S. (M)
Alstad, N. J. (M)
Anderson, F. J. (SM)
Ballou, E. T. (M)
Barker, H. J. (M)
Bennett, L. (M)
Casanave, C. L. (M)
Conard, R. W. (A)
Davis, L., Jr. (SM)
De Bruyn, P. R. (M)
Dyne, J. H. (A)
Fahringer, G. S. (A)
Ferrante, O. (M)
Ferrar, C. M. (M)
Fye, D. L. (M)
Galbraith, J. S. (M)
Gardner, H. A. (SM)
Gillespie, C. N. (M)
Groginsky, H. L. (M)
Hodgkinson, W. S. (M)
Hough, H. O. (M)
Jenks, F. A. (SM)
Jordan, C. E. (M)
Karp, D. (M)
Kather, E. N. (M)
Leake, B. W. (M)
Letaw, H., Jr. (SM)
Lewis, G. S. (A)
Lowery, W. E. (SM)
Mac Dowell, K. M. (M)
Mathews, K. C. (M)
Mathis, G. (M)
McCarthy, W. A. (M)
McNally, I. L. (SM)
Merrill, J. R. (SM)
Michaelis, H. P. (M)
Minicucci, R. P. (M)
Neumann, A. J. (M)
Ohman, J. (SM)
Parkinson, B. W. (M)
Parsons, G. C. (M)
Phillips, T. L. (M)
Pike, R. W. (M)
Pontecorvo, P. J. (SM)
Porter, R. R., Jr. (M)
Prendergast, W. R. (M)
Proctor, H. E., Jr. (A)
Raduziner, D. M. (M)
Reed, R. R. (M)
Rider, D. V. (M)
Rose, J. E. (M)
Saylor, W. R. (SM)
Serotta, M. (M)
Smith, L. L. (M)
Somers, O. H. (M)
Soorian, D. A. (M)
Stevens, R. L. (A)
Stewart, R. F. (A)
Tandy, P. C. (M)
Thornton, R. D. (M)
Trotter, G. C. (M)
Turchinetz, J. (M)
Unger, R. McC. (SM)
Webber, W. W. (M)
White, A. D. (M)
Whitham, G. E. (A)
Wilson, M. S. (M)

Webster (BOS-1)
Jolda, J. M. (M)
Lanman, T. W. (A)
Szczepanski, J. R. (M)

Wellesley (BOS-1)
Banks, D. S. (M)
Barrett, B. W. (M)
Baumann, A. (M)
Bennett, R. K. (M)
Berger, R. (M)
Brainerd, H. B. (SM)
Bristo., H. B. (M)
Buckbee, J. A. (M)
Camp, W. W. (M)
Charow, W. J. (M)
Crosby, R. L. (SM)
Dolansky, L. O. (SM)
Frelich, P. D (A)
French, R. F. (SM)
Gerlach, A. M. (M)
Hajko, H. J (M)
Hart, H. M. (SM)
Hartley, M. S. (SM)
Johnson, R. J. (M)
Kuehn, R. L. (SM)
Macklin, T. G. (M)
McDowell, L. S. (SM)
McKinley, W. D. (M)
Minichiello, R. (M)
Murphy, W. M., Jr. (M)
Neuman, G. J. (M)
Newton, G. C., Jr. (M)
Noyes, B. I. (M)
O'Connor, J. C. (M)
O'Donnell, A. J., Jr. (SM)
Palmer, P. J. (M)
Pease, W. H. (SM)
Pfouffe, R. H. (M)
Reed, W. O. (M)
Rehrig, E. S. (M)
Sparacino, R. R. (M)
Stewart, S. W. (M)
Sutherland, C. M. (M)
Terry, R. W. (M)
Thomson, E. C. (M)
Tucker, N. (A)
Welt, T. A. (M)
Wels, J. L. (M)

Wellesley Hills (BOS-1)
Blasdel, F. G., Jr. (M)
Bowers, G. (A)
Chaffee, R. E. (SM)
Eager, M. (SM)
Farley, J. M. (M)
Flanagan, F. M. (M)
Galagan, S. (SM)
Gavin, J. M. (SM)
Gould, L. (SM)
Gregory, J. G. (SM)
Harris, D. H. (M)
Hatton, W. L. (M)
Heick, B. K. (M)
Hinckley, G. A. (A)
Kline, F. S. (M)
Kriz, J. (A)
Maples, T. K. (SM)
Pierce, G. B. (A)
Porter, H. J. (M)
Reddan, E. D. (M)
Ricardi, L. J. (M)
Seeley, P. E. (A)



Ulrich, V. K. (SM)
Voutselas, T. (A)
Walsh, J. E. (M)
Weeks, P. T. (F)
Welsh, W. A. (SM)
Williams, J. B., Jr. (M)
Zelger, H. P. (M)

Wenham (BOS-1)
Schafer, E. W. (SM)

West Acton (BOS-1)
Armstrong, G. R. (M)
Attridge, C. C. (M)
Bibbins, L. L. (M)
Broadwell, H. S. (M)
Brunton, R. H., III (A)
Brzezinski, W. H. (A)
Bunting, J. H. (A)
Campbell, R. T. (M)
Cole, D. A. (M)
Craig, G. A. (M)
Cuikay, R. S. (M)
Day, A. C. (M)
Fischer, R. F. (M)
Fordon, W. A. (M)
Grosse, P. C. (SM)
Guba, R. F. (M)
Hodgdon, H. W. (M)
Ivanov, A. (M)
Janes, C. W. (SM)
Lawton, D. C. (M)
Newcombe, D. A. (M)
Oliver, D. S. (M)
Panetta, A. R. (M)
Pensyl, J. F. (M)
Perry, J. P. (M)
Petrucci, S. J. (M)
Pusch, G. A. (M)
Randig, G. W. (M)
Roediger, F. E. (SM)
Richter, E. (M)
Schreiber, W. F. (M)
Shiber, H. G. (M)
Shuppert, R. C. (M)
Sims, J. R. (SM)
Skilling, J. K. (M)
Smith, P. C. (SM)
Stewart, A. K. (M)
Theroux, L. N. (SM)
Wood, G. D. (M)

Westboro (BOS-1)
Allen, R. W. (M)
De Poy, M. L. (M)
Quick, J. H. (SM)

West Bridgewater (BOS-1)
Nelson, F. W. (A)

West Concord (BOS-1)
Ausin, H. A. (M)
Bergstad, P. A. (SM)
Berthel, F. W. (A)
Bousquet, A. G. (SM)
Burke, C. T. (F)
Cady, C. A. (SM)
Campbell, L. J. (M)
Chitouras, C. G (M)
Clayton, J. M. (SM)
Cleveland, A. W. (M)
Dawes, H. C. (M)
De Blois, S. W. (M)
Dipaolito, P. W. (M)
Eames, A. M., Jr. (M)
Easton, I. G. (F)
Frank, R. W. (SM)
Fulks, R. G. (M)
Gilman, M. A. (M)
Gray, J. C. (M)
Gross, E. E., Jr. (SM)
Hall, H. P. (M)
Hatch, R. M., Jr. (M)
Johnson, G. O. (M)
Karplus, E. (F)
Krason, H. C. (M)
Lahanas, C. J. (SM)
Leballister, D. C. (A)
Lewis, F. D. (SM)
Littlejohn, H. C. (M)
Macalka, M. P. J. (M)
McElroy, P. K. (F)
Murphy, C. F. (M)
Nelson, R. R. (M)
O'Connor, C. (M)
Painter, H. O , Jr. (M)
Peterson, A. P. G. (F)
Peterson, R. K. (M)
Petricoks, J. (M)
Pilkington, D. W. (M)
Plunk, T. E. (M)
Richmond, R. B. (SM)
Romaine, G. F. (M)
Ruplenas, R. J. (M)
Sacra, C. H. (M)
Sebring, P. B. (M)
Sinclair, D. B. (F)
Smith, M. T (SM)
Soderman, R. A. (SM)
Thiessen, A. E. (SM)
Thurston, W. R. (SM)
Van Veen, F. T. (M)
Webb, H. A. J. (M)
Webster, W. G. (SM)
Wentworth, A. M. (A)
Woodward, C. A., Jr. (SM)
Worthen, C. E. (SM)
Zawada, F. A. (M)

West Falmouth (BOS-1)
Bierman, C. W. (A)

Westfield (WM-1)
Fournier, H. N. (M)
Rachals, R. (M)

Westford (BOS-1)
Cann, A. J. (M)
Chace, W. G. (SM)
Colling, F. L. (M)
Mott, D. R. (M)

West Granville (WM-1)
Hodsdon, J. S. (M)

West Lynn (BOS-1)
Laurent, J. A., Jr. (M)
White, A. (A)

West Medford (BOS-1)
Cook, A. S. (M)
Knapp, G. (M)
Lanciani, D. A. (SM)
McCarthy, J. F. (M)
Murray, N. H. (M)

Westminster (BOS-1)
Nesmari, E. F. (M)
White, D. A. (M)

West Natick (BOS-1)
Sessions, A. E. N. (SM)

West Newbury (BOS-1)
Anderson, W. R. (M)
Fidler, R. R. (M)

West Newton (BOS-1)
Collias, H. C. (M)
D'Argento, F. R. (M)
De Bettencourt, J. (F)
Dertinger, E. F. (M)
Elkan, J. (M)
Freedman, N. (SM)
Halder, C. W. (M)
Hergenrother, R. C. (F)
Hollis, W. T., III (M)
Horrigan, J. B. (M)
Ingber, L. K. (M)
Jones, W. J. (SM)
Kaufman, D. L. (M)
Manning, C. J. (A)
Myers, H. L. (M)
Nerseslan, R. W. (A)
Pelin, H. T. (SM)
Peyster, P. (A)
Plumley, C. (M)
Rizzi, P. A. (SM)
Smith, J. E. (F)
Teixeira, N. A. (M)
Wilcox, R. B. (M)
Wright, B. D. (M)
Wyckoff, P. H. (M)
Young, P. T. K. (A)

Weston (BOS-1)
Abate, A. (M)
Alcalde, H. D. (A)
Baghdady, E. J. (M)
Bark, A. (M)
Bickford, W. J. (M)
Brown, W. C. (F)
Burt, W. G., Jr. (M)
Crowley, A. H. (M)
Dewey, O. L. (M)
Eames, R. D. (M)
Erickson, P. W. (SM)
Fellows, G. E. (SM)
Finison, H. J. (M)
Freedman, J. (SM)
Green, P. E., Jr. (SM)
Gross, F. A. (M)
Hammond, C. R. (M)
Havinga, J. C. (M)
Hebditch, E. A. (M)
Holt, R. B. (SM)
Jayne, A. W. (M)
Kahler, R. C. (M)
Kelly, T. J. (M)
Marks, E. H. (M)
Miller, J. E. (M)
Morrow, W. E. (M)
Olander, W. O. (M)
Phillips, W. E., Jr. (SM)
Ryland, B. G. (M)
Searle, C. L. (M)
Simons, J. C., Jr. (SM)
Stoffel, F. T. (M)
Thomas, J. E., Jr. (SM)
Underhill, B. B. (SM)

Westover AFB (WM-1)
Brigham, J. C. (M)
Cranshaw, R. J., Jr. (A)
Hennele, J. T. (A)
Myers, G. J. (M)
Williams, L. D. (A)
Woodward, W. E. (M)

West Peabody (B-MV-1)
Chin, B. M. (M)
Genett, W. F. (A)
Goldberg, D. (A)
Grant, J., Jr. (A)
Lessin, I. (M)
Porter, R. A. (M)
Simon, E. (M)
Simons, S. C. (M)
White, C. E. (SM)

West Roxbury (BOS-1)
Bonica, J. S. (M)
Bonney, R. W. (A)
Claflin, B. B. (M)
Downing, J. T. (M)
Doyle, F. A. (M)
Doyle, R. J. (M)
Durass, C. J. (M)
Fairbanks, C. G. (A)
Fay, S. (M)
Haddad, S. G. (M)
McCarthy, J. G. (M)
Parsons, A. (M)
Sacon, L. D. (M)
Sevlan, E. A. (M)
Sullivan, P. A. (M)
Thomas, J. E. (M)
Van Schelt, R. A. (M)

West Somerville (BOS-1)
Amann, L. H. (A)
Anderson, P. B. (A)
Cross, A. H. (M)

West Springfield (WM-1)
Burnett, K. H. (M)
Donovan, J. J. (M)
Sheehan, J. J. (A)
Smith, R. D. (M)

West Townsend (BOS-1)
Manseau, H. L. (M)

Westwood (BOS-1)
Abrahamsen, F. H. (M)
Arildsen, M. J. (M)
Arlin, M. N. (SM)
Burke, J. J. (M)
Gere, A. J. (SM)
Gravel, J-P. J. (M)
Hildebrant, B. M. (A)
Keegan, R. F. (M)
Peterson, K. W. (M)
Smith, L. W. (M)
Spears, M. F. (SM)
Talanian, W. B. (A)
Thomas, A. S. (A)
Trocchi, R. F. (M)
Ward, A. A. (M)
Wasley, R. L. (A)
Wilson, R. T. (M)
Wiren, J. (M)

Weymouth (BOS-1)
Chick, R. L. (M)
Enemark, R. B. (M)
Hughes, J. W. (A)
Kearns, J. E. (M)
Lang, C. (M)
Mori, H. (SM)
Spencer, F. J. (M)

Whitman (BOS-1)
Gallimore, J. W. (M)
Simmons, E. C. (M)

Wilbraham (WM-1)
Dewey, C. S. (M)
Webber, F. G. (SM)

Williamstown (WM-1)
Brandt, O. G. (M)
Curry, J. R. (M)
Edwards, J. N. (A)
Fischer, W. (M)
Johansson, E. W. (M)
Luti, R. E. (M)
Lussier, R. J. (M)
Ness, O. A. (M)
Peck, D. B. (M)
Postle, A. H. (M)
Powell, R. F. (M)
Rice, H. L. (M)
Rotast, N. L. (M)
Rowland, W. H. (A)
Scarborough, F. S. (A)
Schimmel, J., III (M)
Schlesinger, C. T. (M)
Stabler, H. P. (SM)
Warriner, R. R. (SM)
White, J. A. (M)

Wilmington (B-MV-1)
Bergerson, J. A. (A)
Di Rocco, J. V. (M)
Ellsworth, E. A., Jr. (A)
Hartwell, H. G. (M)
Hooper, W. G., Jr. (M)
Hovnanian, H. P. (SM)
Kyros, W. (A)
Lynnworth, L. C. (M)
McCard, H. K. (M)
Merenda, F. S. (M)
Montgomery, J. L. (SM)
Page, H. M. (A)
Rich, G. H. (M)
Rose, E. P. (A)
Schroeder, R. L. (A)
Schweiger, R. N. (SM)
Strickholm, G. E. (M)
Waters, M. L. (M)

Winchester (BOS-1)
Adams, H. W. (A)
Babaklan, J. (M)
Bacon, F. S., Jr. (M)
Barrett, T. B. (M)
Bassett, O. E. (SM)
Beranek, L. L. (F)
Blakely, J. R. (SM)
Blanchard, J. T. (M)
Brown, C. B. (M)
Corderman, C. L. (SM)
Cosentino, A. V. (M)
Cronburg, W. E. (M)
Dayton, D. L. (M)
De Young, J. A. (SM)
Dieterich, E. J. (M)
Djorup, R. S. (M)
Durage, A. H. (M)
Fritch, D. J. (SM)
Glendon, R. E. (M)
Grenzeback, R. J. (M)
Hanson, P. R. (M)
Heyck, H. D. (M)
Hillger, R. E. (SM)
Hingston, A. J. (M)
Holdam, J. V., Jr. (SM)
Hottel, H. C., Jr (M)
Hovannesian, A. S. (M)
Ivers, J. H. (SM)
Jackson, W. E. (M)
Jenkins, R. S., Jr. (M)
Kelbley, L. W. (M)
Kent, R. L. (M)
Lamontagne, R. S. (SM)
Leach, H. H. (M)
Mackenzie, M. V. (M)
Mainberger, W. A. (SM)
Marino, D. J. (M)
McCusker, J. H. (A)
McFarlane, D. J. (SM)
McVicar, K. E. (M)
Memishian, J. (M)
Metzgar, K. J. (M)
Overett, T. H. R. (M)
Parks, F. B. (SM)
Phaneuf, C. A. (M)
Purrington, R. L. (M)
Redpath, D. C. (M)
Robinson, T. B. (M)
Rubin, L. G. (SM)
Schlener, J. E. (A)
Schroeder, R. K. (M)
Segerstrom, C. A., Jr. (SM)
Shannon, C. E. (F)
Stevens, C. A. (SM)
Tunnicliffe, W. W. (M)
Unger, D. M. (M)
Wilcox, J. F. (M)
Wundt, R. M. (SM)

Winthrop (BOS-1)
Diaz, L. V. (A)
McDonald, F. J. (A)
Musi, A. J. (A)
Nardone, L. J. (M)
Newton, D. J. (M)
Pappas, G. (M)

Woburn (BOS-1)
Bayliss, R. E. (M)
Berger, H. A. (M)
Bettencourt, J. P. (M)
Bower, F. H. (SM)
Briana, A. M. (M)
Brown, H. E. (A)
Cardillo, A. (M)
Chrusciel, M. R. (M)
Engel, A. (M)
Gallagher, E. F. (M)
Jeffrey, R. F. (M)
Jellison, F. A. (M)
Johnson, E. G. (M)
Jones, G. M., Jr. (M)
Kaz, L. (SM)
Kolp, J. S. (M)
Kritter, E. L. (M)
Leland, H. L. (M)
Mac Donald, K. J. (A)
McMakin, W. B. (M)
Mead, D. C. (SM)
Mello, G. M. (M)
Merrill, R. B. (M)
Mollica, A. J. (M)
O'Connor, L. J. (M)
Pietenpol, W. J. (SM)
Ray, G. H., Jr. (M)
Rice, J. F. (M)
Sabo, J. D. (M)
Seifert, W. W. (SM)
Shaw, G. B. (SM)
Turgiss, W. W. (M)
Ulm, E. H. (M)
Walters, S. H. (SM)

Wollaston (BOS-1)
Armstrong, C. S. (M)
Di Loreto, A. A. (A)
Edmonston, A. S. (M)
Grass, R. W. (M)
Kliman, G. B. (M)
McNamara, T. J. (M)
Moore, C. (M)
Vancura, R. A. (M)

Woods Hole (BOS-1)
Fraser, J. G. (M)
Hervey, J. P. (M)

Worcester (BOS-1)
Anderson, R. M. (A)
Bronwell, A. B. (F)
Browning, E. A. (M)
Caloccia, E. M. (M)
Connolly, J. (M)
Diamond, M. (A)
Didio, R. E. (A)
Edinburg, M. E. (A)
Engelsted, J. (A)
Eteson, D. C. (M)
Forsberg, C. A. (M)
Gerthman, G. L. (A)
Grogan, W. R. (SM)
Hirvi, H. E. (M)
Hoopaian, L. (M)
Howe, D. W. Jr. (M)
Howes, D. E. (M)
Karazia, R. J. (M)
Kasper, J. P., Jr. (M)
Kirsch, I. H. (A)
Lloyd, A. L. (M)
Manoog, J. C. (M)
Milias, E. (M)
Morgan, T. H. (SM)
Newell, H. H. (SM)
Newman, H. C. (A)
Pareseau, P. H. (M)
Richardson, G. A. (SM)
Riordan, W. J. (A)
Stoupis, T. (M)
Wadsworth, W. B. (M)
Wolniewicz, R. S. (A)
Wright, M. W. (M)

MICHIGAN

Adrian (W-MIC-4)
Carr, F. L. (M)

Alger (DET-4)
Ernst, C. E. (A)

Algonac (DET-4)
Withrow, W. L. (M)

Allegan (W-MIC-4)
Borsi, P. N. (M)

Allen Park (DET-4)
Bailey, K. V. (SM)
Bledsoe, J. A. (A)
Tosh, W. M. (M)
Yost, J., Jr. (M)

Alma (W-MIC-4)
George, E. E. (M)
Rufener, R. E. (A)
Schwartz, H. (A)
Smith, R. P. (A)

Ann Arbor (DET-4)
Abshier, D. G. (M)
Ainslie, T. C., Jr. (M)
Arquette, L. K., Jr. (M)
Atwood, S. S. (SM)
Azary, Z. P. (M)
Barcus, R. (M)
Bartman, F. L. (M)
Barton, B. F. (M)
Bates, R. D. (A)
Becher, W. D. (M)
Benson, B. C. (M)
Beutler, F. J. (M)
Bigsall, K. E. (M)
Blythe, R. (M)
Boers, J. E. (M)
Boyd, J. A. (M)
Bozoian, M. (M)
Browder, J. E. (M)
Brown, H. A. (SM)
Brown, J. (SM)
Brown, R. K. (M)
Brown, W. M. (M)
Bublitz, A. T. (M)
Burns, J. A. (M)
Burr, H. (M)
Buxton, C. E. (M)
Buzzard, R. D. (M)
Carlsen, R. A. (A)
Cath, P. G. (M)
Chaney, L. W. (M)
Chu, C. (SM)
Chuang, K. (M)
Clayton, J. F. (SM)
Cohen, G. S. (M)
Collard, R. S. (M)
Collins, A. B. (M)
Connors, T. L. (M)
Cooley, P. (M)
Crane, R. B. (SM)
Croteau, C. J. (M)
Cutrona, L. J. (SM)
De Hart, W. R. (M)
De Voll, L. S. (SM)
Dominiak, K. E. (M)
Dow, W. G. (F)
Dowling, K. T. (M)
Dute, J. C. (M)
Dye, R. H. (M)
Early, C. D. (M)
Early, H. C. (SM)
Earshen, J. J. (M)
Eschelbach, R. E. (M)
Exley, L. (M)
Faram, H. D. (M)
Farris, H. W. (M)
Fensler, W. E. (M)
Ferris, C. C. (M)
Fife, D. W. (M)
Gandhi, O. P. (M)
Garner, H. L. (M)
Gaskill, R. A. (M)
Gilbert, E. G. (M)
Gilbert, E. O. (M)
Goode, H. H. (SM)
Graham, R. R. (M)
Grant, E. C. (A)
Greenwood, D. T. (M)
Grimes, D. M. (M)
Gunderman, R. J. (SM)
Haddock, F. T. (M)
Hall, G. O. (M)
Hamilton, R. E., Jr. (M)
Hanne, J. R. (M)
Harger, R. O. (M)
Harmon, S. Y. (M)
Harokopus, W. P. (M)
Harrison, M. A. (M)
Hawkins, W. G. (SM)
Heerema, C. E. (M)
Henry, E. E. (M)
Hiatt, R. E. (SM)
Hocking, C. S. (M)
Hok, G. (F)
Holland, L. N. (F)

Homic, S. G. (M)
Horvath, J. J. (M)
Horvath, W. J. (SM)
Howe, R. M. (M)
Johansen, E. L. (M)
Johnston, R. W. (M)
Kazda, L. F. (M)
Kent, C. E. (M)
Kerr, W. (SM)
Kimball, J. A. (M)
Kimel, H. W. (M)
Klingler, D. E. (SM)
Kovac, R. E. (M)
Kucera, D. G. (M)
Kuiper, J. W. (M)
Kundu, M. R. (SM)
Larson, R. W. (M)
Larson, R. W. (M)
Lasher, R. W. (M)
Lazarus, D. H. (M)
Lewis, D. C. (M)
Liang, D. Y. (M)
Lillie, R. E. A. (M)
Lindahl, C. E. (M)
Lindsay, W. J. (M)
Loughry, B. W., Jr. (M)
Lyon, J. A. M. (SM)
Mackey, J. R. (M)
Macree, A. B. (SM)
Majeske, D. D. (M)
Martin, E. A. (M)
Martin, R. E. (M)
Mason, D. R. (M)
Maurer, J. C. (M)
McMahon, E. L. (M)
McMillan, S. H. (A)
McNabb, J. W. (M)
McPherson, R. R. (M)
Miller, M. H. (M)
Miller, R. E. (M)
Mollard, W. N. (M)
Monroe, K. E. (M)
Moore, A. W., Jr. (M)
Morakis, J. C. (M)
Mouron, J. C. (SM)
Moy, L. L. (M)
Mullison, J. L. (A)
Naylor, A. W. (A)
Netherwood, D. B. (SM)
Nichols, A. D. (M)
Nunn, W. M., Jr. (SM)
O'Connell, R. J. (A)
Ohlsson, R. L. (M)
Olte, A. (M)
Ormsby, R. D. (M)
Orr, L. W. (M)
Oswald, R. A. (M)
Pantek, H. R. (M)
Paul, L. F. (M)
Perelz, B. (M)
Peterson, G. E. (SM)
Ploughman, T. L. (M)
Politis, D. T. (M)
Pollard, W. J. (M)
Pool, M. H. (A)
Porcello, L. J. (M)
Potter, W. H. (M)
Rauch, L. L. (F)
Raymond, J. A. (M)
Raymond, W. W. (M)
Reiher, H. F. (M)
Remley, F. M., Jr. (M)
Richards, D. B. (M)
Ristenbatt, M. P. (M)
Ristow, H. E. (SM)
Roberts, G. A. (M)
Robinson, G. H. (M)
Robinson, R. C. (M)
Rollin, R. A., Jr. (M)
Roth, P. F. (M)
Rothschild, D. R. (M)
Rowe, J. E. (M)
Rowe, R. J. (M)
Rupert, G. F. (M)
Rupke, E. (M)
Sattinger, I. J. (SM)
Schaefer, E. J. (M)
Schorsch, R. H. (A)
Schroer, R. B. (A)
Schulte, H. F., Jr. (M)
Schutz, G. C. (SM)
Schwarm, F. G. (SM)
Scott, N. R. (SM)
Sellers, E. E. (SM)
Senapata, D. L. (M)
Shank, K. E. (M)
Sharpe, C. B. (M)
Siegel, K. M. (SM)
Sklar, J. R. (M)
Smith, C. J. (A)
Smith, D. F. (M)
Smith, N. (F)
Snell, J. F. (M)
Sondeen, P. (M)
Spencer, N. W. (SM)
Stout, M. B. (SM)
Strand, J. (M)
Sutton, W. A. (M)
Talen, J. L. (M)
Taras, S. M. (M)
Theofil, D. V. (M)
Thomas, R. L. (M)
Tieman, C. R. (SM)
Tucker, C. K. (M)
Umpleby, K. F. (SM)
Vander Knol, L. R. (M)
Venia, R. J. (M)
Wadhwa, R. P. (M)
Wallace, V. L. (M)
Ward, J. W. (M)
Webber, R. C. (M)
Wolaver, L. E. (A)
Wren, A. W., Jr. (M)
Zaltzeff, E. M. (M)

Auburn (DET-4)
Engelhardt, Le R. J. (M)

Battle Creek (W-MIC-4)
Bisko, T. (A)
Brossok, W. C. (M)
Brown, H. M. (M)
Burton, E. T. (SM)
Caldwell, J. R. (M)
Crane, G. C. (A)
Dewey, C. E. Jr. (M)
Halljsman, L. C. (M)
Jude, R. L. (A)
Miller, D. L. (M)
Rose, C. E. (A)
Summerford, De A. C. (SM)
Vennix, J. C. (A)

Bay City (DET-4)
Malzahn, D. F. (A)
Matko, J. W. (M)
Woody, F. (A)

Belleville (DET-4)
Alward, J. L. (M)
Kranz, H. E. (SM)

Benton Harbor (SB-M-5)
Fiebich, E. C. (A)
Martz, A. F., Jr. (M)
Rankin, J. A. (SM)
Tippett, H. H. (A)

Berkley (DET-4)
Blumenberg, A. (M)
Elias, L. W. (A)
Faris, W. R. (M)
Nixon, J. D. (M)
Norris, W. J. (M)

Big Rapids (W-MIC-4)
Poznlak, J. H. (A)
Zimmerman, G. E. (A)

Birmingham (DET-4)
Amil, R. W. (A)
Baird, G. A. (M)
Benaglio, R. V. (M)
Burge, F. L. (M)
Chapa, J. (A)
Chapin, W. R. (SM)
Chapman, F. W. (SM)
Christensen, R. E. (M)
Dearth, G. E. (M)
Erhart, D. L. (M)
Fisher, M. R., Jr. (M)
Gudaitis, W. V. (M)
Hawley, G. H. (M)
Holmes, W. E. (M)
Hutchinson, R. W. (M)
Kreglow, G. L. (M)
Larime, L. H. (SM)
Leydorf, G. F. (SM)
Lovcik, D. J. (M)
McDonnell, W. F. (M)
McGregor, A. D. (M)
Michaels, C. L. (SM)
Middleton, R. G. (SM)
Mika, H. S. (SM)
Miller, R. C. (M)
Olson, D. R. (M)
Retko, E. (M)
Ragsdale, W. H. (M)
Roggenbuck, R. A. (SM)
Sanderson, A. G. (M)
Scherba, M. B. (SM)
Somerville, A. E. (M)
Weller, E. F., Jr. (SM)
Whiteside, A. E. (M)

Bloomfield Hills (DET-4)
Fahrinqer, W. H. (A)
McKenney, H. F. (SM)
Morgan, H. K. (F)

Buchanan (SB-M-5)
Beaverson, W. A. (M)
Burroughs, L. R. (A)
Hagey, L. P. (M)
Mosier, H. F. (M)
Tomcik, D. J. (M)

Byron Center (W-MIC-4)
Jager, A. J. (A)

Calumet (MIL-5)
Perry, J. W., Jr. (M)

Cannonsburg (W-MIC-4)
Hart, W. N. (A)

Cassopolis (SB-M-5)
Meagher, R. E. (M)

Charlotte (W-MIC-4)
Fox, M. L. (A)
Moehring, W. D. (M)
Rypstra, B., Jr. (M)

Clawson (DET-4)
Dougherty, R. H. (M)
Quin, W. J. (M)
Ray, W. S. (M)

Clinton (DET-4)
Spreers, D. F. (M)

Coldwater (FT-W-5)
Munn, E. H., Jr. (M)

Coloma (SB-M-5)
Williams, D. K. (M)

Dearborn (DET-4)
Anger, Le R. E. (M)
Bear, A. W. (A)
Becker, F. C. (M)
Boltz, H. A. (SM)
Boyer, W. D. (M)
Calladine, G. T. (M)
Chall, L. E., Jr. (M)
Chiarenza, J. B. (M)
Davis, F. R. (M)
De Camillis, M. (M)
Doyle, W. J. (M)
Emery, R. R. (M)
Ference, M., Jr. (SM)
Giacoletto, L. J. (F)
Harrigan, P. M. (M)
Hicks, E. P. (M)
Higgins, N. S. (A)
Hogle, R. C. (M)
Horniak, R. L. (M)
Huber, P. (M)
Ioannou, J. T. (M)
Lien, C. E. (M)
Loridas, N. G. (M)
McLaren, I. H. (M)
Newell, C. J. (M)
Olson, R. G. (M)
Popklewicz, F. (A)
Pressede, D. J. (M)
Provine, D. J. (M)
Rogaczewski, J. S. (M)
Saigeon, N. D. (M)
Sather, R. O. (SM)
Sims, R. C. (M)
Stoner, M. J. (A)
Stretanski, P. A. (A)
Van Kirk, D. J. (A)
Ward, D. B. (A)
Williams, C. E. (M)

Detroit (DET-4)
Ahern, C. J. (M)
Altmich, N. (M)
Almas, S. L. (M)
Amber, P. S. (M)
Andrews, G. B. (M)
Asuncion, J. F. (M)
Atems, E. (M)
Ax, A. F. (M)
Bandoian, P. (A)
Barich, T. J. (M)
Blett, E. B. (M)
Bolling, G. D. (M)
Brabant, C. E. (A)
Brainard, R. R. (A)
Brede, E. F. (M)
Brosch, H. T. (A)
Brown, F. L. (M)
Browne, J. F. X., Jr. (A)
Bryant, J. H. (SM)
Buchanan, A. B. (SM)
Burkitt, G. C. (M)
Butchart, R. D. (A)
Butcher, J. H. (M)
Cannon, R. C. (M)
Carr, A. E. (M)
Caschera, J. (M)
Chow, H. (M)
Chute, G. M. (SM)
Cindric, G. T. (SM)
Clark, E. H. (A)
Conroy, K. S. (M)
Cook, W. N. (A)
Coombs, S. H. (M)
Cotton, R. J. (SM)
Craig, H. L. (M)
Crane, R. R. (M)
Currie, J. H. (M)
Da Roza, F. G. (M)
Datwyler, W. F. (A)
Denstaedt, E. C. (SM)
De Tar, J. B. (M)
Dickerhoof, R. M. (M)
Diem, C. W. (M)
Dixon, J. K. (A)
Donelson, L. E. (M)
Donovan, R. (M)
Drane, H. (M)
Dubois, R. C. (M)
Duda, E. M. (A)
Edlefsen, N. E. (F)
Egger, R. J. (M)
Estes, H. H. (M)
Ferguson, D. R. (A)
Fontaine, A. P. (SM)
Forgacs, R. L. (M)
Forsythe, E. H. (M)
Foulke, J. A. (M)
Franklin, R. M. (M)
Fream, R. V. (A)
Friedenthal, A. (M)
Garelis, C. (A)
Gasvoda, D. F. (M)
Goldstone, G. H. (A)
Goodman, G. (M)
Griffith, W. A. (A)
Gundersen, R. E. (A)
Habolan, P. (A)
Halstad, L. R. (F)
Hale, H. W. (SM)
Hartz, F. M. (M)
Hein, D. W. (M)
Henegar, H. B. (M)
Hess, H. M. (SM)
Hill, F. E. (A)
Hollak, A. F. (A)
Houston, C. D., Jr. (M)
Howard, L. R. (M)
Johnson, J. E. (M)
Johnson, J. S. (SM)
Johnson, K. E. (A)
Johnson, S. M. (A)
Kamm, V. C. (M)
King, L. E. (M)
Kley, R. R. (M)
Kocher, C. F. (SM)
Kock, W. E. (F)
Kossuth, A. K. (M)
Kotoucek, W. R. (M)
Kowalik, F., Jr. (A)
Krulikoski, S. J., Jr. (M)
Kryzaniwsky, M. (M)
Kubala, A. M. (M)
Kudela, A. F. (M)
Kuzyk, E. (A)
Lawrence, S. C. (M)
Lax, B. (A)
Le Fevre, H. P. (M)
Leggatt, G. E., Jr. (A)
Lesinsky, F. (M)
Licht, G. L. (A)
Lippmann, S. A. (M)
Lipski, D. B. (M)
Longerich, E. P. (M)
Lovalenti, S. (M)
Love, E. J. (SM)
Lufkin, P. M. (M)
Luzer, H. J. (M)
Macenka, N. (M)
Madgett, W. H. (A)
Marshall, A. R. (M)
Mathamel, F. A. (M)
Matherly, C. W. (M)
McCartin, L. M. (A)
McDonald, L. R. (M)
McFatridge, J. E. (M)
McGlinn, E. J. (M)
McKelvie, J. L. (M)
Melchior, A. D. (A)
Milek, H. (M)
Miller, K. L. (A)
Millett, L. F. (M)
Mills, A. J. (M)
Miwa, G. Y. (A)
Monroe, R. E. (M)
Moose, W. A. (A)
Morgan, J. J. (M)
Nagy, J. R. (M)
Nartonis, W. C. (A)
Nugent, J. A. (A)
Nutter, H. G. (A)
Nutter, M. J. (M)
O'Brien, D. J. (M)
Ogletree, W. A. (M)
O'Neal, R. D. (SM)
Osborne, R. L. (M)
Parker, D. G. (M)
Patton, H. W. (SM)
Pecar, A. J. (A)
Peifer, A. G. (M)
Penhollow, H. A. (M)
Perona, P. J. (A)
Pollard, B. W. (SM)
Popow, G. L. (M)
Poppe, P. A. (M)
Rathsburg, J. M. (M)
Rees, D. W. (M)
Reiss, N. D. (M)
Renkiewicz, R. (M)
Rissi, T. L. (A)
Robb, D. E. (SM)
Rockafellow, S. C. (M)
Ross, H. G. (A)
Ross, P. A. (M)
Rosselot, G. A. (M)
Rothfuss, J. C. (A)
Roush, F. H. (M)
Rowe, F. W. (M)
Rubin, B. Z. (M)
Runkle, E. G., Jr. (M)
Ryan, G. E. (M)
Rykala, T. P. (A)
Rymarz, L. E. (M)
Scanlan, R. J. (M)
Schlachter, H. J. (A)
Schmeisser, K. R. (SM)
Scott, D. P. (M)
Selcik, M. J. (M)
Shockley, L. A. (A)
Silverman, B. S. (A)
Simanyi, A. I. (M)
Smale, P. V. (M)
Snoblen, J. J. (A)
Sobolak, S. J. (M)
Stein, M. O. (M)
Sterling, S. (M)
Stewart, J. A. (SM)
Stewart, J. N. (M)
Stiebel, A. (M)
Stocker, D. V. (M)
Sullivan, D. (M)
Sutherland, C. L. (A)
Tarpinian, H. D. (A)
Tevlin, R. J. (M)
Travis, I. (F)
Tresselt, C. P. (M)
Turnquist, D. W. (M)
Van Den Ende, H. (M)
Wagner, D. L. (M)
Wait, W. H. (M)
Walker, J. R. (A)
Walker, S. H. (M)
Walther, K. (M)
Walton, E. D. (M)
Warske, U. J. C. (M)
Webb, A. E. (A)
Webber, H. C. (A)
Webster, G. J. (M)
Welsand, J. B. (A)
Williams, R. M. (A)
Williams, W. B. (SM)
Willis, E. M., II (M)
Winters, C. S. (A)
Wojclak, J. A. (M)
Wolber, W. G. (M)
Wong, A. (M)
Yakas, J. (M)
Yaskoff, R. (M)
Zawada, D. F. (M)
Zebrowski, M. S. (A)
Zelenka, J. S. (M)
Zettel, D. A. (M)
Zichichi, A. W. (M)

Drayton Plains (DET-4)
Beltairs, G. H. (M)
Clark, R. K. (M)
Lima, E. J. T. (M)

East Detroit (DET-4)
Boyda, M. C. (A)
Kordos, R. W. (M)
Stricker, I. J. (M)
Wodtke, W. H. (A)

East Lansing (DET-4)
Baccus, I. B. (SM)
Dalson, G. T. (A)
Ebert, I. O. (SM)
Eldson, J. C. (M)
Evans, R. J. (M)
Harger, R. A. (M)
Hiedemann, E. A. (SM)
Keeney, M. G. (M)
Kesavan, H. K. (M)
Koenig, H. E. (SM)
Notestine, P. D. (M)
Reed, M. B. (SM)
Reid, R. J. (M)
Ryder, J. D. (F)
Smith, A. E. (M)
Tokad, Y. (A)
Von Tersch, L. W. (SM)
Weeg, G. P. (M)
Wells, C. P. (M)
Wilcox, L. C. (M)
Wolta, M. L. (M)

East Tawas (DET-4)
Pfannkuche, T. E. (M)

Edmore (W-MIC-4)
Chater, M. L. (A)
Marquis, A. (M)

Erie (DET-4)
Bushroe, G. A. (A)

Farmington (DET-4)
Brumm, G. A. (M)
Dubois, D. A. (M)
Hartford, T. W. (M)
Hoge, R. R. (M)
Karwas, F. C. (M)
Niehaus, D. J. (M)
Schafer, R. H. (M)
Thomsen, T. R. (A)
Ward, W. L. (M)

Ferndale (DET-4)
Amman, E. A. (A)
Beck, E. R. (A)
Gardner, D. C. (M)
Ludwig, C. J. (A)
Murphy, J. S. (M)
Payne, D. V. (M)
Searle, L. M. (M)
Seleno, A. A. (M)

Flint (DET-4)
Anderson, H. J. (M)
Bunch, J. I. (M)
Colosi, A. (A)
Common, C. A. (A)
Driver, J. P. (M)
Grimm, R. A. (M)
Halcin, V. T. (M)
Hoop, R. E. (M)
Johnson, H. G. (M)
Jones, M. N. (M)
Linn, D. L. (A)
McBride, W. J. (M)
Parker, W. J. (M)
Petrick, T. J. (A)

Flushing (DET-4)
Clark, P. R. (A)
Garstecke, D. (M)
Loshbough, P. A. (A)

Franklin (DET-4)
Doty, A. C., Jr. (A)

Fraser (DET-4)
Costello, R. E. (M)
Hoehn, A. M. (M)

Galesburg (W-MIC-4)
Smith, R. W. (A)

Garden City (DET-4)
Brown, G. R. (M)
Donald, D. K. (M)
Kuzara, S. W. (M)

Grand Rapids (W-MIC-4)
Baatz, A. C. (M)
Barfuss, J. D. (M)
Berg, R. C. (A)
Brown, C. S. (M)
Cook, D. W. (M)
Croft, W. S. (M)
Davis, R. L. (M)
Detweiler, D. C. (A)
Fischer, E. W. (A)
Gaydos, G. J. (M)
Glardina, J. F. (M)
Gorton, E. D. (M)



Graham, J. M. (M)
Hekker, T. L. (A)
Huff, J. F., Jr. (M)
Kenoyer, H. W. (M)
Lundberg, R. L. (M)
Miller, J. J., Jr. (M)
Mort, V. A. (M)
Olson, V. E. (A)
Scott, H. R. (M)
Stevens, R. R. (SM)
Sullivan, W. J. (A)
Teachman, G. E. (M)
Van Oort, G. W. (A)
Veeneman, J. G. (M)
Volze, C. C. (M)
Waldner, R. G. (M)
Weiss, R. (M)
Wick, A. E. (A)
Wolters, D. G. (M)
Zwiep, T. C. (M)

Grass Lake (DET-4)
James, F. M. (M)

Grosse Pointe (DET-4)
Mac Kenzie, E. P. (A)
Veerkamp, L. J. (M)

Grosse Pointe Farms (DET-4)
Book, E. (A)
Kahle, F. L. (A)
Smale, V. E. (A)

Grosse Pointe Park (DET-4)
Griffith, A. T. (A)

Grosse Pointe Woods (DET-4)
Dacken, L. L. (M)
Delinese, A. H. (M)
Haigh, J. B. (A)
Hamman, P. E. (A)
Irwin, S. N. (M)
Sullivan, R. P. (M)

Gwinn (MIL-5)
Affronti, A. P. (M)

Hamtramck (DET-4)
Maslowski, R. S. (M)
Szewczyk, Z. I. (M)

Harbert (SB-M-5)
Thurston, E. G. (M)

Harper Woods (DET-4)
Ensley, C., Jr. (A)

Haslett (DET-4)
Hedges, H. G. (M)

Hastings (W-MIC-4)
Branch, R. (M)

Hazel Park (DET-4)
Schubring, N. W. (M)

Highland Park (DET-4)
Stinson, R. C. (M)

Hillsdale (DET-4)
Schilling, R. E. (M)
Zaiser, J. E. (A)

Holland (W-MIC-4)
McKenney, J. G. (A)
Tysse, H. L. (M)

Houghton (MIL-5)
Erickson, H. L. (M)
Jones, R. J. (SM)
Klein, H. R. (M)
Lind, M. S. (M)
McMillin, K. M. (M)
Oswald, J. A. (A)
Soper, J. A. (M)

Huntington Woods (DET-4)
Conrath, L. R. (SM)
Van Dusen, H. J. (M)
Wilton, V. A. (M)

Inkster (DET-4)
Cheal, J. (M)
Cleveland, A. J. (M)
Dolsen, J. A. (M)
Le Baron, G. M. (M)

Jackson (DET-4)
Arasim, J., Jr. (A)
Baker, F. J. (A)
Bush, C. H., Jr. (A)
Carlson, H. W. (M)
De La Cova, P. V. (SM)
Devereaux, R. N. (M)
Holda, N. E. (A)
Hungerford, R. S. (M)
King, R. C. (M)
Longman, E. R. (M)
Owen, D. R. (A)
Probert, D. C. (M)
Sikora, J. A. (A)
Stewart, J. A. (M)
Swartzel, K. D. (SM)
Troup, E. O. (M)
Westrate, M. C. (M)
Zieger, C. H. (M)

Kalamazoo (W-MIC-4)
Alway, C. D. (M)
Burke, R. H. (M)
Fetzer, J. E. (SM)
Kennemer, J. R. (A)
Lee, C. E. (A)
Marburger, W. G. (M)
Morse, F. L. (M)
Van Campe, F. M. (SM)
Woods, O. R. (M)

Kingsford (MIL-5)
Phillips, W. J. (M)

Kingston (DET-4)
Ruggles, C. B. (A)

Lakeland (DET-4)
Willett, R. M. (M)

Lansing (DET-4)
Bennett, C. T. (A)
Brooke, C. E. (A)
Finch, B. G. (M)
Hewitt, J. E. (A)
Kateley, J., Jr. (M)
Kruger, V. (A)
Magiera, L. E. (A)
Miller, K. W. (M)
Pennington, R. B. (M)
Simons, H. C. (A)
Taylor, L. C. (A)
Whitacre, J. W. (A)
Winters, L. C. (A)

Leslie (DET-4)
Standfield, S. J. (M)

Lincoln Park (DET-4)
Bradley, R. W. (M)
Scott, R. E. (M)
Tank, H. F. (M)

Livonia (DET-4)
Barsamian, A. S. (A)
Davies, D. C. (M)
Hall, R. J. (M)
Humphreys, D. M. (A)
Mangold, R. R. (A)
Michaels, P. A. (M)
Nay, H. T., Jr. (M)
Porter, C., Jr. (A)
Stout, C. D. (M)
Sullivan, J. E. (M)
Sweet, J. (A)
Taplin, L. B. (M)
Taylor, C. I. (M)
Thomas, T. R. (M)
Veit, N. J. (M)
Waltz, F. M. (M)
Weiss, M. (A)

Ludington (W-MIC-4)
Bond, J. M. (M)
Petters, J. F. (A)
Plank, R. A. (A)
Rasmussen, R. (A)
Shipman, L. E. (M)

Madison Heights (DET-4)
Clements, H. R. (A)
Dexter, R. G. (M)
Risko, F. D. (M)
Thomas, T. (A)

Marquette (MIL-5)
Jackson, W. G. (M)
Marr, G. P. (M)
McKee, J. W. (M)

Marshall (W-MIC-4)
Brownell, G. T. (SM)

Melvindale (DET-4)
Stinson, E. R. (M)
Ziniuk, M. A. (M)

Midland (DET-4)
Adler, S. E. (M)
Allen, J. B. (M)
Bauss, H. H. (A)
Currie, C. G. (M)
Earleywine, E. (M)
Kauppi, D. K. (M)

Milan (DET-4)
Todd, R. H. (M)

Milford (DET-4)
Nichols, G. B. (M)
Paciorek, L. J. (M)
Sink, W. C. (A)
Stark, M. K. (M)
Talaski, C. E. (M)

Mio (DET-4)
Craig, A. D. (A)

Moline (W-MIC-4)
McFarland, T. O. (A)

Monroe (DET-4)
Stearns, G. D. (A)

Mount Clemens (DET-4)
Baker, J. T. (A)
Brunals, E. G. (M)
Buckler, R. A. (A)
Child, R. W. (M)
Christman, C. J. (M)
Donovan, M. A., Jr. (M)
Hunter, J. S. (A)
Lewis, P. L. (A)
Mac Millan, R. C. (M)
Membery, A. H. (A)
Miller, C. E. (M)
Morrison, D. O. (SM)
Timm, F. W. (A)

Muskegon (W-MIC-4)
Castenholz, F. E (SM)
Czemiak, J. L. (A)
Hammer, R. V. (M)
Johnson, E. P., Jr. (A)
McElyea, W. W. (M)
Riekels, H. E. (A)
Saums, H. L. (A)
Schecter, C. W., Sr. (A)

Muskegon Heights (W-MIC-4)
Mau, J. C. (M)
Tsaggaris, J. N. (M)

North Muskegon (W-MIC-4)
De Vries, D. H. (M)

Negaunee (MIL-5)
Rutherford, J. W. (A)

New Boston (DET-4)
Niswonger, B., Jr. (A)

Niles (SB-M-5)
Baldwin, B. J. (M)
Cusick, D. H. (M)
Diehl, J. G. (M)
Hawes, A. W. (M)
Kaminsky, V. J. (A)
Kennedy, R. L. (A)
Miller, J. M., Jr. (SM)
Ramsey, R.C. (M)

Northville (DET-4)
Chadwick, R. T. (M)
Thomas, B. M. (A)
Young, A. E. (SM)

Oak Park (DET-4)
Antonlou, M. I. (M)
Breikss, I. P. (M)
Burr, J. A. (M)
Farrah, H. R. (M)
Lampcov, J. (M)
Le Barre, S. D. (M)
Nichols, A. C. (M)
Schmid, F. L. (M)
Sperber, W. (M)
Wagoner, C. E., Jr. (M)
Warnick, A. (M)
Zimmerman, W. A. (M)

Orchard Lake (DET-4)
De Long, R. B. (M)

Oscoda (DET-4)
Menold, G. A. (M)

Petoskey (W-MIC-4)
Homman, N. L. (M)
Vargo, R. J. (A)

Pleasant Ridge (DET-4)
Leland, R. D. (M)
Swan, W. O., Jr. (M)

Plymouth (DET-4)
Amick, R. H. (A)
Armstrong, R. H. (M)
Bartek, R. J. (M)
Baumgartner, W. H. (M)
Filkins, L. D. (M)
Griggs, J. O., Jr. (M)
Noffz, H. C. (M)
Smith, E. H. (M)

Pontiac (DET-4)
Baker, E. C., Jr. (M)
De Haan, R. F. (M)
Drumheller, D. L. (M)
Kattoua, I. E. (A)
McCall, W. A. (M)
Sanders, W. J. (A)
Smith, L. G., Jr. (A)

Presque Isle (DET-4)
Wesser, C., Jr. (A)

Ravenna (W-MIC-4)
Korson, A. W. (A)

River Rouge (DET-4)
Shepley, L. (A)

Rives Junction (DET-4)
Monroe, D. G. (M)

Rochester (DET-4)
Albert, A. H. (M)
Allured, R. B. (SM)
Collier, A. F. (M)
Hart, D. E. (M)
Jouppi, A. (M)
Kubiak, T. H. (A)
Ostrander, L. V., Jr. (M)
Oxford, C. J., Jr. (M)
Ranke, E. K. (M)
Shott, A. J. (M)
Upton, G. S. (M)

Rogers City (DET-4)
Nauts, D. F. (M)

Romeo (DET-4)
Krug, E. G. (M)
Smith, A. M. (M)

Roscommon (DET-4)
Klemetti, R. O. (A)

Roseville (DET-4)
Bartell, V. T. (M)
Cumeralto, Q. C. (M)
Kott, K. G. (M)
Meltvedt, H. (M)

Royal Oak (DET-4)
Allwine, H. S. (A)
Ansorge, H. W. (M)
Badger, A. H. (A)
Barber, L. E. (M)
Boyd, D. R. (A)
Brown, L. R. (A)
Buttery, R. N. (A)
Chapelle, W. E. (M)
Chiavarini, E. W. (M)
Edwards, C. M. (SM)
Fischer, D. A. (A)
Hanysz, E. A. (M)
Johnson, A. C. (M)
Johnson, E. C., Jr. (SM)
Kubota, J. (M)
Lukawski, E. L. (M)
Mackenzie, W. G. (A)
Neu, J. D. (A)
Patrick, J. L. (M)
Phillips, L. E. (M)
Reinhold, H. W. (M)
Robinson, D. F. (M)
Robinson, R. P. (A)
Saiullo, A. R. (M)
Schloff, R. F. (M)
Schooley, M. H. (A)
Sprague, W. L. (M)
Troll, W. C. (A)
Tuksal, M. A. (M)
Urbanik, E. J. (M)
Walker, J. C. (M)
Wilmot, W. R. (M)

South Lyon (DET-4)
Adams, A. T. (M)

Saginaw (DET-4)
Chesney, W. C. (M)
Loucks, J. W. (A)
McKittrick, T. R. (M)
Rankin, P. M. (M)
Rigda, G. (A)
Wagenseller, G. W. (A)

Saline (DET-4)
Brace, L. H. (A)
Lawrence, W. H. (M)

Sault Ste. Marie (MIL-5)
Edwards, J. T. (M)
Jeffries, C. E. (M)
McPherson, R. T. (M)
Wentzler, A. J., Jr. (A)

Skandia (MIL-5)
Niemi, R. R. (M)

Southfield (DET-4)
Fisk, R. H. (M)
Fryfogle, J. D. (A)
Johnson, M. C. (M)
Jones, T. H. (A)
Rothfusz, R. W. (M)
Runkel, W. E. (M)

St. Clair Shores (DET-4)
Adkins, H. T. (SM)
Barnes, H. R. (M)
Brauning, T. W. (M)
De Baker, J. L. (M)
Jones, H. E. (M)
Salomone, S. M. (M)
Stevens, J. E. (M)
Weagel, K. D. (A)

St. Joseph (SB-M-5)
Moore, D. G. (SM)
Myers, G. H. (M)
Phillips, G. D. (SM)
Ramer, J. S. (M)
Robertson, C. A. (M)
Wennerberg, A. L. (M)

Stevensville (SB-M-5)
Freathy, R. E. (A)
Gardner, E. E. (M)
Hammond, R. J. (M)

Taylor (DET-4)
Lisklewicz, W. T. (M)
Zacharopoulos, G. (A)

Three Oaks (SB-M-5)
Snyder, D. R. (A)

Three Rivers (FT-W-5)
File, R. D. (M)
Fife, G. E., Jr. (M)
Perkins, M. L. (M)

Traverse City (W-MIC-4)
Biederman, L. M. (M)
Hoogesteger, J. R. (M)

Trenton (DET-4)
Buehler, F. A. (M)
Mills, G. L. (A)
Thornton, C. H. (A)

Troy (DET-4)
Lindberg, E. E. (A)
Spain, R. F. (M)

Utica (DET-4)
Boucher, A. L. (M)
Calabro, A. D. (M)
McDermott, J. P. (M)
Payne, G. J. (M)
Rossman, J. E. (A)
Swartz, E. E. (SM)

Walled Lake (DET-4)
Belprez, G. R. (M)
Ganschow, D. C. (SM)
Hart, A. D. (M)
Weidman, J. S. (A)

Warren (DET-4)
Burtey, H. A. (M)
Craig, J. P. (M)
Golembiewski, A. J. (A)
Heinrich, B. F. (M)
Kohr, R. H. (M)
Loughridge, D. H. (SM)
Malafouris, T. (A)
Marshall, J. (M)
McKee, J. M. (M)
Petio, R. A. (M)
Poswiatowski, W. C. (A)
Schwartz, R. E. (M)
Tompos, S. F. (A)
Varner, D. S. (M)
Zukowski, J. A. (M)

Wayne (DET-4)
Haddad, M. T. (M)
Mann, D. W. (M)
Schmalzriedt, T. T. (A)
Tackett, R. W. (M)

Wellston (DET-4)
Thunder, L. C. (M)

Whitmore Lake (DET-4)
Podewils, N. R. (A)

Wyandotte (DET-4)
Blowers, R. C. (A)
Foulkrod, R., Jr. (M)
Moore, J. B. (M)

Ypsilanti (DET-4)
Amble, H. A., Jr. (M)
Augustus, L. M. (M)
Birdsall, T. G. (M)
Bilsken, W. A. (SM)
Breymaier, R. W. (M)
Douglas, W. J. (M)
Evans, H. L. (A)
Gilliam, J. G. (A)
Harding, W. G. (M)
Keyser, R. W. (M)
King, L. G. (A)
Koziara, E. H. (M)
Kroll, R. T. (A)
Lanning, H. E. (M)
Larrowe, B. T. (M)
Larue, J. J. (M)
Lauder, J. A. (M)
Lawson, A. C., Jr. (A)
Maes, R. E., Jr. (M)
Morita, Y. (M)
O'Neill, J. E. (M)
Paprocki, C. R. (M)
Pierpont, R. W. W. (M)
Place, R. F. (A)
Rudolph, I. W. (A)
Sherman, H. W. (M)
Smith, W. (M)
Stewart, M. J. (A)
Van Valkenburg, E. S. (SM)
Weinert, B. R. (M)
Wheatley, W. A. (M)
Wilcox, G. A. (A)
Williams, R. O. (SM)
Wooley, G. J. (M)
Yeh, C. (SM)

MINNESOTA

Annandale (TC-5)
Lantto, E. S. (M)

Anoka (TC-5)
Collier, G. X. W. (M)
Hornsby, J., Jr. (M)
Kimberly, H. D. (M)
Longfellow, R. C. (SM)

Bloomington (TC-5)
Martin, A. L., Jr. (M)
Meyer, B. L. (M)

Buffalo (TC-5)
Schulz, R. H. (M)

Circle Pines (TC-5)
Lind, A. L. (M)

Columbia Heights (TC-5)
Baker, C., Jr. (A)

Coon Rapids (TC-5)
Graves, G. L. (M)
Kittridge, C. E. (M)
Smersh, C. K., Jr. (A)
Watson, F. J. (M)

Duluth (TC-5)
Baker, F. E. (A)
Dettman, R. A. (A)
Gerqen, J. L. (M)
Moore, H. I. (M)
Stromberg, R. L. (A)

Edina (TC-5)
Carlson, K. J. (M)

Excelsior (TC-5)
Johnson, L. E. (M)
Pappas, P. E. (SM)

Fairbault (TC-5)
Folson, D. E. (M)
Schriddke, H. D. (A)

Fergus Falls (TC-5)
Nesting, J. W. (M)

Forest Lake (TC-5)
Botenbaugh, J. E. (M)

Glen Lake (TC-5)
Biltz, F. J. (M)

Grand Rapids (TC-5)
Erickson, E. A. (M)

Halstad (TC-5)
Anderson, J. D. (M)

Hastings (TC-5)
Karpen, R. L. (M)

Hendrum (TC-5)
Brattland, H. A. (M)

Hopkins (TC-5)
Aske, V. H. (M)
Beasinger, V. W. (M)
Blakemore, J. S. (SM)
Bostrom, D. E. (A)
Boyle, R. J. (M)
Carpenter, R. K. (M)
Chandler, R. D. (M)
Haworth, P. G. (M)
Johnson, R. G. (M)
Larsen, F. J. (SM)
Lee, C. B. (M)
Maloney, P. G. (M)
Motchenbacher, C. D. (M)
Nichols, R. F. (M)
Norman, J. C. (M)
Nussbaum, A. (A)
Palmer, D. R. (M)
Stuetzer, O. M. (SM)
Trent, J. E. (M)

Isle (TC-5)
Scherf, A. L. (M)

Lake Elmo (TC-5)
Kirvida, L. (M)

Lake Wilson (TC-5)
Sraders, G. (M)

Mankato (TC-5)
Lease, L. R. (M)

Marshall (TC-5)
Ahmann, R. M. (M)

Minneapolis (TC-5)
Adams, G. E. (SM)
Affeldt, W. A. (A)
Alderson, R. C. (M)
Alterman, F. J. (M)
Andersen, G. A. (M)
Anderson, D. E. (M)
Anderson, D. E. (M)
Anderson, E. M. (A)
Anderson, G. P. (M)
Anderson, L. I. (M)
Anderson, L. T. (M)
Anderson, P. M. (M)
Anderson, R. E. (M)
Andrs, W. L. (M)
Arnold, D. E. (M)
Baeten, W. A. (A)
Baker, H. E. (M)
Bakken, E. E. (M)
Baldwin, J. M. (SM)
Ballew, H. (SM)
Barrett, R. D. (M)
Barron, C. L. (M)
Baumgartner, V. E. (A)
Benz, D. E. (M)
Bergan, K. N. (SM)
Blixt, R. P. (M)
Boatman, L. R. (M)
Boll, H. J. (M)
Bolmgren, L. N. (M)
Bonde, R. L. (M)
Bonestroo, K. G. (M)
Bonnud, L. O. (M)
Bookin, M. L. (M)
Borth, J. W. (M)
Branstad, D. H. (M)
Brekhus, E. H. (A)
Bukosky, J. R. (A)
Burrell, W. P. (M)
Buss, J. L. (M)
Callen, M. W. (M)
Cartwright, P. A. (M)
Casale, C. T., II (M)
Casey, T. J. (M)
Champlin, K. S. (M)
Chen, D. (M)
Churchill, R. W. (M)
Clark, N., Jr. (M)
Clifford, D. E. (M)
Coffin, W. R. (M)
Cohen, A. (SM)
Corbett, J. A. (M)
Cray, S. R. (M)
Croze, M. W. (M)
Davis, W. W. (M)
Debbins, D. J. (M)
Diger, J. F. (A)
Disser, C. J. (M)
Donahue, C. D. (A)
Dorosh, M. (A)
Dubbe, R. F. (M)
Dundovic, J. F. (M)
Ebert, R. F. (M)
Eelma, A. (M)
Eglite, J. A. (M)
Eifer, A. H. (M)
Engelman, C. W. (M)
Englund, R. M. (M)
Erickson, G. J. (M)
Ernst, M. L. (M)
Evans, R. H. (A)
Ewart, J. M. (M)
Ewing, R. D. (SM)
Featherstone, R. P. (M)
Field, B. W. (A)
Fink, J. S. (M)
Flaskerud, K. A. (A)
Flom, K. L. (M)
Flumerfelt, R. L. (A)
Fong, I. J. (M)
Fosseen, I. J. (M)
Foster, J. H. (SM)
Frase, J. H. (M)
Frazier, H. N. (M)
Fullerton, P. L. (M)
Gannett, A. C. (A)
Gaughran, G. W. (M)
Gise, F. G., Jr. (A)
Grabowski, J. H. (M)
Grady, T. J. (M)
Granberg, M. L. (M)
Grashorn, G. N. (M)
Green, S. S. (M)
Grider, D. H. (M)
Griffin, R. E. (M)
Griffith, F. S. (M)
Grindheim, E. A. (M)
Grosz, W. S. (M)
Gustafson, H. A. (M)
Gutman, D. C. (M)
Halland, L. J. (A)
Hamel, G. E. (A)
Hansen, G. F. (A)
Harding, F. W. (M)
Harrington, D. C. (M)
Hartig, H. E. (F)
Harvey, P. O. (M)
Hass, E. G. (A)
Haxby, B. V. (M)
Headen, H. V. (M)
Heer, W. G. (M)
Herrlin, J. M. (M)
Hill, B. M. (A)
Hill, E. L. (SM)
Hinz, D. I. (SM)
Hird, F. S. (SM)
Hogan, J. W. (SM)
Hoyle, W. I. (M)
Holte, J. E. (M)
Hutton, W. I. (SM)
Ingvaldsen, R. E. (A)
Jacobsen, E. L. (M)
Johnson, G. H. (M)
Johnson, J. N. (M)
Johnson, K. R. (M)
Johnson, R. E. (M)
Johnson, W. R. (M)
Josephs, H. C. (M)
Kalb, R. M. (SM)
Kanda, A. F. (M)
Kelar, J. (SM)
Kellough, S. H. (M)
Kennedy, E. J. (M)
Kershaw, J. A. (M)
Kerske, J. F. (M)
Kiene, R. C. (M)
Kinnen, E. (SM)
Kinsman, R. B. (M)
Kline, F. W., Jr. (SM)
Kosters, A. J. (M)
Krantz, K. B. (A)
Krieg, A. R. (A)
Kubicek, W. G. (M)
Kubieck, W. G. (M)
Kuhlmey, E. S. (M)
Kuklock, E. N. (M)
Laeyreid, N. (A)
Lambert, R. F. (M)
Langlie, L. O. (M)
Larson, P. S. (M)
Lasarsky, S. G. (M)
Lehnert, W. E. (M)
Leland, T. P. (M)
Lindemann, W. W. (M)
Lisowski, J. R. (M)
Lockwood, R. L. (M)
Lode, T. (M)
Lundahl, W. N. (M)
Lundquist, P. P. (M)
Lundstrom, D. E. (M)
Lundy, P. E. (M)
Lutz, B. C. (M)
Malcolm, D. H. (M)
Markusen, D. L. (M)
Marshall, J. F. (M)
Martin, R. T. (M)
Matthys, R. J. (A)
McCabe, F. C. (M)
McElroy, W. J. (M)
McGinnis, W. J. (M)
Medved, F. (M)
Meline, P. J. (M)
Mellon, G. E. (A)
Miller, F. V. (M)
Millunzi, P. T. (M)
Moe, W. B. (M)
Moore, A. R. (M)
Morrish, A. H. (SM)
Muckenhirn, O. W. (SM)
Nelson, E. J. (M)
Nelson, R. H. (M)
Nelson, W. G. (M)
Newman, M. M. (M)
Newman, T. F. (M)
Nordloef, A. E. (M)
Nordstrom, J. E. (A)
Nunn, E. C. (M)
O'Brien, H. G. (A)
Olson, K. A. (M)
Onsager, H. F. (M)
Orenstein, E. D. (M)
Ostberg, E. H. (M)
Park, G. L. (M)
Park, J. H., Jr. (M)
Paurus, N. W. (M)
Pence, C. J. (M)
Perchshyn, E. S. (M)
Pernula, M. J. (A)
Persons, C. B. (SM)
Persson, E. K. (M)
Phillips, L. E. (SM)
Pidcock, R. E. (M)
Pierce, W. R. (A)
Poole, J. A. (M)
Premack, J. (M)
Pribble, J. D. (M)
Priebe, N. F. (M)
Prince, J. P. (M)
Prom, G. J. (M)
Quinn, R. D. (M)
Raasch, F. D. (SM)
Rebne, H. K. (M)
Recksiedler, A. L. (M)
Reed, M. W. (M)
Reiner, O. C. (M)
Reinke, J. A. (M)
Reinke, R. F. (M)
Renk, B. J. (M)
Reuyl, J. S. (M)
Rickett, R. J. (M)
Riggle, C. M. (M)
Rizzi, S. R. (A)
Rodgers, D. L. (M)
Rohner, T. G. (A)
Runkle, L. D. (M)
Sackett, W. T., Jr. (M)
Sadler, B. L. (M)
Saprasa, A. G. (M)
Sater, J. C. (M)
Schaumberg, W. H. (M)
Schindler, R. P. (M)
Schmidt, E. H. (M)
Schmidt, W. M. (M)
Schmitt, O. H. (F)
Schott, O. A. (M)
Schuck, O. H. (F)
Schulz, D. G. (M)
Schulz, S. W. (M)
Seils, H. A. (M)
Seim, H. N. (M)
Sell, R. L. (SM)
Senstad, P. D. (M)
Shabaura, D. P. (M)
Shepherd, W. G. (F)
Sheppard, H. F., Jr. (M)
Sherman, J. M. (SM)
Shnquist, M. C. (M)
Simacek, H. A., Jr. (M)
Smith, A. J., Jr. (M)
Solomon, R. M. (M)
Spar, J. E. (M)
Spencer, W. H. (M)
Sprecher, N. D. (M)
Steele, T. S. (M)
Stone, N. T. (M)
Storm, J. F. (M)
Strand, H. D. (M)
Swanlund, G. D. (M)
Swanson, L. F. (M)
Talarczyk, A. R. (A)
Thomas, N. L. (M)
Thompson, V. L. (A)
T'Kach, H. V. (M)
Tobin, R. D., Jr. (M)
Toth, D. H. (M)
Trimmer, J. P. (M)
Tsui, Y. T. (A)
Tuma, J. C. (M)
Valo, H. L. (A)
Van Der Ziel, A. (F)
Volk, H. M. (M)
Walker, M. C. (M)
Warhol, N. (M)
Weber, R. G. (A)
Wehner, G. K. (M)
Weiner, P. J. (M)
Werner, W. (M)
Weyrauch, H. E. (M)
Wicks, A. A. (M)
Wier, E. L., Jr. (M)
Williams, G. I. (M)
Wilson, J. S. (M)
Wilson, W. R. (M)
Windsor, R. N. (A)
Wolf, P. I. (A)
Zimmer, E. D. (M)
Zimmerman, A. J. (M)
Zimmerman, S. L. (A)
Zirkle, R. E., Jr. (M)
Zmeskal, A. (SM)

Moorhead (TC-5)
Berg, N. E. (A)

Mound (TC-5)
Crary, M. M. (A)

New Brighton (TC-5)
Bulleyment, K. J. (M)
Chenette, E. R. (M)
Halverson, R. P. (M)
Olsen, M. R. (M)
Palo, A. M. (M)
Petersen, J. F. (M)

New Germany (TC-5)
Dahlke, C. J. (A)

New Ulm (TC-5)
Lindemann, P. T. (A)
Northfield (TC-5)
Jensen, M. C. (M)
Rossing, T. D. (SM)

North St. Paul (TC-5)
Coles, D. R. (M)
Erpelding, K. T. (M)
Hill, J. L. (M)

Osseo (TC-5)
Fay, T. E. (M)
Schiebe, F. R. (M)

Princeton (TC-5)
Sanford, D. C. (M)

Red Wing (TC-5)
Jelatis, D. G. (M)
Lee, G. M. (M)

Richfield (TC-5)
Barbour, R. E. (M)
Doherty, R. P. (M)
Gordon, R. E. (M)
Vint, J. L. (A)

Savage (TC-5)
Brunker, L. A. (M)
Carlson, R. A. (SM)
Pearsall, P. J. (M)

St. Cloud (TC-5)
Larson, H. B. (A)

St. Louis Park (TC-5)
Miller, C. B. (A)

St. Paul (TC-5)
Alman, J. (M)
Alton, J. M. (M)
Anderson, S. E. (M)
Arndt, R. B. (M)
Baldy, G. A. (M)
Bargen, D. W. (M)
Barnes, J. C. (SM)
Bartlett, V. W. (M)
Baunann, G. M. (M)
Beck, V. W. (M)
Beckler, H. E. (M)
Beltz, C. A. (M)
Benassi, D. A. (M)
Block, E. J. (M)
Bratschi, R. W. (M)
Bronkala, H. J. (A)
Brown, J. L. (M)
Buchanan, K. J. (M)
Campbell, H. S. (M)
Chambers, R. M., Jr. (M)
Chapek, H. T. (M)
Chapin, G. G. (M)
Christgau, M. A. (M)
Christman, R. D. (M)
Christofferson, A., Jr. (M)
Coil, N. B. (SM)
Compton, C. G. (M)
Coon, R. R. (M)
Cooper, C. E. (M)
De Blauw, M. J. (M)
Deeb, E. P. (M)
De Vir, J. F. (A)
Dubbel, W. J. (M)
Edan, D. M. (M)
Eddy, C. W. (M)
Edhlund, A. J. (A)
Engel, E. (M)
Erickson, V. M. (M)
Eulberg, R. J. (SM)
Evans, R. J. (M)
Forenan, J. J. (M)
Frykman, R. W. (M)
Fullwiler, F. K. (M)
Gadler, S. J. (SM)
Geiger, W. D. (M)
Gille, W. H. (SM)
Gist, W. W. (M)
Glewwe, C. W. (M)
Gustafson, T. L. (M)
Hanson, G. N. (M)
Hardenbergh, G. A. (A)
Harkins, W. J. (A)
Harrington, D. A. (M)
Hendry, A. J. (M)
Herzfeld, V. E. (M)
Higgins, J. T. (A)
Hildyard, V. G. (A)
Hill, B. F. (M)
Hinderaker, P. D. (M)
Holdaway, D. R. (M)
Horst, R. L. (M)
House, E. A. (M)
Jallen, G. A. (A)
Jensen, W. (M)
Jessice, A. L. (A)
Johnson, C. A. (M)
Kahnke, J. (M)
Kaszynski, A. Z. (M)
Keating, D. J. (M)
Keel, B. G. (M)
Kegel, R. A. (M)
Keller, H. L. (M)
Kelsey, J. R. (A)
Kidder, H. F. (M)
Kimlinger, J. A. (M)
Kissling, R. T. (A)
Kleason, D. B. (M)
Kliewer, D. L. (A)
Kmoch, N. J. (M)
Knoblauch, A., Jr. (M)
Knox, W. B. (M)
Kolbert, D. E. (M)
Kolling, J. A. (M)
Krauser, J. L. (M)
Kucera, F. M. (M)
Kukuk, H. S. (M)
Kuller, L. (M)
Lahue, P. M. (M)
Larson, J. A. (A)
Lawler, R. A. (A)
Leonard, P. F. (M)
Liepa, A. (M)
Linsley, S. E. (M)
Lubinski, L. D. (M)
Macaulay, M. (M)
Macomber, G. R. (M)
Malone, R. J. (M)
Marble, J. E. (M)
Marks, H. L. (A)
Mayo, P. M. (M)
Maze, R. O. (M)
McDonald, R. E. (M)
McLane, R. C. (M)
McNaughton, R. J. (M)
Melius, F. G. (M)
Miller, L. B. (A)
Moe, J. L. (M)
Moe, W. J. (M)
Moen, J. W. (M)
Moerke, R. W. (M)
Mulholland, K. H. (M)
Multaney, F. C. (SM)
Murray, D. A. (M)
Navolchick, C. (M)
Neese, J. L. (M)
Nellis, W. M. (M)
Neumann, W. J. (M)
Nicholas, J. C. (SM)
Nieters, A. B. (A)
Oen, J. A. (M)
Oman, R. M. (M)
Osofsky, H. (M)
Overas, R. E. (M)
Overdier, D. F. (M)
Pallas, C. (M)
Parseyzan, B. I. (M)
Pearson, R. P. (A)
Peterson, C. K. (M)
Peterson, L. E. (M)
Peterson, N. C. (M)
Pierce, A. J. (M)
Raabe, H. P. (SM)
Robinson, C. J. (M)
Roble, A. R. (M)
Rogers, J. (SM)
Rolfs, J. R. (M)
Rowan, T. D., Jr. (M)
Rowland, C. A., Jr. (M)
Sabine, L. E. (M)
Sanders, R. M. (M)
Sandstrom, D. L. (M)
Scholz, R. M. (M)
Shekels, H. D. (SM)
Skaar, I. G. (M)
Smythe, G. R. (M)
Soller, T. M. (M)
Sonnemeyer, H. F. (M)
Stahmann, J. R. (M)
Tu, J. C. (M)
Tufte, R. C. (M)
Turnquist, R. D. (M)
Von Behren, R. A. (M)
Wellnitz, A. G. (M)
Wells, W. S. (M)
Wesslund, R. E. (M)
Wiedman, R. E. (M)
Wiles, J. K. (M)
Wilson, D. L. (M)
Winoet, W. F. (M)
Wise, H. D. (M)
Wolfe, E. K., Jr. (M)
Wychor, W. (M)
Yeager, R. L. (M)
Yost, R. H. (SM)
Youngquist, R. J. (M)
Zuercher, D. H. (A)

St. Paul Park (TC-5)
Brackett, C. R. (M)
Gehring, R. D. (M)
Khanbata, A. J. (A)

Scandia (TC-5)
Nelson, H. E. (M)

Rochester (TC-5)
Anderson, J. A. (M)
Fedder, J. A. (M)
Brown, L. M. (M)
Cain, J. C. (A)
Casanova, W. J. (M)
Cross, R. W. (A)
Edgington, G. E. (M)
Floyd, R. A., Jr. (M)
Isaacson, J. (M)
Jacobsen, H. J. (M)
Jenkins, K. W. (M)
Jones, R. E. (SM)
McCarthy, C. E. (SM)
Runge, M. R. (M)
Sanders, J. J. (M)
Shaw, D. G. (M)
Stoltenberg, K. D. (A)
Zandall, R. R. (A)

Rosemount (TC-5)
Bowar, R. L. (M)
Chiswell, E. (M)
Geromine, R. L. (A)

Stillwater (TC-5)
Talle, C. A. (M)

Wadena (TC-5)
Denyer, D. B. (M)

Waseca (TC-5)
Hager, F. M., Jr. (SM)
Johnson, E. F. (M)
Kozan, F. J. (A)



Wayzata (TC-5)
Ketchum, J. R. (M)
Larson, V. D. (M)
Mogen, D. C. (M)
Mooers, H. T. (SM)
Neveaux, R. J. (M)
Wagner, F. C. (M)
Young, S. B. (M)

West St. Paul (TC-5)
Engelhardt, R. R. (A)
Valentine, A. G. (M)

White Bear Lake (TC-5)
Crampton, W. M. (M)
Edstrom, C. A. (A)
Enyeart, T. L. (A)
Hawley, C. L., Jr. (M)
Morse, D. C., Jr. (M)
Pool, K. C. (M)
Wesnan, C. (M)

Winona (TC-5)
Chisholm, R. G. (SM)

MISSISSIPPI

Baldwyn (HUN-3)
Williams, T. J. (M)

Bay Springs (NO-6)
Fleming, B. R. (M)

Biloxi (NO-6)
Binns, D. A. (M)
Boritz, S. L. (A)
Davison, R. E. (A)
Ellmer, P. J. (M)
Emmons, G. T. (A)
Ezzell, K. M. (A)
Funk, J. W. (A)
Howland, G. H. (M)
Jackson, L. J. (M)
Johnson, P. B. (M)
Mylnt, A. (M)
Tinsley, H. C. (A)
Van Loon, R. M. (A)
Vermilya, K. O. (M)
Walborn, G. S. (SM)
Ward, L. D. (A)

Cleveland (HUN-M-3)
Nail, W. L., Jr. (M)

Columbus (HUN-3)
Stewart, D. E. (M)

Corinth (HUN-M-3)
Brand, J. R. (M)
Holman, H. E. (M)
Propp, R. R. (M)

Crystal Springs (NO-6)
Spohrer, R. F. (M)
Taylor, D. (M)

Ellisville (NO-6)
Gagnon, R. A. (M)

Greenwood (HUN-3)
Johnson, H., Jr. (M)
Gulfport (NO-6)
Rebenstorff, C. A. (M)

Hattiesburg (NO-6)
Watson, J. N. (M)

Holly Springs (HUN-M-3)
Lollar, H. C. (M)
Vizzier, B. A. (M)

Jackson (NO-6)
Bates, F. E. (M)
Courtenay, J. A. (SM)
Cuthbert, C. (M)
Gaby, E. D., Jr. (M)
Hench, J. L. (M)
Hilbun, J. M. (M)
Hussar, G. (A)

Keesler AFB (NO-6)
Beatrice, R. W. (A)
Fedder, J. A. (M)
Keith, F. R., Jr. (M)
Peacock, W. M., Jr. (M)
Polk, I. D. (M)
Terakawa, K. H. (A)

Laurel (NO-6)
Bowers, D. E. (M)

Long Beach (NO-6)
Malcomson, J. A. (A)

Louisville (HUN-3)
Whitmire, L. W. (M)

McComb (NO-6)
Brady, P. D. (M)

Mississippi City (NO-6)
Rasche, D. D. (M)
Roemer, J. S. (M)

Moss Point (NO-6)
Harrison, R. L. (M)

Natchez (NO-6)
Shultz, O. L. (M)

Ocean Springs (NO-6)
Otis, G. E. (M)

Pascagoula (NO-6)
Murphree, W. H. (M)

Pass Christian (NO-6)
Helwick, E. A. (A)

Saltillo (HUN-M-3)
Peach, S. E. (M)

Starkville (HUN-3)
Guyton, R. D. (SM)
McDaniel, W. L., Jr. (M)

State College (HUN-3)
Barrett, C. R. (M)
Fitzgerald, D. F. (M)
McCown, H. H. (A)
McKee, J. C., Jr. (SM)
Simrall, H. C. (SM)
Woods, H. G. (M)

Tupelo (HUN-M-3)
Green, J. D. (M)

University (HUN-M-3)
Cullen, A. B., Jr. (A)
Herring, R. A., Jr. (SM)
Vicksburg (NO-6)
Hanes, F. P. (M)
Jones, J. F. (A)

MISSOURI

Affton (SL-6)
Abkemeier, L. R. (M)
Fuerst, R. J. (M)
Nurre, H. H., Jr. (M)
Shirling, G. K. (M)

Altenburg (SL-6)
Fischer, F. E. (M)
Fischer, R. A. (M)

Ballwin (SL-6)
Streiff, J. P. (M)

Barnard (KC-6)
Stalling, P. D. (M)

Belton (KC-6)
Brownfield, A. W. (A)

Berkeley (SL-6)
Crowe, E. W. (M)
Esker, A. T. (M)
Moore, R. J. (A)
Otradovec, J. E. (A)
Schmidt, T. G. (M)

Boonville (KC-6)
Lang, R. H. (A)

Brentwood (SL-6)
Benton, C. L. (A)
Bowers, J. C. (M)
Briner, C. D. (M)
Brodkowicz, J. S. (M)
Diesel, J. W. (M)
Dreege, R. F. (A)
Gillennan, L. (M)
Gosselin, B. G. (A)
Hall, R. S. (M)
Johnson, A. B. (A)
Kuhlman, E. A. (A)
Wiese, A. H. (M)

Bridgeton (SL-6)
Baker, C. E. (M)
Davies, H. W. (M)
Ewing, W. J. (M)
Liuzza, V. (A)
Mitchell, W. T. (M)
Saxby, D. R. (A)
Smith, J. B. (SM)

Cape Girardeau (SL-6)
Brennan, R. D. (M)
Hawkins, D. L. (M)
Hirsch, O. C. (M)
Poe, H. E. (M)
Walter, D. R. (M)

Clayton (SL-6)
Esterson, G. L. (M)
Fiedler, G. J. (F)
Gildenberg, D. I. (M)

Columbia (SL-6)
Benningfield, L. M. (M)
Capps, D. R. (M)
Cheng, D. H. S. (M)
Hogan, J. C. (M)
Lago, G. V. (M)
Lamb, J. F. (M)
Lee, D. A. (M)
Randall, J. E. (M)
Richards, E. E., III (A)
Troth, B. J. (A)
Tudor, J. R. (M)
Waldelich, D. L. (F)
Wallis, C. M. (SM)

Concordia (KC-6)
Frerking, M. E. (M)

Crestwood (SL-6)
Boman, W. T., Jr. (M)
Dubuque, T. J. (M)
Ebert, W. J., Jr. (M)
Schwarz, R. M. (SM)

Creve Coeur (SL-6)
Andersen, A. R. (A)
Downing, T. S. (M)
Henker, C. E. (M)
Hiestand, D. W. (M)
Lindenberg, E. C. (SM)
Miller, R. A. (M)
Welxler, H. J. (M)

Dearborn (KC-6)
Boydston, M. C. (A)

Deepwater (KC-6)
Shaffner, L. D. (A)

Des Peres (SL-6)
Clayton, G. H. (A)

Doniphan (SL-6)
Rice, G. M. (M)

Ferguson (SL-6)
Cave, J. H. (A)
Davis, R. T., Jr. (M)
Eggers, K. E. (M)
Harward, J. E. (M)
Henderson, H. W. (M)
Hobbs, E. W. (SM)
Ramsey, R. B. (M)
Reed, D. L. (M)
Rekart, A. F. (M)
Schultz, R. E. (M)
Sudfeld, C. C. (M)

Flat River (SL-6)
Smith, T. C. (M)

Florissant (SL-6)
Acker, R. E. (SM)
Bell, J. H. (A)
Bennett, D. W. (M)
Bott, M. E. (M)
Burnett, N. C. (A)
Campbell, L. G. (M)
Cherer, M. J., Jr. (M)
Decker, D. D. (M)
Deutschmann, F. C. (A)
Doll, J. W. (M)
Du Charme, M. D. (M)
Estes, B. H. (M)
Fenton, R. J. (A)
Fiedler, R. A. (A)
Gardner, B. H. (M)
Goecon, B. R. (A)
Grubbs, W. H. (A)
Guthrie, A. K. (M)
Hamilton, R. H. (M)
Haselwood, S. (M)
Haynes, F. H. (A)
Hinrichs, C. A. (M)
Hodde, R. L. (A)
Johnson, J. D. (M)
Klein, E. J., Jr. (M)
Klinos, D. E. (M)
Kouba, E. R., Jr. (M)
Lee, A. (M)
Luedde, W. J. (M)
Mackin, R. J. (M)
Mueller, V. C. (M)
Nienhaus, H. A. (M)
Payne, J. E. (M)
Pyle, H. S. (A)
Robinson, G. G. (M)
Rokes, N. W. (A)
Rowton, E. E. (M)
Russell, N. E. (SM)
Saxe, R. E. (M)
Schalble, A. V. (M)
Spillman, R. M., Jr. (M)
Swope, C. S. (M)
Twombly, J. W., Jr. (M)
Vicedomine, D. A. (M)
Vieth, R. V. (M)
Volk, J. A. (SM)
Wall, H., Jr. (A)
Wallace, N. D. (M)
Weber, J. P., Jr. (M)
White, E. F. (A)
Wilson, H. E. (M)
Wolf, C. P. (M)

Fordland (KC-6)
Chick, R. W. (M)

Fort Leonard-Wood (KC-6)
Berry, J. L. (M)

Fulton (SL-6)
Nickles, R. W. (M)

Glascow Village (SL-6)
Longshore, J. F. (M)

Glendale (SL-6)
Malsbary, J. S. (M)
Rustemeyer, G. L. (A)

Grandview (KC-6)
Bahm, D. H. (M)
Bishop, D. D. (M)
Damon, F. A. (A)
Fernane, J. (SM)
Gallagher, D. M. (SM)
Schlesselman, L. A. (A)
Schmitendorf, J. A. (M)
Ware, J. F. (M)

Hazelwood (SL-6)
Anderson, R. C. (M)
Fish, G. D. (M)
Hentges, V. W. (M)
Marquiles, H. H. (A)
Meyer, R. L. (M)
Nesheim, W. L. (M)
Reiser, W. (A)

Hickman Mills (KC-6)
Barnes, R. E. (SM)
Long, E. D. (M)
Mason, R. E. (M)
May, R. C. (A)
McCallen, P. M. (SM)
Orr, R. E. (A)
Smith, F. M. (M)
Snider, D. D. (A)
Witte, W. E. (M)

Independence (KC-6)
Beebe, J. A. (M)
Benedict, K. D. (M)
Brosky, K. T. (A)
Canning, D. C. (A)
Forristal, J. A. (M)
Gessley, D. (M)
Koontz, F. A. (M)
Leibold, F. H. (A)
McCall, E. A. (M)
McDole, M. M. (A)
Ptacek, J. F. (M)
Richey, J. D. (M)
Riegle, G. W. (A)
Schell, R. H. (A)
Springer, P. J. (M)
Willinger, K. G. (A)

Ironton (SL-6)
Sutton, D. A. (M)

Jefferson City (KC-6)
Belshe, R. D. (M)

Jennings (SL-6)
Blankenship, G. S. (M)
Munson, R. D. (M)
Stephenson, G. B. (M)

Kansas City (KC-6)
Aco, R. E. (A)
Anderson, R. W. (M)
Ashley, W. H., Jr. (M)
Barclay, J. C. (M)
Barman, J. E., Jr. (A)
Bastin, Q. S. (M)
Benzon, C. G. (M)
Bergren, A. L. (SM)
Berry, F. M. (M)
Bettis, M. E. (A)
Bland, F. K. (M)
Bossert, A. J., Jr. (M)
Boutros, O. L. (M)
Boyles, J. O. (M)
Brackney, K. H. (M)
Brink, D. K. (M)
Burton, R. R. (A)
Butler, R. W. (SM)
Camden, K. E. (A)
Catalano, S. J. (M)
Chinn, F. T. (M)
Clarke, E. L. (M)
Cleary, D. R. (M)
Collins, J. J. (M)
Constant, P. C., Jr. (SM)
Cox, G. O. (M)
Crissman, L. R. (M)
Davis, S. E. (A)
Day, D. H. (A)
Denny, R. D. (A)
Devine, W. F. (SM)
Dillon, R. B. (M)
Donovan, R. W. (M)
Easterday, M. R. (M)
Ellis, T. H. (A)
Epstein, S. (A)
Finlay, R. S. (M)
Fitzgerald, J. A. (M)
Foster, C. L. (SM)
Fouts, A. L. (M)
Fry, L. D. (A)
Fry, W. E. (A)
Gamble, G. R. (A)
Gish, G. B. (A)
Glass, A. H. (M)
Goldenberg, H. E. (M)
Grimsley, J. E. (A)
Hains, V. H. (M)
Hanson, D. K. (A)
Hardin, M. K. (M)
Harris, J. B. (M)
Hathhorn, W. R. (M)
Hearson, L. T. (SM)
Heffelfinger, J. B. (SM)
Helmlich, C. J. (A)
Heisey, W. H. (A)
Hoefer, J. J. (M)
Hull, C. E. (M)
Jensen, L. J. (A)
Johnson, L. R. (M)
Johnson, R. E. (A)
Jones, C. L. (A)
Jones, F. S. (M)
Jones, I. J. (M)
Jones, M. R. (SM)
Kaine, A. A., Jr. (M)
Kams, K. B. (M)
Kartman, D. J. (M)
Kay, J. R. (A)
Keith, J. M. (A)
Kilp, J. A. (M)
Kimball, C. N. (F)
Kirk, W. J., Jr. (M)
Kling, J. J. (SM)
Kolen, N. (A)
Kramer, D. M. (M)
Kring, C. I. (M)
Kunkle, B. L. (A)
Lane, J. W. (A)
Lanford, L. D. (M)
Lanier, W. T. (A)
Lembke, J. R. (M)
Lewis, W. R. (SM)
Lutes, R. K. (M)
Lutz, J. W. (SM)
Mackie, S. P. (A)
Mariotti, A. L. (M)
Martin, E. J., Jr. (SM)
Mathews, V. M., Jr. (SM)
Mayer, A. B. (A)
McAllister, M. J. (A)
McDowell, J. B. (A)
McFarland, R. L. (M)
McKnight, H. P. (A)
Meador, B. M. (SM)
Meltzer, A. A. (M)
Modrcin, M. R. (A)
Morrow, R. S. (M)
Musburger, R. B. (A)
Nail, P. L. (M)
Neidenberger, T. A. (M)
Nemecek, J. F. (M)
Newnham, N. G. (A)
Newton, K. V. (SM)
Parks, J. V. (M)
Pascuzzi, C. A. (A)
Patton, P. C. (M)
Perkins, J. L. (A)
Peters, N. S. (M)
Pettyjohn, P. K. (A)
Redlingshafer, R. A. (A)
Rhodes, M. H. (M)
Roberts, B. (M)
Rohs, A. H. (M)
Ruby, D. P. (M)
Runge, L. (M)
Russell, T. J. (M)
Salzer, C. E. (M)
Savino, B. J. (M)
Schmidt, A. F. (M)
Schnakenberg, K. L. (A)
Schofield, R. J. (M)
Schrunk, J. F. (M)
Schwerin, E. B. (SM)
Scott, G. H. (SM)
Scott, P. (M)
Scribner, N. (M)
Shapiro, E. (A)
Shontz, L. A., Jr. (SM)
Slater, C. A., Jr. (M)
Slusher, R. W. (A)
Smeltzer, V. J. (M)
Smith, C. B. (A)
Soldanels, R. M. (A)
Somers, R. M. (SM)
Spies, F. A. (M)
Sterner, W. J. (A)
Stone, D. W. (M)
Stone, J. B. (A)
Stout, H. L. (SM)
Stubbs, De W. L. (M)
Swafford, J. H. (A)
Tomcak, J. F. (M)
Troeglen, K. (SM)
Uhrig, R. B. (M)
Van Gundy, C. G. (M)
Vasen, G. (A)
Verhyden, L. C. (A)
Villander, N. E. (M)
Walte, W. P. (M)
Watson, J. F. (M)
Welborn, D. L. (A)
Werner, W. T. (M)
Whitaker, B. J. (M)
White, J. D., Sr. (A)
Wielenga, W. G. (M)
Wilcox, J. V. (SM)
Williams, H. E. (A)
Young, C. D., Jr. (M)

Kearney (KC-6)
Plumlee, B. L. (A)

Kirkwood (SL-6)
Barnes, J. A. (M)
Binzel, M. S. (M)
Henrichs, M. W. (M)
Hermon, R. (M)
McAllister, J. C. (M)
Risk, J. E. (M)
St. Vrain, W. E. (M)
Susek, J. F., Jr. (M)
Verbarg, L. E. (SM)
Watson, C. A. (M)
Yount, T. L. (SM)

La Due (KC-6)
Zak, S. J. (SM)

La Grange (SL-6)
Hobbs, L. L. (M)

La Monte (KC-6)
Thompson, M. L. (A)

Lee's Summit (KC-6)
Chin, S. H. H. (M)
Hanneman, W. E. (M)
Keser, O. A. (M)
Porter, B. L. (A)
Tuel, E.E.(M)
Wolfskill, R. F. (SM)

Liberty (KC-6)
Hilton, W. A. (M)
Lovan, J. E. (M)

Lowndes (SL-6)
Gibbons, J. L. (M)

Malden (SL-6)
Whited, C. R. (M)

Manchester (SL-6)
Keil, E. W. (A)

Maplewood (SL-6)
Fricke, L. H., Jr. (M)
Herries, D. G. (M)

Maryville (KC-6)
Tillman, M. E. (A)

## MISSOURI

Moberly (SL-6)
Stroup, R. E. (A)

Moscow Mills (SL-6)
Humphrey, D. D. (M)

Normandy (SL-6)
Makela, L. V. (A)
Murty, E. H. (M)
Stephens, E. T. (A)

North Kansas City (KC-6)
Bishop, W. T., Jr. (SM)
Tuttle, W. R. (A)

Northwoods (SL-6)
Bossert, J. A. (A)
Ridings, R. V. (M)

Oak Grove (KC-6)
Means, R. T. (M)

Olivette (SL-6)
Chapman, G. H. (M)
Trugman, J. (M)

Overland (SL-6)
Lienhard, O. W. (A)
McFarland, T. C. (M)
Means, S. B. (A)
Mosley, C. E. (SM)
Nordling, W. K., Jr. (M)
Schurter, W. W. (M)

Parkville (KC-6)
Clark, W. B. (M)
Habe, W. P. (M)
Robertson, A. J. L. (M)

Parkwell (KC-6)
Herde, E. E. (A)

Perry (SL-6)
Davis, C. L. (SM)

Perryville (SL-6)
Short, L. E. (A)

Pine Lawn (SL-6)
Weir, J. E. (M)

Raytown (KC-6)
O'Neal, W. O. (M)
Repper, O. C. (M)
Sneddon, J. H. (M)
Vaughan, L. D. (A)

Richmond (KC-6)
Basham, R. (M)
Kirkland, F. B. (A)

Richmond Heights (SL-6)
Harris, R. L., Jr. (M)
Lynch, F. R. (M)

Rock Hill (SL-6)
Frazier, R. L. (M)

Rolla (SL-6)
Bardon, D. G. (M)
Brown, P. O. (M)
De Woody, R. T. (M)
Gooding, D. J. (M)
Marsinkavage, D. M. (A)
Mitchum, M. M. (M)
Nau, R. H. (SM)
Nolte, R. E. (SM)
Skitek, G. G. (M)
Smith, J. G. (M)
Thompson, D. (M)
Tingley, F. T. (M)

St. Ann (SL-6)
Neil, W. C., Jr. (M)
Wall, D. E. (M)

St. Charles (SL-6)
Benner, B. (SM)
Beschert, R. J. (M)
Bosworth, V. O., Jr. (A)
Bromberg, B. G. (SM)
Crow, R. K. (M)
Finke, H. G. (M)
Flickinger, P. R. (A)
Hansbrough, F. G. (M)
Hartmann, D. W. (M)
Hegner, H. R. (M)
Hercules, F. P. (M)
Hommes, H. E. (M)
Martin, G. M. (M)
Vaughn, J. E. (A)
Wagner, F. R. (M)

Ste. Genevieve (SL-6)
Hermann, G. L. (M)
Huck, R. H. (M)

St. Johns (SL-6)
Butler, J. G., Jr. (M)
Kubischta, P. B. (M)
Wylie, J. E. (M)

St. Joseph (KC-6)
Carroll, J. C. (H)
Cottrell, G. G. (M)
Koelling, A. J., Jr. (M)
Lux, K. E. (A)
Moss, D. E. (A)
Simonds, R. L. (M)

St. Louis (SL-6)
Abbott, R. W. (M)
Abernathy, J. L. (M)
Adams, C. B. (A)
Albert, M. P. (M)
Anderson, K. M. (A)
Apel, C. K. (M)
Augustine, R. J. (M)
Auld, S. D. (M)
Aurin, R. N. (M)
Babka, F. J. (M)
Baker, C. L. (M)
Beller, E. H. (A)
Bennetsen, W. J. (M)
Beuc, R., Jr. (M)
Bitzer, R. J. (M)
Black, D. R. (M)
Boring, W. D. (M)
Brent, L. L. (SM)
Brickler, J. B. (M)
Brnjac, J. B. (M)
Browde, A. (SM)
Brown, J. (M)
Brueggemann, T. A. (M)
Bundschuh, W. A. (M)
Burgener, W. R. (M)
Carlson, P. D. (M)
Cassidy, R. E. (M)
Ceries, R. E. (M)
Chapin, M. F. (M)
Chen, G. K. C. (M)
Chenoweth, J. A. (M)
Clemens, J. F. (SM)
Clodfelter, G. C. (M)
Coe, G. J. (M)
Combs, J. F. (M)
Condon, E. U. (F)
Cornell, J. B. (M)
Cornell, J. I. (SM)
Cox, J. R., Jr. (A)
Darwin, F. A. (SM)
David, R. F. (M)
Davis, J. R. (A)
Detchemendy, J. A. (M)
Dickneite, A. J. (A)
Dietrich, R. G. (M)
Dowdle, E. E. (M)
Dreifke, G. E. (M)
Duda, F. A. (M)
Dusin, A. J., Jr. (M)
Elfhim, C. (M)
Ehlers, E. A. (M)
Eisher, P. E. (A)
Ellis, G. A. (A)
Emmerich, C. M. (M)
Fahey, J. R. (M)
Fencl, J. G. (M)
Fennewald, R. W. (A)
Fisher, C. L. (M)
Fitzman, G. (M)
Fox, G. W. (SM)
Furline, A. L. (M)
Gage, B. C. (M)
Germeroth, J. H. (M)
Gioia, S. C. (M)
Glaeser, D. H. (M)
Goodbarlet, E. F. (M)
Griffiths, O. H. (M)
Hamm, H. W. (A)
Hammett, J. E. (M)
Harris, H. H. (M)
Harrison, C. E. (SM)
Harts, W. G. (M)
Hawley, M. (A)
Heembrock, M. R. (SM)
Heitzeberg, C. H. A. (SM)
Honnell, P. M. (F)
Hubenschmidt, W. E. (A)
Iwan, R. D. (M)
Jackson, J. R. (M)
Jacobsmeyer, H. T. (SM)
Kelly, L. A., Jr. (M)
Kling, N. (M)
Kosfeld, W. H. (M)
Langston, J. C. (A)
Lashley, J. D. (M)
Lauher, V. A. (M)
Lawson, R. G. (A)
Lechtreck, L. M. (M)
Little, G. R. (M)
Loew, W. (M)
Long, L. L. (M)
Lowell, B. W. (A)
Lowell, T. B. (A)
Mayer, M. F., Jr. (M)
McAninch, C. H. (M)
McDaniel, O. S. (SM)
McDonough, S. L. (M)
McGary, W. T. (A)
McHoney, L. M. (SM)
McKinney, H. F. (A)
Meehan, R. F. (A)
Meyer, G. C. (M)
Meyer, G. L. (M)
Miller, G. L. (M)
Million, T. E. (A)
Min, H. S. (M)
Mohman, R. F. (A)
Mollman, L. A. (M)
Mundel, E. F. (M)
Murphy, C. H. S. (SM)
Newberry, D. A. (M)
Ordinachev, M. D. (A)
Ozment, R. (A)
Polk, G. D. (M)
Pultman, L. (M)
Quick, J. R. (M)
Reed, P. J. (M)
Richter, R. J. (A)
Roberts, E. M., Jr. (M)
Roche, J. M. (M)
Rosenkoetter, E. A. (M)
Ross, D. K. (M)
Sack, V. M. (M)
Sayer, J. D. (M)
Schaefer, J. (A)
Scherz, C. J. (M)
Schewe, R. W. (M)
Schlamann, K. J. (A)
Schmidt, E. C., Jr. (M)
Schowengerdt, R. N. (M)
Schwarz, C. J. (SM)
Seehan, J. S. (M)
Sherman, S. M. (M)
Siepman, A. B. (A)
Small, F. R. (SM)
Stanhope, R. D. (A)
Stape, V. E. (M)
Steinmeyer, D. J. (M)
Stertmann, W. E. (A)
Stover, D. R. (M)
Stuhlman, R. M. (M)
Swartz, C. W. (M)
Taylor, J. J. (M)
Taylor, W. (M)
Tedeschi, A. (A)
Thielen, H. H. (A)
Thomas, R. M. (A)
Trantham, J. F. (A)
Tsai, S. (M)
Upton, Le R. (A)
Veras, J. A. (A)
Vogel, E. H. (M)
Volpe, S. J. (A)
Waters, J. I. (M)
Weller, J. L. (M)
Weinstock, G., Jr. (M)
West, J. R. (M)
White, C. E. (A)
Williams, A. (A)
Wilson, L. V. (M)
Withers, J. S. (A)
Wolf, N. F. (M)
Wulfmeyer, J. A. (SM)
Zaborszky, J. (SM)
Zehr, N. J. (SM)

Sappington (SL-6)
Schillinger, E. J. (M)

Sedalia (KC-6)
Morrison, M. M. (M)

Springfield (KC-6)
Curry, W. F. (A)
Gentges, F. H. (A)
Summers, O. H., Jr. (M)
Trotter, C. E. (M)
Wheat, W. M. (M)

Steelville (SL-6)
Baker, T. W. (M)

Sullivan (SL-6)
Withington, J. G. (M)

Tina (KC-6)
Plummer, T. S. (M)

University City (SL-6)
Bulger, M. V. (M)
Frager, A. M. (A)
Goldberg, J. G. (M)
Hieken, M. H. (M)
Liddle, W. C. (M)
Mercer, D. H. (M)
Motchan, H. L. (SM)
Scheer, M. L. (M)
Tucker, M. F. (M)
Watson, S. E., Jr. (SM)

Warson Woods (SL-6)
Weigle, D. M. (M)

Webster Groves (SL-6)
Fague, A. C. (M)
Hill, R. D., Jr. (SM)
Jeter, W. C. (M)
Marsh, R. G. (M)
Sigman, H. M. (M)
Smith, H. N. (M)
Walsh, G. J. (M)
Will, J. H. (M)

Winfield (SL-6)
Crosby, H. A. (M)

Wright City (SL-6)
Meyers, J. W. (A)
Walker, D. R. (A)

### MONTANA

Billings (SEA-7)
Behrendt, R. T. (M)
Cropley, B. M. (A)
Lundquist, F. E. (M)
Mills, N. W. (M)
Watkins, P. E. (M)

Bozeman (SEA-7)
Beadle, W. E. (M)
Kilmer, W. L. (M)
Nickerson, J. F. (M)
Seibel, R. C. (M)
Shyne, N. A. (M)
Sifford, B. M. (M)
Sykes, C. B. (M)
Weaver, D. K., Jr. (M)
Weir, T. T. (M)

Butte (SEA-7)
Kerns, R. L. (A)
McCourt, A. R. (M)

Flaxville (SEA-7)
Mollerstuen, R. B. (M)

Fort Peck (SEA-7)
Von Eschen, R. L. (A)

Great Falls (SEA-7)
Andersen, V. O. (M)
Fifield, D. (M)
Lopuch, A. J. (M)
McKelvey, H. K. (A)
Parker, J. E. (M)

Helena (SEA-7)
Lynch, H. N. (M)

Lewiston (SEA-7)
Blackburn, J. G. (A)

Livingston (SEA-7)
Littleton, D. A. (A)

Missoula (SEA-7)
Taylor, A. S. (SM)

Opheim AFS (SEA-7)
Tomaszewicz, J. S. (M)

### NEBRASKA

Beatrice (OM-L-5)
Emerson, W. R. (M)

Bellevue (OM-L-5)
Easley, W. A., Jr. (A)
Logue, H. L., Jr. (M)

Columbus (OM-L-5)
Carter, G. W. (M)
Field, T. O. (M)
Matejka, J. J. (M)
Risk, G. (SM)
Ross, R. M. (A)
Sheffer, O. N. (M)
Thelsinger, L. P. (M)
Watley, L. D. (M)
Watley, O. D. (M)

Dakota City (OM-L-5)
Shadbolt, M. H. (A)

Fremont (OM-L-5)
Beaver, V. H. (A)
Fritz, G. L. (A)

Genoa (OM-L-5)
Edwards, C. E. (M)

Grand Island (OM-L-5)
Farrall, W. R. (M)
Lynch, U. L. (M)

Hastings (OM-L-5)
Allison, D. B. (M)

Hebron (OM-L-5)
Uphoff, R. D. (M)

Humphrey (OM-L-5)
Weis, V. A. (M)

Kearney (OM-L-5)
Beshore, P. S. (M)
Pace, R. A. (M)

Lexington (OM-L-5)
Bitner, R. J. (M)

Lincoln (OM-L-5)
Bashara, N. M. (M)
Combs, R. G. (M)
Ebel, A. J. (SM)
Elwell, W. G. (M)
Estes, J. F. (A)
Gallawa, R. L. (M)
Gatliff, H. H. (A)
Ghormley, R. K. (M)
Hyde, C. M. (M)
Marts, B. C. (M)
Norris, F. W. (SM)
Olive, D. W. (M)
Park, L. C. (M)
Quincy, E. A. (M)
Richardson, M. J. (M)
Robison, W. C. (M)
Sohl, L. H. (M)
Taylor, D. R. (M)
Winkler, C. W. (M)

McCook (OM-L-5)
Lenwell, L. W. (M)

Mead (OM-L-5)
Maglio, M. W. (A)
Nichols, D. R. (M)
Schollard, R. J. (M)

Norfolk (OM-L-5)
Gettman, W. C. (M)

North Platte (OM-L-5)
Baker, R. L. (A)
Griffin, D. C. (A)
Seide, J. H. (M)
Townsend, J. G. (M)

Offutt AFB (OM-L-5)
Barile, T. M. (M)
Hausman, L. R. W. (M)
Marks, J. B. (M)
McDavid, J. A. (SM)
Smith, D. W. (M)
Snoke, C. E., Jr. (SM)

Ogallala (OM-L-5)
Huntley, C. W. (M)
Lucas, J. B. (A)
Pestel, T. L. (A)
Wainwright, R. M. (SM)
Wiles, Q. T. (A)

Omaha (OM-L-5)
Akerson, A. W. (M)
Andersen, E. C. (A)
Backman, F. F. (M)
Barmore, J. L. (M)
Barnett, R. D. (M)
Bates, A. G. (M)
Becker, H. W. (SM)
Beenken, H. G. (M)
Bjornberg, V. J. (M)
Borcher, E. J. (A)
Chamberlain, I. J. (SM)
Crozier, C. R. (M)
Curry, H. D. (M)
Desler, D. A. (M)
Doll, C. L. (M)
Dunbar, B. L. (M)
Dunn, A. L. (SM)
Dunn, F. L. (SM)
Edgerton, M. J. (A)
Emey, D. W. (A)
Fried, R. A. (A)
Gaeth, A. R. (M)
Griffin, J. M. (M)
Groce, J. L. (M)
Hadsell, G. C. (SM)
Hagman, C. O. (A)
Hansen, C. L. (M)
Hickey, H. G. (M)
Hicks, R. W. (M)
Hill, R. L. (M)
Hirschinger, K. (M)
Holdcraft, F. E., Jr. (A)
Hower, P. A. (M)
Jaudegis, P. V. (M)
Jelinek, G. S. (A)
Jett, C. O. (SM)
Jones, R. L. (M)
Kopel, L. F. (A)
Kotera, W. J. (SM)
Kozicki, L. J. (A)
Krogstad, M. O. (A)
Larsen, W. M. (A)
Latta, L. O., Jr. (SM)
Loch, R. D. (A)
McGowan, M. L. (M)
Moran, J. F., Jr. (M)
Moss, T. L. (M)
Mumick, A., Jr. (M)
Neelands, C. H. (M)
Noonan, D. J. (M)
Peterson, L. P. (M)
Petrik, J. S. (SM)
Plossl, T. F. (A)
Pogge, R. W. (M)
Ralls, R. H. (SM)
Risley, M. I. (M)
Rogers, J. A. (M)
Rogers, W. M. (M)
Rood, R. S. (M)
Ryba, F. J. (A)
Schneider, A. A. (M)
Sedlak, L. J. (A)
Sibilia, L. (M)
Smith, F. R. (A)
Snyder, J. D. (A)
Stafford, B. H. (M)
Stanohill, J. R. (A)
Stratbucker, R. A. (M)
Tellkamp, H. M., Jr. (M)
Thedens, R. L. (M)
Vickland, R. J. (M)
Wallace, J. F. (M)
Wallis, D. E., Jr. (M)
Walston, C. E. (SM)
Wayne, J. W., III (M)
Wheeler, R. D. (A)
Winkler, G. E. (M)
Zink, R. L. (A)

Overton (OM-L-5)
Wycoff, K. H. (M)

Papillion (OM-L-5)
Doll, R. E. (A)

Pender (OM-L-5)
Pearson, J. A. (M)

Pilger (OM-L-5)
Nelson, D. J. (M)

Ralston (OM-L-5)
Crandall, K. H., Jr. (M)
Hartman, A. E. (M)

Seward (OM-L-5)
Osborn, L. W. (A)

Tobias (OM-L-5)
Bamer, W. J. (M)

Wahoo (OM-L-5)
Thompson, J. J. (M)

### NEVADA

Fallon (SAC-7)
Collins, R. L. (M)
Lone, R. S. (M)

Henderson (LV-7)
Allton, M. M. (M)
Guthrie, R. L. (A)
McEwen, D. L. (A)

Las Vegas (LV-7)
Amadon, C. R. (A)
Bannon, J. J., Jr. (A)
Bullerwell, K. M. (A)
Daly, E. J. (SM)
Delzer, C. L. (M)
Dixon, K. L. (M)
Ferguson, H. G. (M)





Floering, K. S. (A)
Fralzer, R. R. (A)
Garvey, W. J., Jr. (A)
Gonce, C. L. (M)
Han, W. B. (M)
Hawkins, P. A. (M)
Hirota, G. A. (M)
Holmes, S. J. (M)
Hopkins, W. L. (A)
Hunt, D. P. (M)
Karlson, E. L. (M)
Luetkehans, G. R. (M)
Marsh, O. A. (A)
Matthews, E. M. (M)
Mitchell, W. R. (A)
Morrison, R. G. (M)
Nelson, T. J. (M)
Neville, W. (M)
Parker, R. A. (M)
Patten, R. B. (M)
Percy, G. F. (A)
Piccolo, J. F. (M)
Poe, W. R. (M)
Rickwartz, C. H. (M)
Rogers, C. M. (A)
Roper, W. C., Jr. (A)
Scott, W. S. (A)
Spiess, E. R. (M)
Stephenson, P. L. (A)
Sterling, M. F. (M)
Stralser, B. J. (SM)
Taraldson, J. H. (A)
Van Den Berg, W. J. (M)
Vannucci, R. D. (M)
Warner, B. P. (M)
White, D. J. (M)
Wilder, L. D. (M)
Winn, R. (A)
Young, F. W. (M)

Mercury (LV-7)
Crawford, T. R. (M)

North Las Vegas (LV-7)
Carder, B. M. (SM)
Fort, R. L. (M)
Hanson, B. L. (M)
Harris, H. W. (M)
Hopkinson, E. A. (M)
North, H. C. (A)

Reno (SAC-7)
Bixler, R. W. (SM)
Cann, R. W. (M)
Clark, G. H. (M)
Conly, E. R. (A)
Domingos, H. (M)
Mattingly, C. D. (A)
McGee, A. D. (M)
Murphy, J. L. (A)
Pendleton, L. S. (A)
Sandorf, J. J. (SM)
Speir, F. H. (SM)
Trabert, J. W. (M)
Turner, H. G. (SM)

Sparks (SAC-7)
Carlson, A. L. (M)
McVae, D. K. (M)

Tonopah (LV-7)
Edwards, B. G. (M)

### NEW HAMPSHIRE

Amherst (B-NH-1)
Martin, P. E. (M)
Sharoe, W. P., Jr. (M)
Wenzel, J. H. (M)

Brookline (B-NH-1)
Leppanen, K. E. (M)
Sommers, D. J. (M)

Charlestown (B-NH-1)
Buckland, F. A. (M)

Chester (B-NH-1)
Akselsen, H. (M)
Greenway, T. H. (M)
Minks, F. A. (SM)
White, H. B. (A)

Concord (B-NH-1)
Brew, R. A. (M)
Dwyer, J. J. (M)
Erskine, L. L. (A)
Evans, C. B. (M)
Fermanian, A. (M)
Frost, D. F. (M)
Hermansen, L. A. (M)
Juuras, P. D. (M)
Katz, R. P. (M)
Meyer, H. R. (M)
Oleson, D. R. (M)
Paine, B. B. (M)
Stoneham, C. E. (M)
Weeks, R. F. (M)
Zilberstein, R. M. (M)

Derry (B-MV-1)
Dollinger, K. (M)
Tupper, F. R., Jr. (M)

Dover (B-MV-1)
Armitage, P. E., Jr. (A)
Brown, V. R. (M)
L'Ecuyer, J. J. (A)
Mucher, G. J. (SM)
Neal, W. S. (M)
Youngblood, J. J. (SM)

Durham (B-MV-1)
Clark, R. R. (M)
Faiman, R. N. (SM)
Frost, A. D. (SM)
Hellar, M. W., Jr. (M)
Melvin, D. W. (M)
Winn, A. L. (M)

East Concord (B-NH-1)
Richardson, T. F., Jr. (M)

East Rochester (B-NH-1)
Ashton, D. M. (M)

Epping (B-MV-1)
Karandanis, S. M. (M)

Exeter (B-MV-1)
Carbonneau, V. J. (M)
Matthews, C. M. (A)

Francestown (B-NH-1)
Bailey, A. B. (SM)

Gilmanton (B-NH-1)
Wilkens, W. B. (SM)

Golfstown (B-NH-1)
Vickery, D. H., Jr. (M)

Greenville (B-NH-1)
Wellman, B. (M)

Hampton (B-MV-1)
Farrell, L. H. (M)
Gearhart, J. J. (A)
Lecoutsakos, G. N. (M)

Hanover (B-NH-1)
Heckbert, A. I. (SM)
Morgan, M. G. (SM)
Ottowitz, P. J. (M)

Hillsboro (B-NH-1)
Carruth, R. O. (M)
O'Loan, W. R. (SM)
Wood, J. A. (M)

Hudson (B-NH-1)
Johnson, A. H. (M)
Whitaker, N. A. (M)

Jackson (B-NH-1)
Stone, A. P. (M)

Keene (B-NH-1)
Cloutier, D. L. (M)
Robarge, E. T. (M)

Kingston (B-NH-1)
McLean, D. I. (M)

Laconia (B-NH-1)
Campbell, R. H., Jr. (M)
Greene, G. G. (SM)
Hadden, G. H. (M)
Healy, S. M. F., Jr. (M)
Snyder, M. A. (A)

Lebanon (B-NH-1)
Spencer, M. C. (M)

Lyme (B-NH-1)
Johnson, G. L. (SM)
Wood, J. A., Jr. (SM)

Manchester (B-NH-1)
Allard, E. L. (M)
Apostolos, T. (M)
Baer, R. H. (M)
Banker, J. A. (M)
Bean, F. E. (M)
Bellucci, F. A. (M)
Bouchard, J. G. F. (M)
Brous, D. W. (SM)
Cassidy, J. A. (M)
Castor, A. H. (M)
Chasaris, C. N. (M)
Chase, E. W. (M)
Daughton, G. B. (M)
Dupre, M. L. (A)
Gabor, W. D. (M)
Gagne, L. E. (M)
Halle, C. F. (A)
Lamere, B. E. (M)
Loeffler, W. J., Jr. (M)
McCluskey, J. L. (M)
McIsel, J. G. (M)
Mondor, L. E. (M)
Nadeau, R. U. (M)
Rust, W. F., Jr. (SM)
Smaus, L. H. (SM)
Tilton, D. S. (M)
Treisman, J. W. (A)
Westlake, N. L., Jr. (M)
Wilkinson, H. W. (M)

Milford (B-NH-1)
Nelligan, K. P. (M)
Romney, E. (A)
Striffler, F. L. (M)
Williston, R. L. (M)

Nashua (B-NH-1)
Andrews, E. G. (SM)
Arnesen, R. F. (M)
Ault, R. D. (A)
Ayer, D. R. (M)
Borski, G. K. (M)
Bostwick, L. S., Jr. (M)
Bradley, D. J. (M)
Brown, C. R. (M)
Bryant, W. E. (M)
Bucci, C. T. (M)
Butler, J. L. (M)
Dabrowski, S. A. (M)
Drescher, D. C. (M)
Eidson, R. A. (M)
Evans, J. E., Jr. (M)
Forcier, F. O. (A)
Frank, R. A. (M)
Gagne, F. W. (M)
Gallagher, L. R. (M)
Gilligan, L. H. (M)
Goodwin, R. O. (M)
Goulder, M. E. (M)
Greenspan, L. E. (M)
Harrington, J. D. (A)
Hawes, R. B. (SM)
Hutchinson, D. F. (M)
Jacobi, R. J. (M)
Johnson, M. L. (M)
Kaplan, P. D. (M)
Kitzredge, E. M. (M)
Klaman, K. J. (M)
Le Blanc, R. A. (A)
Le Van, J. D. (M)
Low, R. C. (A)
Lowe, W. R., Jr. (M)
Mackowiak, J. K. (M)
Mattson, T. (M)
Manoogian, H. (SM)
Mayhew, D. K. (M)
Mehron, M. E. (A)
Misek, V. A. (M)
Morgan, W. E., Jr. (M)
Newsom, E. G. (A)
Newton, L. W. (SM)
O'Neil, J. F., Jr. (A)
Otey, C. R. (M)
Pothier, R. G. (M)
Putnam, H. (A)
Richmond, M. R. (M)
Robbins, R. (M)
Rusch, W. T. (M)
Ryder, A. V. (M)
Safford, F. J. (SM)
St. Jean, L. E. (SM)
Sanders, R. C., Jr. (M)
Sheftelman, E. H. (M)
Steeg, G. F. (M)
Sweenie, G. C. (M)
Thayer, G. H. (M)
Turner, C. F. (M)
Uhrich, W. J. (SM)
Weener, R. E. (M)
Wilson, W. J. (M)
Wood, C. S. (A)
Woodruff, T. E. (M)
Woods, R. E. (M)
Zumba, C. F. (M)

New Ipswich (B-NH-1)
Cole, I. H. (M)

Newmarket (B-NH-1)
George, J. A. (A)

Pease AFB (B-MV-1)
Bloom, V. A. (M)
Decker, B. J. (A)
Driver, R. E. (M)
Fitts, R. E. (M)

Pelham (B-NH-1)
Powers, J. E. (M)

Penacook (B-NH-1)
Brock, J. M. (M)

Peterboro (B-NH-1)
Hampson, E. R. (M)

Pittsfield (B-MV-1)
Adams, P. L. (M)

Plaistow (B-MV-1)
Backard, M. J. (M)
Minnich, E. L. (M)

Portsmouth (B-MV-1)
Farbach, J. R. (A)
Molla, J. J. (M)

Reeds Ferry (B-NH-1)
Kannair, C. J., Jr. (M)

Salem (B-NH-1)
Falkenham, G. A. (A)
Goyette, P. E. (M)

Salem Depot (B-NH-1)
De Vinney, J. S. (A)
Taylor, F. N. (M)

South Merrimack (B-MV-1)
Comstock, D. C. (M)

Wilton (B-NH-1)
Abbott, W. B. (M)
Clement, C. M., Jr. (A)
Dickinson, R. V. C. (A)
Eckhardt, E. W. (A)

Windham (B-NH-1)
Nakasato, J. (M)

### NEW JERSEY

Absecon (PHI-3)
Gay, T. W., Jr. (M)
Stoker, R. R., Jr. (M)
Taggart, S. E. (M)
Walking, R. W. (M)
Willey, V. E. (M)
Zimnoch, J. J. (M)

Allendale (NNJ-2)
Robinson, A. S. (M)
Strauch, G. R. (M)

Allenhurst (NY-M-2)
Greer, W. R., Jr. (SM)
Haddock, J. W. (M)
Nagy, Z. S. (M)
Wiener, A. (M)

Allentown (NY-M-2)
Baer, J. (SM)
Murr, J., Jr. (A)

Alpha (NNJ-2)
Schaefer, J. B. (SM)

Alpine (NNJ-2)
Borders, C. R. (SM)
Merry, J. M. P. (A)

Andover (NNJ-2)
Meister, P. T. (M)
Ostlund, E. M. (SM)
Price, E. (M)

Arlington (NNJ-2)
Bremer, F. V. (SM)
Durie, J. C., Jr. (A)

Asbury Park (NY-M-2)
Bauer, P. S., Jr. (M)
Bauer, S. J. (A)
Belmont, E. (M)
Cahn, H. (SM)
Dolan, H. C. (A)
Dravneek, W. R. (M)
Ercolino, M. D. (A)
Foderaro, J. V. (A)
French, H. H. (A)
Gisonno, G. L. (M)
Gottlieb, R. M. (A)
Jones, J. D. (M)
Klasewitz, S. J. (M)
Kolchin, R. I. (M)
Leinkram, C. Z. (M)
Mannel, W. M. (M)
Reich, B. (M)
Resnick, A. (M)
Rokaw, L. (M)
Salvano, D. P. (A)
Sarlo, L. M. (M)
Schelleng, J. C. (F)
Schodowski, S. S. (M)
Schwartz, S. S. (M)
Slack, E. G. (M)
Stelnberg, J. (A)
Strasser, S. (M)
Tobias, W. T. (M)
Weltz, S. (M)

Ashland (PHI-3)
Kingsbury, S. R. (A)
Kowalski, L. E. (M)
Mahland, E. W. (M)
Matty, H. B., Jr. (M)
Nelson, D. W. (M)
Russell, K. H. (M)

Atco (PHI-3)
Stanko, E. (SM)

Atlantic City (PHI-3)
Bremmer, L. F. (SM)
Christiansen, G. H. (M)
Dunkel, H. D. (M)
Gieseche, H. (A)
Hill, J. H. (M)
Holland, F. C. (M)
Jackson, A. S. (M)
Kups, E. F. (SM)
Marschall, F. W. (M)
Martin, W. A., Jr. (M)
Mouradian, H. (M)
Newman, S. (M)
Pardee, S. (M)
Petrie, J. W. (A)
Ricketts, P. E. (SM)
Scott, R. M. (SM)
Yulo, C. (M)

Atlantic Highlands (NY-M-2)
Barrett, L. C., Jr. (A)
Brown, S. P. (SM)
Douglas, R. G. (M)
Durrer, J. H. (A)
Forest, O. J. (A)
Gange, R. A. (M)
Jacobsen, T. L. (M)
Petersen, P. B. (M)
Popovich, R. G. (M)

Audubon (PHI-3)
Beers, R. A. (SM)
Ficcki, R. F. (M)
Kozanowski, H. N. (SM)
Massari, J. P. (M)
Moses, H. J. (M)
Murphy, J. J. (M)
Rolf, T. E. (M)
Rutherford, R. O. (M)
Ryan, J. G. (M)
Slate, M. W. (M)
Smalts, F. W. (M)
Stasz, C. E. (M)

Avenel (PRI-2)
Caton, W. J. (M)
McCarthy, T. (A)
Shuskus, J. M. (A)
Willmot, W. C. (A)

Avon (NY-M-2)
Egley, T. H. (A)

Avon-By-The-Sea (NY-M-2)
Child, T. M. (SM)

Barnegat (NY-M-2)
Morrison, J. G. (A)

Barrington (PHI-3)
Beecher, A. E. (M)
Caldwell, H. R. (M)
Duncan, J. F. (M)
Johnson, C. W. (M)
Logan, J. J. (SM)
Reis, G. C. (A)
Rudolph, R. L. (M)
Thompson, J. R. (M)
Thompson, J. R. (M)

Basking Ridge (PRI-2)
Darque, F. B. (M)
Engelbrecht, R. S. (M)
Farmer, W. B. (M)
Glauber, J. J. (SM)
Hasley, A. D. (SM)
Hearn, R. B. (SM)
Hull, R. W. (M)
Iwats, M. C. (M)
Jacobus, H. R. (SM)
James, G. W. (M)
Paul, R. L. (M)
Pierce, W. L. (M)
Power, D. W. (SM)
Rosson, J. W. (M)
Schumacher, R. B. F. (M)
Talpey, T. E. (M)
Uhler, K. W. (SM)

Bay Head (NY-M-2)
Parker, J. A. (M)

Bayonne (NNJ-2)
Eager, G. S., Jr. (M)
Leslie, J. P. (M)
Mazzilli, F. (M)
Mydosh, J. A., III (M)
Parowski, G. C. (M)
Pettegrove, G. G. (A)
Raketsky, W. W. (A)
Schnipper, A. (M)
Silbermann, G. F. H. (M)
Skibneski, C. E. (M)
Szmerda, R. J. (M)
Vazalaro, A. V. (A)
Zacharellis, G. (A)

Bedminster (PRI-2)
Chase, S. C., Jr. (M)
Geils, J. W. (M)

Belford (NY-M-2)
Collom, P. W., Jr. (M)
Cowgill, R. M. (M)
Glendinning, W. B. (M)
Motsek, M. (A)

Belle Mead (PRI-2)
Pressey, C. W. (A)
Smith, H. B. (M)

Belleville (NNJ-2)
Bagno, S. M. (SM)
Cohen, B. E. (M)
Forshay, D. W. (A)
Frank, A. (M)
Franklin, D. E. (M)
Godfrey, P. (M)
Greene, V. A. (M)
Klein, M. S. (M)
Mock, W. C., Jr. (SM)
Reilly, R. A. (M)
Richards, G. P. (M)
Roeloffs, E. H. (M)
Salz, H. (M)
Schuster, R. M. (M)
Seiden, N. (M)
Senio, N. (M)
Silverman, D. (M)
Wallace, F. C. (SM)
Warren, J. E. (M)
Winship, T., Jr. (M)
Woodman, R. A., Jr. (M)
Woodson, R. D. (M)
Yellen, S. (A)

Belmar (NY-M-2)
Boxer, V. (M)
Brookins, R. U. (M)
Gordon, F., Jr. (M)
Hambleton, G. E. (M)
Jarema, E. D. (M)
Kamplnsky, A. (M)
Kosmakl, H. G. (SM)
Lee, A. St. J. (SM)
Shaw, A. W. (M)
Stone, H. A. G. (A)
Stone, M. V. H. (M)
Theissing, H. H. (SM)
Townes, W. D. (SM)
Wagner, H. M. (SM)
Waite, R. W. (M)

Bellmawr (PHI-3)
Balchaitis, A. V. (M)
Fillebrown, S. M. (M)
King, E. (M)
Walyik, J. J. (M)
Ziehm, R. T. (M)

Bergenfield (NNJ-2)
Abend, I. J. (M)
Anolik, B. S. (M)
Bright, T. F. (A)
Crawford, A. R. (M)
Fee, D. R. (M)
Franklin, W. S. (M)
Frimzis, R. (M)
Goodman, L. J. (M)
Haleblian, D. K. (A)

Hallett, J. L. (A)
Kleinberg, H. (A)
Losher, M. I. (M)
Meadow, S. (M)
Musselman, H. (A)
Rusch, H. (A)
Schmidt, C. J. (SM)
Votaw, C. J. (M)

Berkeley Heights (NNJ-2)
Abbott, G. F., Jr. (M)
Andrews, H. W. (M)
Austin, J. E. (M)
Chruney, M. (M)
Closson, H. T. (M)
Cohen, B. G. (M)
Diorindakis, M. (M)
Estoppey, R. F. (M)
Graham, R. E. (F)
Hall, R. E. (M)
Hart, O. P., Jr. (M)
Heacock, B. E. (SM)
Humerick, S. M. (M)
Huseland, N. (M)
Jensen, A. G. (F)
Klessling, E. H. (M)
Kozicki, H. (M)
Lawlor, J. A. (M)
Lyon, W. C. (A)
Maher, T. P. (M)
Mann, H. (M)
Maul, L. L. (M)
Mayo, J. S. (A)
Moore, E. P. (A)
Nace, P. L. (M)
Orlando, A. J. (M)
Schade, F. W. (A)
Schwarz, G. R. (M)
Seley, E. L. (M)
Smith, F. B. (A)
Swartzwelder, J. C. (A)
Williams, C. E. (M)
Zilis, G. S. (M)

Berlin (PHI-3)
Bazan, S. J. (M)
Erichsen, H. K. (M)
Helliwell, J. (M)
Wiseman, P. E., Jr. (M)

Bernardsville (PHI-2)
Coddington, G. H. (M)
Coles, F. A. (SM)
Green, N. H. (M)
Hedel, K. K. (M)
Larsen, J. (SM)
Levine, S. (SM)
Murphy, J. A., Jr. (M)
Rager, G. T. (M)
Wooldridge, A. C. (SM)

Beverly (PHI-3)
Cottone, C. V. (A)
Day, R. F. (M)
Gehweiler, W. F. (A)
Hain, J. L. (M)
Horton, P. R. (M)
Jones, T. M. (M)
Newcomb, R. H. (M)
Pitt, N. E. (M)
Soohoo, E. L. (A)
Steudel, W. R. (M)
Taylor, D. M. (M)
Walker, K. E. (SM)
Wolcott, R. G. (M)

Blackwood (PHI-3)
Swedloff, B. (A)
Webb, R. B. (M)

Blairstown, (NNJ-2)
Maffenbeier, J. B. (M)
Widenor, P. E., Jr. (SM)

Bloomfield (NNJ-2)
Accardo, N. A. (M)
Atkins, C. E. (SM)
Bates, J. K., Jr. (A)
Baxter, H. R. (M)
Bitinas, J. (M)
Bloom, R. F. (M)
Brown, J. T. L. (M)
Clements, W. I. (M)
Cook, H. L. (M)
Coon, C. E. (M)
Currier, P. J. (A)
Elston, G. F. (SM)
Everett, L., Jr. (SM)
Fortin, R. C. (SM)
Gluck, F. W. (M)
Grandmont, P. E. (M)
Hawk, W. H. (M)
Hayes, W. A. (M)
Heberling, W. W., Jr. (M)
Heney, J. F. (M)
Heuston, T. J. (M)
Hobbs, J. (A)
Horvath, B. N. (A)
Howard, J. W. (M)
Ivey, H. F. (SM)
James, R. L. (M)
Jarmick, R. J. (M)
Johnson, V. L. (M)
Johnson, W. C. (SM)
Kelso, R. J. (M)
Kerwin, B. D. (A)
Kittiver, C. (M)
Knochel, W. J. (SM)
Kreer, J. G., Jr. (SM)
Lang, A. J. (M)
McNall, J. W. (SM)
Menne, R. S. (M)
Mitchell, A. V. (M)
Mitchell, C. D. (SM)
Moltz, A. J. (M)
Rhodes, H. A. (M)
Rosenthal, M. S. (M)
Sifre, R. A. (A)
Simon, R. T. (M)
Singer, F., Jr. (SM)
Skellett, A. M. (F)
Sloan, F. M. (A)
Wallace, P. A. (M)
Waskiewicz, L. R. (A)
Wetzel, K. C. (M)
Whelan, W. R. (A)
Widell, E. G. (SM)
Williams, N. T. (SM)
Wilmarth, R. W. (SM)
Wolfe, T. R. (M)
Wood, G. R., Jr. (M)
Yeisley, W. F. (M)

Bogota (NNJ-2)
Gilcher, V. (A)
Hafenmaier, H. F. (M)
McCaffery, W. W. (M)
Scherf, H. T. (A)
Weber, R. A. (M)

Boonton (NNJ-2)
Anderson, N. J. (A)
Benning, H. H. (SM)
Bidlack, R. H. (M)
Bozer, R. (M)
Christensen, H. (M)
Cook, L. (M)
Downsbrough, G. A. (M)
Erickson, L. E. (M)
Franks, C. J. (M)
Genoble, F. (M)
Hopler, V. E. (A)
Houlroyd, G. F. (M)
Hoyt, W. F. (M)
Hull, C. J. (A)
Hull, L. M. (F)
Jacobus, W. M. (A)
Jones, J. J. (M)
Kenney, C. M. (A)
King, P. B., Jr. (SM)
Kuller, K. K. (M)
Manrik, G. (A)
March, P. S. (M)
Martin, R. F. (A)
Montcalm, S. R. (SM)
Parkes, A. W., Jr. (SM)
Peters, D. P. (M)
Pittenger, A. W. (M)
Pittenger, R. C. (A)
Pfahn, R. W. (M)
Redington, J. H. (SM)
Richardson, A. G. (F)
Richardson, S. A. (M)
Schanz, W. H. (M)
Seabury, E. S. (A)
Weinberg, J. (A)
White, W. F. (M)
Zayac, F. R. (M)
Zieger, J. A. (M)

Booton Township (NNJ-2)
Black, W. L. (SM)
Engert, G. W. (M)

Bordentown (PHI-3)
Gutterson, M. A. (A)
Meier, D. J. (M)

Bound Brook (PRI-2)
Boyles, C. W. (A)
Brown, W. A. R. (A)
De Versterre, W. I. (M)
Engelberg, C. (M)
Gerhardt, G. E. (A)
Gruber, R. (M)
Handen, J. (M)
Kuklis, J. A. (M)
Savoca, J. G. (M)
Toth, A. M. (M)
Van Derveer, E. J. (M)
Witherell, C. E. (M)

Bradley Beach (NY-M-2)
Brown, M. A. (M)
Macallister, A., Jr. (A)
Steward, R. L. (M)

Bricktown (NY-M-2)
Jackson, P. F. B. (M)
Kasper, H. W. (M)

Bridgeton (PHI-3)
Deal, J. H. (A)

Brielle (NY-M-2)
Eason, C. R. (M)
Schor, H. (M)

Brookside (NNJ-2)
Adams, E. W., Jr. (M)

Brown Mills (PHI-3)
Tellier, J. C. (F)

Burlington (PHI-3)
Bechtold, G. W. (M)
Dubrow, W. (A)
Escriba, C. F. (M)

Butler (NNJ-2)
Bradford, D. C. (M)
Gordon, J. P. (SM)
Gradjelick, T. J., Sr. (M)
Hoagland, K. A. (SM)
Metz, D. F. (M)
Meyer, K. H. (M)
Miller, H. W. (M)
Munroe, P. C. (SM)
Wachter, J. E. (M)
Wild, R. F. (SM)
Wolter, H. R. (M)

Caldwell (NNJ-2)
Graff, E. S. (A)
Heloso, A. H., Jr. (SM)
Janes, A. W. (M)
Koerner, C. T. (SM)
McBrair, H. C. (M)
McKeeby, R. W. (M)
Meixell, O. S. (SM)
Schoenbaum, J. R. (SM)
Schwerin, R. L. (SM)
Sutherlin, L. (SM)
Vogel, W. H., Jr. (M)
Williams, W. J., Jr. (A)

Caldwell Township (NNJ-2)
Dulac, J. P. (M)
Poole, R. E. (M)

Camden (PHI-3)
Ankenbrandt, F. L. (F)
Annus, L. E. (A)
Astheimer, W. (M)
Benima, D. (A)
Bennett, F. L. (M)
Berg, C. O. (M)
Berges, W. P. (A)
Bock, J. J. (M)
Boehm, P. C. (A)
Bolden, E. L. (M)
Bonshock, S. N. (M)
Bowen, D. C. (SM)
Brooks, R. R. (M)
Casey, R. H. (M)
Chalupa, J. F. (M)
Chan, R. H. G. (M)
Chen, D. (M)
Christopher, A. J., Jr. (M)
Clay, B. R. (SM)
Colton, R. M. (A)
Cooperman, M. (M)
Corrington, M. S. (F)
Courtney, J. E. (M)
Cramer, R. E., Jr. (M)
Crosby, D. R. (SM)
Dickens, B. L. (M)
Di Paolo, L. A. (A)
Domin, F. J. (A)
Eagan, J. F., Jr. (A)
Edwards, N. E. (M)
Elsenberg, H. (M)
Elderkin, C. D. (M)
Fang, J. (M)
Feyerherm, M. P. (SM)
Figueroa, J. W. (M)
Flateau, S. L. (M)
Fricke, R. H. (M)
Galanek, G. J. (A)
Gelchis, M. V., Jr. (M)
Gleitman, J. (M)
Glenn, A. B. (SM)
Gloates, E. (A)
Goans, C. E. (M)
Goldberg, A. S. (M)
Goss, G. J. (M)
Grasberg, A. G. (M)
Green, L. S. (M)
Gunther, C. A. (F)
Guthrie, P. L., Jr. (M)
Hanway, W. F. (M)
Harris, S. J. (SM)
Harris, W. A. (SM)
Hawes, M. K. (M)
Head, F. E. (M)
Howard, D. V., Jr. (M)
Jones, L. F. (SM)
Kent, W. S. (M)
Kidd, M. C. (SM)
Klessling, G. A. (M)
Koenig, M. (A)
Lacy, W. H. (A)
Langworthy, D. C. (M)
Lemberg, A. E. (M)
Le Vann, M. F. (M)
Link, J. M. (M)
Luethy, R. E. (A)
Maguire, J. A. (A)
Martin, H. B. (SM)
Mathews, J. W. (M)
Matsumura, G. K. (M)
McAdara, F. C. (M)
McCasland, G. P. (M)
McDonnell, F. M., Jr. (M)
McNicol, F. R. (A)
Meng, D. R. (M)
Monshaw, V. R. (M)
Moody, W. L. (M)
Moore, C. E. (SM)
Morse, E. (A)
Myers, B. D., Jr. (A)
Nelson, M. D. (M)
Novick, S. (M)
Orpin, L. H. (SM)
Patterson, T. T., Jr. (SM)
Peebles, P. Z. (M)
Pessin, L. (M)
Rao, G. V. (M)
Reeves, T. C. (M)
Richter, R. (M)
Roberts, R. S., Jr. (M)
Rosner, I. S. (M)
Scally, P. J. (A)
Schlegelmilch, H. K. (M)
Schulbach, A. (M)
Scull, W. E., Jr. (SM)
Smith, A. L. (A)
Smith, F. D. (M)
Smith, T. A. (SM)
Spears, W. K. (M)
Stech, G. (M)
Tait, W. F. (A)
Taylor, J. I., Jr. (M)
Terris, D. (M)
Tourshou, S. (SM)
Tracy, E. C. (M)
Trainer, M. A. (SM)
Trebing, G. W. (M)
Ur, H. (M)
Vilkomerson, B. S. (SM)
Vincent, L. R. (A)
Walter, J. C. (SM)
Waters, G. B. (M)
Wege, H. R. (SM)
Wern, D. W., Jr. (M)
Wilder, J. (M)
Wirtz, E. L. (A)
Wright, S. L. (A)

Cape May (PHI-3)
Knauss, D. L. (M)

Carlstadt (NNJ-2)
Kaiser, A. W. (SM)
Kramer, H. J. (A)
Payne, M. P. (SM)

Carteret (PRI-2)
Goyena, S. R. (A)

Cedar Brook (PHI-3)
Wasiski, E. B. (A)

Cedar Grove (NNJ-2)
Altman, H. (M)
Balas, P., Jr. (M)
Beckers, A. E. (M)
Brown, W. G. (M)
Bulkley, A. W. (M)
Clarke, A. F., Jr. (M)
Davis, R. C. (M)
Dickstein, S. R. (M)
Dooner, J. L. (M)
Fichter, W. C., Jr. (M)
Golick, G. (M)
Gordon, R. F. (A)
Gorss, C. G., Jr. (M)
Grieg, D. D. (SM)
Harris, R. J. (A)
Hartmann, J. C. (M)
Himmel, L. (SM)
Kelin, F. J., Jr. (M)
Kettmann, H. W. (A)
Klein, A. M. (M)
Kuras, H. F. (M)
Lawrence, J. T. (SM)
Lenker, J. N. (M)
Luongo, J. (M)
Magdeburger, P. E. (M)
Marmar, G. (M)
May, L. T. (M)
Morris, S. H. (M)
Moskowitz, S. (M)
Mukai, V. S. (M)
Petruzzelli, R. T. (A)
Pogoda, A. L. (M)
Reeves, E. H. (M)
Reichert, W. G., Jr. (M)
Shackelford, C. L. (SM)
Spiro, N. J. (M)
Sutton, L. E., III (A)
Trim, M. E. (M)
Van Brunt, Le R. B. (M)
Van Duyne, J. P. (M)

Cedar Knolls (NNJ-2)
Eden, B. F. (M)
Hetzel, G. L. (M)
Schulz, W. J. (A)

Chatham (NNJ-2)
Albrecht, H. W. (SM)
Andrew, H. B. (M)
Arnold, C. G. (SM)
Babcock, W. C. (M)
Bishop, J. D. (M)
Bobeck, A. H. (M)
Bondy, M. (M)
Bryant, N. W. (SM)
Corwith, H. P. (F)
Cousins, V. M. (M)
Day, R. G. (M)
Diehl, G. A. (A)
Edson, A. P. (M)
Edwards, J. R. (M)
Felch, E. P. (F)
Filo, J. P. (M)
French, H. N. (M)
Funk, D. L. (M)
Glasel, W. B. (M)
Herud, E. C. (M)
Higgs, R. E. (M)
Hilberg, E. A., Jr. (M)
Hilty, D. C. (M)
Hinck, L. L. (M)
Hofmockel, D. L. (M)
Hopper, K. D. (M)
Houghton, E. W. (SM)
Kay, E. D. (M)
Klesse, W. R. (M)
Koch, D. G. (M)
Lambert, D. W. (M)
Levengood, J. W. (M)
Lynch, J. A. (A)
Macina, N. A. (A)
Martel, H. C. (A)
McLean, D. A. (SM)
Moorhead, G. H. (M)
Morrow, S. R. (A)
Neitzert, C. (M)
Peterson, A. C., Jr. (SM)
Radcliffe, F. E. (SM)
Rohn, W. B. (M)
Rose, R. H., II (M)
Rupp, O. R. (A)
Sagan, E. A. (M)
Schreiber, O. P. (M)
Smoot, A. W. (M)
Sonntag, L. (M)
Southworth, G. C. (F)
Sproul, P. T. (SM)
Sweeny, C. P. (SM)
Taylor, P. H. (M)
Tighe, D. J. (M)
Vaughan, H. E. (SM)
Vaughan, V. N., Jr. (SM)
Von Der Linden, M. A. (SM)
Wintringham, W. T. (F)
Wirsz, N. C. (M)
Yariv, A. (M)

Chatham Township (NNJ-2)
Singer, F. J. (SM)
Stone, R. C., Jr. (M)

Chester (NNJ-2)
Hubbell, B. (M)
Ruff, J. A. (A)

Cinnaminson (PHI-3)
Warnick, G. E. (M)

Clark (NNJ-2)
Basarab, J., Jr. (M)
Collazo, J. L. (M)
Gomer, W. J., Jr. (A)
Seymour, J. W. (SM)
Whitty, M. S. (M)

Clark Township (NNJ-2)
Arnaud, J. P. (F)

Clementon (PHI-3)
Connelly, J. J. (M)

Cliffside Park (NNJ-2)
Larena, S. F. (A)
Ring, E. W. (M)
Wehner, J. F. (M)

Clifton (NNJ-2)
Arditi, M. (SM)
Arp, R. H. (A)
Ault, C. F. (M)
Bean, J. D. C. (M)
Bearman, A. L. (A)
Belinfante, J. D. (M)
Bender, D. J. (M)
Brady, J. F. (SM)
Brady, L. J. (M)
Brockel, E. P. (A)
Callanan, W. F. (M)
Casabona, A. M. (M)
Chin, J. W. (A)
Clemens, J. R. (M)
Davidson, G. M. (M)
De Bell, J. M., Jr. (M)
Deichert, R. W. (M)
Dolan, F. J. (M)
Dumont, A. B. (F)
Dzula, B. (M)
Egan, T. R. (M)
Elbert, C. H. (M)
Fahnestock, D. L. (M)
Feldt, R. (SM)
Filliman, J. J. (M)
Glasser, S. (M)
Glomb, W. L. (M)
Goldstein, R. L. (A)
Green, M. W. (SM)
Gruber, C. W. (M)
Haefeli, J. E. (M)
Hamar, R. K. (M)
Heim, A. M. (M)
Heins, P. N. (M)
Hogan, M. J. (A)
Hval, H. N. (M)
Jeans, J. R. (M)
Kaplzi, W. (M)
Katzmann, F. L. (M)
Koch, S. J. (A)
Kohler, E. (A)
Krehbiel, R. K. (M)
La Plant, W. P. (A)
Lappin, D. (M)
Legrang, J. S. (M)
Librizzi, P. N. (SM)
Lieberman, I. J. (M)
Lupi, A. M. (M)
Moron, M. (A)
Morrow, R. A. (M)
Murphy, G. G. (SM)
Nelson, J. E. (SM)
Osifchin, N. (A)
Oswald, R. L. (M)
Otis, A. N., Jr. (A)
Pollack, L. (SM)
Postal, R. H. (A)
Rate, W. R., Jr. (M)
Romano, J. A. (A)
St. Louis, R. A. (M)
Salzer, P. (M)
Salzer, R. M. (M)
Sanford, E. E. (A)
Scherago, R. I. (A)
Schneider, A. E. (M)
Schneiderman, M. (A)
Schroeder, J. O. (SM)
Schwartz, P. L. (M)
Smith, C. B., Jr. (M)
Snadyc, A. M. (SM)
Stein, S. (M)
Suklich, W. J. (A)
Tippe, S. (M)
Tobias, J. (M)



Vanca, G. (M)
Weinshanker, J. (M)
Wilding, J. V. (M)
Yaroshko, P. (M)
Yeates, R. A. (M)
Zahner, C. F. (M)
Zweibel, J. (M)

Closter (NNJ-2)
Slawson, W. J. (M)
Soderquist, W. A. (A)

Collingswood (PHI-3)
Abel, D. R. (M)
Ackerman, M. J. (SM)
Aron, S. (M)
Aurand, J. A. (M)
Avella, N. R. (A)
Baker, W. W. (M)
Bancroft, H. S. (M)
Beauchemin, A. (M)
Booth, G. W. (M)
Brotzman, E. S. (SM)
Brown, E. M. (M)
Brown, W. J. (M)
Buck, D. G. (M)
Burke, M. D. (M)
Caron, E. J. (SM)
Chin, G. D. (M)
Christensen, J. L. (M)
Clark, E. L. (SM)
Corey, C. P. (A)
Cox, R. L. (M)
Crawford, R. D. (M)
Daniel, J. W., Jr. (M)
Davis, C. E. (M)
Diehl, D. W. (M)
Di Russo, E. (M)
Dobbins, L. W. (M)
Douglas, J. W. (M)
Duffin, J. D. (M)
Ebert, P. M. (M)
Eiselein, J. E. (SM)
Farnett, E. C. (M)
Fastring, R. A. (M)
Finkelstein, M. B. (SM)
Fuschetto, A. N. (M)
Genetta, T. L. (M)
Glazer, B. G. (M)
Gluyas, T. M., Jr. (SM)
Goodman, H. (SM)
Goodrich, H. C. (SM)
Grier, E. W. (M)
Homan, A. A. (M)
Honda, H. (M)
Houck, G. A. (M)
Houck, G. S. (M)
Hurford, W. L. (M)
Kane, J. R. (M)
Kolar, R. F. (M)
Kowal, A. (M)
Kurvits, A. (M)
Lapidos, R. W. (M)
Laskey, J. M. (M)
Lauer, H. (M)
Lea, E. C. (M)
Le Donne, F. (M)
Lefczik, S. W. (A)
Low, F. (M)
Lynn, S. (SM)
Mallitz, E. (M)
Maloff, I. G. (F)
Marra, T. (M)
Martin, T. B. (M)
McDonnell, J. A. (SM)
McGiffney, D. Z. (M)
Meeker, W. F. (M)
Moschetti, G. J. (M)
Mozzi, E. J. (M)
Paris, A. A. (M)
Pettengill, G. W. (M)
Phillips, L. B. (M)
Rangachar, H. V. (M)
Rezek, G. (A)
Robertson, J. Y. (M)
Roe, J. H. (SM)
Schwarz, H. G. (M)
Selby, E. O. (M)
Sharp, R. F. (M)
Shashoua, F. E. (M)
Shelton, C. T. (M)
Sheaf, J. R., II (SM)
Slukola, M. (M)
Skorup, G. E. (SM)
Smith, A. E. (M)
Southworth, W. T. (M)
Staniszewski, J. R. (M)
Stupp, R. W. (M)
Thompson, E. E. (M)
Turner, A. H. (M)
Underwood, J. F. (SM)
Ver Wys, G. A. (M)
Watson, F. M. (A)
Weiss, H. J. (M)
Wing, D. H. (M)
Wolf, R. R. (M)
Woodward, B. J. (M)
Yin, H. (M)
Young, H. D. (M)
Ziemelis, V. (M)

Colonia (NNJ-2)
Anderson, E. C. (A)
Gegenheimer, R. F. (M)
Glick, C. L. (M)
Griffee, F. M. (M)
Levine, I. (M)
Mathews, R. H. G. (SM)
Sheffield, B. (SM)
Zeler, A. J. (A)

Convent (NNJ-2)
Siegel, F. L. (A)

Cookstown (PHI-3)
Kazmierczak, B. (M)

Coytesville (NNJ-2)
Boychuk, B. (M)
Xertesz, Z. J. (A)
Robin, G. W. (M)

Cranbury (PRI-2)
Langer, G. O. (M)
Matthews, N. F. J. (M)
Morgan, J. M. (SM)
Shankweiler, R. G. (SM)
Scholz, K. W. (A)
Zonis, F. I. (M)

Cranford (NNJ-2)
Abrams, H. (M)
Bell, B. A. (M)
Carlson, F. M. (M)
Fanarjian, R. C. (M)
Herzer, W. P. (M)
Hilliyer, C. (M)
Jagerman, D. L. (M)
Kolts, R. C. (M)
Lee, H. C. (M)
Madan, R. W. (A)
Schaner, F. A. (SM)
Schwarz, W. H. (A)
Shenk, J. J. (M)
Sullivan, H. J. (M)
Widmann, E. (M)

Cresskill (NNJ-2)
Lippner, B. (A)
Stebbins, M. D. (M)

Deal (NY-M-2)
Bennett, H. S. (SM)
Klayton, M. H. (SM)
Reingold, I. (SM)
Rosenblum, A. (M)

Delanco (PHI-3)
Brooks, H. B. (SM)
Hermann, P. E. (M)
Phillips, J. W. (A)
Potter, E. H. (SM)

Delaware Township (NNJ-2)
Batterman, S. (M)
Weir, W. T. (M)

Demarest, (NNJ-2)
Furrer, C. G. (A)
Sapiro, A. M. (M)

Denville (NNJ-2)
Baker, R. A. (M)
Beckmann, U. L. (A)
Bemis, A. R. (M)
Bercaw, J. D. (M)
Boatright, D. L. (M)
Farbanish, E. (A)
Gilbert, E. A. (M)
Helgeson, B. P. (M)
Jamba, D. M. (M)
Koch, H. J. (M)
Kodner, J. L. (A)
Kruger, H. A. (M)
Langdon, C. G. (M)
Mindes, A. S. (M)
Novick, W. (M)
Paull, M. (A)
Porter, E. A. (M)
Renwick, E. B., Jr. (M)
Ritterman, S. A. (M)
Sclar, N. (SM)
Vanek, L. J. (M)
Van Winkle, D. (A)

Dover (NNJ-2)
Backer, L. A. (SM)
Benson, R. K. (M)
Brown, A. F. (M)
Calafati, S. S., Jr. (SM)
Frank, J. E. (M)
Glass, L. H. (M)
Grenier, T. J. (M)
Grinoch, A. (M)
Helm, G. D. (SM)
Hotvedt, A. (M)
Hughes, T. A. (M)
Karger, G. (M)
Mc Crory, J. R. (M)
Mc Kechnie, K. H., Jr. (M)
Neville, S. M. (M)
Nielsen, M. I. (M)
Olson, J. W. (M)
Peretko, H. T. (M)
Poolas, G. (A)
Pursley, R. E. (M)
Rein, J. J., Jr. (M)
Schwartz, A. J. (M)
Shurley, R. M. (M)
Tilson, B. A. (M)
Waxler, D. (SM)
Zenk, G. E. (M)

Dumont (NNJ-2)
Apfel, G. J. (A)
Auld, J. S. (A)
Eland, P. D. (M)
Garrison, R. J. (M)
Hahn, J. (M)
Hammerstein, H. A. (M)
Kerner, S. J. (M)
Kompass, E. J. (M)
Leahy, G. F. (M)
Schwerin, P. (SM)
Smythe, R. D. (A)
Strain, M. (M)
Sundberg, A. (A)
Townsend, C. L. (A)

Dunellen (PRI-2)
Bradley, B. F. (M)
Chabrak, T. A. (M)
Frals, L. (M)
Geigel, A. A. (M)
Kaiser, C. J. (M)
Kinch, J. E. (M)
Longo, C. V. (SM)
Povich, J. (A)
Schmidt, S. J. (M)
Wolin, S. (SM)

Dutch Neck (PRI-2)
Wysocki, J. J. (M)

East Brunswick (PRI-2)
Fisher, J. L. (M)
Fisher, W. W. (M)
Meyerhoff, A. A. (SM)
Rubin, A. (M)
Vaccaro, F. E. (M)

East Orange (NNJ-2)
Armstrong, T. D. (M)
Borken, A. (A)
Byrum, E. J. (SM)
Carlat, B. (SM)
Conrad, T. E., Jr. (M)
D'Amanda, A. W. (M)
Fesler, R. (A)
Forman, J. A. (M)
Frandsen, D. V. (A)
Gawler, H. C. (SM)
Gonzalez, C. (M)
Henry, T. J. (SM)
Hodowanec, G. (M)
Holden, D. C. (M)
Kendall, B. W. (SM)
Krochmal, R. S. (A)
Lardieri, G. (A)
Lindon, J. (A)
Loomis, D. C. (A)
Meyer, B. (M)
Meyers, S. T. (SM)
Moritz, K. C. (SM)
Nelson, R. S. (M)
Park, R. C. (M)
Richardson, D. E. (M)
Riegler, R. L. (A)
Rubin, S. (M)
Rustan, J. (M)
Sandretto, P. C. (F)
Schneider, I. (M)
Smith, H. H. (M)
Smith, W. P. (A)
Spies, D. (A)
Stalker, F. B. (M)
Tanguay, G. R. (M)
Welble, N. R. (M)
Worthington, R. L. (M)

East Paterson (NNJ-2)
Benewicz, T. F. (M)
Boubil, E. J. (A)
Brennan, J. E. (M)
De Falco, N. J. (M)
Dehoney, R. J. (M)
Ederer, N. (M)
Fomin, M. (A)
Gardner, J. L. (A)
Grower, B. B. (M)
Grosbaum, E. (M)
Hesse, H. R. (SM)
Hoffman, P., Jr. (A)
Kendall, K. J. (M)
Koenig, J. A. (A)
Maron, M. (M)
Rosenes, O. (M)
Sinnema, E. M. (M)
Travis, W. (A)
Tuber, R. J. (M)
Woodward, R. J. (M)

East Rutherford (NNJ-2)
Palmer, J. G. (M)
Skalski, W. A. (M)

East Vineland (PHI-3)
Konrad, L. (M)

Eatontown (NY-M-2)
Abercrombie, G. D. (A)
Bartow, J. E. (M)
Burkhard, H. F. (M)
Curtis, M. W. (M)
Deblasio, C. (A)
Duffie, K. R. (A)
Felbish, H. L. (A)
Fentress, T. D., Jr. (SM)
Gaskell, R. J. (A)
Goubau, G. J. E. (F)
Hanson, E. D. (M)
Heinlein, J. V. (A)
Jones, J. L. (SM)
Jory, H. R. (M)
Kennedy, W. J. (M)
Kesselman, W. A. (M)
Landberg, A. (M)
Lasher, D. R. (M)
Laugesen, T. C. (A)
Lucyk, J. (M)
Lupinski, A. M. (M)
Mattes, A. J. (M)
Moody, C. S. (M)
Mullen, J. F. (M)
Newman, H. (M)
Occhioorosso, T. (M)
Petrallis, J. A. (A)
Petrillo, S. E. (F)
Rauffer, W. M. (A)
Rielly, V. E. (SM)
Shirley, T. L. (M)
Singer, F. L. (M)
Smidowicz, T. Z. (M)
Wassenberg, J. F. (M)
Woodward, R. M., Jr. (M)

Edgewater (NNJ-2)
Yelick, N., Jr. (A)

Edison (NNJ-2)
Bernstein, A. L. (M)
Birdsey, G. J., Jr. (M)
Kozma, J. A. (M)
Nelson, E. B. (M)
Sokol, S. (M)
Taylor, J. C. (M)

Edison Township (PRI-2)
Nussear, J. G. (SM)

Elberon (NY-M-2)
Bady, I. (SM)
Blum, M. S. (M)
Brand, F. A. (M)
Burke, M. H. (M)
Elser, A. C. (M)
Fontana, W. J. (SM)
Gelernter, B. (M)
Gould, W. B., III (A)
Hatkin, L. (M)
Hill, J. F. (M)
Ikrath, K. (A)
Jacoby, D. L. (M)
Krueger, T. O. (M)
Malkin, S. (M)
Prichard, A. C. (SM)
Schafer, J. P. (SM)
Scialfa, J. (A)
Sussdorff, R. R. (M)
Tanzman, H. D. (M)
Woodworth, J. D. (M)
Wynne, W. M. (M)
Ziegler, H. K. (SM)

Elberon Park (NY-M-2)
Hecker, H. F. (M)
Trauben, W. (M)

Elizabeth (NNJ-2)
Abenilla, J. C. (A)
Bellis, V. L. (A)
Blaisdell, W. C. (SM)
Blatter, H. (M)
Chasek, M. B. (M)
Cocker, W. T. (A)
Cooper, C. G. (A)
Elovic, A. (M)
Garfinkel, B. D. (M)
Glassman, S. H. (M)
Green, L. N. (M)
Heinen, J. (M)
Hirsch, F. (M)
Hold, H. W. (A)
Kaseta, A. R. (M)
Kent, R. A. (A)
Levine, S. W. (M)
Ligis, T. (M)
Lowe, W. H. (A)
Mohler, D. S. (A)
Nellis, S. (A)
Nelson, D. E. (M)
Olsen, R. F. (A)
Pecina, R. G. (M)
Peitzer, H. E. (SM)
Perez, C. P. (SM)
Peterson, T. A., Jr. (SM)
Pietrantonio, F. V. (M)
Putterman, H. (M)
Rosen, H. (M)
Scaturo, C. (M)
Sisany, R. (M)
Triano, J. N. (M)
Walsh, C. (SM)
Weinberg, M. (M)
Worthing, F. L. (A)

Elmer (PHI-3)
Tipton, W. F. (M)

Emerson, (NNJ-2)
Boyens, R. D. (SM)
Freid, J. (M)
Grossman, H. W. (M)
Kelley, J. R. (M)
Leonard, C. J. (M)
Long, J. H. (SM)
MacVeety, R. C., Jr. (M)
Rapaport, H. (SM)
Reinish, G. B. (M)
Rubino, J. W. (SM)
Sacco, V. (M)
Swiggett, W. O. (A)

Englewood (NNJ-2)
Alsberg, H. (A)
Anick, G. (A)
Dern, H. (SM)
Elders, D. S. (M)
Graham, J. S. (A)
Haagens, D. (M)
Hertzog, W. F., Jr. (M)
Hillman, L. (M)
Hughes, K. E. (M)
Kozmik, F. (A)
Lanigan, J. J. (A)
Mendelsohn, M. (M)
Press, M. (SM)
Roselli, D. J. (A)
Saliba, G. J. (SM)
Saliba, J. R. (M)
Sargeant, C. E. (M)
Smith, P. C. (M)
Stiefel, E. (A)
Thomas, E. R. (M)
Wolthoff, C. E. (A)

Englewood Cliffs (NNJ-2)
Bailin, R. C. (M)
Davis, J. H. (M)
Scott, D. A. (A)

Erlton (PHI-3)
Blaisdell, H. L. (SM)
Blumbaum, H. M. (M)
Buchanan, J. P. (M)
Carignan, R. J. (M)
Casolaro, R. N. (M)
D'Amato, E. J. (M)
Foley, T. U. (M)
Harmon, G. B. (A)
Kampf, R. J. (A)
Mechler, E. A. (SM)
More, L. C. (M)
Mullen, C. V. (A)
Murdock, W. G. (M)
Pearson, R. W. (M)
Pettersen, E. S. (M)
Schottenfeld, I. A. (A)
Smith, C. J. (M)
Varsos, S. G. (M)
Weisbecker, J. A. (M)

Erskine Lakes (NNJ-2)
Cosgrove, T. (SM)

Essex Fells (NNJ-2)
Blancke, T. B. (M)
Henneberger, T. C., Jr. (M)
Lederer, E. A. (F)

Fair Haven (NY-M-2)
Aronoff, M. (SM)
Chappell, J. F. (M)
Corkran, D. H. (SM)
Dickson, F. H. (M)
Evans, D. J., Jr. (M)
Gale, R. J. (M)
Hanley, J. F. (SM)
Harrison, D. J. H. (A)
Kelley, L. C. (M)
Kolar, E. F. (SM)
Lartaud, H. R. (SM)
Leddy, E. J. (M)
Loud, V. F. (A)
Marcuse, D. (M)
O'Neil, J. J. (M)
Priebe, F. K. (M)
Puzlo, P. S. (A)
Riehs, R. C. (SM)
Russell, W. J., Jr. (M)
Ruthroff, C. L. (M)
Schedlbauer, C. M. (SM)
Van Deusen, G. L. (F)
Young, J. A., Jr. (M)
Zahl, H. A. (F)

Fair Lawn (NNJ-2)
Bawer, L. I. (SM)
Bradburd, E. M. (M)
Brodsky, J. L. (M)
Carlin, B. (M)
Carpenter, P. J. (M)
Chao, J. (A)
Cooper, B. (M)
Diepeveen, N. (M)
Feit, L. (A)
Feller, M. (M)
Fischer, L. O. (M)
Frank, E. D. (M)
Fruchter, C. L. (M)
Gaines, R. I. (M)
Grabois, B. (M)
Guertin, W. S., Jr. (A)
Gulak, J. G. (SM)
Hill, E. (M)
Hill, E. R. (A)
Johnson, A. C. (M)
Judlowe, S. B. (M)
Kaylin, R. R. (M)
Lafferty, R. E. (SM)
Le Vine, D. J. (SM)
Levitsky, J. (M)
Lupo, F. J. (SM)
Miloy, M. (M)
Marrone, P. C. (M)
Mittman, E. E. (SM)
Moulton, J. H. (M)
Perry, M. A. (M)
Rabb, M. (M)
Reilly, N. B. (M)
Renard, W. J. (M)
Rosenberg, L. (A)
Sachs, H. S. (A)
Scarr, H. F. (SM)
Schacher, D. L. (M)
Schwartz, E. I. (M)
Sherman, H. (A)
Silver, M. (M)
Smolen, A. (M)
Spector, M. (A)
Star, M. (M)
Stein, E. (M)
Stein, E. (M)
Steinberg, S. (M)
Stumpf, F. J., Jr. (M)
Torrey, L. W., Jr. (M)
Zerkin, M. (M)

Fairview (NNJ-2)
Hammerle, F. H. (M)
Meo, M. (M)
Patan, B. A. (M)
Staluppi, J. P. (M)

Fanwood (NNJ-2)
Few, F. A. (M)
Henley, E. J. (A)
Hower, M. M. (M)
Isaacson, A. M., Jr. (M)

Rybakoff, G. (M)
Seidel, H. (M)
Squires, W. K. (SM)
Thomas, A. W. (M)
Whaley, H. R. (SM)
Wise, W. H. (SM)

Far Hills (PRI-2)
Baulch, E. L. (M)
Grissler, H. W. (M)
James, D. B. (M)
McDougall, A. (A)
Owen, R. W. (M)
Peery, W. E. (M)
Serig, H. W. (SM)

Farmingdale (NY-M-2)
Rock, F. E. (M)
Zilfger, W. H. (A)

Fayson Lakes (NNJ-2)
Duncombe, W. M. (A)

Flemington (PRI-2)
Hoffmann, K. G. (M)
Shaffer, R. E. (A)
Tanana, E. J. (M)

Florham Park (NNJ-2)
Ambruster, W. S. (A)
Anderson, W. W. (M)
Chapman, C. M. (M)
Coonce, H. E. (M)
Fultz, K. E. (A)
Gaunt, W. B., Jr. (M)
Greenwood, T. S. (A)
Hensperger, E. S. (M)
Meinholtz, H. J. (A)
Nikiel, R. V. (M)
Simone, C. F. (M)
Sullivan, M. V. (SM)
Tarrant, S. R. (A)

Fords (PRI-2)
Glickman, V. (M)
Goldberg, H. (M)
Gumbs, J. (A)
Helm, R. J. (A)
Kalista, S. A. (A)
Kaplan, L. A. (M)
Kemash, A. E. (M)
Mosolgo, R. N. (M)
Zapotocky, A. C. (M)

Fort Dix (PRI-2)
Kannawin, W. I. (A)

Fort Lee (NNJ-2)
Bernstein, S. B. (A)
Chin, E. (M)
Conerly, F. L. (A)
Foodman, H. W. (M)
Frisch, F. W. (M)
George, W. P. (M)
Goldsman, J. L. (M)
Grant, M. S. (M)
Hodge, F. W. (M)
Keller, E. W. (M)
Lager, B. (M)
Leonold, R. (SM)
Lieberman, H. (M)
Nidus, L. S. (M)
Snell, W. A. (M)
Sullivan, V. J. (A)
Unold, R. W. (SM)

Fort Monmouth (NY-M-2)
Bechmann, R. (F)
Brazee, G. (SM)
Brick, G. E., Jr. (A)
Brown, H. M. (SM)
Burke, A. L. (SM)
Campbell, R. G. (A)
Cline, R. B. (A)
Curry, D. D. (M)
De Laney, W. B. (M)
Favre, R. M., Jr. (M)
Freiberg, E. (M)
Gartner, W. W. (M)
Gerber, E. A. (F)
Grube, J. C. (M)
Hendricks, A. D. (M)
Hirst, W. B., Jr. (M)
Meindl, J. D. (M)
Obenchain, I. R., Jr. (SM)
Rouge, L. J. D. (SM)
Saulnier, E. A., Jr. (M)
Varnik, A. (M)
Washington, S. (M)
Watters, J. F. (SM)
White, H. E. (M)
Wilson, J. L., Jr. (SM)

Franklin (NNJ-2)
Segarra, J. (A)

Franklin Lakes (NNJ-2)
Gottfried, N. J. (M)
Hoover, L. R. (A)
Houghton, T. F. (M)
Piccoli, P. E. (M)
Pulchlopek, E. S. (M)
Sellner, H. W. (A)

Franklin Park (PRI-2)
Anas, V. R. (A)
Belohoubek, E. F. (M)
Braun, M. (M)
Brown, H. R. (A)
Callais, R. T. (M)
Moore, T. H. (M)
Murray, P. C. (M)
O'Connell, J. H. (A)
Presser, A. (M)
Randolph, G. C. (A)

Freehold (NY-M-2)
Buck, D. T. (M)
Elcock, G. C. (A)
Hersh, H. J. (SM)
Kalser, E. J. (M)
Katz, S. (M)
Lawn, F. (M)
O'Donnell, R. V. (SM)
Pochmerski, D. (M)

Frenchtown (PRI-2)
Carlson, R. (A)

Garfield (NNJ-2)
Gabel, D. D. (A)
Horvath, S. J. (M)
Krzych, L. J. (A)
Mayurnik, G. (A)
Puskas, W. E. (M)
Sadvary, J. W. (A)
Scott, A. (M)
Zabawa, J. J. (M)

Gibbsboro (PHI-3)
Lebovitz, S. (A)
Neely, W. J. (A)
Nikolayuk, N. (A)

Gillette (NNJ-2)
Almquist, M. L., Jr. (M)
Kannenberg, W. F. (SM)
Rist, R. E. (M)
Roller, E. L. (M)
Rushing, L., Jr. (M)
Rystedt, T. (M)
Spector, C. J. (M)
Turrin, R. H. (M)
Vitkovits, S., Jr. (M)

Glassboro (PHI-3)
Atherton, D. G. (M)
Deml, A. J. (M)
Loeb, P. (M)
Riggs, D. L. (M)
Saganowich, J. T. (M)

Glen Ridge (NNJ-2)
Brubaker, P. M. (M)
Crowley, J. F. (A)
Dorff, L. A. (SM)
Hamilton, C. E. (SM)
Honaman, R. K. (SM)
Hopgood, R. C. (SM)
Mandel, M. (M)
Olsen, E. U. (M)
Polyzou, J. (M)
Reveal, P. A. (M)
Tambling, R. L. (SM)
Tresnak, R. F. (M)
Vallese, L. (SM)
Walte, G. F. (A)
Wolfe, R. A. (M)

Glen Rock (NNJ-2)
Abrams, J. (M)
Ballou, F. M. (M)
Becker, E. D. (M)
Browne, R. (M)
Clark, L. E. (M)
Cotellessa, R. F. (SM)
Erickson, C. R. (M)
Fischer, L. G. (SM)
Graebner, J. C. (M)
Green, R. C. (A)
Kloster, D. E. (A)
Lott, R. E., Jr. (M)
Lukas, W. (M)
McGovern, J. J. (M)
Ringer, R. L., Jr. (M)
Senator, R. S. (M)
Singer, E. (M)
Wiles, R. L. (A)

Glendora (PHI-3)
Currey, W. J. (A)
Jack, D. E. (M)
Liebold, F. A. (M)

Gloucester (PHI-3)
Cornet, E. (SM)
Dunn, D. C. (M)
Fisher, D. M. (A)
Lanphear, F. L. (M)
Leung, T. C. (M)
Osler, S. J. (M)
Seay, R. T. (A)

Great Notch (NNJ-2)
Berkley, C. (A)
Denney, J. M. (M)
Godley, P. F. (M)
Godley, P. F., Jr. (M)

Grenloch (PHI-3)
Barton, H. R., Jr. (A)
Henuset, F. V., III (A)

Guttenberg (NNJ-2)
Brackett, J. J. (A)

Hackensack (NNJ-2)
Arcidiacono, J. (M)
Bastian, A. L. (M)
Davis, H. M. (A)
Frishman, M. A. (M)
Gage, L. W. (M)
Gutcheon, W. Y. (M)
Larkin, D. E. (M)
Lumbert, J. S. (A)
Maasik, C. (A)
Mate, H. (M)
McKenzie, A. A. (SM)
Nagl, J. L. (M)
Roenisch, J. L. (SM)
Samuelson, C. D. (SM)
Siltanen, J. C. (M)
Wertman, R. C. (M)
Wylde, W. N. (M)

Hackettstown (NNJ-2)
Glass, J. F. (A)
Ouellette, L. A. (A)

Haddonfield (PHI-3)
Achenbach, J. C. (SM)
Adams, R. L. (M)
Alexander, E. M. (M)
Alter, A. C. (SM)
Ammon, G. M. (A)
Anderl, M. T. (M)
Anderson, C. V. (M)
Anderson, E. I. (F)
Andrews, B. I. (M)
Andrews, K. E. (M)
Anlage, J. J. (A)
Ardys, J. (M)
Armbruster, G. J. (A)
Atkins, R. E. (M)
Austein, E. E. (M)
Austin, W. J. (M)
Bail, J. W. (M)
Bailey, R. E. (M)
Baker, A. E. (M)
Bardash, I. (M)
Barry, R. F. (M)
Barton, D. K. (SM)
Bauer, W. R. (M)
Beck, F. X., Jr. (M)
Beers, G. L. (F)
Benner, A. H. (SM)
Berge, R. G. (SM)
Bergquist, P. (M)
Binzer, C. (A)
Blackman, W. (M)
Blau, W. (A)
Blaustein, H. D. (M)
Blodgett, E. D. (SM)
Boemer, T. J. (SM)
Bowen, O. N. (M)
Bowman, S. T. (A)
Bradburn, R. C., Jr. (A)
Braddock, E. (M)
Bragdon, J. H. (M)
Breckman, J. L. (M)
Brock, F. M. (M)
Brooks, C. L., Jr. (M)
Brown, H. W., Jr. (SM)
Brown, L. (M)
Brown, W. J. (M)
Bry, J. C. (M)
Bullock, J. B. (M)
Bunn, J. S., Jr. (M)
Burton, N. H. (M)
Butler, J. G. (A)
Campopiano, C. N. (M)
Cantalfio, L. J. (A)
Capron, R. W. (M)
Carter, G. W. (SM)
Cashwell, R. G., Jr. (M)
Castleberry, J., Jr. (M)
Cederbaum, L. R. (M)
Cheetham, R. P. (M)
Chiabrando, J. C. (A)
Chiei, F. D., Jr. (M)
Chittick, K. A. (F)
Cimerman, I. (M)
Cohen, L. M. (M)
Cohen, P. (SM)
Coleman, J. B. (F)
Coleman, R. E. (M)
Colligan, J. A. (M)
Connor, W. J., Jr. (M)
Cook, M. E. (M)
Cooper, R. M., III (M)
Cooper, S. (M)
Covely, F. D., III (SM)
Coyle, D. J. (M)
Crawford, C. F. (SM)
Crooks, H. N. (SM)
Cubert, J. S. (M)
Cunningham, O. B. (SM)
Davis, D. A. (M)
Davis, S. J. (M)
De Long, G. E. (M)
Dennen, W. B., Jr. (M)
Denton, B. E. (SM)
Desautels, G. L. (M)
Desrochers, R. E. (M)
Dewitt, C. C. (A)
Dishler, J. J. (A)
Ditkofsky, H. (M)
Donze, D. W. (M)
Dougherty, J. P. (M)
Douma, T. (SM)
Drake, A. H. (A)
Drenik, J. (M)
Ehrich, W. G. (M)
Elliott, H. M. (M)
Erdmann, R. G. (M)
Emsberger, R. E. (M)
Erwin, G. E. (M)
Everhard, F. U., Jr. (A)
Facer, R. S. (A)
Fedak, J. F., Jr. (A)
Federlin, H. M. (M)
Feltx, E. H. (SM)
Feller, J. B. (M)
Ferron, J. A. (M)
Feryszka, M. (M)
Feze, H. K. (M)
Fine, R. S. (SM)
Fink, M. (M)
Flore, R. E. (M)
Fitzpatrick, A. G. (M)
Flint, R. J. (M)
Fong, T. T. (M)
Forrester, C. A. (M)
Forte, S. R. (M)
Foster, H. B. (M)
Fox, R. I. (M)
Frary, R. S. (M)
Frosch, J. A. (M)
Funk, K. A. (M)
Furnstahl, J. S. (M)
Gallo, J. E. (SM)
Gallo, L. (M)
Gensel, W. L. (M)
Gerardi, V. A. (M)
Graeff, R. F. (M)
Graham, R. C. (M)
Gray, F. D. (M)
Green, M. (M)
Grever, J. L. (M)
Griess, R. K. (M)
Gross, D. T. (M)
Guerber, H. P. (M)
Gutsmuth, H. R. (M)
Haddad, R. A. (M)
Halpern, S. (SM)
Hammel, R. A. (A)
Handler, M. J. (A)
Harwood, L. A. (M)
Haynes, H. E. (SM)
Helzer, J. T. (M)
Henker, C. R. (M)
Hermley, G. C., Jr. (SM)
Heman, G. W. (M)
Hermann, F. J. (SM)
Hill, N. R. (M)
Hillman, E. L. (A)
Himmelstein, F. (M)
Hodson, L. A. (SM)
Holdridge, G. R. (M)
Hollingsworth, G. E. (M)
Holshouser, J. R., Jr. (M)
Horton, J. B. (M)
Housky, L. J. (M)
Howard, T. B. (M)
Hsieh, P. K. (M)
Hubbard, B. L. (M)
Hunt, R. W. (M)
Hurd, R. G. (A)
Hymas, D. G. (M)
Into, A. N., Jr. (A)
Ison, W. R. (SM)
Janz, D. W. (M)
Jolfe, I. (M)
Johnson, E. O. (SM)
Johnson, R. V. (A)
Kalkman, E. C. (M)
Kasmar, R. A. (M)
Katz, A. (M)
Keefe, J., Jr. (A)
Kellom, B. K. (A)
Kemnitz, W. F. (M)
Kennedy, H. W., Jr. (M)
Kessler, B. I. (M)
Kettler, A. H. (SM)
Kingan, J. (M)
Kirkwood, L. R. (SM)
Kita, R. K. (M)
Klaus, W. J. (M)
Klavens, N. I. (M)
Klawsnik, C. (SM)
Kolesnik, M. (M)
Koros, L. L. (SM)
Kouns, W. D., Jr. (M)
Krasney, S. (A)
Krell, A. I. (M)
Kropp, G. W. (A)
Kruger, I. D. (M)
Krugman, L. M. (SM)
Larson, K. E. (M)
Lawler, J. J. (A)
Lesko, J. (M)
Lev, S. N. (M)
Levy, M. A. (M)
Levy, S. N. (M)
Lewis, E. S. (M)
Lewis, R. J. (SM)
Lezan, G. R. E. (M)
Lieberman, G. (M)
Liebermann, J. (M)
Lind, A. H. (M)
Lindheim, F. H. (M)
Lindner, G. H. (A)
Linhardt, R. J. (SM)
Lisicky, A. J. (M)
Logan, W. L. (M)
Lombardo, A. (A)
Lowe, M. H. (SM)
Luber, L. (M)
Luddy, E. N. (M)
Luksch, J. A. (M)
Lundgren, D. L. (SM)
Lundon, J. J. (M)
Lyndon, W. L. (SM)
Lyon, W. T. (M)
Lyons, R. E. (M)
Magyarics, R. F. (A)
Major, R. P. (M)
Mann, H. T. (M)
Mannino, A. J. (SM)
Marks, T. P. (A)
Maron, I. (M)
Martin, F. F. (M)
Martinson, L. W. (M)
Mathwich,, H. R. (M)
Matson, L. E., Jr. (M)
Mayer, D. B. (M)
Mayo, A. L. (A)
McCoy, J. F. (SM)
McGaughey, P. C. (SM)
McKee, D. M. (A)
Meisenheimer, R. L. (SM)
Mertz, H. W. (M)
Messina, M. F. (M)
Michel, C. A. (M)
Milewski, C. A. (M)
Miller, G. F. (M)
Mitchell, R. D. (A)
Mitchell, W. T. (M)
Mitin, N. (A)
Monro, C. R. (M)
Montague, H. R. (M)
Morgan, M. J., Jr. (A)
Moule, W. N. (M)
Munson, I. K. (SM)
Muoio, A. W. (M)
Murakami, T. (SM)
Musson, D. R. (M)
Nachtrieb, T. W. (M)
Nacke, C. C., Jr. (M)
Nessmith, J. T., Jr. (M)
Neumann, K. L. (M)
Nicholson, B. E. (SM)
Niewenhous, J. H. (M)
Nishimura, G. H. (M)
Noble, R. B. (M)
Noel, R. Y. M. (M)
Noguchi, R. Y. (A)
Nold, D. E. (A)
Nordyke, H. W., Jr. (M)
Nossen, E. J. (M)
Obenland, D. K. (M)
Oberle, G. W. (SM)
O'Brien, T. J. (A)
Oelwein, W. R. (M)
Ohle, A. F. (M)
O'Neil, P. T. (M)
Paley, L. I. (M)
Palmer, J. E. (A)
Pandorf, R. J. (M)
Parker, J. R. (M)
Perreault, W. J., Jr. (M)
Perry, S. V. (SM)
Peterson, C. E. (M)
Peterson, R. A. (SM)
Petri, W. H., Jr. (SM)
Phelps, D. E. (A)
Poltras, D. J. (M)
Poorte, G. E. (M)
Poskevich, J. J. (M)
Potts, J. B. (M)
Pratt, D. (SM)
Price, W. E. (SM)
Pritchard, E. M. (SM)
Prunty, R. B. (M)
Pyle, M. O. (M)
Randt, R. C. (M)
Reich, L. (M)
Reimertz, R. R. (M)
Reinert, D. O. (M)
Rettig, A. S. (SM)
Riccio, A. H. (SM)
Roberts, G. H. (M)
Robinson, W. C. (M)
Rocamora, R. L. (M)
Rose, H. E. (M)
Rose, W. A. (M)
Rosenblatt, M. (M)
Ross, G. T. (M)
Roth, J. H. (SM)
Rowland, G. E. (M)
Rudner, M. A. (SM)
Ryan, V. F., Jr. (M)
Sable, J. D. (M)
Sall, C. W. (SM)
Samartino, R. F. (M)
Sander, S. (M)
Scharff, L. (SM)
Schilling, R. D. (M)
Schneider, H. T. (A)
Schrader, H. J. (F)
Schwartz, B. R. (M)
Schwarz, N. (M)
Scobee, E. M. (M)
Scott, P. B. (M)
Shapiro, L. (M)
Shectman, M. (M)
Shectman, N. (M)
Shelton, J. A. (M)
Sibley, R. L. (M)
Siegal, M. E. (M)
Simon, L. H. (M)
Singer, G. A. (M)
Skarbek, I. R. (M)
Skidmore, W. S. (M)
Smith, E. B. (SM)
Smith, J. N. (M)
Sonnenfeldt, R. W. (SM)
Spiegel, S. S. (M)
Stafford, R. H. (A)
Starner, C. J. (M)
Starr, S. C., Jr. (M)
Staton, M. G. (M)
Stern, I. (M)
Stone, F. B. (SM)
Stover, R. A. (A)
Strickland, K. T. (M)
Strip, J. (SM)
Sullivan, J. L. (A)
Sumino, R. S. (A)
Taylor, J. G. (M)
Taylor, J. P. (A)
Taylor, W. E. (A)
Thomas, J. W. (M)
Thomas, L. P. (SM)
Tice, G. Y. (M)
Tissot, T. P., Jr. (M)
Toscano, P. M. (SM)
Trachtenberg, R. (SM)
Traub, W. F. (M)
Trouant, V. E. (SM)
Truesdell, R. L. (M)
Turecki, A. (M)
Turnbull, S. W. A. (M)
Turner, R. R. (M)
Ubben, R. C. (M)



Waddell, R. G. (M)
Wahlstrom, R. N. (A)
Waite, J. H., Jr. (SM)
Wallner, F. S. (M)
Walter, C. E., III (SM)
Walters, W. R. (M)
Wang, T. (A)
Watson, S. H. (SM)
Weber, L. J. (M)
Weir, K. (M)
Welse, R. C. (M)
Weiss, M. V. (M)
Weiss, S. L. (M)
Welsh, R. R. (SM)
Welsher, C. E. (SM)
Wenger, W. D. (SM)
Wentworth, J. W. (M)
West, L. G. (M)
Westwood, D. H. (SM)
Wheeler, B. F. (SM)
Widmann, F. W. (SM)
Wilder, M. K. (M)
Willman, R. C. (SM)
Wilson, H. S. (M)
Wolf, L. J. (SM)
Wolf, R. E. (M)
Woolf, I. (M)
Wooten, L. B. (M)
Wroblewski, B. (M)
Yanis, E. M. (M)
Yanofsky, B. M. (A)
Yao, Y. L. (M)
Zoltan, I. N. (M)

Haddon Heights (PHI-3)
Altel, M. L. (M)
Arrowood, W. E. (M)
Auerbach, B. (M)
Barger, J. R. (M)
Beckhart, G. H. (M)
Boehm, P. P. (M)
Braun, J. H. (M)
Burke, A. M. (M)
Carlson, D. J. (SM)
Conroy, G. J. (M)
Darnell, W. E. (SM)
Eulo, G. R. (M)
Goodman, G. H. (SM)
Gunter, D. L. (M)
Hartmann, H. (A)
Harwood, F. E. (A)
Hoger, D. T. (M)
Hoyle, W. E. (M)
Leighton, A. K. (M)
Leithan, N. D. (M)
Mackway, H. J. (M)
Moore, E. E. (M)
Pan, W. Y. (F)
Phillips, C. R. (M)
Ringo, K. A. (SM)
Roehm, R. A. (M)
Solomon, K. (M)
Steoger, J. E. (A)
Wolf, L. (SM)
Woll, H. J. (SM)

Hamburg (NNJ-2)
Tomey, J. G. (M)

Hamilton Square (PRI-2)
Miller, J. C. (M)
Quinn, R. E. (M)

Hammonton (PHI-3)
Haskin, R. H. (M)
Pietrofitta, S. M. (M)
Reber, P. W. (A)

Hanover (NNJ-2)
Byrne, E. R. (M)
Coker, J. A. (M)
Doll, W. E. (M)
Irland, E. A. (M)
Leonard, T. H. (M)
Lloyd, A. G. (A)
Simms, R. L., Jr. (M)

Harbourton (PRI-2)
Reed, R. D. (SM)

Harrington Park (NNJ-2)
Aron, M. (SM)
Burruano, S. J. (SM)
Evers, J. H. (A)
Vleth, W. G. (M)

Harrison (NNJ-2)
Austin, W. M. (M)
Bahls, W. E. (SM)
Bertin, E. P. (M)
Bucklin, K. G. (SM)
Burton, D. M. (M)
Carrona, J. J. (M)
Cimorelli, J. T. (SM)
Cranmer, W. S. (SM)
Dunn, R. F. (M)
Eberly, H. L. (SM)
Freedman, N. S. (SM)
Freeling, M. R. (M)
Gutowski, J. L. (SM)
Hirlinger, J. F. (SM)
James, W. M. (SM)
Johnk, O. (A)
Kautzmann, A. P. (SM)
Kelly, R. L. (SM)
Kleinman, B. (M)
Koustas, P. (SM)
Levine, B. (M)
Maquire, J. T. (M)
McElwee, E. M. (SM)
McMurrough, R. W. (M)
McPartland, J. F. (A)
Mead, W. H. (M)
Meyer, C. A. (SM)
Middings, S. (M)
Modugno, V. D., Jr. (A)
Morris, C. M. (SM)
Novak, G. (M)
Nowogrodzki, M. (M)
Perkins, T. B. (M)
Reusch, R. K. (M)
Rose, G. M., Jr. (F)
Sarullo, M. J. (M)
Scholz, L. C. (SM)
Shaw, G. R. (F)
Shuttleworth, E. (A)
Smith, D. Y. (SM)
Stacy, I. F. (M)
Stein, V. J. (M)
Talpey, R. G. (SM)
Troy, E. M. (M)
Wanchow, J. J., Jr. (M)
Wheeler, C. R. (SM)

Hasbrouck Heights (NNJ-2)
Henn, W. (M)
Lasch, W. H. (M)
Lazos, N. J. (M)
Michaelson, W. (M)
Zoref, A. S. (A)

Haskell (NNJ-2)
De Gruchy, D. C. (M)

Haworth (NNJ-2)
Clausen, R. W., Jr. (M)
Guy, R. F. (F)
Osborn, P. H. (M)
Terry, F. B. (A)

Hawthorne (NNJ-2)
Carlson, E. S. (M)
Constantin, L. L. (M)
Madle, P. J. (SM)

Hazlet (NY-M-2)
Angel, K. W. (M)
Bogaenko, S. W. (M)
Bryson, W. B. (M)
Coffey, W. D. (M)
Hancock, G. H. (A)
Harries, W. (M)
McDonald, J. R. (A)
Morgan, R. L. (M)
Przybylski, T. P. (A)

High Bridge (PRI-2)
Bartles, E. K. (A)
Hoffman, J. E., Jr. (M)

Highland Park (PRI-2)
Bocchieri, A. J. (A)
Garfinkel, A. R. (SM)
Goldin, S. M. (M)
Hassell, R. D. (A)
Lannary, J. (M)
Molony, D. A. (SM)
Nelson, J. L. (M)
Nishida, R. K. (A)
Norman, D. W. (M)
Stephenson, M. L. (A)

Highlands (NY-M-2)
De Bretteville, A. P., Jr. (M)
Ferrar, R. C. (SM)
Korn, W. (M)
Rohrle, T. A. (A)

Hightstown (PRI-2)
Crooke, A. W. (A)
Fraipont, D. F. (M)
Green, R. S. (M)
Lyon, C. C. (A)
Monsen, A. M. (A)
Winkowski, R. (M)

Hillsdale (NNJ-2)
Barnabic, E. V. (M)
Conroy, R. J. (M)
Goldberg, S. R. (M)
Klein, M. E. (M)
Koehler, J. A. (M)
Lapham, F. K., Jr. (A)
Marsh, C. O., Jr. (M)
Paradise, R. Y. (M)
Powell, C. (M)
Sullinger, W. B. (SM)
Teitler, A. (SM)

Hillside (NNJ-2)
Aleixo, A. (M)
Breunig, J. J. (M)
Cohen, H. (M)
Hood, C. N., II (SM)
Hrusovsky, S. (A)
Kahant, C. G. (A)
Robinson, A. J. (M)
Sperber, M. (M)
Zentmaier, K. H. (M)

Hoboken (NNJ-2)
Clark, J. J. (M)
Ficken, W. H. (M)
Gilmore, A. C., Jr. (M)
Hahn, R. F. (M)
Hauser, E. B. (M)
Koenig, H. C. (M)
Merrill, L. L. (SM)
Rossi, S. (A)
Shouri, J. C. (M)
Simberkoff, J. A. (A)
Simberkoff, S. W. (A)
Sullivan, W. L. (SM)

Hohokus (NNJ-2)
Ebersol, E. T. (M)
Mangels, L. A. (A)
Markus, J. (SM)
Saul, E. R. (M)
Seggebruch, R. L. (A)
Spaulding, H. K. (A)

Holmdel (NY-M-2)
De Lange, O. E. (M)
Enloe, L. H. (M)
Marcatili, E. A. J. (M)
Woo, K. W. (M)

Hopewell (PRI-2)
McCoy, D. S. (M)
Townsend, C. C., Jr. (M)

Interlaken (NY-M-2)
Krassner, G. N. (M)
Todd, W. (M)

Ironia (NNJ-2)
Brown, R. E. (M)
Markle, R. E. (M)
Weiss, A. A. (M)

Irvington (NNJ-2)
Ackerly, R. J. (A)
Angello, J. P. (M)
Dougherty, E. V. (M)
Gropo, B. P. (M)
Heber, J. F. (M)
Hibbett, R. M. (M)
Huettl, K. W. (A)
Momno, E. J. (M)
Nesselroth, M. D. (M)
Schroeder, C. R. (M)
Stevens, Z. J. (M)
Sutton, R. H. (A)

Iselin (PRI-2)
Fryer, W. R. (M)
Kosonocky, W. F. (M)
Kvedaras, A. P. (M)
Libes, S. (A)

Jersey City (NNJ-2)
Azevedo, J. M. (A)
Balter, L. (M)
Bernstein, E. (A)
Brogan, J. M. (M)
Cacutte, W. R. (M)
Casaldi, J. A. (A)
De Rosa, J. J., Jr. (A)
Faber, M. J., Jr. (A)
Gaudiosi, J. V. (A)
Graul, G. D. (M)
Gregory, J. P., Jr. (A)
Hawkins, F. T. (A)
Howell, W. J. (SM)
Israel, D. D. (F)
Kierce, E. (M)
Lee, T. J. (M)
Lolterman, L. (M)
Marchand, O. P. (A)
Marrie, E. K. (M)
Mayor, R. (A)
McAndrew, T. V. (M)
Napoleon, J. J. (M)
Olin, R. P. (M)
Parisi, D. J. (A)
Polcyn, S. J., Jr. (M)
Putt, D. R. (A)
Raffel, L. (A)
Seel, M. (A)
Sickles, C. E. (A)
Slurzberg, N. (A)
Smith, J. A. (M)
Swietluk, S. (M)
Tenten, R. C. (A)
Wormcke, W. (M)
Yaworsky, Y. J. (M)

Keansburg (NY-M-2)
Darke, J. G. (A)

Kearny (NNJ-2)
Belamarich, J. P. (M)
Bondon, L. A. (SM)
Helwig, W. J. (SM)
Isdanovich, E. J. (A)
Lewis, R. F. (M)
McKeon, E. F. (M)
Percival, W. R. (SM)
Pfleger, K. W. (SM)

Keasbey (PRI-2)
Albers-Schoenberg, E. (SM)
Snyder, C. L. (SM)

Kenilworth (NNJ-2)
Jakub, J. J. (M)
Mayer, J. H. (A)
McCarroll, A. K. (A)
Scheibner, J. F. (M)

Kenvil (NNJ-2)
Jensen, A. K. (M)
McIntyre, J. W. (M)

Keyport (NY-M-2)
Blumberg, L. (M)
Schlaack, N. F. (SM)
Schmeling, A. M. (A)
Slobodin, L. (M)

Kingston (PRI-2)
Czukrasz, Z. P. (A)

Kinnelon (NNJ-2)
Gaw, N. W. (M)

Lake Hiawatha (NNJ-2)
Bremer, H. A. (M)
Calzaretta, R. G. (M)
Greenberg, A. H. (M)
Rosenbusch, F. (A)

Lakehurst (NY-M-2)
Annable, W. G. (M)

Lake Parsippany (NNJ-2)
Hoglund, K. M. (M)
Janik, J., Jr. (M)

Lake Pine (PHI-3)
Gavinski, V. A. (M)

Lakewood (NY-M-2)
Bell, J. (A)
Hartley, J. H. (M)
La Cava, E. (A)
Ringel, M. (A)

Landing (NNJ-2)
Gateka, F. A. (M)

Landisville (PHI-3)
Gardenghi, R. A. (M)

Laurel Springs (PHI-3)
Coffey, E. W. (M)
Smith, W. J. (A)

Laurelton (NY-M-2)
Vorwerk, F. A. (A)

Lawrenceville (PRI-2)
Bender, M. (M)
Blankenbaker, J. V. (A)
Kihn, H. (SM)

Lebanon (PRI-2)
Daskam, S. W. (M)
Kosmac, I. (M)
Rhodes, R. M. (M)

Ledgewood (NNJ-2)
Deveau, R. L. (M)

Leonia (NNJ-2)
Burger, F. J. (A)
Christie, F. W. (M)
Dietsch, C. G. (SM)
Grube, W. O. (SM)
Kennedy, T. R., Jr. (SM)
Kerman, M. (M)

Levittown, (PHI-3)
Ameniya, H. (M)
Angelastro, M. (M)
Arlan, L. (M)
Buckman, S. L. (A)
Callahan, J. F. (M)
Cox, A. L. (M)
Curtis, J. J. (M)
Davis, R. S. (M)
Dorsay, T. A. (M)
Garcia, S. C. (M)
Godefroy, A. F. (M)
Goldberg, M. L. (A)
Goldman, H. B. (A)
Guerin, M. (M)
Hirsch, S. C. (A)
Hunt, A. E. (M)
Huyck, W. J., Jr. (M)
Kardash, J. J. (M)
Kilday, J. C., III (M)
Kreitzer, H. M. (A)
Mayhew, T. R. (M)
McGuire, T. J. (M)
McHugh, E. L. (M)
Mitchell, A. (M)
Mogensen, H. (M)
Mohr, H. F. (M)
Neely, E. H. (M)
O'Brien, D. B. (M)
Page, F. E., Jr. (SM)
Rapoza, T. J. (M)
Riley, R. L. (A)
Robertz, A. N. (M)
Saks, H. L. (M)
Scearce, F. T. (M)
Smith, E. D. (SM)
Smith, R. A. (M)
Srolovitz, H. R. (A)
Stahl, P. D. (SM)
Vetack, J. E. (M)
Vrattos, G. P. (M)
Yu, E. K. C. (M)

Lincoln Park (NNJ-2)
Brennan, P. M. (A)
Lapham, C. J. (A)
Quinlan, D. E. (A)

Lincroft (NY-M-2)
Bawden, H. G. (M)
Ceres, G. V. (A)
Duffy, J. P. (M)
Knehs, A. R. (A)
Pellegrinelli, A. (M)
Slevin, R. F. (M)
Wagner, L. H. (M)

Linden (NNJ-2)
Braun, L. (A)
Garshelis, I. J. (A)
Gladden, C. J. (A)
Kashork, E. F. (M)
Levin, R. M. (A)
Macovski, A. (SM)
Meyer, S. F. (M)
Olesky, M. (A)
Redd, T. M. (M)
Riley, G. B. (SM)
Tkach, G. D. (M)
Turner, C. R. (M)
Wexler, B. (A)

Linwood (PHI-3)
Baker, R. L. (SM)
Braverman, N. (SM)
Dogantzis, B. E. (M)
Rogers, D. C. (M)
Russell, C. M. (SM)
Saadeh, D. (M)
Segen, S. A. (A)
Voisich, J. (A)

Little Falls (NNJ-2)
Bluhm, R. W. (A)
Bondy, J. O. (A)
De Ryder, H. (M)
Edwards, R. A. (M)
Gurwacz, C. J. (M)
Hintikka, I. (M)
Huettner, O. A. (M)
Jaasma, E. G. (M)
Needels, F. R. (M)
Nord, H. H. (M)
Oberg, T. E. (SM)
Russo, O. L. (A)
Thiergartner, G. J. (A)
Turkheimer, P. M. (M)

Little Ferry (NNJ-2)
Gartner, J. J. (M)
Rostan, R. J. (M)

Little Silver (NY-M-2)
Blair, C. L. (SM)
Borgeson, C. A. (SM)
Bracken, J. R. (M)
Brueckmann, H. L. (F)
Bullwinkel, E. C. (M)
Butler, H. (M)
Craig, L. H. (SM)
Daniels, F. B. (SM)
Domidion, W. G., Jr. (A)
Fox, K. H. (SM)
Garoff, K. (SM)
Goldsmith, B. M. (SM)
Griffiths, R. J. (SM)
Havel, J. M. (M)
Huebner, D. L. (M)
Jensen, A. M. (M)
King, H. D. (SM)
Klenk, L. M. (SM)
Krevsky, S. (SM)
Lowry, L. R. (SM)
Mack, A. (M)
Miller, L. (SM)
Mond, L. I. (M)
Morris, M. M. (SM)
Paschetto, E. J. (M)
Pick, L. A. (M)
Pollock, D. (M)
Poteet, D. P. (M)
Sharp, C. E. (SM)
Shive, S. L. (SM)

Livingston (NNJ-2)
Augenblick, H. A. (M)
Baker, D. (A)
Bishop, J. B. (SM)
Bogner, I. (SM)
Bolvin, P. B., Jr. (M)
Broekhuysen, W. C. (SM)
Chen, R. K. (M)
Cohen, E. (M)
Cunningham, T. M. (M)
Dorros, I. (M)
Engelmann, H. F. (SM)
Feinstein, J. (M)
Galanty, H. (SM)
Goldstein, A. (M)
Greenwald, C. (A)
Hatch, R. W. (M)
Hertherington, R. W. (A)
Hoeh, F. W. (M)
Hoerner, E. F. (M)
Jandoli, L. R. (M)
Kafalas, C. (M)
King, J. H., Jr. (M)
Kroeacher, G. (SM)
Kulik, V. A. (M)
Markosian, V. (SM)
Mawhinney, D. D. (M)
Membury, P. J. (M)
Mennie, J. H. (M)
Misra, R. P. (SM)
Newman, L. (A)
Nordlin, H. G. (SM)
Normando, N. J. (M)
Oglesby, J. D. (SM)
Ost, S. B. (M)
Ploufle, R. L., Jr. (SM)
Richardson, A. L. (M)
Sanger, D. M. (M)
Silverscholtz, S. B. (M)
Steiger, B. F. (M)
Steinhoff, R. (M)
Stinehelfer, H. E., Sr. (SM)
Sussman, E. B. (M)
Ussery, P. W. (M)
Vadersen, C. W. (M)
Veley, H. N. (SM)
Voorhis, W. B. (SM)
Wolkstein, H. J. (M)
Zacharais, E. M., Jr. (M)

Loch Arbour (NY-M-2)
Silva, A. A. (M)

Lodi (NNJ-2)
Brand, E. G. (M)
Conrad, R. J. (M)
Edelman, G. (M)
Fox, A. (M)
Glazer, E. (M)
Meyer, R. W. (M)
Seda, O. L. (A)
Sidari, P. J. (A)
Villar, R. A. (A)

Long Branch (NY-M-2)
Adamson, A. L. (SM)
Alexander, J. M. (M)
Allen, J. A. (M)
Ballato, A. D. (M)
Balton, I. A. (M)
Barr, H. (M)
Berl, S. (M)
Brown, A. (SM)
Caldwell, W. C. (SM)
Chernow, M. (M)
Chong, G. R. (M)
Christianson, L. F. (SM)
Dowski, E. R. (M)
Dwin, D. (A)
Eaton, K. O. (M)
Faralla, R. A. (SM)
Gall, R. C. (A)
Gaus, E. L. (M)
Gougoulis, G. H. (M)
Greenspan, S. (M)
Gubin, L. L. (A)
Hamer, H. (SM)
Holsclaw, R. F. (A)
Homa, S., Jr. (M)
Humbel, B. F. (M)
Insterman, H. E. (M)
Kardauskas, E. (M)
Kinnie, I. G. (M)
Klein, T. J. (M)
Koch, O. F. (A)
Kravitz, M. L. (M)
Law, D. C. (M)
Marsh, C. J. (M)
Meijer, R. R. (SM)
Milik, R. W., Jr. (M)
Munn, K. J. (M)
Newell, R. A. (M)
Perlman, S. (SM)
Reder, F. H. (A)
Rose, J. R. (A)
Ross, P. (M)
Sacks, F. A. (A)
Schacter, D. J. (A)
Schwab, D. (M)
Schwering, F. K. (M)
Silberman, A. (M)
Swan, R. A. (A)
Tarantolo, G. J. (A)
Theibault, J. E. (A)
Ulfers, H. E. (M)
Weinstock, M. (A)
Winkler, G. M. R. (M)

Lyndhurst (NNJ-2)
Domanico, P. T. (M)
Friberg, V. (A)
Gaffney, J. F. (M)
Grant, R. T. (M)
Hamer, W. A. (A)
Horbach, S. (M)
Kelmis, K. J. (A)
La Medica, K. O. (A)
Lomega, M. (M)
Robinson, G. D. (A)
Sobocienski, G. S. (A)

Madison (NNJ-2)
Aster, A. K. (M)
Barney, H. L. (SM)
Browne, T. E. (M)
Carter, H. T. (SM)
Coultas, R. A. (A)
D'Asaro, L. A. (M)
Dimock, P. V. (SM)
Duffy, F. P. (M)
Eastwood, N. W. (M)
Ellis, B. T., Jr. (SM)
Fawcett, W. G. (M)
Garreau, R. R. (M)
Grantges, R. F. (M)
Green, C. W. (M)
Gross, F. J. (M)
Hammann, P. L. (SM)
Hartzell, J. W. (M)
Howard, E. J. (SM)
Kaiser, J. F. (A)
Leppert, J. H. (M)
Livera, A. L. (M)
Lundin, J. A. (M)
Martin, E. O. (M)
Mearns, A. B. (M)
Melville, J. R. (A)
Munk, P. R. (M)
Neunzig, R. C. (A)
Okean, H. C. (M)
Ossanna, J. F., Jr. (M)
Oster, F. J. (M)
Parrott, A. D. (M)
Peterson, R. N. (SM)
Reed, J. F., Jr. (M)
Roetken, A. A. (F)
Ruckelshaus, J. G. (SM)
Smith, J. W. (SM)
Stark, P. D. (M)
Swain, R. G. (M)
Taylor, H. E. (M)
Thompson, C. F. (A)
Van Tassel, E. K. (SM)
Vogelsong, J. H. (M)
Wall, R. D. (M)
Wepsler, H. E. (M)
Wilson, W. F. (M)

Magnolia (PHI-3)
Bisaga, J. J. (M)
Ciarrocchi, J. A. (M)
Davis, E. D. (M)
Egan, W. E. (M)
Guertin, R. J. (M)
Holt, J. M. (M)
Lawton, R. S. (M)
Zarnoch, E. J. (M)

Mahwah (NNJ-2)
Berg, R. M. H. (A)
Constantine, A. (A)
Constantine, P. M. (A)
Sielski, A. T. (M)

Manahawkin (NY-M-2)
Taylor, J. W. (A)

Manasquan (NY-M-2)
Cline, D. E. (M)
May, M. M. (M)
Teesel, W. P. (M)

Manasquan Park (NY-M-2)
Gibbons, D. R. (M)

Mantua Township (PHI-3)
Montgomery, D. H. (M)

Maple Shade (PHI-3)
Brown, C. J. (M)
Dusheck, G. J., Jr. (M)
Hoover, E. W. (M)
Kim, Y. C. (M)
Kramer, N. R. (M)
Naubereit, H. (M)
O'Donnell, J. J. (M)
Parmer, M. E. (M)
Parsons, J. L. (M)
Ramsell, J. L. (M)
Rogers, A. (M)
Small, H. E. (M)
Twinam, J. R. (M)
Whitesides, R. B. (M)
Williams, R. V., Jr. (M)

Maplewood (NNJ-2)
Barkley, H. F. (M)
Borden, D. C. (M)
Cohen, D. (M)
Dickey, D. W. (SM)
Fromer, M. (M)
Gardner, P. S. (A)
Hazzeline, A. L. (F)
Helfrich, J. H. (M)
Humphrey, H. C. (M)
Koskos, P. (SM)
Layer, W. J. (M)
Murphy, W. F., Jr. (M)
Oswald, A. A. (F)
Prosser, T. C. (A)
Pruden, H. M. (SM)
Rossi, A. J. (M)
Sherman, A. E., Jr. (A)
Steinmetz, C. M. (M)
Tschang, P. (M)
Vance, H. C. (SM)
Wallenstein, J. P. (M)
Wilhelm, J. F. (SM)
Youngstrom, N. C. (M)

Margate (PHI-3)
Justman, S. (M)
Kester, R. E. (SM)

Margate City (PHI-3)
Thron, B. K. (M)

Marlboro (NY-M-2)
Bernard, J. L., Jr. (M)
Hindin, A. (A)

Marlton (PHI-3)
Allison, W. V., Jr. (M)
Barber, F. H. (M)
Cochran, S. W. (SM)
Eglit, W. F. (M)
Fulroth, W. H. (M)
Galat, E. J. (M)
Garrott, L. O. (M)
Gaskill, M. L. (A)
Glauberman, M. H. (M)
Koch, W. R. (F)
Shaffer, R. C. (M)
Swarthe, E. (SM)
Thowless, E. A. (M)
Wood, R. F. (M)

Matawan (NY-M-2)
Romanello, A. C. (M)
Ronson, H. T. (A)
Stout, J. E. (M)
Wolff, H. H. (SM)

Maywood (NNJ-2)
Coggeshall, L. S. (F)
Garthwaite, J. L. (A)
Halpern, E. L. (M)
Meeks, P. S. (A)
Russo, A. (M)
Savisaar, A. (M)
Seibert, J. L. (SM)

Medford (PHI-3)
Au, R. C. S. (M)
Hess, W. J. (M)
Jennings, E. R. (M)
Klidder, R. W. (M)
Malvin, M. A. (M)
Snow, F. W. (M)
Weise, D. S. (M)

Medford Lakes (PHI-3)
Beaulieu, D. E. (M)
Cichon, H. P. (M)
Fink, W. R. (M)
Liddle, R. W., Jr. (A)
McCoy, J. W. (M)
Sprowls, P. H. (M)
Stepchew, J. (A)
Wilson, R. M. (M)

Mendham (NNJ-2)
Brooks, R. E. (M)
Halline, E. G. (M)
Hires, J. B. (M)
Irvine, M. M. (SM)
Lewis, W. D. (F)
Murray, J. L. (M)
Ong, F. C. (SM)
Poclus, C. F. (A)
Saltus, G. E. (A)
Wilder, K. T. (M)
Wintemitz, T. W. (M)

Merchantville (PHI-3)
Abeyta, I. (M)
Andrews, D. R. (M)
Bartlett, T. L. (M)
Baumgardner, P. E. (M)
Bell, O. K. (SM)
Bishop, B. F. (M)
Blasberg, L. A. (SM)
Brown, I. (M)
Cafaro, J. A. (M)
Carey, C. R. (M)
Cobellas, E. M. (M)
Coston, H. E. (SM)
Darling, W. (M)
Deal, H. B. (SM)
Dordick, H. S. (M)
Farkas, C. E. (M)
Farkas, L. (M)
Fell, W. F. (M)
Foster, J. A. (M)
Gainey, L. L. (M)
Gallo, P. (SM)
Gaynor, E. (SM)
Gihring, H. E. (SM)
Gilmore, W. C. (M)
Goldman, L., Jr. (M)
Graham, R., Jr. (SM)
Grim, E. D. (M)
Groff, J. H. (M)
Halpern, H. M. (M)
Hamm, N. G. (SM)
Heacock, R. M. (M)
Hobbs, C. A., Jr. (M)
Holler, F. W., Jr. (M)
Hopkins, A. R. (SM)
Hoyt, C. W. (SM)
Huxtable, C. K. (SM)
Kern, R. J. (M)
Kimmel, J. (M)
Kiss, W. F. (M)
Kranzley, A. S. (M)
Lakin, G. A. (M)
Lappin, L. S. (SM)
Law, C. K. (SM)
Lawrence, W. L. (M)
Layer, J. H. (A)
Lazarus, F. F. (M)
Lenberg, B. (M)
Lending, R. D. (M)
Luther, A. C., Jr. (M)
Mac Dermid, B. W. (A)
Marsh, D. R. (M)
McAllister, H. M. (M)
McClure, D. A. (M)
McGough, R. P., Jr. (M)
McKinney, R. S. (A)
Mehuron, W. O. (M)
Miller, J. P. (M)
Mittelman, W. (M)
Musto, W. C. (M)
Nash, A. A. (M)
Nelson, A. L. (M)
Oman, N. J. (M)
Orr, J. R. (M)
Ottinger, R. W. (M)
Pandolfi, D. L. (M)
Parker, D. J. (SM)
Patterson, E. B. (SM)
Pendred, C. R. (M)
Piontkowski, J. S. (M)
Quinn, W. H. (M)
Reese, J. S. (M)
Sanborn, J. W. (SM)
Schach, S. (M)
Schwartz, A. J. (M)
Shepherd, R. C. (A)
Sheppard, W. H. (M)
Smiley, J. W. (M)
Smyton, S. A. (M)
Steagall, W. F. (M)
Stokes, P. F. (M)
Story, T. H. (SM)
Swierczek, P. C. (SM)
Thompson, L. E. (F)
Trinkle, R. C. (A)
Van Keuren, E., III (M)
Wald, S. (SM)
Warren, M. V. (A)
Weitz, M. K. (M)
Wuerflel, H. L. (SM)
Young, J. E. (SM)

Metuchen (PRI-2)
Aderente, A. A. (M)
Arntsen, A. P. (M)
Becchina, J. A. (M)
Brereton, C. H. (SM)
Dineen, J. J. (M)
Downie, D. E. (M)
Florito, P. (A)
Fooks, J. H. (SM)
Ford, R. W. (M)
Ginsberg, L. H. (SM)
Gluchoski, W. J. (M)
Grill, C. (A)
Haeseler, P. R. (M)
Heffron, C. B. (M)
Helm, C. W. (M)
Jordan, J. P. (SM)
Kasner, E. (M)
Kedrowsky, G. V. (M)
Knosko, J. A. (A)
Kornetz, N. S. (SM)
Larson, G. C. (SM)
Lempert, I. E. (SM)
Lerner, A. M. (M)
MacDonald, A. F. (SM)
McClane, C. T. (M)
Nash, H. (M)
Olson, D. H. (A)
Polack, M. M. (M)
Pritchard, P. G. (M)
Russell, G. H. (M)
Scheer, F. H. (SM)
Schiffmayer, G. F. (M)
Schneider, W. A. (SM)
Schofield, C. R. (A)
Sienkiewicz, L. J. (SM)
Sillman, D. (SM)
Skinner, K. R. (M)
Staffin, R. (M)
Thomas, D. G. (M)
Walowitz, H. L. (M)
Wasserman, J. (M)
Welkowitz, W. (M)
Whitney, G. H. (A)

Middlebush (PRI-2)
Reid, S. C., Jr. (M)

Middlesex (PRI-2)
Day, R. G. (SM)
King, M. L. (M)

Middletown (NY-M-2)
Baumann, D. A. (M)
Clark, H. R. (M)
Hayes, F. A. (A)
Keen, H. J. (A)
Klein, G. E. (M)
Luebbert, W. F. (SM)
Martin, J. E. (M)
Mikkelsen, W. R. (A)
Miller, S. E. (F)
Osborne, J. M. (SM)
Patterson, R. A. (M)
Stanley, A. M. (M)

Midland Park (NNJ-2)
Baldwin, J. M. (M)
Bertram, H. A. (A)
Brophy, W. T. (M)
Ellison, B. (M)
Gedney, G. C. (M)
Koole, J. G. (M)
Sohn, H. B., Jr. (M)
Van Gelder, A. (M)

Millburn (NNJ-2)
Bailey, A. (F)
Bown, R. (F)
Chassanoff, A. L. (M)
Freeman, R. H. (A)
Halstead, W. K. (SM)
Higgins, W. H. C. (F)
Johnson, J. B. (F)
Linn, G. A. (M)
Maurushat, J., Jr. (M)
Mazer, W. M. (SM)
Mellen, E. R. (SM)
Morris, R. M. (F)
Nyquist, H. (F)
Shackleton, S. P. (SM)
Stirleby, M. E. (SM)
Wall, G. B., III (M)
Wittlinger, H. A. (M)

Millington (NNJ-2)
Alexander, A. A. (M)
Ansley, W. G. (M)
Boschen, A. C. (M)
Dettman, M. C. (M)
Drenick, R. (SM)
Frost, H. B. (M)
Harrison, C. W. (M)
Morelock, J. (SM)
Schwenker, J. E. (M)
Walsh, L. (SM)

Milltown (PRI-2)
Aniskovicz, S. (A)
Kang, C. L. (M)
Moon, G. K., Jr. (A)

Monmouth Beach (NY-M-2)
Menzel, H. W. (M)

Monmouth Junction (PRI-2)
Schoenwald, G. (A)

Montclair (NNJ-2)
Baker, C. I. (SM)
Baurle, H. F. (M)
Bradley, J. L. (A)
Busignies, H. (F)
Corradi, F. J., Jr. (A)
Crombie, K. F. (A)
Curtis, L. W. (M)
Dooley, M. N. (M)
Freeman, L. C. (M)
Gage, W. M. (A)
Goodfriend, L. S. (SM)
Haynes, H. S. (M)
Hittman, S. (M)
Johnson, R. E. (M)
Jones, D. M. (A)
Josephson, P. R. (A)
Kaufman, C. W. (M)
Kirchner, K. F. (SM)
Lane, F. A. (M)
Leighton, H. W. (M)
Maginnis, W. J. (M)
Maginnis, W. P. (SM)
Miller, H. P., Jr. (SM)
Peck, J. L. (M)
Pughe, E. W., Jr. (M)
Razdow, A. (M)
Rose, F. C. (M)
Rucki, D. H. (M)
Schulz, F. J. (A)
Shvidrik, W. P. (M)
Sprague, V. G. (M)
Steinbrecher, E. E. (M)
Thomas, H. E. (SM)
Trackman, J. C. (M)
Vosburgh, M. C. (SM)
Wall, C. K. (A)
Weiss, W. I. (M)
Whitley, E. G. (A)
Whitzle, R. L. (SM)
Wolff, F. M. (M)
Zitzmann, F. R. (M)

Montvale (NNJ-2)
Corcoran, D. G. (M)
Doniger, J. (M)
Hoyns, G. W., Jr. (A)
Nelson, B. W. (M)
Scherer, D. R. (M)
Taylor, H., Jr. (A)

Montville (NNJ-2)
Atwood, H., Jr. (M)
Douglas, E. B. (M)
Higgins, L. A. (A)
Rathjen, P. (M)

Moorestown (PHI-3)
Alexander, W. R. (M)
Allen, R. W. (SM)
Anderson, T. E. (M)
Anderson, W. G. (M)
Andros, L. R. (A)
Baker, H. F. (M)
Baker, R. H. (SM)
Batsel, M. C. (F)
Brelsford, H. A. (SM)
Brostrand, A. C. (SM)
Buchter, J. M. (M)
Buder, S. H. (M)
Christen, A. L. (M)
Colby, N. C. (M)
Coleman, J. T. (M)
Conant, L. C., Jr. (M)
Conner, R. W. (M)
Corum, D. R. (M)
Craig, J. A. (M)
Curtin, W. A. (M)
Deakins, G. L. (SM)
Dobson, D. B. (M)
Duncan, H. S. (SM)
Duszak, H. (M)
Evans, L. L. (SM)
Field, G. R. (SM)
Fisher, R. M. (A)
Foley, A. A. (M)
Frederick, R. H. (M)
Gibo, E. (A)
Gillespie, H. C. (M)
Gotch, W. E. (M)
Graham, M. L. (SM)
Greenwood, H. T., III (SM)
Greven, P. J. (M)
Hadlock, W. O. (SM)
Haines, E. C., Jr. (M)
Hannan, W. J. (M)
Harmon, H. D. (M)
Hartnett, E. J. (M)
Hawley, M. E. (SM)
Heinly, W. C. (M)
Herrman, R. F. (SM)
Hill, D. R. (M)
Hodge, W. H. (M)
Holmes, D. B. (SM)
Hopkins, G. C. (M)
Howery, R. W. (M)
Hubbell, P. G. (M)
Hughes, C. J. (M)
Hunt, W. A. (M)
Hyde, G. (M)
Ireland, F. H. (SM)
Jackson, A. (A)
Johnson, D. C. (M)
Jose, R. S. (M)
Kanter, I. (M)
Kroupa, H. F. (M)
Ladof, L. G. (SM)
Laurlat, P. R. (M)
Lerch, Q. A., Jr. (M)
Lieber, R. (M)
Lillie, D. F., Jr. (M)
MacQueene, P. H. (SM)
Matthews, E. W., Jr. (SM)
May, E. G. (M)
McCall, E. G., Jr. (M)
McCulley, J. M. (A)
Mertens, L. E. (M)
Mills, H. J. (M)
Moll, A. P. (A)
Morrison, W. C. (SM)
Mulle, W. A. (M)
Nagle, J. J. (SM)
Nishino, H. H. (SM)
Noakes, G. L. (M)
Nyden, R. C. (SM)
Oldershaw, L. E. (M)
Olive, G. A. (M)
Paiss, M. H. (SM)
Palester, J. (SM)
Palm, K. E. (SM)
Palmer, J. B., Jr. (M)
Palmquist, J. F. (SM)
Perecinic, W. S. (M)
Poch, W. J. (F)
Poellnitz, F. D. (M)
Porter, J. W. (M)



Purdue, R. E. (M)
Rauchwerk, A. (M)
Rawdin, E. (M)
Ray, R. H. (M)
Reister, K. W., Jr. (M)
Renfrow, R. J. (M)
Rettenmeyer, F. X. (F)
Robinson, J. E. (M)
Rodman, M. D. (M)
Rogers, G. F. (SM)
Rogers, M. W. (SM)
Rulifson, R. R. (M)
Sheeder, A. M. (A)
Sherman, S. M. (SM)
Schmit, D. F. (F)
Shue, R. W. (M)
Smith, R. S. (M)
Smith, R. M. (SM)
Sobolewski, F. (M)
Sommer, W. G. (M)
Sonntag, W. A. (M)
Stevens, R. W. (M)
Stevens, W. T., Jr. (M)
Taenzer, E. (SM)
Talamini, A., Jr. (SM)
Tall, M. M. (M)
Taylor, M. L. (SM)
Taylor, T., Jr. (A)
Tesch, W. L. (SM)
Twitchell, H. D., Jr. (M)
Tysenn, W. J. (M)
Vance, D. H. (M)
Vaughan, J. A. (M)
Veniers, D. C. (M)
Weimer, A. G. (M)
Whale, D. J. (M)
Wheeler, G. M., Jr. (M)
Whisonant, J. T. (SM)
Whitman, C. L. (A)
Williams, E. A. (M)
Wills, W. P. (SM)
Wood, T. A. (M)

Morgan (NNJ-2)
O'Connor, E. J. (A)

Morganville (NY-M-2)
Lavoie, S. D. (A)

Morris Plains (NNJ-2)
Alexander, E. J. (M)
Andrews, R. J. (M)
Blair, B. W. (M)
Brown, V. L. (M)
Campbell, M. E. (SM)
Clark, N. M. (M)
Dougherty, H. J. (M)
Freeman, W. C., Jr. (SM)
Gibbon, J. (M)
Goldstein, M. I. (A)
Gretsch, W. R. (M)
Hofmann, H. R. (M)
Johannesen, J. D. (M)
Kurtz, D. P. (M)
Nyberg, R. G. (SM)
Peruzini, N. M. (M)
Poole, N. K. (A)
Robertson, J. P. (M)
Robinson, W. A. (A)
Schauler, V. A. (A)
Sharko, N. (M)
Torpey, G. J. (M)
Townley, R. C. (M)
Underwood, M. D. (M)
Van Dine, G. A. (M)
Van Iderstine, A. (SM)
Waldhauer, F. D. (M)
Wantuch, E. (M)
Whalen, A. D. (M)
Wilde, A. E., Jr. (SM)
Young, J. M. (M)

Morristown (NNJ-2)
Bain, S. (M)
Bethge, C. E. (M)
Bishop, E. L., Jr. (M)
Bohning, J. R. (M)
Bond, J. E. (M)
Caplan, D. I. (M)
Caprarola, L. J. (M)
Cavanagh, A. (SM)
Cohen, R. M. (SM)
Cooper, D. I. (SM)
Crowell, M. H. (M)
Daniel, R. G. (M)
Davis, C. G. (M)
Disch, L. J. (A)
Du Bois, J. H. (SM)
Ehrlich, N. (SM)
Evans, P. H. (F)
Fitmer, W. L. (M)
Gerth, J. H. (SM)
Githens, J. A. (M)
Goldfarb, S. (M)
Hagelbarger, D. (M)
Hammer, H. (M)
Harkless, E. T. (M)
Harris, J. R. (SM)
Hershenov, S. (M)
Hines, J. N. (M)
Hockett, F. D. (M)
Jacobs, O. B. (M)
Jewell, A. G. (M)
Kessler, J. E. (M)
Klenzle, H. G. (M)
Kingsland, D. H., Jr. (A)
Kretsch, K. P. (M)
Larisch, R. W. (M)
Lenihan, J. J., Jr. (A)
Lennon, F. W. (A)
Maddox, C. L. (M)
McCarter, R. S. (M)
McDaniel, W. J. (M)
Meitzler, A. H. (M)
Minter, J. B. (M)
Mohr, A. E. (M)
Morrison, H. (SM)
Mowery, V. O. (A)
Perow, J. (M)
Peterson, R. B. (M)
Peskin, E. (SM)
Peage, J. F. (M)
Potter, R. K. (F)
Priebe, H. F., Jr. (A)
Roxberry, R. C. (M)
Sandahl, C. R. (SM)
Shaw, H. M. (A)
Slana, M. F. (M)
Stewart, J. C. (M)
Stewart, J. B. (M)
Stowe, R. W. (A)
Straubie, E. P. (M)
Strong, W. A. (M)
Strzyk, C. (M)
Taylor, F. F. (M)
Unger, S. H. (M)
Van Beuren, J. M. (SM)
Voeller, R. L. (M)
Wakefield, P. R. (M)
Walecki, V. (M)
Zambarelon, J. T. (A)

Mount Arlington (NNJ-2)
Wacker, W. F., III (A)

Mount Ephraim (PHI-3)
Anzalone, P. J. (M)
Daiber, E. M. (A)
Taylor, J. M., Sr. (M)

Mount Holly (PHI-3)
Boling, H. E. (A)
Custer, C. W. (M)
Dressler, J. W. (M)
Fessler, W. H. (M)
Goldberg, E. (M)
Gorman, J. (M)
Griffith, B. D. (M)
Gubin, S. (SM)
Guhn, D. K. (M)
Herzog, D. G. (M)
Heyer, E. M. (M)
Johnson, M. C. (M)
Langelo, V. A. (M)
Love, K. E. (A)
Schantz, H. F. (M)
Welsted, I. G. (M)

Mountain Lakes (NNJ-2)
Bareiss, M. (SM)
Beck, R. J. (M)
Bender, W. C. (M)
Bliss, E. E. (A)
Dodington, S. H. M. (SM)
Doremus, J. A. (SM)
Gabel, W. (M)
Hart, P. K. (M)
Hughes, R. W. (SM)
Jackson, F. R., Jr. (SM)
Jenny, H. K. (SM)
Krist, H. K. (SM)
Krogh, R. A. (M)
Leef, G. R. (M)
Lilly, C. H. (A)
Locke, A. S. (SM)
Marble, F. G. (SM)
Mathews, P. H. (A)
Merriam, F. F. (SM)
Naugle, R. B. (A)
Nordstrom, B. H. (SM)
Noyes, A., Jr. (SM)
Osterland, E. (SM)
Sessler, J. G. (M)
Tyzzer, H. J. (SM)
Ware, J. L. (SM)
Webster, F. D. (SM)
West, J. M. (SM)
Winter, J. W. (M)

Mountainside (NNJ-2)
Anderson, T. N. (SM)
Harrington, J. C. (M)
Johansson, L. G. (M)
Kniazuk, M. (M)
Rowe, H. C. (SM)
Vreeland, W. E. (A)
Wagner, S. J. (SM)

Mullica Hill (PHI-3)
Siddall, W. J. (M)

Murray Hill (NNJ-2)
Aagesen, J. (M)
Aaron, M. R. (M)
Aaronson, D. (A)
Abbott, H. H. (SM)
Abraham, L. G. (F)
Allen, T. E. (SM)
Andrews, F. T., Jr. (M)
Andrews, J. L. (A)
Armstrong, F. O. (M)
Badgley, R. H. (SM)
Baldwin, G. L. (SM)
Baldwin, J. A., Jr. (M)
Baldwin, M. W., Jr. (F)
Bangert, J. T. (SM)
Barnett, W. T. (M)
Barstow, J. M. (F)
Becker, F. K. (SM)
Becker, G. E. (SM)
Bennett, W. R. (F)
Bishop, W. M. (A)
Black, D. M. (SM)
Blackman, R. B. (M)
Bielsch, G. W. (M)
Blye, P. W. (SM)
Bomba, J. S. (M)
Bowker, M. W. (M)
Boyd, G. D. (M)
Braga, F. J. (M)
Brown, A. B., Jr. (SM)
Brown, J. M. (M)
Brunson, R. B., Jr. (M)
Bryan, G. E. (M)
Bullington, K. (F)
Bullock, D. B. (M)
Burford, T. M. (M)
Burger, M. J. (SM)
Carbrey, R. L. (M)
Carlson, D. E. (M)
Carson, D. N. (M)
Chapman, R. C., Jr. (M)
Chen, F. S. (M)
Chisholm, D. A. (M)
Chislow, J. H. (M)
Church, S. E. (M)
Ciccolella, D. F. (SM)
Clement, F. J. (M)
Cocker, J. T. (M)
Collins, D. R. (M)
Cook, J. S. (M)
Cooper, H. W. (M)
Cornell, W. A. (M)
Crabtree, T. H. (M)
Cranna, N. G. (M)
Crawford, R. V. (SM)
Crowley, T. H. (M)
Cutler, C. C. (F)
Dacey, G. C. (SM)
Daggett, E. H. (M)
Darlington, S. (F)
David, E. E., Jr. (SM)
Day, C. M., Jr. (M)
De Grasse, R. W. (M)
Dennis, F. R. (M)
Depp, W. A. (SM)
Dickleson, A. C. (F)
Doba, S., Jr. (F)
Doucette, E. I. (M)
Dubosky, D. D. (M)
Durkee, A. L. (SM)
Ebbe, G. L. (M)
Eglin, J. L. (M)
Ehrbar, R. D. (SM)
Eisenlohr, D. M. (M)
Elmendorf, C. H. (SM)
Fagen, M. D. (SM)
Fay, C. E. (F)
Ferrell, E. B. (F)
Finch, T. R. (M)
Fischer, H. B. (SM)
Fisk, J. B. (F)
Flanagan, J. L. (M)
Flegal, J. R. (SM)
Fletcher, R. C. (SM)
Forman, L. E., Jr. (M)
Fraser, J. M. (SM)
Fulmer, R. J. (M)
Gewartowski, J. W. (M)
Gianola, U. F. (SM)
Gibby, R. A. (M)
Gloer, A. J. (SM)
Glowere, W. J. (M)
Glaser, J. L. (SM)
Glass, M. S. (SM)
Goldey, J. M. (M)
Goodale, W. D., Jr. (M)
Gray, M. C. (M)
Green, E. I. (F)
Grossman, A. J. (SM)
Gryb, R. M. (M)
Haas, H. H. (M)
Hall, W. G. (M)
Hartman, C. D. (M)
Harvey, F. K. (M)
Hasdorff, L. (M)
Hathaway, J. W. (A)
Hefele, J. R. (SM)
Hempstead, C. F. (M)
Herr, F. J. (M)
Hey, H. C. (SM)
Highleyman, W. H. (M)
Hines, M. E. (M)
Hirsch, A. E., Jr. (M)
Hohmann, L. A., Jr. (M)
Holzman, L. N. (M)
Hopkins, H. F. (SM)
Hopper, A. L. (SM)
Hornbeck, J. A. (SM)
Horton, A. W., Jr. (F)
Howson, L. (M)
Hudack, J. M. (SM)
Ingram, S. B. (SM)
Israel, J. O. (SM)
Iwersen, J. E. (M)
Jaeger, R. P. (SM)
Johanson, A. E. (M)
Julesz, B. (M)
Junker, S. L. (M)
Jutson, R. P. T. (SM)
Kaenel, R. A. (M)
Kahng, D. (M)
Kamenisky, L. A. (M)
Kammerer, F. W. (M)
Karlin, J. E. (M)
Karnaugh, M. (M)
Kaylor, R. L. (M)
Keith, C. R. (SM)
Kelley, R. A. (M)
Kelly, J. L. (M)
Kerney, I. (SM)
Kersta, L. G. (SM)
Kimme, E. G. (M)
Kinariwala, B. K. (M)
Kinsburg, B. J. (M)
Kinzer, J. P. (SM)
Kirkpatrick, W. E. (SM)
Kluver, B. (A)
Knowlton, A. D. (SM)
Kojima, M. (M)
Kolding, A. R. (M)
Kompfner, R. (F)
Kretzmer, E. R. (SM)
Kummer, O. (SM)
Kurokawa, K. (M)
Lebert, A. W. (M)
Leed, D. (SM)
Levin, S. A. (SM)
Levinson, J. (SM)
Lewis, H. A. (SM)
Lindser, P. D. (M)
Livingston, J. R. (M)
Loar, H. H. (M)
Logan, B. F., Jr. (M)
Lonan, G. T. (M)
Long, N. G. (M)
Lonnquist, C. W. (M)
Looney, D. H. (M)
Louis, R. A. (M)
Macintosh, I. M. (M)
Mallery, P. (M)
Manley, J. M. (F)
Mason, W. P. (F)
Mathews, M. V. (M)
Matlack, R. C. (A)
Maunsell, H. I. G. (M)
Maybach, W. J. (M)
McDavitt, M. B. (SM)
McDonald, H. S. (M)
McEntee, J. A., Jr. (M)
McGuigan, J. H. (M)
McKay, K. G. (SM)
McKiernan, D. L. (M)
McLaren, J. W. (M)
Melly, J. O. (F)
Meacham, L. A. (F)
Meadows, H. E., Jr. (M)
Mehring, A. C. (M)
Mendenhall, H. E. (SM)
Merrill, J. L., Jr. (M)
Michaels, S. E. (SM)
Miedema, H. (SM)
Miller, R. A. (M)
Miller, R. P. (M)
Millman, S. (F)
Mischler, W. D. (M)
Misenheimer, H. N. (SM)
Moore, E. F. (M)
Moore, G. E. (M)
Morgan, S. P. (SM)
Morton, J. A. (F)
Mottram, E. T. (SM)
Mounts, F. W. (A)
Nel, K. J. (A)
Newhall, E. E. (A)
Norton, E. L. (SM)
Norwine, A. C. (SM)
Nylund, H. W. (SM)
Ostermayer, F. W. (M)
Packard, G. N. (M)
Perryman, N. A. (M)
Pierce, J. R. (F)
Porter, P. T. (M)
Powell, J. F. (M)
Powers, T. L. (M)
Raleigh, J. T. (M)
Rea, W. T. (SM)
Reiling, P. A. (M)
Rice, L. P. (M)
Rice, S. O. (F)
Riesz, R. R. (SM)
Rigrod, W. W. (M)
Riley, R. M. (M)
Roberts, L. R. (M)
Rosenthal, C. W. (M)
Ross, I. M. (SM)
Rowlinson, D. E. (M)
Runyon, J. P. (M)
Ryder, E. J. (SM)
Ryder, R. M. (F)
Saari, V. R. (A)
Sauseng, O. G. (A)
Schachtman, M. G. (M)
Schelkunoff, S. A. (F)
Schimpf, L. G. (SM)
Schneider, H. A. (M)
Schott, L. O. (A)
Schulte, H. J., Jr. (M)
Schumacher, R. A. (M)
Schwartz, F. L. (M)
Sears, R. W. (SM)
Sharp, W. O. (SM)
Sharpe, G. E. (SM)
Sherman, P. M. (M)
Shive, J. N. (SM)
Shreiss, J. M. (M)
Slepian, D. (M)
Slonczewski, T. (SM)
Sparks, M. (SM)
Spencer, A. E., Jr. (M)
Steenaart, W. J. D. (M)
Stickle, R. L. (M)
Stillwell, A. L. (SM)
Stone, H. A., Jr. (SM)
Stoughton, M. D. (M)
Straube, H. M. (SM)
Sumner, E. E. (SM)
Sunde, E. D. (SM)
Szekely, Z. (A)
Szentirmai, G. (M)
Thatcher, T. W., Jr. (M)
Thomas, D. E. (SM)
Thurston, R. N. (M)
Tien, P. K. (M)
Tilley, J. H. (M)
Townsend, M. A. (SM)
Toy, W. N. (M)
Trofatter, K. F. (A)
Tucker, R. S. (SM)
Uenohara, M. I. (M)
Van Haste, W. D. (SM)
Varnerin, L. J., Jr. (SM)
Veazie, E. A. (SM)
Von Roesgen, C. A. (M)
Waddell, R. E. (M)
Weller, D. C. (SM)
Wentz, J. F. (SM)
Wertz, H. S. (SM)
Wetzel, L. B. (M)
White, L. D. (M)
Whitehead, H. G. (M)
Wickliffe, P. R., Jr. (M)
Williams, R. D. (M)
Willis, F. H. (M)
Winnicky, A. P. (SM)
Winter, H. F. (M)
Wolfe, R. M. (M)
Wolman, E. (M)
Wood, I. F. (M)
Worden, A. E. (M)
Young, C. H. (SM)
Zeigler, R. M. (A)

Neptune (NY-M-2)
Ackerman, J. C. (M)
Alexander, L. D. (A)
Alvarez, F. B. (M)
Armstrong, R. W. (SM)
Christian, J. R. (M)
Coffin, W. W. (A)
Danko, S. F. (M)
Davidson, G. G. (M)
Dennis, L. F. (M)
Dworzak, D. C. (A)
Evers, J. T. (M)
Hannon, L. (A)
Haratz, D. (SM)
Kramer, N. (A)
Lipetz, N. (M)
Loffer, G. W. (M)
Matthei, W. G. (M)
McNaul, J. P. (M)
Pokorny, G. E. (A)
Ruzgis, A. G. (M)
Smith, A. W. (M)
Speaker, B. (A)
Swingle, D. M. (M)
Woodyard, O. C. (M)
Warner, F. N. (M)

Neshanic Station (PRI-2)
Barnard, D. F., Jr. (M)
Pignatiello, J. L. (M)

Netcong (NNJ-2)
Reichard, W. C. (SM)

Newark (NNJ-2)
Abou-Taleb, N. M. (SM)
Acosta, F. B. (A)
Alperin, N. E. (M)
Andrushkiw, R. I. (M)
Bagley, D. S. (M)
Bahler, A. S. (M)
Barabutes, T. (M)
Berger, J. (M)
Bizon, M. J. (A)
Blonder, I. S. (M)
Bortkiewicz, J. (A)
Boyson, C. V. (A)
Burrows, R. L. (M)
Carluccio, J. (SM)
Cerf, A. E. (A)
Clement, G. (A)
Cohen, H. (M)
Cohen, S. (SM)
Connell, D. M. (M)
Coponta, A. A. (M)
Crabill, W. B. (A)
Dale, J. C. (M)
Drukaroff, I. (M)
Elizondo, E. L. (M)
Fishman, S. (SM)
Furman, J. (M)
Gans, T. C. (M)
Gershen, B. J. (A)
Gilbert, R. W. (F)
Giordano, A. F. (SM)
Glickman, M. N. (SM)
Golding, J. (A)
Graydon, A. (M)
Green, D. (M)
Gross, J. I. (A)
Heidrick, C. P. (M)
Helner, A. J. (M)
Holdman, M. (M)
Hooven, M. D. (SM)
Jalajas, A. A. (M)
Jordan, C. A. (M)
Kalfus, P. I. (M)
Karcher, E. A. (M)
Katz, M. (A)
Kaufman, A. S. (M)
Kopoelon, R. (SM)
Kozimor, M. (M)
Kubilins, E. T. (A)
Kwast, V. B. (M)
Lakshmanan, T. K. (M)
Lamb, F. X. (M)
La Verda, F. R. (M)
Lemeshka, M. B. (M)
Lender, A. (M)
Light, H. A. (M)
Manz, A. F. (M)
Marchese, N. (M)
Mayer, A. (M)
McClure, R. B. (M)
McCormick, D. A. (M)
Meier, W. L. (M)
Meyer, H. G., Jr. (A)
Mohsen, A. (M)
Monari, A. J. (A)
Moreno, C. N. (M)
Morgan, W. H. (M)
Munson, V. E. (M)

Mutschler, E. C. (M)
Perna, P. J. (M)
Peters, F. H. F. (A)
Peterson, D. A. (M)
Polsinelli, V. (A)
Purdy, D. R. (M)
Ranger, R. H. (F)
Ross, P. L. (M)
Russell, F. A. (SM)
Scharkss, H. (M)
Schwartzberg, I. G. (M)
Shaw, N. K. (M)
Sitzer, V. (M)
Small, L. M. (A)
Snyder, G. H. (M)
Steers, W. F. (SM)
Stein, F. S. (SM)
Steinkamp, W. H. (M)
Stepner, A. B. (A)
Stolar, G. (SM)
Tongue, B. H. (SM)
Ustan, G. M. (M)
Walker, H. R. (M)
Walker, R. D. (M)
Zlydak, V. J. (M)

New Brunswick (PRI-2)
Baumunk, J. F. (M)
Buhnstedt, C. E. (M)
Cahill, R. M. (M)
Claypool, H. W. (A)
Dahlke, H. E. (A)
Degan, J. J. (M)
Diensi, J. F. (M)
Fich, S. (SM)
Frisch, J. A. (A)
Hemmer, R. J. (M)
Hertz, K. L. (M)
Irby, H. C. (M)
Katz, R. A. (M)
Klenk, R. L. (M)
Koch, P. F. (M)
Knapp, J. Z. (M)
Kozovick, P. B. (M)
Lebowitz, L. L. (M)
Lipnick, R. (M)
Meitzner, A. C. (A)
Munt, I. (M)
Polgar, M. S., Jr. (M)
Potter, J. L. (F)
Reinig, H. (M)
Rosenthal, L. (SM)
Ruble, G. B. (M)
Siekanowicz, W. W. (M)
Sirkis, M. D. (M)
Williams, M. E. (M)
York, R. K. (M)

Newfoundland (NNJ-2)
Goebel, R. J. (M)

New Gretna (PHI-3)
Pohl, W. A. (SM)

New Hampton (PRI-2)
Boehm, G. H. (M)

New Milford (NNJ-2)
Ewert, A. C. (M)
Gartner, G. W. (M)
Godofsky, M. (M)
Grillo, J. (SM)
Hammerich, H. A. (A)
Jones, M. E. (A)
Lang, A. H. (A)
Liucci, C. A. (A)
Northrop, D. T. (M)
Oliver, W. (M)
Ornstein, S. (M)
Phelps, R. B. (M)
Reich, P. J. (M)
Roth, H. (M)
Shaw, A. B. (M)
Shaw, W. (M)
Umles, M. S. (M)
Van Sicklen, H. E., Jr. (M)
Vergoz, R. A. (A)

New Monmouth (NY-M-2)
Brehm, J. H. (M)

New Providence (NNJ-2)
Alterman, M. E. (M)
Booth, D. L. (M)
Bowyer, L. R. (M)
Capranica, R. R. (M)
Class, J. S. (M)
Cornelius, H. J. (A)
Drexler, J. (M)
Farney, G. K. (M)
Griswold, D. M. (M)
Johnson, H. C. (M)
Keder, V. (M)
Kocan, J. (M)
Latter, R. F. (M)
Lindsay, M. H. A. (SM)
Malchaner, W. A. (SM)
May, J. P. (M)
McCulloh, W. L. (M)
Morrison, B. A. (M)
Nast, D. W. (M)
Nasto, S. N. J. (A)
O'Neill, M. P. (M)
Poole, K. M. (A)
Simonds, R. E. (SM)
Terman, F. W. (M)
Thatch, R. A. (M)
Waltke, H. C. (M)
Welber, I. (M)
Zmolek, C. R. (M)

New Shrewsbury (NY-M-2)
De Paola, G. E. (M)

Govinsky, W. (A)
Keigher, B. J. (M)
Levy, B. (M)
MacPherson, D. H. (SM)
Meader, G. S., Jr. (M)
Schallerer, J. W. (M)

Newton (NNJ-2)
Kellogg, W. M. (SM)
Lamb, J. M. (M)
Satz, R. G. (M)
Schneider, B. K. (A)
Sirowatka, J. C. (A)

New Vernon (NNJ-2)
Clark, O. (SM)
D'Heedene, A. R. (SM)

Nixon (PRI-2)
Cameron, J. A. (M)
Farhi, S. (M)
Feder, E. I. (M)
Fisher, J. B. (A)
Gote, J. T. (M)
Neidig, K. E. (M)
Re Corr, K. H. (M)
Unger, R. J. (A)

Nixon Park (PRI-2)
Sable, A. A. (A)

North Arlington (NNJ-2)
Bruning, J. M. (M)
Finkelstein, D. (M)

North Bergen (NNJ-2)
Adam, E. P., Jr. (A)
Assadourian, F. (SM)
Belland, E. N. (M)
Bowab, L. G. (M)
Cox, J. L. (M)
Decker, W. J. (M)
Feucht, R. E. (M)
Fullington, H. J. (A)
Genser, A. (A)
Handjani, H. (M)
Harms, F. G. (A)
Heflich, G. B. (M)
Hollopeter, W. C. (M)
Jacob, K. C. (A)
Kirsch, A. F. (M)
Nordman, E. G. (M)
Nordman, O. D. (M)
Perlis, H. J. (SM)
Pizzigoni, A. (A)
Puente, J. G. (M)
Sags, I. M. (M)
Scherer, G. A. (M)
Shahin, E. S. (A)
Solomon, S. M. (M)
Sparacio, F. J. (M)
Wasserman, A. (M)

North Branch (PRI-2)
Aitken, K. M. (SM)
McDonald, J. H. (SM)
Willison, R. E. (M)

North Branch Depot (PRI-2)
Peldunas, A. P. (M)

North Brunswick (PRI-2)
Morris, M. J. (A)
Ungerleider, B. R. (M)
Uphoff, E. C. (M)

North Caldwell (NNJ-2)
Carmody, T. P. (M)
Goldman, H. (A)
Moore, E. B. (SM)
Muller, C. R. (SM)
Peet, E. C. (SM)
Poff, J. K. (M)
Rennenkampf, L. J. (M)
Schade, O. H., Jr. (M)
Schneider, P. C. (M)
Siemens, R. H. (SM)
Smith, P. G. (M)
Sokolowski, E. M. (A)

Northfield (NNJ-2)
Axel, E. K. (M)
Fehr, D. L. (M)
Headstrom, R. L. (SM)
Holliday, R. H. (SM)
Lasewicz, V. J. (M)
Shanteau, N. G. (M)
Swanseen, H. W. (A)
Wright, C. R. (M)

North Plainfield (NNJ-2)
Beehler, J. (M)
Blicher, A. (SM)
Flavin, M. A. (M)
Frank, R. J. (M)
Grover, A. C., Jr. (M)
Henn, H. C. (A)
Keane, J. B. (M)
Larson, B. O. (M)
McMurtrie, C. L. (M)
Ottobre, J. N. (SM)
Palmquist, H. H. (M)
Pike, N. (M)
Quinlan, R. V. (M)
Shupack, M. H. (A)
Wamsley, D. H. (SM)
Williams, A. D. (M)

Northvale (NNJ-2)
Arlessohn, E. R. (M)
Zito, G. V. (M)

Norwood (NNJ-2)
Brick, F. R., Jr. (SM)

Haas, K. A. (A)

Nutley (NNJ-2)
Adams, R. T. (SM)
Altman, F. J. (SM)
Aubrey, G. (M)
Beyer, J. P. (M)
Blanchard, R. J. (M)
Boychenko, O. (M)
Boyer, J. T. (M)
Brandes, N. J. (M)
Brush, J. M. (M)
Campbell, D. R. (M)
Capen, H. N. (SM)
Carey, E. D. (M)
Carpenter, D. J. (M)
Chapman, R. F. (M)
Cirullis, U. (M)
Clark, J. T., Jr. (M)
Coen, R. T. (M)
Cohen, A. B. (M)
Colin, R. I. (SM)
Collard, J. R. G. (M)
Cullari, C. C. (M)
Davis, R. C. (SM)
De Clark, R. S. (A)
De Vany, B. V. (M)
Duerig, W. H. (A)
Ellis, R. (M)
Feldman, J. (M)
Felsenheld, R. A. (M)
Finocchi, A. J. (M)
Fletcher, I. L. (M)
Friedman, S. S. (M)
Galvin, P. (M)
Girgus, S. D. (M)
Goldan, T. J. (A)
Goldstein, B. S. (M)
Gray, R. E. (M)
Griebell, C. A. (M)
Gronberg, H. C. (M)
Hacker, S. J. (M)
Happe, W. H., Jr. (M)
Harding, G. C. (M)
Harvey, J. (SM)
Helman, D. R. (M)
Herbin, L. (A)
Himes, D. I. (M)
Hoechner, I. L. (M)
Hollis, R. P. (M)
Jeffers, N. L. (SM)
Kandolan, A. G. (F)
Kennedy, J. B. (M)
Khanna, S. M. (M)
Kilfen, D. E. (A)
Kloibasa, E. (M)
Kiss, M. L. (M)
Kozuch, M. (M)
Kunkel, E. A., Jr. (M)
Landfear, G. F. (A)
Lilljegren, J. C. (M)
Lundburg, F. J. (SM)
Macalpine, W. W. (SM)
Manders, A. M. (M)
Mangolds, B. (M)
Margetts, J. S. (M)
Masonson, M. (M)
Mavromatis, A. (M)
Medler, L. (M)
McMullen, E. W. (A)
Metzger, J. E. (SM)
Meyers, K. F. (M)
Meyers, S. J. (M)
Miller, R. J. (A)
Mills, H. J. (M)
Minder, B. M. (M)
Mount, E. (M)
Norton, M. L. (M)
Odess, L. R. (M)
Perry, D. P. (M)
Place, H. (A)
Presto, A. F. (M)
Rogoff, M. (M)
Rutherford, R. E. (SM)
Rutherford, R. E., Jr. (M)
Schildknecht, R. O. (SM)
Schnall, D. (M)
Schmidt, W. M. (M)
Schreiner, S. M. (SM)
Shames, J. (M)
Shapiro, O. (M)
Sichak, W. (F)
Silverman, M. L. (M)
Sliwa, R. A. (M)
Snedeker, E. K., Jr. (M)
Sokol, G. F. (M)
Solomon, R. H. (M)
Soukup, J. (SM)
Spahr, P. K., Jr. (M)
Stein, N. N. (M)
Streisand, J. L. (M)
Stueck, T. (M)
Sugal, I. (M)
Surenian, D. (M)
Swinney, J. G. C., Jr. (SM)
Taolin, R. H. (M)
Taylor, A. R. (A)
Tomaszewski, J. A. (M)
Turvey, F. P. (M)
Van Vechten, R. K. (A)
Weber, F. J. (M)
White, H. R. (M)
Wickersham, W. H. (SM)
Willis, W. J. (M)
Wing, A. K., Jr. (F)
Winslow, N. E. (M)
Wojtowicz, Z. A. G. (M)
Young, N. H. (SM)
Zablocki, H. S. (M)
Zaret, M. E. (SM)
Zeliff, R. J. (A)

Oakhurst (NY-M-2)
Benanti, M. A. (A)

Whelan, C. D. (M)

Oakland (NNJ-2)
Bloch, M. W. (M)
Dzula, G. (M)
Hoffman, D. (SM)
Thomas, G. N. (M)
Yohai, I. (M)

Oaklyn (PHI-3)
Bensky, L. S. (M)
Barooiy, T. J. (M)
Callen, P. J. (M)
Christiansen, W. G. (A)
Forbes, E. J. (M)
Gerber, P. D. (M)
Giordano, R. L. (M)
Graham, J. J. (SM)
Henderson, R. A. (SM)
Kenville, R. F. (M)
Korbin, A. D. (M)
Olson, C. L. (M)
Putzrath, F. L. (M)
Scheidorf, R. D. (M)
Smith, C. L. (M)
Torbert, J. C., Jr. (M)
Watts, E. R. (M)

Ocean City (PHI-3)
Gallagher, V. C. (M)

Ocean Grove (NY-M-2)
Ewald, H. W. (M)

Oceanport (NY-M-2)
Bryan, J. F. (SM)
Buckley, J. E. (M)
Capam, C. (M)
Doelger, R. J., Jr. (M)
Nylander, G. A. (M)
Sherburne, F. B. (A)
Schmidt, R. A. (M)
Waite, A. H., Jr. (SM)
Weatherby, Y. D. (M)

Old Bridge (PRI-2)
Bellis, R. P. (M)
Brown, I. A. (A)
Striedniq, L. J. (M)
Student, S. G., Jr. (M)
Tomasheski, C. J. (M)

Old Tappan (NNJ-2)
Bass, S. D. (M)

Oldwick (PRI-2)
Mortimer, A. J. (M)

Oradell (NNJ-2)
Anthony, I. B. (M)
Brackett, H. H. (M)
Bruce, W. D. (M)
Canty, E. T. (M)
Fichtl, R. R. (A)
Howard, J. S., Jr. (A)
Levine, A. M. (SM)
Oberholtz, L. P. (M)
Podell, R. L. (M)
Rauch, L. R. (M)
Zich, M. M. (M)

Orange (NNJ-2)
Black, J. E. (M)
Brodersen, R. K. (M)
Burkhart, W. H. (M)
Butenko, J. W. (M)
Cerone, J. R. (M)
Chin, J. S-N. (M)
Di Girolamo, J. V. M. (SM)
Domchick, S. J. (M)
Gruenberg, H. S. (M)
Hardwick, A. H. (SM)
Hardwick, F. (M)
La Manna, R. J. (M)
Markowitz, H. (A)
Oliwa, W. S. (A)
Shackelford, B. E. (F)
Sumpter, P. B. (M)
Suydam, C. H. (M)
Wells, G. W. (M)
Yaeger, W. O. (M)

Oxford (NNJ-2)
Edson, J. O. (SM)

Packanack Lake (NNJ-2)
Lang, H. J. (M)
Mutz, H. R. (SM)
Seergy, C. M. (M)

Palisade (NNJ-2)
Andrews, E. (M)
Lefebvre, R. E. (A)
Rover, R. R., Jr. (M)

Palisades Park (NNJ-2)
Ackerman, B. F., Jr. (M)
Carocari, J. B. (M)
Fassbero, M. (A)
Isaacson, A. (M)
Kam, E. W. (M)
Keller, E. F. (A)
Levine, O. W. (M)
Marks, G. J. (A)
Packer, S. S. (M)
Richards, E. G. (M)
Schmied, J. W. (M)
Takakjian, J. S. (A)

Palmyra (PHI-3)
Borchers, N. L. (M)
Brewster, P. J. (M)
Ennis, F. J. (A)

Farber, K. L. (M)
Foerster, W. (M)
Galton, E. B. (SM)
Groon, J. G. (A)
Hilbourn, C. L. (M)
Keller, C. E., Jr. (M)
Kropp, R. J. (A)
Rammer, C. A. (M)
Rice, R. A. (M)
Ringer, H. N. (M)
Robinson, H. A. (SM)
Scheuer, H., Jr. (M)
Smith, W. I. (M)
Vidas, V. G. (M)
Waring, J. W. (M)
Yewdall, G. E. (SM)

Paramus (NNJ-2)
Ankenbrock, C. A. (A)
Becker, O. G. (M)
Bodeen, G. S. (SM)
Brown, R. I. (M)
Brown, T. G. (SM)
Campanale, A. J. (M)
Chalmers, W. G. (M)
Chanes, H. (M)
Church, A. (A)
Conway, J. F., Jr. (SM)
Deiss, E. W. (A)
Devane, F., Jr. (M)
De Vincent, J. (A)
Donaldson, W. G. (SM)
Dufour, G. L. (M)
Evzeman, H. S. (SM)
Friedman, T. D. (A)
Gilmore, J. P. (SM)
Hackenberg, F. U. (M)
Haque, R. Z. (A)
Harvey, C. C. (M)
Honeiser, V. P. (M)
Humble, C. W., Jr. (A)
Jansky, C. M. (SM)
Karz, A. R. (M)
Kashar, A. S. (M)
Knights, G. F. (M)
Kovarik, H. (A)
Kriss, C. J. (M)
Levin, M. S. (M)
Mairs, L. A. (M)
Manheimer, B. H. (M)
McSweeny, R. (SM)
Neu, W. J. (M)
Petrina, R. J. (A)
Pfuhl, H. P. G. (M)
Plehn, A. D. (M)
Pravetz, R. M. (M)
Renwick, F. B. (M)
Root, C. S. (SM)
Sakate, F. S. (M)
Sattem, I. (M)
Schmidt, L. D. (M)
Slotkin, A. (M)
Taylor, R. C. (M)
Taylor, R. G., Jr. (M)
Trager, B. L. (M)
Werth, A. M. (M)
Young, R. (M)
Zilovsky, S. A. (M)

Park Ridge (NNJ-2)
Bellis, H. M. (M)
Bartuccio, T. D. (M)
Norton, E. A. (M)
Schiff, R. M. (A)
Stansfield, F. H. (M)

Parlin (PRI-2)
Herrel, W. W. (A)
Howard, F. S. (M)
Panos, R. J. (M)
Zaratkiewicz, E. A. (M)

Parsippany (NNJ-2)
Anders, J. V. (M)
Anspach, T. E. (A)
Du Pont Darden, P. S. (M)
Goeller, L. F., Jr. (M)
Hendrickson, A. H. (M)
Kallish, H. M. (M)
Krause, C. K. (M)
Lawton, B. E. (M)
Mandzik, M. M. (M)
Marco, G. E. (M)
Meola, R. R. (SM)
Montsma, J. (M)
Nervik, J. M. (M)
Pratt, W. R. (M)
Stanton, S. W. (M)
Waters, H. S. (M)
Wing, J. M. (M)

Passaic (NNJ-2)
Backus, A. S. (SM)
Brobst, W. A. (M)
Brussel, E. H. (M)
Christman, W. G. (M)
Larkin, J. P. (M)
Masavage, I. R. (A)
McGuire, L. D. (M)
Rosenthal, J. E. (SM)
Schumann, L. C. (A)
Seals, P. (A)
Sim, R. M. (A)
Sommemeyer, O. R. (M)
Stern, M. M. (M)
Stoj, F. R. (M)
Suszek, E. J. (A)
Wakeman, R. P. (SM)
Webster, W. C. (M)
Woods, J. R. (M)
Yu, Y. P. (M)
Zavoda, J. P. (M)



Paterson (NNJ-2)
Binneveld, H. A. J. (A)
Brino, J. A., Jr. (M)
Cameron, R. F. (M)
Carlson, O. E. (M)
Earnshaw, E. F., Jr. (M)
Fierro, R. A. (M)
Gold, M. (M)
Hoberman, M. J. (SM)
Janowsky, S. (M)
Katz, J. (A)
Kuehler, H. R. (M)
Lane, W. M. (M)
Lavorgna, M. P. (M)
Levin, H. L. (M)
Lome, J. B. (M)
Malone, M. (M)
Noveko, N. (A)
Papa, B. F. (M)
Papanou, D. S. (M)
Piller, S. (SM)
Potash, J. (M)
Shapiro, F. J. (A)
Sledge, L. L. (M)
Spinosa, M. (M)
Street, W. D. (M)
Trifari, E. F. (A)
Weinberg, H. C. (M)
Winters, H. (A)

Paulsboro (PHI-3)
Gross, S. D. (M)

Pennington (PRI-2)
Bamford, H. S. (SM)
Duncan, S. L., Jr. (M)
Knowlton, C. R. (M)
Tuska, J. W. (M)

Pennsauken (PHI-3)
Arleth, J. M. (M)
Bakal, E. A. (A)
Bessette, O. E. (M)
Boenecke, C. A. (M)
Bogush, A. J., Jr. (A)
Bordogna, A. C. (M)
Brady, T. J., Jr. (M)
Brummer, C. H., Jr. (A)
Colander, G. E. (M)
Eddy, K. C. (M)
Fedorka, R. T. (M)
Fisher, C. D. (M)
Fox, R. D. (A)
Freedman, D. D. (A)
Givens, R. C. (M)
Hobson, N. L. (A)
Homann, A. J. (M)
Kasowski, S. E. (M)
Kaufman, E. J. (M)
Kaufmann, K. G. (M)
Kay, F. T. (M)
Knapschaefer, D. H. (M)
Krawitz, L. J. (A)
Landis, J. V. (SM)
Mayer, L. J. (A)
McVey, J. H. (A)
Menkes, E. D. (A)
Mina, V. A. (M)
Montemuro, A. T. (M)
Moy, R. G. (A)
Nash, S. (M)
Nelson, G. A. (A)
Nickel, G. C., Jr. (M)
Oberlander, F. M. (SM)
Oberman, J. R. (M)
Obert, M. J. (SM)
O'Brien, J. F. (M)
Pearson, A. W. (M)
Pietrolewicz, J. P. (M)
Purvis, R. E. (M)
Quinlan, E. J. (M)
Rende, A. M. (M)
Rodeman, G. A. (M)
Rosenzweig, G. E. (M)
Rudd, R. B. (M)
Saeger, W. (M)
Sawyer, J. F. (M)
Sie, C. H. (M)
Skavicus, A. J. (M)
Smith, W. E. (M)
Solomon, S. (SM)
Stander, L. (M)
Stockton, E. M. (M)
Troxel, D. I. (M)
Tullai, J. (M)
Willette, E. L. (M)
Willey, J. R. (M)
Wolter, L. R. (A)
Wyant, E. D. (M)

Penns Grove (PHI-3)
Garrett, L. B., Jr. (M)

Pennsville (PHI-3)
Fisher, C. (A)
Loeffler, T. F. (M)

Pequannock (NNJ-2)
Aitonji, E. R. (M)
Bergeron, W. F. (M)
Goldman, I. (M)
Kearney, J. J. (M)
Richard, C. A., Jr. (M)
Schkolnick, H. (M)
Schmidt, C. R. (M)

Perth Amboy (PRI-2)
Basson, D. E. (M)
Chlemidia, R. A. (M)
Ernst, W. P. (M)
Houser, B. E. (A)
Jesse, S. A. (A)

Phalanx (NY-M-2)
Welle, R. J. (M)

Phillipsburg (NNJ-2)
Gerken, W. G. (M)
Ward, R. E. (M)

Pine Brook (NNJ-2)
Brinkman, J. D. (M)
West, C. B. (M)
Wheeler, C. M. (SM)

Pine Hill (PHI-3)
Burns, D. C. (A)

Pitman (PHI-3)
Andrade, L. (M)
Brown, I. N. (SM)
Sloan, R. H. (M)
Sterner, J. F. (SM)

Pittstown (PRI-2)
Bennett, A. F. (SM)

Plainfield (NNJ-2)
Adams, W. C. (M)
Arons, L. D. (M)
Babcock, W. E. (SM)
Balbo, C. C. (M)
Bethke, J. R. (A)
Bloom, S. (SM)
Chandler, R. D., Jr. (M)
Christiansen, N. H. (M)
Churchill, L. S. (M)
Cooke, J. P. (A)
Cormier, R. J. (A)
Cowperthwait, W. L., Jr. (M)
Coxhead, H. B. (SM)
Fisher, J. H. (M)
Glasberg, M. (M)
Hammett, W. G. (M)
Hardin, L. L., Jr. (SM)
Harris, R. C. (SM)
Harris, S. (A)
Harris, W. T. (M)
Horner, R. G. (M)
Horowitz, L. (M)
Hunter, W. B. (A)
Husenita, J. (A)
Jamiyan, H. H. (M)
Kettering, H. V. (M)
Kuchinsky, S. (SM)
Kuhn, E. F. (M)
Laning, C. B. (SM)
Laughlin, G. R. (A)
Lee, R. F. (A)
Lester, B. E. (SM)
Lewin, D. R. (A)
Lott, D. H. (A)
Lyon, Z. G., Jr. (M)
Malkin, I. I. (M)
Masnaghetti, R. K. (M)
May, C. J., Jr. (M)
Mazur, S. (M)
McEowen, J. R. (M)
Melhose, A. E. (M)
Mosolgo, R. E. (M)
Mullin, S. N. (A)
Nussbaum, E. (M)
O'Donohue, J. P. (M)
Oefelein, J. C. (A)
Ottesen, L. (M)
Perks, A. F. (A)
Rossiu, E. W. (M)
Sampson, S. F. (M)
Schaeffer, R. W. (M)
Soja, M. (SM)
Sweeney, W. R. (M)
Townsend, W. H., Jr. (M)
Wallace, R. L., Jr. (F)
Warren, C. A. (SM)
Wehrle, A. W. (A)
Weingarten, I. R. (A)
Woody, M. W. (A)
Wright, J. E. (M)

Plainsboro (PRI-2)
Hanford, R. W. (SM)

Pleasantville (PHI-3)
Curtis, V. F. (A)
Felton, W. W. (SM)
Relyea, D. P. (M)

Pluckemin (PRI-2)
Sattler, E. W., Jr. (A)

Point Pleasant (NY-M-2)
Boggio, M. R. (M)
Diebold, B. A. (M)
Eckenfelder, R. C. (M)
Elliott, C. T. (M)
Falk, H. H. (A)
Friedlein, J. G. (M)
Lucier, O. S. (A)
Rottner, A. W. (M)
Schermann, L. E. (M)
Van Benthem, J. (M)

Point Pleasant Beach (NY-M-2)
Szaframski, J. J. (M)

Pompton Lakes (NNJ-2)
Chmiel, B. A. (M)
Gorman, R. T. (A)
McEwan, A. W. (SM)
Plummer, R. J. (M)
Romain, D. O. (A)
Solomon, K. (M)

Pompton Plains (NNJ-2)
Abrahams, R. P. (SM)
Arnold, A., Jr. (A)

Cavanagh, R. T. (SM)
Dall, A. B. (M)
Engler, C. F. (M)
Gitter, R. E. (M)
Hansen, N. W. (A)
Hollberg, R. W. (M)
Johnson, K. C. (M)
Kramer, A. S. (SM)
Lang, C. W. (M)
Lynch, R. G. (A)
McAdams, B. (SM)
Muller, F. A. (SM)
Nielsen, A. H. (M)
Palmer, R. C. (M)
Pauloski, S. H. (M)
Porta, A. (M)
Stem, W. (A)
Urban, A. (A)

Princeton (NNJ-2)
Amarel, S. (SM)
Avins, J. (F)
Awschalom, M. (M)
Bach, H. M. (M)
Bangs, J. R. (M)
Barco, A. A. (F)
Barton, L. E. (F)
Beck, G. A. (M)
Bedford, A. V. (F)
Behrend, W. L. (SM)
Binstock, P. L. (M)
Blattner, D. J. (SM)
Bliss, W. H. (SM)
Bond, D. S. (F)
Borgelt, W. E. (M)
Borkan, H. (SM)
Brackmann, W. J. (SM)
Braden, R. A. (SM)
Brandlmeyer, J. J. (M)
Briggs, G. R. (SM)
Brinster, J. F. (SM)
Brown, G. H. (F)
Burns, L. L., Jr. (SM)
Burrill, C. M. (SM)
Caras, B. (A)
Carlson, W. L. (F)
Chambers, F. T., III (M)
Chaykowsky, O. O. C. (M)
Cheeseman, P. R. (M)
Chir. T. N. (M)
Chrastian, S. M. (SM)
Clark, A. N. (A)
Clement, P. R. (M)
Cohen, S. (M)
Cooke, H. L. (A)
Cowan, E. J. (M)
D'Agostini, D. (M)
Davey, J. R. (M)
De Sobrino, R. (SM)
Dickey, E. T. (SM)
Dodge, S. W. (SM)
Dolotta, T. A. (M)
Donal, J. S., Jr. (SM)
Donath, E. (SM)
Donley, H. L. (SM)
Dousmanis, G. C. (SM)
Dow, O. E. (SM)
Eckenhoff, W. B. (A)
Epstein, J. (SM)
Ewing, D. H. (F)
Favreau, R. R. (M)
Fischbeck, K. H. (M)
Fischer, J. T. (M)
Flory, L. E. (F)
Flory, R. E. (M)
Forgue, S. V. (SM)
Fredendall, G. L. (F)
Freedman, L. A. (M)
Frei, A. H. (M)
Frum, A. (A)
Garretson, E. B. (M)
Gay, A. C. (SM)
George, R. W. (SM)
Giaimo, E. C., Jr. (A)
Gibson, J. J. (M)
Gibson, W. G. (M)
Gold, R. D. (M)
Goldstein, A. (M)
Goldstein, P. (M)
Goodale, E. D. (SM)
Goodman, A. M. (M)
Graber, G. F. (M)
Greenblatt, M. H. (SM)
Gross, J. (SM)
Hackley, R. A. (M)
Hallows, R. L. (M)
Hamner, L. H. (M)
Hansell, C. W. (F)
Hart, H. C. (M)
Harvey, R. L. (SM)
Hatke, F. L. (A)
Hauser, G. G. (A)
Heacock, D. P. (SM)
Headrick, L. B. (F)
Herkart, P. G. (M)
Herman, F. (SM)
Hermquist, K. G. (SM)
Hershenov, B. (M)
Herzog, G. B. (M)
Hillibrand, J. (M)
Hillier, J. (F)
Hinsdale, E. M., Jr. (SM)
Hirsch, C. J. (F)
Hoedemaker, R. W. (M)
Holmes, R. S. (F)
Hook, H. O. (SM)
Houghton, W. D. (SM)
Hubbard, B. R. (M)
Hutter, E. C. (M)
Isaila, M. V. (M)
Jenny, D. A. (M)
Johnson, E. O. (F)
Johnson, H. (F)

Johnson, W. C. (SM)
Johnston, L. B. (M)
Jolliffe, C. B. (F)
Kams, M. E. (SM)
Karstad, K. (SM)
Keigler, J. E. (M)
Kelser, B. E. (SM)
Keizer, E. O. (SM)
Kell, R. D. (F)
Kerr, R. B. (M)
King, C. J., Jr. (SM)
Kingsley, B. (SM)
Klopfenstein, R. W. (SM)
Korman, N. I. (F)
Kreuzer, B. (M)
Kurshan, J. (SM)
Lamorte, M. F. (A)
Landon, V. D. (F)
Laport, E. A. (F)
Larrabee, R. D. (M)
La Valva, C. M. (A)
Law, H. B. (F)
Lefrak, F. H. (M)
Leverenz, H. W. (F)
Levy, S. Y. (M)
Lewin, M. H. (M)
Leyton, E. M. (SM)
Lindenblad, N. E. (F)
Linder, E. G. (F)
Lindgren, J. B. (A)
Lindsay, F. A. (A)
Little, C. W., Jr. (M)
Loebner, E. E. (SM)
Lorber, H. W. (M)
Lowers, C. E. (SM)
Luck, D. G. C. (F)
Lugannani, R. (M)
Mac Lean, K. G. (SM)
Maitra, K. K. (M)
Malek, H. J. (M)
Manasse, F. K. (M)
Marshall, T. G., Jr. (M)
Mather, N. W. (SM)
McClusky, E. J., Jr. (SM)
McCormick, S. T., Jr. (M)
Mesner, M. H. (SM)
Metzger, S. (SM)
Miller, H. L. (M)
Mitchell, G. J. (M)
Moles, W. H. (M)
Morgan, W. L. (A)
Morton, G. A. (F)
Mueller, C. W. (F)
Nergaard, L. S. (F)
Newman, A. W. (M)
Nicoll, F. H. (SM)
Norman, F. H. (M)
North, D. O. (F)
Ochs, S. A. (M)
O'Connor, R. A. (SM)
Olson, C. V. (M)
Olson, H. F. (F)
Pankove, J. I. (SM)
Pensak, L. (SM)
Peter, R. W. (F)
Peterson, D. W. (M)
Pilo, A. T. (SM)
Plummer, C. H. (M)
Poor, E. W., Jr. (M)
Powers, K. H. (SM)
Pritchard, D. H. (M)
Pyne, I. B. (M)
Quioque, V. J. (M)
Rahm, W. E., Jr. (A)
Rajchman, J. A. (F)
Ramberg, E. G. (F)
Rankin, J. B. (M)
Ratchford, A. W. (M)
Ricci, R. C. (M)
Richards, B. W. (M)
Roberts, T. C. W. (A)
Roberts, W. V. B. (F)
Robinson, J. G. (M)
Rodda, W. E. (M)
Rose, A. (F)
Ross, C. W. (SM)
Rynn, N. (SM)
Sanford, R. F. (M)
Scharrer, O. S. (F)
Schnitzler, P. M. (M)
Schorr, H. (M)
Serrell, R. (SM)
Shahbender, R. A. (M)
Shatzkin, J. (SM)
Sklansky, J. (SM)
Smith, B. (M)
Smith, J. P. (SM)
Smith, P. T. (F)
Sommer, A. H. (F)
Staras, H. (SM)
Sternberg, S. (SM)
Sterzer, F. (M)
Strother, J. A. (SM)
Stuber, P. (M)
Surber, W. H., Jr. (M)
Tabak, M. A. (M)
Thomas, J. B. (M)
Thompson, R. D. (M)
Truitt, T. D. (M)
Tults, J. (M)
Tuska, C. D. (F)
Vose, C. H. (SM)
Vural, B. (SM)
Wadlin, M. L. (M)
Wall, M. E. (M)
Wallmark, J. T. (SM)
Warter, P. J., Jr. (M)
Webster, W. W. (F)
Weimer, P. K. (F)
Wendt, F. S. (M)
Westneat, A. S., Jr. (SM)
Wilkinson, W. C. (SM)
Williams, C. H. (A)

Williams, T. R. (M)
Wilmotte, R. M. (F)
Wine, C. M. (M)
Winters, J. D. (SM)
Wittke, J. P. (M)
Wolff, I. (F)
Wolff, S. S. (M)
Woodbridge, D. E. (M)
Woodward, J. G. (SM)
Woodward, O. M., Jr. (SM)
Wright, S. E. (M)
Young, C. J. (F)
Zalninger, K. H. (M)
Zapoulla, L. M. (A)
Zworykin, V. K. (F)

Princeton Junction (PRI-2)
Aronson, A. I. (M)
Bowker, J. D. (M)
Chandler, H. M., Jr. (M)
De Remer, K. R. (M)
Krittman, I. M. (M)
Riedel, J. (A)
Sublette, I. H. (M)
Szekely, M. E. (M)
Tritter, A. L. (M)

Prospect Park (NNJ-2)
Serra, E. M. (M)

Rahway (NNJ-2)
Bellingham, L. C. (A)
Disole, W. M. (A)
Horneck, J. F. (M)
Jones, E. L. (A)
Robinson, G. D. (A)
Rogers, R. E. (M)
Shombert, D. J. (A)

Ramsey (NNJ-2)
Bayer, E. M. (SM)
Cynamon, J. J. (A)
Detweiler, H. L. (M)
Dubbs, W. M. (M)
Gray, L. F. (M)
Heiser, W. H. (SM)
Lynch, D. J. (M)
Maillet, A. J. (A)
Mason, R. S. (M)
Murphy, W. J. (M)
Pardovich, J. T. (M)
Price, J. M. (M)
Stryker, H. J. (M)
Wood, H. F. (A)
Yurasek, J. F. (M)

Rancocas Woods (PHI-3)
Gilmartin, T. A. (M)

Raritan (PRI-2)
Ditrick, N. H. (M)
Fucito, D. T. (M)
Kleppinger, R. E. (M)
Newman, J. J. (M)
Ollis, J. H. (M)
Pearson, D. B. (SM)
Troiano, A. (M)

Red Bank (NY-M-2)
Anderson, E. C. (SM)
Bagwell, C. E. (SM)
Barrios, A. A. (M)
Bassler, S. G. (M)
Beck, A. C. (F)
Beizer, H. H. (SM)
Benowitz, R. B. (M)
Billick, P. (M)
Budenkaye, A. C. (M)
Bush, J. A. (A)
Castellini, M. R. (A)
Chasek, N. E. (M)
Crawford, A. B. (F)
Crivello, A. A., Sr. (M)
Dathe, L. C. (A)
Dawson, R. W. (M)
Davis, R. C. (A)
De Loach, B. C., Jr. (M)
Demko, J. G. (M)
Dickey, V. F. (M)
Edwards, C. F. (M)
Egli, J. J. (SM)
Ehrlich, W. E. (A)
Eisenberger, A. J. (M)
Fox, A. G. (F)
Frankel, H. C. (SM)
Goodall, W. M. (F)
Halpern, R. E. (M)
Hawley, R. C. (M)
Hayden, G. (SM)
Helbig, W. L. (M)
Hogg, D. C. (SM)
Hunt, L. E. (SM)
Hutchinson, H. P. (SM)
Jakes, W. C., Jr. (SM)
Johnson, G. D., Jr. (M)
Kaminow, I. P. (M)
Kane, B. P. (M)
Kaprelian, E. K. (SM)
Kelly, L. H. (A)
Kibler, L. U. (M)
King, A. P. (SM)
Kulinyi, R. A. (M)
Lacy, R. E. (SM)
Lang, L. M. (SM)
Lawrence, W. A. (A)
Lewis, G. (M)
Li, T. (M)
Lindner, H. G. (SM)
Macilroy, A. P., Jr. (A)
Marx, D. H. (M)
Massell, F. (SM)
Menhennett, G. H. (M)
Miller, H. V. (M)

Moore, J. C., Jr. (M)
Nilson, L. H. (M)
Ohm, E. A. (M)
Perkins, O. D. (SM)
Peters, A. E. (M)
Rauch, A. (A)
Ring, D. H. (SM)
Rose, C. F. P. (SM)
Rowe, H. E. (M)
Sardo, W. (M)
Schmidt, J. L. (A)
Senn, G. F. (SM)
Sharpless, W. M. (F)
Sher, H. T. (M)
Siderman, J. A. (M)
Smith, D. M. (M)
Standley, R. D. (M)
Stanley, H. T. (M)
Tillotson, L. C. (SM)
Triolo, F. J. (M)
Turner, E. H. (SM)
Unger, H. (SM)
Valenty, G. E. (M)
Vogt, G. F. (SM)
Warters, W. D. (SM)
Wogat, J. W., Jr. (A)
Wurthmann, G. E. (A)
Zalesky, S. J. (M)

Ridgefield (NNJ-2)
Ackerman, H. T. (M)
Bishop, P. (M)
Cheng, B. K. (M)
Dardano, L. B. (A)
Dolinko, L. (M)
Fristensky, C. A. (M)
Gershon, G. S. (M)
Olwig, R. F. (A)
Ricca, R. F. (M)
Ross, G. G. (M)
Spitz, T. S. (M)
Sterling, R. S. (A)
Strole, J. C. (M)
Sutherland, E. F. (M)

Ridgefield Park (NNJ-2)
Famiglietti, B. L. (A)
Foster, R. M. (A)
Machi, D. (M)
Vinkman, V. V. (A)

Ridgewood (NNJ-2)
Anderson, C. W. (M)
Bailey, E. M. (A)
Blauvelt, D. H. (M)
Boyle, G. G. (M)
Clay, A. N. (M)
De Leon, J. (M)
Detlefs, H. (SM)
Donnell, J. R. (A)
Engel, G. C. (M)
Fitts, W. F. (M)
French, H. A. (SM)
Gill, C. J. (M)
Hinckley, R. H. (SM)
Holt, A. C. (SM)
Howite, R. (M)
James, S. D. (SM)
Johnson, F. H. (M)
Labagh, E. L. (M)
Mead, D. C., Jr. (M)
Mihalik, J. J. (M)
Mueller, J. F. (M)
Mulligan, J. H., Jr. (F)
Pratt, T. B., Jr. (M)
Priest, R. B. (M)
Puckette, C. M., Jr. (M)
Robinson, K. H., Jr. (A)
Rogers, T. I. (SM)
Sands, L. G. (SM)
Scarpone, J. B. (M)
Schmalz, H. H. (M)
Simoni, F. R. (A)
Simpson, L. C. (F)
Streich, R. J. (M)
Stubner, J. W. (M)
Troell, R. E. (M)
Walsh, P. P. (A)
Willis, J. S. (SM)

Riverdale (NNJ-2)
Hegeman, B. L. (A)

River Edge (NNJ-2)
Balter, S. A. (M)
Baum, E. (M)
Biagi, A. D. (M)
Garfunkel, A. C. (M)
Grybowski, T. M. (M)
Howitt, G. (M)
Isert, I. L. (M)
Izzo, A. J. M. (A)
Kennedy, M. J. (M)
Kleslong, J. D. (A)
Kumble, A. S. (M)
Mazzola, J. R. (SM)
Salmen, L. M., Jr. (M)
Seldin, L. (SM)
Slack, S. J. (M)

River Plaza (NNJ-2)
Serwin, R. J. (M)

Riverside (PHI-3)
Bay, B. P. (M)
Gardner, R. K. (M)
Kalmes, E. A. L. (A)
Vammen, C. M. (M)

Riverton (PHI-3)
Allen, C. D. (M)
Alperin, N. N. (M)
Arturo, N. F. (M)

Baron, A. S. (M)
Bilcon, R. F. (SM)
Blumenstein, W. C. (M)
Bollinger, W. P. (SM)
Bondy, M. F. (M)
Brown, L. (SM)
Burton, G. T. (M)
Canavan, T. P. (M)
Chang, G. M. (M)
Chapman, L. J. (M)
Coan, E. M. (SM)
Coffland, A. E. (A)
Danheiser, E. L. (M)
Davidson, R. C. (M)
Delker, A. G., Jr. (M)
Dudziak, C. (M)
Fabbioli, L. F. (M)
Falvey, T. L., Jr. (M)
Farrelly, R. J. (M)
Faust, A. C. (M)
Fazzini, C. (M)
George, M. E. D. (A)
Gold, A. (SM)
Goodwin, W. V. (SM)
Grey, R. (M)
Hammel, D. G. (M)
Hartshorne, F. A. (M)
Herman, D. J. (M)
Hodson, L. M. (M)
Hong, J. C. T. (A)
Howells, J. A. (A)
Hunt, G. W., Jr. (M)
Keys, D. D. (A)
Kitchens, L. E. (M)
Kreitzberg, S. B. (A)
Lavedan, L. J., Jr. (M)
Lawrence, W. J. (M)
Lawson, J. Q. (M)
Llewellyn, A. D. (M)
Long, K. G. (M)
Marsten, R. B. (SM)
McChesney, P. E. (M)
Mintzer, A. I. (M)
Nahay, L. P. (M)
Norcross, J. S., Jr. (A)
Oseas, J. (M)
O'Toole, C. E. (SM)
Penfield, A. W. (A)
Petrilla, A. D. (M)
Phillips, D. E., Jr. (A)
Plofker, M. H. (M)
Powell, W. E., Jr. (M)
Prant, A. (M)
Pruitt, D. L. (SM)
Quan, K. K. (M)
Raphelson, M. (M)
Reust, R. H. (M)
Rutledge, J. E., Jr. (M)
Schide, C. C., Jr. (M)
Schweiss, W. W. (M)
Shannon, R. E. (SM)
Sidman, R. D. (M)
Small, C. E. (M)
Smith, B. D. (M)
Snead, C. R. (M)
Spoelstra, R. J. (M)
Stangler, D. M. (A)
Starlin, H. E. (A)
Steigelman, W. H., Jr. (M)
Strinkowski, N. W. (A)
Suther, G. A. (M)
Takacs, S. J. (M)
Turnow, W. F. (M)
Vendeland, R. N. (M)
Watson, B. W. (M)
Westcott, H. H. (M)
Wieder, E. J., Jr. (M)
Woodward, C. P. (SM)
Yorio, R. A. (M)

River Vale (NNJ-2)
Battel, F. A. (A)
Betlejewski, F. J. (M)
Brain, B. (A)

Riviera Beach (NY-M-2)
Mossa, F. P. (M)

Rochelle Park (NNJ-2)
Auerbach, A. (M)
Brannagan, T. H. (M)
Carroll, J. M. (A)
De Yoreo, R. (M)
Farber, D. J. (M)
Ferrando, H. J. (M)
Flanagan, J. R. (M)
Gradus, W. S. (M)
Jones, G. E., Jr. (SM)

Rockaway (NNJ-2)
Coulter, G. W. (M)
Deegan, J. R. (M)
Greene, K. (SM)
Haupt, A. (M)
Horton, W. E. (M)
Johansson, H. B. (A)
Kelder, D. T. (M)
Magel, A. (M)
McFann, H. L. (M)
Morgen, M. (M)
Ross, W. C. (M)
Santos, J. S. (M)
Seeber, C. C. (M)
Ulloa, E. (SM)
Wahlig, R. L. (M)
Williams, C. S. (M)
Zyskowski, J. J. (M)

Roosevelt (NY-M-2)
Myhre, R. (A)
Rips, E. M. (A)

Roseland (NNJ-2)
Ahlstedt, T. E. (SM)
Grey, A. J. (M)
Nichols, P. A. (A)
Schwartz, S. (M)

Roselle (NNJ-2)
Barash, M. (M)
Boycks, E. C. (M)
De Sciscio, J. W. (A)
Durand, I. G. (M)
Frank, L. H. (A)
Preuss, E. A. (M)
Saccente, J. C. (M)

Roselle Park (NNJ-2)
Hanselman, K. J. (M)
Lee, T. (A)

Rumson (NY-M-2)
Deisler, J. D. (M)
Friis, H. T. (F)
Golay, M. J. E. (F)
Gruol, J. W. (SM)
Kennedy, J. D. (M)
Kimmel, L. D. (M)
Larrabee, R. W. (A)
Stromberg, R. E. (M)

Runnemede (PHI-3)
Copeland, W. O. (M)
Eckel, C. C. (M)
Jones, G. C. (A)
McCollor, R. L. (SM)
Nieh, N. Y. (M)
Perilli, R. R. (M)
Williamson, W. H., Jr. (M)

Rutherford (NNJ-2)
Conant, T. W. (A)
Copeland, M. (M)
Edmunds, J. J., Jr. (M)
Foster, J. E. (M)
Henzel, G. L. (A)
Juhas, L. A. (M)
Lohrenz, C. A. (M)
Lopresti, A. P. (A)
Lopresti, M. (A)
Luteran, F. K. (M)
Merrill, J. B. (M)
Moskowitz, C. (M)
Rau, A., Jr. (SM)
Ravner, S. M. (M)
Reenstra, W. A. (M)
Sammon, A. C. (A)
Schwartz, M. I. (M)
Scott, G. R. (M)
Simkovich, J. R. (M)
Simpson, W. F. (M)
Stoller, K. J. (M)
Van Winkle, E. W. (SM)
Walker, D. J. (M)
Walter, C. W. P. (SM)
Wattson, H. B. (SM)
Weinshenker, T. J. (M)
Zemanian, A. H. (SM)

Saddle Brook (NNJ-2)
D'Amico, A. T. (M)
Feoranz, F. J. (M)
Gambuti, P. F. (A)

Salem (PHI-3)
Bailey, L. W. (SM)
Morton, R. S. (M)
Perlsweig, A. M. (M)

Scotch Plains (NNJ-2)
Ballinger, L. H. (M)
Barr, J. C. (M)
Bell, J. S. (M)
Bird, S. P. (A)
Butler, W. E. (A)
Carhoun, D. O. (M)
Charest, R. J. (A)
Cummins, R. L. (M)
Dooley, G. F. (M)
Dranetz, A. (M)
Dvorak, F. S. (M)
Forsyth, P. G. (SM)
Greene, W. J. (SM)
Harris, F. (SM)
Hergenhan, O. (M)
Holmes, J. C. (M)
Jensen, C. A. (M)
McLean, J. B. (M)
Montfor, J. A. (M)
Mueller, P. L. (M)
Schultz, J. L. (SM)
Shipoen, H. T. (M)
Swenson, R. A. (A)
Young, C. B., Jr. (SM)

Sea Bright (NY-M-2)
Schnabolk, H. L. (M)

Seabrook (PHI-3)
Superior, W. J. (M)

Sea Isle City (PHI-3)
Bechler, W. C., Jr. (M)

Seaside Park (NY-M-2)
Sinn, R. S. (M)

Secaucus (NNJ-2)
Tonn, J. L. (A)

Sewaren (PRI-2)
Lojewski, T. (A)

Sewell (PHI-3)
Collar, H. W. (SM)
Woodward, J. D. (SM)

Short Hills (NNJ-2)
Bodmer, M. G. (M)
Budenbom, H. T. (F)
Carroll, M. J. (SM)
Dabrowski, H. L. (A)
Dore, A. J. (A)
Doyle, E. J. (SM)
Gerber, G. V. (M)
Giese, R. C. (SM)
Granlund, J. (M)
Handelman, R. B. (SM)
Huber, G. H. (SM)
Jones, H. B., Jr. (A)
Kelly, M. J. (F)
Klehm, W. G., Jr. (M)
Olson, N. K. (M)
Schaumberg, F. L. (A)
Schisel, J. (SM)
Tucker, J. P. (M)
Vanderbilt, S. (A)
Whittemore, L. E. (F)
Wright, A. K. (SM)
Ziegler, A. W. (SM)

Shrewsbury (NY-M-2)
Bernhardt, W. L. (M)
Covici, W. (M)
Czerwinski, W. P. (M)
Edmunds, E. E. (SM)
Gerhold, R. A. (M)
Johnstone, J. H. (SM)
Layden, O. P. (M)
Maloney, T. E. (M)
Michael, L. M. E. (A)
Rehm, W. L. (SM)
Ross, A. H. (SM)
Williams, L. H. (A)

Sicklerville (PHI-3)
Ayres, J. J. (M)
Berry, R. L. (A)

Singac (NNJ-2)
Fetko, J. F. (M)

Somerdale (PHI-3)
Haworth, R. F. (M)
Hedlund, L. V. (M)
Howell, M. (M)
Kolodin, L. (A)
Kurchin, A. (M)
Mascoli, V. J. (A)
Metzler, M. A. (M)
Ross, M. D. (M)
Sweeney, J. E. (M)
Warren, W. L. (M)
Weisenfeld, S. (M)

Somers Point (PHI-3)
Mayer, D. S. (M)
Niquette, R. P. (M)

Somerville (PRI-2)
Ahrons, R. W. (M)
Armstrong, L. D. (M)
Boesenberg, W. A. (SM)
Brooks, B. (M)
Bruce, C. R. (M)
Buehler, R. K. (M)
Burns, F. P. (M)
Cadra, V. J. (M)
Chen, S. J. (M)
Coburn, R. D. (A)
Cohen, E. (M)
Collings, F. C., Jr. (M)
Cormier, R. A. (M)
Di Stefano, R. T., Jr. (M)
Donahue, D. J. (M)
Erb, G. H. C. (M)
Gibbons, L. H., Jr. (M)
Gifford, J. S. (M)
Glover, A. M. (F)
Gobat, A. R. (SM)
Good, L. H. (SM)
Greig, W. J., Jr. (M)
Hamilton, K. E. (M)
Hatzikyriakos, P. P. (M)
Hornstein, M. B. (M)
Imrie, R. W. (M)
Iverson, J. H. (M)
Jacobus, L. A., Jr. (M)
Janes, R. B. (F)
Johnson, R. R. (M)
Kestenbaum, A. L. (M)
Kleinman, H. M. (M)
Lederhandler, S. R. (A)
Levin, B. B. (M)
Levy, D. T. (M)
Lloyd, R. H. F. (M)
Lohman, R. D. (M)
Long, W. T. (M)
Luedicke, E. (M)
Mc Laughlin, K. M. (SM)
Molnar, J. T. (A)
Okun, A. M. (SM)
Painter, R. R. (M)
Parker, H. (A)
Pinto, R. C. (M)
Pius, L. (M)
Roettcher, C. A. (M)
Ross, A. J. (SM)
Rustako, A. J., Jr. (A)
Santilli, R. A. (M)
Schwartz, B. (A)
Sosna, V. (A)
Thanos, H. (M)
Thorne, D. (M)
Toth, S., Jr. (A)
Veloric, H. S. (M)
Vossen, J. L. (M)
Wheeler, A. J. (M)
Wybrands, K. (M)
Zuk, B. (M)

South Amboy (PRI-2)
Kilcommons, W. H. (M)
O'Brien, R. E. (M)
Rauth, R. G. (M)

South Belmar (NY-M-2)
Fimmel, R. O. (M)

South Bound Brook (PRI-2)
Dobrowolski, R. M. (M)
Ezzard, G. (A)
Kalish, I. H. (M)

South Hackensack (NNJ-2)
Krauss, E. (A)
Sherman, E. W. (A)

South Orange (NNJ-2)
Bonanno, J. L. (SM)
Burnap, R. S. (F)
Crowley, H. L. (SM)
Harris, W. A. (F)
Hight, S. C. (F)
Miller, H. J. (SM)
Myers, G. H. (SM)
Quinn, K. C. (M)
Robison, R. M. (M)
Stanwick, C. A. (M)

South Plainfield (NNJ-2)
Bellew, F. N. (SM)
Brooks, W. D. (M)
Goehner, R. H. (M)
Greenman, R. (M)
Hoyt, R. S. (M)
Hunter, F. L., Jr. (M)
Kimble, C. B. (M)
Lipnick, J. (A)
Misdon, W. E. (M)
Pickering, W. C. (M)
Rogers, H. D., Jr. (A)
Shalvoy, R. E. (M)
Strokin, A. L. (A)
Sykes, R. T. (A)
Tesno, R. R. (SM)
Wolfe, R. W. (M)

South River (PRI-2)
Blanchard, C. K. (M)

South Somerville (PRI-2)
Delle-Torre, E. (M)

Sparta (NNJ-2)
Hearn, E. F. (M)
Hussey, L. W. (SM)
Lundstrom, A. A. (SM)

Spotswood (PRI-2)
Nachbar, M. S. (M)
Pike, G. W. (A)
Sideris, G. W. (A)

Springfield (NNJ-2)
Brumer, M. (A)
Cunningham, F. W. (SM)
Emmel, L. L. (M)
Field, W. T. (M)
Garber, A. M. (M)
Hartz, W. W. (A)
Liberman, M. E. (M)
McDowell, H. L. (M)
Meisel, H. R. (M)
Moore, E. J. (M)
Ollendorf, J. (M)
Pollacek, E. H. (M)
Rice, D. W. (M)
Rawicz, H. C. (M)
Sensale, C. J. (M)
Silverstein, A. N. (M)
Smith, R. C., Jr. (M)
Wolfe, G. (SM)
Wolff, J. P. (M)

Spring Lake (NY-M-2)
Huber, W. A. (SM)
Seelen, H. R. (SM)
Witham, R. G. (M)

Spring Lake Heights (NY-M-2)
Huband, L. W. (M)

Stewartsville (NNJ-2)
Belanger, E. D. (A)

Stirling (NNJ-2)
Hirmann, J. (SM)

Stratford (PHI-3)
Johnson, P. O. (M)
Lipsky, F. R. (M)
Parnell, H. A. (M)
Shellock, J. V. (A)

Succasunna (NNJ-2)
Di Stadio, D. (M)
Habib, N. (M)
Hangley, R. M. (M)
Hauck, G. (M)
Johnson, J. R. (M)
Johnson, L. C. (M)
Lightcap, E. T. (M)
Martin, S. J. (M)
Moss, A. M. (M)
Willibald, G. E. (SM)

Summit (NNJ-2)
Anderson, C. N. (F)
Baker, P. A. (M)
Black, H. S. (F)
Bost, J. F. (M)
Byrne, C. J. (M)
Cavelos, A. A. (M)



Chamolin, R. B., Jr. (M)
Cohen, G. (M)
Davis, R. E. (M)
De Costanzo, J. R. (A)
Dudley, H. W. (SM)
Early, J. M. (F)
Espenshade, D. L. (M)
Evans, H. W. (SM)
Ewoldt, H. J. (M)
Grierson, C. A. W. (SM)
Griffin, W. F. (SM)
Hammell, R. (M)
Hanchett, G. D., Jr. (SM)
Harley, J. B. (SM)
Hartley, R. V. L. (F)
Hathaway, S. D. (M)
Haynie, G. D. (M)
Heinze, W. W. (M)
Helsing, R. A. (F)
Helms, H. D. (M)
Hensel, M. L. (M)
Higgins, R. H. (M)
Hoth, D. F. (SM)
Howden, W. E. (M)
Hughes, E. C., Jr. (SM)
Johnson, R. L. (M)
Kaiser, E. T. (SM)
Kelly, H. P. (M)
Kitsopoulos, S. C. (M)
Koslov, S. (A)
Long, M. B. (M)
Lundry, W. R. (SM)
Marshall, R. W. (M)
Mayhew, A. G. (A)
McClelland, W. R. (A)
McMillan, J. D. (M)
Means, W. J. (SM)
Meise, H. A., Jr. (M)
Moore, R. F., Jr. (M)
Moster, C. R. (M)
Nordahl, J. G. (SM)
Ozsvath, D. R. (M)
Pain, D. H. (A)
Pasternak, C. F. (M)
Prystak, N. E. (SM)
Quinby, E. J. (M)
Raynsford, C. K. (M)
Richards, P. C. (M)
Rollman, R. F. (M)
Rose, A. C. (M)
Samuel, R. (M)
Shepard, F. H., Jr. (M)
Slover, W. L. (A)
Snedeker, D. E. (M)
Stevens, F. J. (M)
Tendick, F. H., Jr. (M)
Thomas, G. B., Jr. (SM)
Treitel, W. S. (M)
Unglaub, R. K. (M)
Wagenhals, E. R. (M)
Witt, F. J. (M)
Yost, L. A. (SM)

Sussex (NNJ-2)
Bliss, D. C. (A)

Teaneck (NNJ-2)
Benamy, D. A. (M)
Borg, R. H. (A)
Chamberlain, L. J. (M)
Chemack, G. (M)
Colloff, I. (M)
De Jongh, E. (A)
Dunn, W. J. (A)
Ennis, F. T. (M)
Galbraith, J. E. (M)
Gannett, E. K. (SM)
Greenquist, R. E. (M)
Hertzberg, I. (M)
Jacobs, B. H. (M)
Kalin, F. (M)
Kinn, A. J. (M)
Kramer, G. L. (M)
Kurtz, A. D. (M)
Lawrence, C. W. (M)
Levy, D. (M)
Levy, G. (A)
Ludwig, M. L. (M)
Luhrs, C. H. (M)
Luskin, B. (M)
McCarthy, G. F. (M)
Mezger, G. R. (SM)
Mittenthal, R. S. (M)
Pearl, S. L. (M)
Pincus, B. G. (M)
Pittler, M. S. (M)
Pulley, A. A. (M)
Quance, F. R. (M)
Rensin, E. (A)
Roesch, B. D. (M)
Rugo, J. J. (A)
Sather, O. J. (SM)
Shaft, P. D. (A)
Sheer, C. (SM)
Tsao, T. C. (SM)
Versepuit, P. C. (A)
Weber, S. (M)
Wood, T. A. (M)
Woolf, J. (A)
Zimmerman, J. R. (M)

Tenafly (NNJ-2)
Adams, R. H. (A)
Anthony, R. L. (SM)
Border, B. (A)
Del Ben, R. A. (M)
Engel, J. S. (M)
Hull, R. E. (M)
Hutchinson, C. C. (A)
Iwahasi, K. K. (A)
Laurence, R. B. (M)
Litsios, J. (A)
Mayo, H. L. (A)
Nadler, M. (M)
Parker, S. R. (M)
Sciorra, A. F. (M)
Shotliff, L. A. (SM)
Unger, W. H. (M)

Teterboro (NNJ-2)
Boronow, E. L. (M)
Keetch, W. A. (A)
McCaul, J. N. (A)
Nietsch, H. E. (A)
Robinson, C. S. (M)
Shangraw, C. C. (SM)
Sprung, R. A. (M)
Watts, C. D., Jr. (A)

Thorofare (PHI-3)
Freeze, R. (M)

Toms River (NY-M-2)
Driessen, W. B. (M)
Dunn, W. J. (A)
Helmus, D. H. (A)
Jennings, R. L. (M)
Mangold, F. J. (M)

Totowa (NNJ-2)
Marantz, H. V. (M)
Monsees, W. A. (M)
Unger, A. (M)

Totowa Borough (NNJ-2)
Gutleber, F. S. (M)
Helnis, F. W. (A)
Wehner, J. H. (M)

Towaco (NNJ-2)
Bird, H. H. (A)
Muller, E. E. (M)

Trenton (PRI-2)
Ballard, R. C. (SM)
Carver, L. A. (M)
De Chico, R. A. (M)
Edwards, L. M. (A)
Fausey, D. C. (M)
Ferber, L. W. (SM)
Handelsman, M. (SM)
Harris, F. M. (M)
Hull, D. H. (M)
Inslee, J. A. (M)
Kerbec, M. J. (M)
Klotz, C. G. (M)
Kucker, J. A. (M)
Kunicki, H. R. (M)
Lacy, H. R. (A)
Lavin, R. D. (A)
Lechner, B. J. (M)
Lewis, P. A. (M)
Lipinski, Z. J. (M)
Marquardt, C. S. (A)
Miller, H. S. (M)
Molnar, J. G. (M)
Monshaw, J. H. (M)
Power, J. B. (A)
Raser, E. G. (SM)
Ratz, A. G. (M)
Remis, B. R. (M)
Rogers, A. E. (M)
Sabisky, E. S. (M)
Seideman, I. M. (M)
Snedaker, D. G. (M)
Sowiak, M. M. (M)
Strother, W. F. (A)
Szmaur, L. (M)
Szwedo, S. G. (A)
Wentzel, A. G., Jr. (M)
Woolston, J. R. (M)
Yard, E. M. (M)

Troy Hills (NNJ-2)
Sumrell, F. N. (SM)

Union (NNJ-2)
Anderson, N. E. (M)
Barr, W. J. (M)
Brunje, R. M. (M)
Chartoff, M. (M)
D'Agostino, V. F. (M)
Davis, E. S. (M)
Edwards, J. B. (M)
Faughnan, J. F. (M)
Frank, D. N. (A)
Goldman, J. (A)
Hemmendinger, B. G. (M)
Jahn, C. W. (A)
Lambert, G. W. (A)
Mason, C. R. (A)
Metzler, R. (A)
Miller, L. (M)
Nagy, J., Jr. (M)
Polkosnik, C. F., Jr. (M)
Salatos, M. J. (M)
Salduti, A. R. (M)
Saloom, J. A. (M)
Sandoz, R. W. (M)
Snyder, V. A. (A)
Uebelhoer, H. K. (M)
Weintraub, N. (SM)
Woerner, G. R. (M)

Union City (NNJ-2)
Campanaro, P. L. (A)
Corson, D. E. (SM)
Cuny, J. J. (M)
Delguidice, T. F. (M)
Galoppo, D. E. (A)
Genzel, S. (A)
Lavene, B. (A)
Matto, V. G. (A)
Savi, L. (M)
Vaughan, C. B. (A)

Upper Montclair (NNJ-2)
Adams, P. R. (SM)
Beisel, F. A. (M)
Borden, E. W. (SM)
Buck, T. F. (M)
Chipo, R. D. (F)
Christaldi, P. S. (F)
De Rosa, L. A. (F)
Dishal, M. (F)
Dunn, J. G. (M)
Gaon, D. (M)
Goldsmith, T. T., Jr. (F)
Hamilton, R. D. (M)
Harries, W. L. (SM)
Hicks, B. A. (SM)
Hunkins, H. R. (M)
Huntley, H. R. (F)
Nagy, L. D. (A)
Osborne, H. S. (F)
Peer, G. C. (A)
Ruiter, J. H., Jr. (SM)
Siegel, R. (A)
Sparrow, E. L. (M)
Stanton, F. T., Jr. (A)
Sullivan, J. F. (M)
Terhune, H. R. (SM)
Umbach, P. E. (M)
Warner, H. M. (A)
White, R. J. (M)

Upper Saddle River (NNJ-2)
Bochet, F. J. (M)
Feldkamp, L. P. (A)
Havstad, H. (SM)
Sereno, C. A. (SM)
Weiner, M. J. (M)
Wertn, J. J. (M)

Vaux Hall (NNJ-2)
Seldon, C. (M)

Ventnor (PHI-3)
Clavier, A. G. (F)

Verona (NNJ-2)
Barosin, S. (M)
Baxter, C. L. (A)
Beltz, W. F. (SM)
Beste, H. E. (SM)
Borcrow, F. S. (A)
Butle, H. R. (SM)
Caruso, C. (SM)
Curtis, L. B. (M)
Dillon, J. J. (A)
Fisher, G. C. (M)
Hectus, G. V. (M)
Hoops, H. W. (A)
Hulst, G. D. (SM)
Jacobs, G. W. (M)
Janoff, A. (A)
Kram, W. (A)
Lewinter, S. W. (SM)
Metzger, A. C. (M)
McDonough, V. T. (M)
Polkinghorn, F. A. (F)
Polkinghorn, R. W. (M)
Rymer, R. H. (M)
Scheraga, M. C. (SM)
Scherer, M. (M)
Smith, E. J. (M)
Smith, H. R. (M)
Stegner, C. B. (SM)
Tobler, C. R. (M)
Tompson, E. C. (A)
Wohlgemuth, A. C. (M)
Zelen, H. J. (A)

Vineland (PHI-3)
Lolli, A. V. (M)
Waugh, J. R., Jr. (M)

Waldwick (NNJ-2)
Atkin, J. (M)
Bailey, R. S. (SM)
Broderick, N. E. (SM)
Brown, T. M. (A)
Certner, A. (A)
De Witt, R. G. (M)
Graney, J. F., Jr. (A)
Juba, S. J. (M)
Pearson, D. D. (A)
Rosett, E. (M)
Schumacher, H. L. (M)
Shaler, D. (SM)
Starrett, W. A. (A)

Wallington (NNJ-2)
Van Savage, J. (M)

Wallpack (NNJ-2)
Houck, H. W. (F)

Wanamassa (NY-M-2)
Acker, M. (M)
Allen, R. C. (M)
Carp, G. (M)
Chewey, V. C. (M)
Goldberg, B. (SM)
Halprin, L. H. (M)
Kelly, B. M. (SM)
Kuhnapfel, R. H. (SM)
Miller, M. (M)

Washington (NNJ-2)
Aten, D. C. (M)
Feindel, A. (M)
Neuls, C. W. (A)
Schmidt, A. F., Jr. (A)

Watchung (NNJ-2)
Hellstrom, M. J. (SM)
Hoeckele, W. J. (A)
Wehof, H. (M)

Wayne (NNJ-2)
Appleberry, T. K. (M)
Armstrong, T. R. (M)
Baird, D. R. (A)
Bentley, A. Y. (SM)
Bonazza, W. J. (M)
Brown, A. T., III (M)
Bruggeman, J. T. (M)
Butterworth, J. W. (SM)
Caspar, C. W., Jr. (M)
Davis, E. L. (SM)
Des Jardins, R. A. (A)
Dilatush, E. (M)
Ecklund, E. E. (SM)
Evans, N. L., Jr. (M)
Fockler, W. G. (SM)
Fosher, W. A. P. (M)
Goldstein, H. (M)
Gregory, L. A., Jr. (M)
Hamlin, J. C. (M)
Hilton, J. J. (M)
Juncker, J. R. (M)
Kass, J. S. (M)
Katz, A. J. (SM)
Kazuk, W. F. (A)
Kern, G. A. (SM)
Koudelka, O. (A)
Lay, C. A., Jr. (A)
Lehman, G. C. (M)
Lucas, E. F. (M)
Mohn, D. L. (M)
Murphy, D. F. (M)
Numrich, F. H. (SM)
Peters, G. J. (M)
Rich, P. A. (A)
Ryan, J. (M)
Schmidt, L. (M)
Schreiber, S. (M)
Shea, R. A. (SM)
Silco, R. O. (M)
Spelle, T. F. (A)
Struck, H. E. (M)
Thompson, W. T. (M)
Underhill, E. M. (SM)
Washburn, C. L. (M)
Williams, R. J. (M)
Wixson, F. C. (SM)
Wolfish, H. H. (M)

Wayne Township (NNJ-2)
Grimes, W. M., Jr. (M)

Weehawken (NNJ-2)
Armstrong, D. T. (A)
Bodonyi, A. B. (M)
Mahony, J. P. (M)
McKee, F. J. (M)
Petersen, W. P. (M)

Wenonah (PHI-3)
Robinson, J. L. (M)

West Allenhurst (NY-M-2)
Brockel, H. W. (A)
Friedrich, V. L. (SM)
Levine, R. H. (SM)
Lewis, H. M. (SM)
Ramella, P. R. (M)
Steelman, K. C. (A)
Sugarman, R. H. (SM)
Treston, P. (M)

West Belmar (NY-M-2)
Applegate, G. W. (M)
Fliegler, E. (A)

West Berlin (PHI-3)
Trimble, J. E. (A)

West Caldwell (NNJ-2)
Beyer, F. J. (M)
Brundage, J. H. (SM)
Capodanno, R. T. (SM)
Clark, T. G. (M)
Cole, H. W. (M)
Crumo, E. E. (M)
Dunn, R. H. (M)
Eberhard, L. E. (M)
Edge, W. H. (M)
Friedman, S. L. (M)
Grundler, H. L. (M)
Hampshire, R. A. (M)
Hessinger, P. S. (SM)
Knight, M. B. (SM)
Knoop, W. A., Jr. (SM)
Lebleboojian, G. (M)
Levine, S. B. (A)
Lynn, P. R. (M)
Matthews, T. N. (A)
Myers, R. H. (A)
Quickel, T. E. (M)
Reiner, R. L. (M)
Richardson, G. G. (SM)
Richardson, R. J. (A)
Rusinow, K. (M)
Schade, O. H. (F)
Seybold, A. M. (SM)
Shepard, R. H. (M)
Stalder, J. J. (M)
Steiner, J. W. (M)
Toepel, W. A. (M)
Walzer, F. (M)
Wilson, L. F. (M)

West Collingswood (PHI-3)
Croom, L. W. (M)
Cummings, J. J. (SM)
Levy, A. S. (M)
O'Brien, J. A. (SM)
Orth, R. B. (M)
Perry, R. A. (M)
Ramanis, O. (M)
Ryerson, C. M. (SM)

Sapp, D. H. (M)
Williams, D. E. (M)

West Deal (NY-M-2)
Berger, R. M. (SM)

West End (NY-M-2)
Baars, R. D. (M)
Chazen, J. (M)
Epstein, M. (M)
Howder, J. M. (M)
Kahn, D. (M)
Winters, A. L. (A)

West Englewood (NNJ-2)
Bitner, R. E. (M)
Boehm, G. W. (A)
Boesch, D. R. (M)
Bucholtz, M. N. (M)
Geiling, H. F. (M)
Krainin, S. (M)
Kuss, P. W. (SM)
Picholtz, R. L. (M)
Schnoll, N. (SM)
Shenk, E. R. (SM)
Walsh, A. A. (SM)

Westfield (NNJ-2)
Augustadt, H. W. (SM)
Bachrach, H. E. (M)
Bacon, D. R. (M)
Barker, R. A. (M)
Beeny, L. S. (SM)
Beltz, D. M. (M)
Bergan, M. D., Jr. (A)
Bumiller, G. B. (M)
Cafarelli, N. J., Jr. (M)
Canavan, J. J. (M)
Cunniff, T. W. (M)
Edwards, R. (SM)
Follingstad, H. G. (M)
Foster, R. M. (F)
Goldsmith, A. S. (M)
Hayward, W. S., Jr. (M)
Hopkins, C. H. (M)
Jackson, W. H. (M)
Jensen, T. F. (M)
Leeds, M. (M)
Leggett, E. P. (M)
Macgill, L. T., Jr. (M)
Massey, R. P. (A)
Meyer, B. W. (M)
Moons, A. G., Jr. (M)
Nein, H. R. (M)
Peterson, L. J. (M)
Sensenig, W. A. (M)
Shepard, R. M. (A)
Siegelin, C. O. (SM)
Smith, J. W. (SM)
Smith, K. D. (SM)
Suchomel, M. (A)
Warner, H. K. (M)
Wier, J. M. (M)
Wohlgemuth, A. J. (M)
Wolf, B. H. (SM)
Young, C. E. (M)

West Keansburg (NY-M-2)
Castle, B. B. (M)

West Long Branch (NY-M-2)
Anderson, B. S. (SM)
Barbour, T. M. (M)
Berman, G. (M)
Bonfetto, A. (M)
Delsinger, D. A. (SM)
Doxey, W. L. (M)
Farlee, R. J. (M)
Gikow, E. (SM)
Gore, T. S., Jr. (M)
Gormley, R. S. (SM)
Griffith, P. E. (SM)
Grubman, S. (M)
Gutwein, G. K. (SM)
Hooten, M. G. (M)
Jacobs, H. (SM)
Kublin, V. J. (M)
Kullback, I. (M)
Labanca, D. L. (M)
La Marca, P. J. (M)
Lippel, B. (M)
Lipton, M. H. (M)
Martinson, F. L. (SM)
McKenna, F. A. (SM)
O'Brien, J. F. (M)
O'Dwyer, M. S. (M)
Segner, S. M. (SM)
Spergel, J. (M)
Vieweger, A. L. (SM)
Vogler, J. G. (M)
Wolinsky, A. (A)

Westmont (PHI-3)
Beezer, J. E. (M)
Burke, T. J. (M)
Carrell, R. M. (M)
Cepas, P. J. (M)
Dennison, R. C. (M)
Dilley, J. E. (M)
Fast, H. (M)
Fish, C. A. (M)
Garabedian, H. B. (M)
Grundmann, G. L. (SM)
Knox, J. E. (A)
Leidy, H. W. (A)
Maggio, A. F. (M)
Mullen, D. J. (M)
Pierce, D. L. (A)
Pierce, J. A. (M)
Rapoza, E. J. (M)
Schatz, S. (A)
Sinnett, C. M. (F)
Sloan, J. E. (M)

Walker, R. B. (M)
Witt, L. A. (M)
Yourich, A. A. (A)
Zartman, N. B. (M)

West New York (NNJ-2)
Davis, G. B. (M)
Hershberg, D. E. (M)
McPhee, A. J. (M)

West Orange (NNJ-2)
Abate, J. E. (M)
Albanese, D. F. (M)
Baron, H. M. (M)
Belott, N. J. (A)
Bernier, V. A. (A)
Bernstein, B. (M)
Blanchard, W. A. (M)
Booth, R. P. (SM)
Dzik, A. (SM)
Edison, T. M. (M)
Fineman, T. P. (M)
Fishbein, S. B. (SM)
Garten, L. A. (M)
Goldshine, A. D. (M)
Goldstein, M. K. (SM)
Grady, C. B., Jr. (M)
Grayson, E. L. (M)
Greenberg, H. (M)
Greenfield, G. (M)
Hershoff, L. (SM)
Hess, R. C. (M)
Hetherington, G. V. (A)
Kahn, H. S. (M)
Kantrowitz, W. (A)
Kishpaugh, A. W. (SM)
Krakau, W. S. (A)
Lander, F. (A)
Langford, R. C. (SM)
Mann, O. J. (M)
Masson, F. Y. (SM)
Milner, C. M. (M)
Newman, R. J. (SM)
Padalino, J. J. (SM)
Panter, P. F. (SM)
Pfersch, G. H., Jr. (M)
Puder, R. K. (A)
Reed, E. D. (M)
Reise, H. A. (SM)
Riemenschneider, N. L. (M)
Saltzberg, B. R. (M)
Sapoff, M. (M)
Schotland, F. D. (SM)
Scully, J. F. (SM)
Segers, R. G. (M)
Shamis, S. S. (SM)
Shimp, G. H. (A)
Smith, J. F. (A)
Snow, H. A. (F)
Tutchin, H. (SM)
Wagner, R. L. (M)
Zmuda, E. J. (M)

West Paterson (NNJ-2)
Knight, R. T. (M)
Mozek, G. J. (M)
Woncik, M. (M)
Young, D. A. (M)

Westville (PHI-3)
Fatkin, H. W., Jr. (M)
Sinclair, G. (M)

Westwood (NNJ-2)
Anaya, F. J. (M)
Clark, S. F. (M)
Duschka, W. A. (M)
Elwell, H. G., Jr. (M)
Gordon, M. J. (M)
Gregory, G. S. (SM)
Gunderson, L. C. (M)
Hirsch, R. M. (SM)
Lauer, E. K. (M)
Link, F. M. (SM)
O'Connell, E. P., Sr. (M)
Rudd, C. D. (M)
Schary, G. A. (A)
Schentes, M. J. (SM)
Siegel, P. (M)
Spanos, W. M. (M)
Triantafellow, W. (A)
Warden, F. W. (SM)
Ware, D. H. (M)
Woodin, R. H. (M)
Zangenberg, H. E. (M)

Wharton (NNJ-2)
Hall, W. W. (M)
Hart, R. E. (A)
Hoft, W. L. (A)
Klapach, P. (A)
Krueger, P. C. (M)
Obee, R. A. (A)
Vandak, R. F. (M)

Whippany (NNJ-2)
Allen, C. L. (M)
Alsberg, D. A. (SM)
Anderson, A. B. (M)
Anderson, G. M. (SM)
Anselmo, D. R. (M)
Apostolakis, G. C. (M)
Armstrong, C. A. (SM)
Bachman, W. J. (SM)
Baker, G. H. (M)
Baird, J. A. (SM)
Baldwin, E. G. (M)
Barstow, J. M., Jr. (M)
Bearer, P. J. (SM)
Becraft, C. E. (A)
Bedell, E. H. (M)
Beeler, T. L. (M)
Berkowitz, M. Z. (A)
Blair, R. R. (SM)
Bode, H. W. (F)
Bohren, A. K. (SM)
Bollman, J. H. (SM)
Boyce, P. M. (M)
Boysen, A. P., Jr. (M)
Brenneman, D. (M)
Brown, D. J. (M)
Brown, L. O., Jr. (M)
Budlong, W. A. (M)
Busch, K. J. (M)
Cagle, W. B. (M)
Carretta, P. M. (M)
Chasteen, J. T. (M)
Clarke, D. R. (M)
Clement, A. W. (SM)
Clutts, C. E. (M)
Cocchiaro, M. (A)
Compton, H. B. (SM)
Connell, J. B. (M)
Coulter, D. M. (M)
Crater, T. V. (A)
Crue, C. R. (A)
Dale, G. V. (M)
Daly, I. W. (M)
Danylchuk, I. (M)
Darnell, P. S. (SM)
De Graaf, D. A. (M)
De Motte, F. E. (SM)
Diamond, E. H. (A)
Dietzold, R. L. (F)
Dintenfass, J. (A)
Dobkowski, J. T. (A)
Dollard, P. M. (M)
Dominick, J. B. (SM)
Dorn, R. J. (M)
Dudek, S. J. (M)
Dungan, R. R. (M)
Elias, L. G. (SM)
Elliott, S. J. (M)
Emshwiller, M. (M)
Engstrom, O. D. (SM)
Fair, I. E. (M)
Fairweather, B. A. (M)
Favin, D. L. (M)
Field, J. M. (M)
Fitch, J. C. (M)
Fleckenstein, W. O. (M)
Fleming, H. C. (SM)
Franke, H. C. (M)
Frantz, D. R. (SM)
Frasco, W. V. (M)
Freeman, E. R. (M)
Fuss, P. S. (M)
Gallant, R. J. (A)
Gamble, G. L. (M)
George, J. E. (M)
Ghiron, H. (A)
Gieseler, L. P. (M)
Giloth, P. K. (A)
Goldstein, H. L. (M)
Guettler, P. L. (A)
Gunderson, D. C. (M)
Haber, K. H. (M)
Harding, P. A. (A)
Haught, D. E. (M)
Hays, F. R. (M)
Heber, E. (A)
Heberlein, A. A. (SM)
Helm, H. A. (M)
Hewitt, W. H., Jr. (SM)
Hibbert, J. J. (M)
Hirsch, P. (M)
Hofmann, E. H. (M)
Hohmann, G. D. (M)
Huff, D. N. (A)
Hunter, R. A. (A)
Ingerson, W. E. (M)
Jacobs, I. (M)
Janiszewski, F. A. (M)
Joel, A. E., Jr. (SM)
Johnson, G. D. (SM)
Johnson, J. E. (M)
Jones, C. (M)
Kasper, F. J. (M)
Kay, A. M. (M)
Kelley, W. E. (M)
Kellogg, L. H. (SM)
Ketchledge, R. W. (SM)
Kindberg, E. V. (M)
Kirkwood, L. W. (SM)
Kiss, M. J. (M)
Klahn, R. (M)
Koenig, W., Jr. (A)
Kovach, L. D. (M)
Krauss, W. N. (M)
Krieger, R. W. (M)
Lane, R. F. (SM)
Larsen, L. F. (M)
Lauver, R. M. (M)
Leavitt, J. R. (M)
Lee, C. Y. (M)
Lenigan, T. E. (M)
Linder, S. L. (SM)
Lowell, R. (M)
Lowry, G. M. (A)
Lowry, T. N. (M)
Lozier, J. C. (SM)
Lucas, R. M. (M)
Lund, N. (M)
Lunney, R. E. (M)
Mac Williams, W. H., Jr. (SM)
Manship, J. F. (M)
Marshall, J. L., Jr. (M)
Martin, D. W. (A)
Matthews, J. G. (M)
Mattingly, R. I. (SM)
May, J. E., Jr. (SM)
McBride, A. L. (M)
McCann, T. A. (SM)
McCarthy, J. A. (SM)
McCoy, J. C. (SM)
Mc Cune, R. J. (A)
McMillan, B. (SM)
McWhan, B. (M)
Mead, R. (A)
Medwin, A. H. (M)
Menard, J. Z. (M)
Meyer, W. C. (M)
Miller, W. F. (M)
Moore, R. M. (SM)
Morris, P. L. (A)
Morrison, E. D. (M)
Morrison, J. F. (F)
Morrison, L. W. (SM)
Mumford, W. W. (F)
Munn, A. J. (SM)
Nebel, C. N. (M)
Nehama, I. D. (M)
Newhouse, R. C. (F)
Nicodemus, K. L. (A)
Nielsen, G., Jr. (M)
Nyser, H. J. (M)
Och, H. G. (SM)
Olmstead, N. C. (SM)
Otterman, J. (M)
Pardee, S., Jr. (M)
Paul, C. E. (M)
Petrich, L. G. (M)
Price, A. C., Jr. (M)
Prieler, C. E. (A)
Reed, S. C. (M)
Reichle, W. E. (SM)
Rice, D. R. (M)
Rice, R. V. (A)
Richman, G. H. (A)
Robertson, G. H. (A)
Ronne, J. S. (M)
Rudolph, J. C. (M)
Rumpel, C. H. (A)
Rundstedt, R. J. (M)
Sandberg, I. W. (M)
Saxe, H. A. (M)
Schaefer, F. J., Jr. (M)
Schmidt, E. F. (M)
Schramm, C. W. (SM)
Schunneman, R. F. (M)
Sears, P. R. (M)
Seckler, H. N. (M)
Seidler, R. L. (M)
Sellers, G. A., Jr. (M)
Shaffer, R. A. (M)
Shaller, A. (SM)
Siegel, E. H., Jr. (M)
Simons, B. H. (M)
Sinclair, R. O., Jr. (SM)
Smith, C. A. (SM)
Smith, L. M. (M)
Smith, P. H. (F)
Solitsz, A. (M)
Souders, E. R. (M)
Spence, P. W. (M)
Solees, W. G. (M)
Staehler, R. E. (A)
Stammerjohn, L. W. (M)
Sturdy, W. W. (SM)
Sturges, R. P. (M)
Sund, E. T. (M)
Swift, R. A. (SM)
Taft, C. R. (SM)
Tatsuguchi, L. (M)
Teeters, D. R. (M)
Thatcher, W. H. (SM)
Thompson, M. J. (M)
Thompson, T. H. (M)
Tidd, E. D. (M)
Tidd, W. H. (SM)
Tinus, W. C. (F)
Tuomenoksa, L. S. (M)
Ulrich, W. (M)
Von Aulock, W. H. (A)
Warner, A. W., Jr. (SM)
Weber, R. M. (A)
Weiss, M. M. (M)
Wheeler, G. W. (SM)
White, D. L. (M)
Wiggins, J. J. (A)
Wiley, B. (M)
Williams, D. L. (M)
Williams, J. M. (M)
Willson, F. E. (M)
Winans, R. C. (M)
Wise, R. O. (SM)
Woodmansee, B. S. (SM)
Yokelson, B. J. (M)
Yostpille, J. J. (M)
Zimmerman, A. P. (M)

White House Station (PRI-2)
Berkowitz, M. D. (M)
Brough, J. R. (SM)

White Meadow Lake (NNJ-2)
Goldstein, M. (M)

Wickatunk (NY-M-2)
Grubb, W. C., Jr. (SM)

Wildwood (PHI-3)
Eberle, H. (M)
Kendall, L. B. (SM)
Pohle, C. G., Jr. (M)
Wouters, A. P. (A)

Wildwood Crest (PHI-3)
Barrett, C. S. (M)

Williamstown (PHI-3)
Kaufmann, D. C. (M)
Roberts, M. J. (M)

Woodbridge (PRI-2)
Benko, G. M. (A)
Desimone, O. L., Jr. (A)
Melnick, R. J. (M)
Rugg, D. A. (A)
Woodbury (PHI-3)
Bailey, E. S. (M)
Barnes, R. W., Jr. (M)
Billstein, R. W. (A)
Comninos, D. A. (M)
De Credico, R. J. (M)
Frank, A. J. (M)
Frantz, E. C. (M)
Garcia, A. (M)
Glenn, H., Jr. (M)
Harbert, D. D. (M)
Kapust, L. A. (M)
Lapp, D. N. (SM)
Neubert, H. A., Jr. (M)
Priestley, D. M. (M)
Rittman, M. C. (M)
Rozier, C. P. (M)
Salter, P. W. (M)
Secor, W. B. (M)
Shibler, W. (M)
Skinner, R. L. (M)
Stark, J., Jr. (M)
Torre, A. J. (SM)
Yelverton, J. N. (M)

Woodcliff Lake (NNJ-2)
Franzel, J. H. (M)
Hammerschmidt, A. L. (SM)
McNally, J. P. (A)
Swanson, C. A. (M)
Von Kunits, P. (M)

Woodlynne (PHI-3)
Mancino, V. J. (M)

Wood Ridge (NNJ-2)
Robinson, K. P. (M)
Yockel, A. P. (M)

Wrightstown (PHI-3)
Collins, D. H. (A)
Miller, R. (M)

Wyckoff (NY-M-2)
Baasch, H. C. (M)
Benenson, C. A. (M)
Braun, W. E. (M)
Chambers, A. B. (A)
Foley, R. M. (M)
Lorenzo, A. M. (A)
Marshall, R. A. (A)
Oesterle, A. G., Jr. (M)
Poch, S. (M)
Samson, R. L. (M)
Troast, W. H. (A)
Watson, W. E. (A)

NEW MEXICO

Alameda (A-LA-7)
Hopkins, L. A., Jr. (M)

Alamogordo (ALA-H)
Alfie, C. L. (SM)
Allison, C. H. (A)
Arnold, N. E. (A)
Baker, R. E. (M)
Barnard, L. N. (A)
Bergtsen, C. N. (A)
Berg, D. V. (M)
Birkholz, R. L. (A)
Brackeen, T. W. (M)
Breunig, K. H. (M)
Castillo, H. T. (M)
Cloon, R. E. (A)
Cornell, F. W. (M)
Crawford, J. E. (A)
Dodd, S. C. (M)
Driscoll, M. W. (SM)
Ebersole, H. R. (M)
Ehni, F. P. (M)
Frei, J. (M)
Gatton, H. F. (SM)
Gibbs, T. M. (M)
Guenthner, F. K. (A)
Hammer, W. H. (A)
Harris, L. M. (M)
Hawn, A. V. (M)
Heinrich, R. E. (M)
Hibben, J. M. (M)
Hursh, E. M. (M)
Inafuku, R. H. (M)
Jaenke, M. G. (A)
Johnson, R. R. (SM)
Jones, M. W. (M)
Keller, P. A. (A)
Lanfair, B. B. (M)
La Pierre, A. F. (SM)
Lopez, O. C. (A)
Lovell, E. C. (SM)
Lux, M. O. (SM)
Lynch, A. J., Jr. (M)
Lynch, V. J. (SM)
Malley, F. (A)
Martin, W. T. (M)
Michelsen, P. W. (M)
Muhlberger, J. G. (A)
Nicholson, T. (M)
Parent, V. F. (M)
Pykosz, T. F. (M)
Rowe, M. L. (A)
Rudy, C. E., Jr. (M)
Saylor, R. P. (M)
Smith, H. D. (M)
Steele, O. A. (SM)
Stewart, F. E. (A)
Stokes, J. W. (M)
Stotts, W. S. (SM)
Szukalski, D. J. (M)
Tantzen, R. G. (M)
Taylor, L. L. (SM)
Thorne, M. G. (A)
Trout, E. M. (A)
Tuttle, J. B. (M)
Vellquette, H. R. (A)
Warnock, R. L. (SM)
Waterman, A. (A)
Webb, R. C. (M)
Weber, M. E. (M)
Wegman, R. L. (M)
Wells, B. D. (A)
Whitley, G. E. (M)
Wiant, R. C. (M)
Young, D. L. (A)
Zagone, P. V. (M)
Zimmerman, B. L. (M)

Albuquerque (A-LA-7)
Abeyta, G. A. (M)
Adams, R. E. (M)
Aden, R. D. (A)
Allen, B. O. (A)
Allen, L. J. (M)
Allen, J. B. (M)
Alls, C. R. (M)
Ames, J. R. (M)
Anderson, G. W., Jr. (M)
Anderson, H. L. (M)
Anderson, W. L. (M)
Arnold, A. C. (M)
Arnot, G. A., Jr. (M)
Arquette, D. W. (M)
Austin, H. B. (M)
Bachand, G. (SM)
Bacher, J. R. (M)
Baerwald, H. G. (SM)
Bailey, V. A. (A)
Baker, R. P. (M)
Banks, T. G., Jr. (SM)
Barlow, W. J. (M)
Basore, B. L. (SM)
Belote, J. C. (M)
Bennett, H. A. (M)
Bentz, R. D. (A)
Bidwell, C. H. (SM)
Bircher, P. H. (M)
Bird, F. W. (A)
Bishop, R. H. (M)
Bivens, H. M. (M)
Bliss, S. A., Jr. (M)
Bloomquist, J. O. (M)
Boatwright, L. T., Jr. (M)
Boettcher, G. E. (M)
Booker, S. R. (M)
Boor, R. A. (M)
Brassfield, J. R. (M)
Braudaway, D. W. (A)
Brazda, A. L. (A)
Breen, E. L. (M)
Briggs, J. B. (A)
Brooks, E. P. (M)
Brown, R. L. (M)
Brown, W. L. (M)
Bryan, W. C. (M)
Bueffel, B. H., Jr. (SM)
Buksa, E. J. (A)
Burns, W. W. (A)
Canute, A. J. (A)
Carman, W. H. (SM)
Carter, A. G., Jr. (M)
Church, A. B. (M)
Church, T. S. (SM)
Cilke, H. J. (M)
Clark, A. J., Jr. (M)
Clement, W. L. (M)
Clifford, D. E. (M)
Cohn, A. L. (M)
Cole, L. L. (M)
Coleman, D. J. (M)
Collier, J. R. (SM)
Connell, J. C. (M)
Cooper, R. L. (M)
Cooper, W. K. (M)
Corcorran, H. B., II (A)
Cramond, W. R. (M)
Cordova, N. A. (M)
Corey, F. B. (M)
Cravens, M. N., Jr. (M)
Crevelling, R. (SM)
Crook, G. S. (A)
Dankworth, J. F. (M)
Davis, E. C. (SM)
Davis, L. W. (SM)
Denton, D. H., Jr. (M)
De Pew, R. T. (M)
Dicken, H. K. (M)
Dieruf, B. E. (M)
Dietz, J. P. (A)
Dike, S. H. (SM)
Doods, L. F. (A)
Donohoe, R. W. (M)
Dossey, J. L. (SM)
Dowling, E. C. (M)
Downs, G. G. (M)
Durant, J. R. (M)
Edison, A. R. (M)
Edmonds, S. C. (A)
Ehrman, L. (M)
Elkins, E. P. (M)
Ellingson, A. C. (M)
Elliott, N. J. (M)
Ellis, J. W. (M)
Ellis, P. R., Jr. (M)
Endsley, D. L. (A)
Erteza, A. (M)
Farrell, R. W. (A)
Fergesen, J. A. (A)
Fernandez, H. M. (M)
Finch, H. D. (M)
Findlay, J. H. (SM)
Fish, F. N. (A)
Fisher, H. V., Jr. (M)
Fisher, R. V. (A)
Flanagan, T. J. (M)
Fleissner, C. L. (M)
Fletcher, E. E. (M)



Fletcher, E. R. (M)
Fligner, O. M. (M)
Flynn, K. D. (M)
Fossum, D. E. (SM)
Foster, C. E. (M)
Fowler, G. A. (F)
Frank, J. L. (A)
French, R. R. (A)
Frenkel, L. J., Jr. (SM)
Fry, D. R. (SM)
Fuhrman, D. W. (M)
Garlington, A. R., Jr. (A)
Gatlin, H. E. (M)
Gebert, C. T. (M)
Gelt, P. A. (M)
Gerwin, H. J. (M)
Gerzine, R. D. (M)
Glaze, E. W. (M)
Goldenberg, H. B. (SM)
Gomel, C. L. (SM)
Goss, F. A., Jr. (SM)
Grannemann, W. W. (M)
Green, M. C. (SM)
Greenwood, S. B. (M)
Griffith, R. D. (M)
Gross, J. E. (SM)
Grover, R. K. (M)
Guilford, R. P. (M)
Hagedorn, J., Jr. (M)
Halliday, J. R. (M)
Hamby, R. E. (M)
Hansen, V. W. (M)
Hanson, D. C. (M)
Hanson, R. E. (M)
Hardin, K. D. (M)
Harrison, C. W., Jr. (SM)
Harrison, S. E. (M)
Harroun, T. V. (M)
Hart, A. S., Jr. (A)
Hayre, H. S. (M)
Henry, D. E. (M)
Henry, T. J. (M)
Henry, W. E. (M)
Herrmann, R. W. (M)
Herron, R. G. (SM)
Hey, J. C. (M)
Hicks, C. W. (SM)
Higgins, P. B. (M)
Hinde, J. E. (M)
Hinds, D. R. (M)
Hodges, E. M. (M)
Hogue, L. H. (A)
Holck, D. K. (M)
Holcomb, M. E. (M)
Holladay, R. E. (M)
Hollinger, E. C. (A)
Holmes, J. J. (M)
Hood, J. A. (M)
Houts, H. E. (SM)
Hunter, W. C. (SM)
Hurford, A. F. (SM)
Huters, A. F. (M)
Hyde, W. L. (M)
Ingersoll, C. E. (M)
Iverson, M. M. (A)
Ives, E. E. (M)
Jacklin, W. L. (A)
Jacobs, C. F. (M)
Jacobs, E. L. (M)
Janza, F. J. (SM)
Jean, F. H. (M)
Jeske, H. O. (M)
Jesse, P. C. (A)
Johnson, G. S. (M)
Johnson, R. O. (A)
Jones, L. E. (M)
Jones, M. C. (M)
Jones, R. D. (M)
Jorgensen, R. W. (M)
Kear, F. W. (A)
Keck, L. J. (M)
Kelly, R. D. (M)
Kimball, G. S. (M)
King, C. J. (M)
Kinoshita, G. S. (M)
Klink, E. J. (M)
Knapp, T. W., Jr. (M)
Koepsel, W. W. (M)
Komen, P. J., Jr. (SM)
Koschmann, A. H. (M)
Kostel, J. J. (A)
Kreitler, C. E. (M)
La Coss, W. D. (M)
Lambert, R. P. (M)
Land, C. E. (SM)
Lane, E. L. (M)
Laster, J. A. (A)
Lathrop, L. L. (M)
Lawrence, A. F. (M)
Laycock, H. S. (SM)
Lee, C. K. (M)
Lemm, R. S. (M)
Lenhert, D. H. (M)
Lewis, C. E. (M)
Lincoln, R. A. (M)
Linsenmayer, G. R. (M)
Littleford, A. C. (M)
Livingston, P. E. (A)
Lodge, L. L. (A)
Loeppke, G. E. (A)
Lommasson, T. E. (M)
Long, C. M. (M)
Longerot, C. D. (M)
Looney, V. C. (A)
Lopez, O. (M)
Love, W. D. (M)
Lung, H. R. (M)
Lytle, C. W. (SM)
MacKay, J. S. (M)
Madlener, M. J., Jr. (A)
Marker, T. F. (SM)
Martinek, R. E. (M)
Mason, H. (M)
Matthews, R. P. (M)
Mattison, M. T. (M)
Max, A. J. (SM)
Maxon, J. S. (M)
May, W. L. (M)
McCampbell, C. B. (M)
McCann, R. P. (SM)
McCarthy, F. M. (M)
McCracken, H. J. (M)
McDowell, J. F., Jr. (M)
McGarry, J. J., Jr. (M)
McGehee, R. M. (SM)
McLaughlin, C. R. (M)
McLay, J., Jr. (SM)
Melick, L. M. (M)
Merren, G. T. (A)
Miller, E. G., Jr. (SM)
Mills, G. S. (A)
Milton, O. (M)
Minnear, L. H. (SM)
Mitchell, J. C., Jr. (M)
Molnar, J. P. (F)
Montoya, E. K. (A)
Moore, R. K. (SM)
Morrison, D. M. (M)
Morton, W. B. (M)
Myers, V. V., Jr. (M)
Myre, W. C. (M)
Naley, N. C. (M)
Neilson, F. W. (M)
Nelson, J. E. (A)
Newlin, G. C. (M)
Newman, J. J. (M)
Newsom, M. M. (M)
Nicoloff, C. C. (M)
Noble, R. P. (M)
Nowlin, D. K. (A)
O'Nan, R. L. (M)
Ouverson, C. D. (M)
Pace, R. K. (A)
Pace, T. L. (SM)
Paddison, L. J. (M)
Padilla, D. J. (A)
Palmer, J. E. (SM)
Palmer, P. R. (M)
Patterson, A. D. (A)
Patterson, H. H., Jr. (SM)
Paulus, W. K. (M)
Peabody, R. L. (A)
Peckham, V. D. (A)
Pepmueller, A. D. (A)
Pereda, E. F. (M)
Petty, W. E. (M)
Peurifoy, R. L., Jr. (M)
Phillips, J. E. (M)
Phinney, E. S. (M)
Polakowski, W. G. (M)
Post, D. F. (M)
Poulsen, H. L. (A)
Powell, R. L. (M)
Puzalis, J. W. (M)
Purdue, C. H. (M)
Quate, C. F. (M)
Radman, N. T. (A)
Ray, B. M. (SM)
Ray, H. K. (M)
Read, G. R., Jr. (M)
Reese, J. D. (M)
Rehberg, J. C. (SM)
Reineke, R. G. (M)
Reinties, I. C. (M)
Relyea, J. R. (A)
Reynolds, R. S. (SM)
Rhodes, H. T. (M)
Ridinger, J. J. (M)
Riggins, G. L. (A)
Roberts, R. W. (SM)
Roble, D. D. (A)
Robinson, M. E. (M)
Roby, E. M. (M)
Roelle, D. E. (A)
Rogers, J. L. (M)
Rogers, W. J., Jr. (A)
Rollosson, G. W. (SM)
Ross, F. A. (M)
Rudolph, R. J. (M)
Russell, J. F. (SM)
Rust, R. F. (M)
Sabisch, K. A. (M)
Sander, H. H. (M)
Scebold, R. D. (A)
Scharrer, R. G. (M)
Schauer, J. D. (SM)
Scheibner, J. E. (M)
Schelby, F. (M)
Schiess, M. C. (M)
Schmidt, C. H. (M)
Schnurr, R. H. (M)
Schreiner, D. G. (A)
Schwarz, A. C. (M)
Scott, J. H. (M)
Scott, J. C. (M)
Scranton, W. A. (M)
Seavey, R. W. (M)
Sedlack, B. F. (M)
Seifert, F. F. (M)
Sellers, T. A. (M)
Senter, C. H. (SM)
Sewell, B. L. (M)
Sharp, W. E. (A)
Shaum, R. L. (SM)
Shoemaker, W. F. (M)
Shoup, J. P. (SM)
Shrock, J. B. (SM)
Shumway, K. J. (M)
Simmons, R. E. (M)
Singleton, H. A. (A)
Sinnott, N. F. (A)
Smart, T. E. (M)
Smith, G. K. (A)
Smoll, L. A. (M)
Sonnenberg, R. E. (M)
Sparks, D. (M)
Spence, R. C. (SM)
Stockham, T. G., Jr. (M)
Stockley, C. H., Jr. (A)
Stomp, J. M., Jr. (A)
Stone, T. E. (M)
Stringfellow, W. M. (SM)
Swain, G. R. (A)
Swain, R. R. (M)
Sydor, M. (M)
Syler, R. P. (M)
Szeman, P. (M)
Taylor, C. D. (M)
Thom, D. C. (M)
Thomas, J. A. (M)
Tillery, R. J. (M)
Tillman, J. E. (SM)
Tinkle, T. M. (M)
Todd, J. L., Jr. (M)
Tompkins, H. E. (SM)
Torres, H. S. (M)
Tullar, R. V. (M)
Turner, D. H. (M)
Tynes, R. A. (SM)
Uhl, J. E. (A)
Vayer, R. M. (M)
Vulgan, E. J. (A)
Wakefield, J. P. (M)
Walker, H. E. (SM)
Walsh, J. P. (M)
Warner, B. D. (M)
Warthen, C. M. (M)
Watkins, L. C., Jr. (SM)
Watson, D. E. (M)
Weimer, R. E. (A)
Weingarten, D. H. (M)
Wentz, J. L. (M)
Westman, W. W., Jr. (M)
Westmark, C. I. (M)
Weston, B. J. (SM)
Wetherington, J. M. (M)
Whaley, E. W. (M)
Whitford, R. E. (M)
Widenhoefer, N. C. (A)
Wilde, R. L. (M)
Williams, C. S., Jr. (M)
Williams, L. E. (A)
Williams, R. H. (A)
Womelsdiff, R. E. (A)
Worden, O. L. (M)
Wright, G. L. (M)
Wright, P. H. (M)
Yrisarri, E., Jr. (A)
Zeller, T. R. (A)

Belen (A-LA-7)
Douglass, T. F. (M)
Lucas, A. E. (A)

Carlsbad (A-LA-7)
McKay, R. A. (M)

Cedar Crest (A-LA-7)
Miller, G. L. (M)
Roeschke, C. W. (SM)
Urquhart, K. J. (M)

Clovis (A-LA-7)
Watrous, D. S. (M)

Edgewood (A-LA-7)
Wilson, G. Q. (M)

Holloman AFB (ALA-H-7)
Artery, H. D. (M)
Ashmore, T. G. (M)
Belan, E. F. (M)
Chick, W. G. (M)
Doherty, J. M. (M)
Godwin, C. B. (M)
Johnson, W. H. (M)
Kiefer, C. F., Jr. (M)
Koellner, K. H. (A)
Liston, D. H. (M)
Lockhart, R. J. (M)
Marr, W. J. (M)
May, C. L. (M)
Mock, R. E. (M)
Montgomery, R. L. (M)
Morse, J. H. I. (M)
Murphy, D. J. (M)
Peske, E. C. (M)
Shelley, C. B. (M)
Smith, H. F., Jr. (M)
Tisdale, W. G. (A)
Vicek, D. H. (SM)
Wagner, H. E. (M)
Weinstein, G. E. (M)

Kirtland AFB (A-LA-7)
Ahearne, J. F. (M)
Graves, P. J. (M)
Joosa, R. M. (SM)
Katzive, R. H. (M)
Kuras, A. C. (M)
Olszewski, L. V. (A)
Vajda, F. S. (M)

Las Cruces (EP-WS-6)
Bacon, J. K. (M)
Bone, S., Jr. (M)
Boone, B. B. (A)
Bullard, R. W. (M)
Bunn, J. R. (A)
Carbine, I. L. (M)
Carrillo, C., Jr. (M)
Coffee, T. A. (M)
Collins, R. E. (A)
Daniels, C. M. (A)
De Rosa, A. L. (A)
Ecklund, R. E. (A)
Embree, O. D. (M)
Fawcett, J. K. (M)
Garrett, L. E. (SM)
George, J. E. (A)
Haas, H. W. (M)
Helfrich, G. A. (M)
Hemingway, F. S., Jr. (M)
Higgins, L. S. (A)
Hill, P. D. (M)
Hinchey, F. A. (M)
Holcomb, W. G. (M)
Jensen, W. V. (M)
Kidwell, R. P. (M)
Maestas, J. F. (M)
Malone, C. P. (M)
McSpadden, W. R., Jr. (M)
Miller, V. L. (M)
Mills, J. C. (M)
Owen, R. L. (M)
Pickel, A. B. (A)
Prado, D. (M)
Roberson, C. F. (M)
Sedillo, J. N. (A)
Small, P. (M)
Smith, M. E. (M)
Taylor, H. V. (M)
Tipton, R. B. (M)
Treat, C. J. (M)
Wagner, N. (A)
Welch, C. M. (SM)

Las Vegas (A-LA-7)
Procter, B. M. (A)
Wood, L. S. (M)

Los Alamos (A-LA-7)
Aiello, W. P. (M)
Aprill, G. P. (M)
Baker, D. A. (M)
Benton, C. U. (M)
Boyd, T. J., Jr. (M)
Briscoe, W. L. (SM)
Brown, E. A. (M)
Carlson, W. F. (M)
Charmatz, A. W. (M)
Crew, W. H. (SM)
Deal, J. B., Jr. (M)
Demuth, H. B. (M)
Doremire, F. E. (SM)
Fagan, P. (SM)
Field, W. R. (M)
Freyman, R. W. (SM)
Gilland, J. R. (M)
Glascock, R. B. (M)
Glore, J. P. (M)
Grant, L. P. (M)
Gray, R. W. (SM)
Greenwood, A. H. (A)
Hale, L. C. (M)
Hall, J. O. (M)
Hayes, B. (M)
Hlebert, R. D. (SM)
Hull, D. E. (SM)
Janney, D. H. (M)
Jennings, H. K. (M)
Kaufman, D. E. (M)
Kemp, E. L., Jr. (M)
Koelle, A. R. (M)
Kraker, K. P. (M)
Lamb, J. K. (SM)
Landahl, C. E. (M)
Lang, H. J. (M)
Lewis, R. E. (M)
Lilienthal, J. R. (SM)
Mace, P. N. (M)
Malmberg, A. F. (M)
McCloud, B. J. (M)
Mohler, R. R. (M)
Peck, R. C. (M)
Rawcliffe, A. S. (SM)
Rudnick, P. (SM)
Rupert, G. N. (M)
Schulze, H. T. (M)
Singer, S. (SM)
Spack, W., Jr. (M)
Standring, H. A. (M)
Stapleton, R. E. (M)
Stephenson, D. L. (M)
Stevens, R. R., Jr. (M)
Tesche, F. R. (SM)
Trexler, V. L. (M)
Washburn, B. W. (M)
Watts, R. J. (SM)
Weber, W. (M)
Weintraub, L. (A)
White, J. G., Jr. (M)
Winston, J. G. (M)

Raton (A-LA-7)
Ficklin, B. P. (M)
Maciszewski, A. H. (SM)

Roswell (EP-6)
Binnix, R. G. (A)
McKee, C. W. (M)

Sandia Park (A-LA-7)
Yearout, D. K. (M)

Sandoval (A-LA-7)
Smith, W. T. (SM)

Santa Fe (A-LA-7)
Bookwalter, E. C. (M)
Corkran, R. E. (A)
Doles, A. E. (M)
Fisher, R. C. (A)
Ford, W. R. (M)
Gardiner, T. (M)
Heyman, H. (SM)
Martin, C. F. (M)
Sanders, B. T., Jr. (M)
Wilcoxon, H. O. (M)

Socorro (A-LA-7)
Bailey, R. K. (A)
Foster, A. M. (M)
McFarland, J. H. (A)
Pickett, H. (M)

Springer (A-LA-7)
McDowell, J. K. (M)

State College (EP-WS-6)
Duncan, R. H. (M)

Tijeras (A-LA-7)
Caldes, W. E. (SM)
Davis, G., Jr. (M)
Middelton, A. D. (SM)
Stout, K. D. (M)

Truth or Consequences (A-LA-7)
Manley, D. W. (M)

Tucumcari (A-LA-7)
Larltson, L. P. (M)

Tularosa (ALA-H-7)
Billups, E. E. (M)
Lecrone, J. G. (M)
Suska, J. T., Jr. (M)

University Park (A-LA-7)
Brown, H. A. (SM)
Covington, L. R. (M)
Johnson, C. E. (M)
La Fleur, W. (M)
Miller, G. W., Jr. (M)
Montz, W. F. (A)
Paul, R. H. (A)
Weeks, W. L. (M)
Weinschel, H. D. (M)
Williams, J. N. (A)

Walker AFB (A-LA-7)
Bouvier, F. C. (M)

White Sands Missile Range (EP-WS-6)
Albert, J. A. (M)
Crocker, B. G. (A)
Ender, A. (M)
Enright, D. J. (M)
Essary, W. D. (M)
Frerking, M. E. (M)
Hakeman, G. J. (M)
Lebanoff, L. (A)
Milstead, F. C. (M)
Moore, T. E. (M)
Moss, E. C. (M)
Mraz, W. L. (SM)
Pollock, C. (M)
Pyle, C. A. (M)
Schafersman, R. L. (M)
Smith, W. G. (M)
Taylor, L. H. (M)
Wise, J. A., III (M)
Wooding, H. C., Jr. (M)

NEW YORK

Accord (NY-MH-2)
Pagel, R. W. (M)

Albertson (LI-2)
Brandt, T. (M)
Corrado, V. M. (M)
Delore, G. E. (A)
Georges, M. J. (A)
Kay, L. M. (SM)
Kelvin, W. (M)
Sullivan, G. D. (M)
Westman, H. P., Jr. (M)

Afton (BING-1)
Lavender, R. W. (M)

Akron (BN-1)
Lewis, F. J. (M)
Mech, H. D. (A)
Neubauer, R. A. (M)

Albany (SCH-1)
Blau, C. C. (A)
Bloomsburg, R. A. (M)
Bogosslan, Z. (M)
Carleton, L. K. (M)
Christo, N. (A)
De Russo, P. M. (M)
Dewire, D. S. (SM)
Kirwin, G. R. (M)
Lessen, M. (M)
Levitas, A. (M)
Lorch, J. (M)
Marsh, J. L., Jr. (M)
Maurer, J. W. (M)
Muth, J., Jr. (M)
Poll, J. J., Jr. (M)
Portanova, M. C. (M)
Reagan, J. A. (M)
Schaffer, C. A. (M)
Schwedock, B. (M)
Smith, D. H. (SM)
Tewell, J. R., Jr. (M)
Walsh, B. D. (M)

Alden (BN-1)
Allen, J. K. (M)

Alfred (ELM-C-1)
Burzycki, M. (M)

Allegany (BN-1)
Steiger, A. E. (A)

Alplaus (SCH-1)
Story, R. W. (M)

Altamont (SCH-1)
Bielchner, C. W. (SM)
Fortington, W. H. (M)

Amityville (LI-2)
Barone, S. A. (SM)
Brockner, C. E. (SM)
Chadwick, J. H., Jr. (M)
Cosmas, A. (M)
Forsberg, A. W. (SM)
Frank, F. P. E. (M)
Hyland, J. R. (M)
Isherwood, H. (M)
Krayer, G. (SM)
Martin, J. L. (M)
Minto, E. W. (A)
Palmer, W. (F)
Pearsall, C. H., Jr. (M)
Peckens, D. F. (M)
Schabbehar, E. A. (M)
Sixbey, S. R. (M)
Stuart, A. F. (M)
Trinkle, F. J. (M)
Withnell, R. (M)
Wolber, R. R. (M)
Zeluff, I. S., Jr. (SM)

Amsterdam (RU-1)
Bohanske, T. A. (M)
Drek, R. J. (A)
Garratt, P. M. (M)
Warren, D. W. (M)

Angola (BN-1)
Olney, V. W. (M)
Riker, C. E. (A)

Apalachin (BING-1)
Benscoter, W. A. (M)
Betts, W. K. (M)
Bird, C. M. (M)
Frank, D. E. (M)
Frizzell, J. H. (M)
Grimmer, R. C. (M)
Hess, G. (M)
Houser, G. G. (M)
Howard, P. H. (A)
Hudson, F. J., Jr. (M)
Jones, J. C. (M)
Jones, R. W. (M)
Joseph, D. L. (A)
Kostyshyn, B. (M)
MacIntyre, R. E., Sr. (M)
Mahoney, R. E. (A)
Obsharsky, P. (M)
Schaaf, F. W. (M)
Scott, G. L. (M)
Simpson, R. G. (M)
Sweet, M. E. (M)
Taylor, P. R. (SM)
Wolterman, A. J. (M)
Wood, E. W. (M)

Ardsley (NY-W-2)
Busharis, J. G. (SM)
Derr, R. J. (M)
Graveson, R. T. (M)
Prestholdt, O. (M)

Armonk (NY-W-2)
Bashe, C. J. (M)
Hector, L. G. (SM)
Lawton, L. M., Jr. (M)
Northen, W. C. (M)
Porterfield, E. A. (M)
Sacks, E. I. (SM)

Astoria (LI-2)
Arzenati, M. H. (A)
Benesch, E. J. (M)
Berenyi, S. (M)
Breitzer, D. I. (M)
Fitzgerald, D. J. (A)
Iversen, R. J. (SM)
Mitchell, J. R. (A)
Odabashian, H. (A)
Orlando, A. S. (M)
Palumbo, C. J. (M)
Perini, H. R. (M)
Phanos, S. (M)
Siouris, G. M. (M)
Spiralis, P. (M)
Strauss, H. J. (M)
Termini, F. A. (A)
Vallades, W. (A)
Witt, G. (A)

Atlantic Beach (LI-2)
Harvey, A. J. (A)

Attica (ROC-1)
Frazer, A. W., Jr. (SM)

Auburn (SYR-1)
Blanchard, J. W. (M)
Byrns, R. E. (M)
Dyer, R. F., Jr. (M)
Hall, G. N. (SM)
Hall, W. H. (SM)
Hauge, K. (M)
House, H. J. (A)
Kaufman, H. (A)
Lyon, R. P. (SM)
O'Connor, C. R. (A)
Wolf, G. T. (M)

Aurora (SYR-1)
Willy, J. R. (M)

Avoca (ELM-C-1)
Bliss, R. L. (A)

Avon (ROC-1)
Malone, W. J. (A)

Babylon (LI-2)
Anderson, R. G. (M)
Biell, F. J. (SM)
Brown, M. W., Jr. (M)
Collins, K. (M)
Gollhofer, P. J. (M)
Lindberg, R. (A)
Lory, J. (M)
Morfin, H. W. (M)
Nelson, O. A. (A)
Nolte, C. T. (M)
Picone, J. D. (M)
Richmond, L. W. (M)
Siegel, L. I. (M)
Szuchy, N. C. (A)

Bainbridge (BING-1)
Coe, D. H. (M)

Baldwin (LI-2)
Allen, H. E. (SM)
Antonucci, D. (M)
Constable, R. C. (M)
Dayton, F. R. (M)
Dreyer, J. F., Jr. (SM)
Fogelberg, J. E. (A)
Hartmann, Z. (M)
Karron, G. A. (M)
Klahr, S. (M)
Lautenberger, H. W. (M)
MacHill, J. (SM)
McConaughy, R. L. (M)
McCoy, L. L. (A)
McDonald, F. J. (A)
Menear, W. R. (M)
Ozolins, I. (A)
Plotkin, A. A. (M)
Rhodes, B. S. (M)
Schnebbe, A. D. (M)
Seide, L. M. (A)
Shelton, P. W. (M)
Slama, V. J. (A)
Sobczak, T. V. (A)
Solbrig, A. L. (A)
Townsend, R. W. (A)
Tschudi, E. W. (M)
Utley, W. A. (SM)
Welch, T. J. (M)
White, C. E. (A)

Baldwin Harbor (LI-2)
Krieger, K. C. (M)

Baldwinsville (SYR-1)
Ackley, E. H. (M)
Bemis, B. G. (M)
Bloomquist, R. G. (M)
Brown, B. P. (SM)
Bunker, W. M. (M)
Chapin, W. T. (SM)
Christensen, W. M. (M)
Clinton, T. G. (M)
Connolly, T. E. (M)
Cottle, D. W. (M)
Cowan, F. C. (A)
Craig, E. L. (M)
Cummings, S. J. (M)
Custin, T. G. (M)
Downey, R. L. (M)
Goetter, W. F. (M)
Hansen, R. J. (SM)
Hildebrandt, H. J. (M)
Jensen, R. C. (SM)
Jones, D. V. (SM)
Ladstatter, J. (M)
Lanzl, R. H. (M)
Lavin, H. P. (M)
Majcher, C. L. (M)
Mathis, V. P. (SM)
Mayer, F. J., Jr. (SM)
McCann, R. T. (M)
Nielsen, E. G. (A)
North, S. M. (M)
Putschi, H. N. (M)
Rhodehamel, A. J. W. (M)
Russell, M. E. (SM)
Schiro, A. R. (M)
Schmidt, J. D., Jr. (M)
Stearns, H. F. (M)
Vahle, J. (M)
Ver Schure, M. D. (M)
Wainright, J. A. (SM)
Winchester, D. S. (M)
Wood, R. F. (M)
Young, G. G. (SM)

Ballston Lake (SCH-1)
Blume, A. C. (SM)
Coffey, W. N. (M)
Freiburghouse, E. H. (M)
Hodges, D. J. (M)
Jachym, T. M. (M)
Krueger, D. H. (M)
Spalding, J. F. (M)
Stokoe, R. H. (M)
Truax, C. J. (M)
Whitten, J. R. (M)

Ballston Spa (SCH-1)
Krygsman, C. (A)

Batavia (ROC-1)
Abboud, F. L. (A)
Drummeter, W. (M)
Henry, F. T. (M)
Hunt, W. E., II (M)
Kwit, C. J. (A)
Lofton, J. H. (M)
Richardson, D. A. (M)
Thalner, R. R. (SM)

Bath (ELM-C-1)
Barney, W. H., Jr. (M)
Campagna, E. R. (M)
Connelly, T. R. (A)
Evon, J. (M)
Fleck, W. (SM)
Haley, A. J. (M)
Jacobs, P. W. (M)
Massey, W. F. (M)
Merritt, S. (M)
Overholts, R. W. (M)
Payne, W. J. (M)
Szilasi, A. (SM)
Wise, L. J. (A)

Bayport (LI-2)
Walters, J. L. (M)
Watson, R. F. (M)

Bayshore (LI-2)
Dudley, D. J. (M)
Engelman, J. (M)
Gilmer, L. B. (A)
Kopp, R. E. (M)
Maher, E. F. (A)
Melliger, A. W. (M)
Petty, B. E. (M)
Rappolt, F. A., Jr. (M)
Robertson, C. A. (A)
Salvante, F. A. (A)
Schindwolf, R. (A)
Sears, R. A. (M)
Weiss, D. W. (M)
Williams, D. P. (M)
Zuroff, C. A. (M)

Bayside (LI-2)
Averett, S. S. (M)
Baasch, T. L. (M)
Bartram, R. H. (M)
Bass, H. H. (M)
Battle, R. P. (SM)
Berman, R. F. (A)
Bernstein, J. L. (M)
Blass, J. (M)
Bloom, L. R. (SM)
Blum, R. J. (A)
Bodenburg, J. F. (SM)
Bohn, R. (A)
Bracco, D. J. (SM)
Caffiaux, J. A. (SM)
Canadeo, G. N. (A)
Carrara, A. S. (A)
Carver, F. (A)
Cecka, R. A. (M)
Cohen, J. R. (M)
Cohen, J. (M)
Cortizas, A. P. (M)
Costa, T. A. (M)
Crowhurst, N. H. (SM)
Damora, V. A. (A)
D'Avola, S. B. (M)
De Plota, F. J. (M)
De Sena, F. G. (M)
Doyle, E. J. (M)
Dzik, S. (M)
Ellefson, B. S. (F)
Eng, J. W. (SM)
Fabricant, B. S. (M)
Feay, D. I. (M)
Ferrara, J. J. (M)
First, D. (SM)
Fowler, V. J. (M)
Friedrich, S. (SM)
Gardiner, C. E. (M)
Gatti, W. (M)
Geissler, F. X. (M)
Gellert, J. (M)
Golden, H. (A)
Goldman, I. (SM)
Golick, S. (M)
Grazda, E. E. (M)
Gross, J. (M)
Gross, L. (M)
Gross, V. (SM)
Harrison, R. I. (M)
Harrison, S. W. (SM)
Hollander, J. M. (M)
Howell, D. M. (M)
Hurley, E. T. (M)
Hyatt, A. J. (M)
Jacob, G. W. (M)
Jacobson, N. (M)
Jenkins, P. R., Jr. (M)
Keck, P. H. (M)
Krimsky, W. J. (M)
Lepic, R. E. (M)
Lewis, B. F. (M)
Lieber, S. (M)
Ligori, J. (M)
Livingston, D. C. (SM)
Lowenschuss, O. (SM)
Lubkin, S. (SM)
Malang, A. W. (M)
Marx, J. (SM)
McEvoy, J. A. (M)
Mealy, J. T. (M)
Monahan, W. R. (M)
Moody, J. R. (M)
Nadler, B. D. (SM)
Nakamura, D. S. (A)
Novick, L. R. (M)
Novick, P. B. (M)
O'Neill, G. D. (F)
Paulsen, H. (M)
Pflieger, R. H. (M)
Podeyn, G. J., Jr. (A)
Poteracke, J. L. (M)
Ralidis, G. W. (M)
Ramirez, E. V. (M)
Reinhardt, G. (A)
Relis, M. J. (M)
Romano, M. (A)
Rook, S. (A)
Rosen, B. (M)
Rosenstein, M. (M)
Ross, A. (M)
Scheffler, R. G. (A)
Schinzel, R. R. (M)
Schneider, S. (SM)
Schoen, G. G. (M)
Shaler, G. J. (M)
Siegmann, M. J. (M)
Sklar, S. (M)
Sonnenschein, A. H. (SM)
Spero, W. I. (A)
Sulto, T. (A)
Sutkin, S. (M)
Taylor, I. R. (M)
Telleman, J. (M)
Tobey, G. D. (M)
Trinkaus, J. W. (SM)
Troxler, L. J. (SM)
Tylinski, F. V. (A)
Verton, M. P. (M)
Westerkamp, J. E. (M)
Whalley, W. B. (SM)
Zelsler, M. D. (M)

Bayside Hills (LI-2)
Bellantoni, J. (M)

Bayville (LI-2)
Bartolomei, G. G. (M)
Doll, R. E. (M)
Finn, E. C. (A)
Morenz, P. W. (M)
Porter, S. T. (M)
Richardson, H. W. (M)
Savino, R. T. (A)

Beacon (NY-MH-2)
Craft, J. L. (M)
Cummings, C. E. (M)
Zakarias, I. (M)

Bearsville (NY-MH-2)
Reynolds, A. M. (M)

Beaver Dams (ELM-C-1)
Marshall, D. E. (A)

Bedford Hills (NY-W-2)
Vogeler, R. A. (M)

Bedford Village (NY-W-2)
Miccioli, A. A. (M)

Beechurst (LI-2)
Coundjeris, A. (SM)
Meyrowitz, P. E. (M)
Seetoo, T. F. (M)

Bellaire (LI-2)
Amato, J. A. (M)

Belle Harbor (LI-2)
Eliasoff, A. (M)
Schure, A. (M)
Williamson, R. T. (M)

Bellerose (LI-2)
Aidala, J. B. (SM)
Altman, D. (A)
Biss, R. E. P. (M)
Burger, J. H. (A)
Colodney, J. (A)
Daly, J. M. (M)
De Angelis, D. P. (M)
Edelmann, R. (M)
Farber, H. (SM)
Frey, H. E. (M)
Geyer, R. E. (M)
Kashkin, R. (M)
Tramposch, R. W. (A)
Wengryn, M. (M)
Zymaris, C. (M)

Bellerose Manor (LI-2)
Buchsbaum, W. H. (SM)

Bellmore (LI-2)
Bass, H. W. (M)
Dvorak, C. J. (M)
Glaser, E. M. (SM)
Jackson, C. H. (M)
Kenny, J. A. (SM)
McGowan, J. F., Jr. (M)
Parke, H. G. (M)
Tocci, D. P. (M)
Wellman, F. C. (M)

Bellport (LI-2)
Madey, R. (M)

Berkshire (BING-1)
Klessling, C. E., Jr. (A)

Bethpage (LI-2)
Algase, L. I. (SM)
Barlowe, M. (A)
Bogner, R. D. (M)
Bronstein, F. (M)
Burko, A. J. (A)
Cantarella, V. J. (A)
Cosentino, F. J. (M)
Friedlander, M. O. (A)
Gamble, J. H. (M)
Giola, J. (A)
Gruber, R. E. (A)
Jagoe, R. W. (M)
Jones, M. W. (A)
Lipset, L. B. (M)
Madigan, J. P. (A)
Mason, L. (M)
Morrow, P. F. (M)
Mueller, E. H. (M)
Nielsen, P. (M)
Nosal, P. (M)
Olah, J. (A)
Rice, J. (M)
Rinkel, S. A. (M)
Russell, D. H. (M)
Sangi, D. W. (M)
Satre, W. I., Jr. (M)
Schenck, H. F. (M)
Schlemm, N. H., Jr. (M)
Schumacher, J. H., Jr. (M)
Sivilli, J. M. (A)
Smith, W. F. (M)
Trock, R. (SM)
Waldron, J. E., Jr. (M)
Yarnall, W. M. (A)

Big Flats (ELM-C-1)
Howe, L. H. (SM)

Binghamton (BING-1)
Barrentine, W. M. (M)
Bartholy, F. E. (M)
Bechtol, H. D. (SM)
Bishop, R. J. (M)
Brown, G. A., Jr. (M)
Bucci, A. A. (M)
Burton, W. E. (M)
Carpenter, M. L. (M)
Corderman, S. A. (M)
Crofford, D. J. (M)
Dahlberg, A. W. (M)
Danek, W. L., Jr. (M)
Decker, D. M. (M)
Decker, G. A. (M)
Dibb, G. (M)
Dolphin, H. L. (A)
Drechsler, W. G. (M)
Foss, F. A. (M)
Gamblin, R. L. (M)
Gilbert, H. G. (SM)
Gower, D. E. (M)
Hallinan, C. (M)
Harrison, C. L. (A)
Hennis, R. B. (M)
Herzfeld, G. M. (M)
Hicken, J. (SM)
Higgs, P. T. (A)
Hilburn, E. D. (A)
Klinko, E. H. (A)
Kobb, T. J. (M)
Kombluh, A. J. (A)
Kripl, J. F. (M)
Laws, L. C. (M)
Ling, O. T. (SM)
Lockhart, B. W. (M)
Lovelace, R. E. (M)
Maass, K. K. (M)
Mailhot, J. R. (M)
McPheeters, D. W. (M)
Merchant, J. H. (M)
Mitchell, J. (M)
Napierala, R. J. (A)
New, R. F. (M)
Northrup, R. M. (M)
Oldwine, C. V. (A)
Paufve, E. H. (M)
Potts, R. (M)
Pratt, R. J. (A)
Reed, G. G. (A)
Rekort, W. (M)
Ricciardelli, G. (M)
Richter, K. E. (M)
Rowly, R. A. (M)
Saeman, C. D. (A)
Sanneman, R. A. (A)
Schmid, H. (A)
Sitterlee, L. J. (SM)
Stantz, L. H. (SM)
Vignos, J. P. (M)
Walsh, N. J. (M)
Webster, J. E. (M)
Whitmore, J. H. (M)
Wilkinson, R. H. (M)
Young, M. A. (M)
Zimmerman, D. O. (M)
Zylich, N. P. (M)

Black Creek (ELM-C-1)
Lewis, R. M. (M)

Bloomington (NY-MH-2)
Loekle, O. J. (M)

Blossvale (RU-1)
Vogel, G. J. (A)

Blue Point (LI-2)
Field, P. L. (M)

Boston (BN-1)
Drankhan, V. C. (M)

Bowmansville (BN-1)
Lindberg, E. (M)

Breesport (ELM-C-1)
Sculiln, C. H. (M)

Brentwood (LI-2)
Carroll, J. J. (M)
Gould, G. B. (M)
Johnson, D. E. (M)

Brewerton (SYR-1)
Hunt, D. E. (M)
Thomas, W. P., Jr. (M)
Tooley, C. E. (A)

Brewster (NY-MH-2)
Blumenfeld, A. (M)
Dreher, C. (F)
Dunford, W. (A)
Hazzard, E. W. (M)



Hemming, C. B. (M)
Siegert, R. R. (M)

Briarcliff Manor (NY-W-2)
Brooks, L. P. (M)
Burditt, W. F. (A)
Drubin, M. (M)
Edwards, A., Jr. (M)
Ellen, N. A. (SM)
Eyster, J. A. (SM)
Fried, W. R. (SM)
Gaffney, J. E., Jr. (M)
Keller, R. E. L. (M)
Marlnace, R. C. (SM)
Stavis, G. (SM)
Stitzer, J. (M)
Strumer, J. N. (M)
Thomas, F. J. (M)
Urban, C. (M)

Briarwood (LI-2)
Nemeroff, I. (A)
Podall, B. A. (M)
Raft, P. D. (M)

Brightwaters (LI-2)
Becker, S. (M)
Damast, M. A. (M)
Fallin, J. W. (SM)
Geiger, J. M. (M)
Hansen, J. P. (SM)
Kramer, S. I. (SM)
Lang, J. G. (M)

Brockport (ROC-1)
Donaher, T. P. (M)

Bronx (NY-2)
Abrevaya, E. (M)
Ackerman, D. D. (M)
Alfieri, G. J. (M)
Allison, J. K. (A)
Alphonse, G. A. (M)
Altamuro, F. V. (A)
Amazon, J. R. (A)
Asher, R. L. (M)
Baldovin, J. C. (A)
Barjian, H. (M)
Barkley, R. (M)
Baumoel, D. (M)
Beattie, J. W. (M)
Berg, S. (M)
Berger, L. (A)
Berman, L. R. (M)
Bianco, S. G. (A)
Birenbaum, L. (M)
Blaustein, S. E. (M)
Boles, S. (M)
Borenstein, D. P. (M)
Bottari, W. J. (M)
Braus, H. A. (M)
Bregman, M. W. (M)
Brickman, A. F. (A)
Butler, C. R. (A)
Byrnes, I. F. (F)
Campbell, G. M. (A)
Cash, W. I. (M)
Cohen, M. L. (M)
Cohn, M. R. (A)
Covino, A. A. (SM)
Crawford, J. J. (M)
Creedon, R. I. (M)
Crowley, T. J. (M)
D'Amico, V. J. (M)
Darnovsky, A. (M)
Davidson, G. M. (M)
De Franco J. J. (M)
De La Parra, A. F. (M)
D'Elio, C. (M)
Dell'Acqua, L. (M)
Demby, S. J. (M)
De Salvo, A. F. (SM)
Dickstein, M. (M)
Divins, B. (A)
Dolan, D. T. (M)
Donaghy, J. F. (A)
Doyle, F. H. (M)
Dugandzic, P. F. (A)
Dunn, E. J., Jr. (A)
Eckstein, S. (A)
Ekstein, D. M. (A)
Elkort, D. S. (M)
Epstein, D. J. (A)
Facio, V. J. (M)
Fanuele, M. A. (M)
Farrago, R. J. (A)
Farrand, C. L. (F)
Feinland, S. (A)
Feldberg, I. (A)
Ferri, R. I. (M)
Fioretti, C. (M)
Fisch, R. A. (M)
Fleming, M. E. (M)
Flynn, C. W. (M)
Fraser, G. R. (M)
Friedman, O. (SM)
Gelfond, N. A. (A)
Gerson, M. (A)
Giannattasio, A. R. (M)
Ginsburg, L. (M)
Giordano, A. M. (A)
Giumento, A. (M)
Glatt, G. M. (M)
Glazer, I. (M)
Gold, S. D. (A)
Goldstein, S. I. (A)
Gonzalez, C. M. (A)
Gonzalez-Villafane, A. (M)
Good, S. (A)
Goodman, A. (SM)
Gordon, M. N. (M)
Gordon, S. (A)
Grabel, A. (M)
Greenblatt, E. (M)
Greenblatt, S. (M)
Griffin, J. P. (M)
Grossman, D. H. (M)
Guido, A. A. (M)
Gunzburg, M. N. (M)
Gurley, L. T. (M)
Guthait, M. (A)
Haims, M. J. (M)
Hanau, R. (A)
Handler, H. (M)
Haran, P. P. (M)
Harmatuk, S. N. (M)
Harris, B. (SM)
Hastings, J. J. (M)
Henion, T. T. (M)
Herskowitz, A. E. (A)
Hoffmann, R. G. (A)
Jacobowitz, H. (M)
Johannes, V. I. (M)
Johnson, D. A. (A)
Josefsberg, M. B. (M)
Kahn, W. A. (M)
Kane, J. R. (M)
Kantrowitz, P. (M)
Kaplan, L. J. (M)
Kass, E. J. (M)
Kirschner, M. (A)
Klipper, H. (M)
Kraemer, J. T., Jr. (M)
Kram, B. (M)
Kupersmith, F. (M)
Kurz, L. (M)
Kwo, T. (M)
Lampert, L. (M)
Lastiq, W. (M)
Lauricella, J. C. (A)
Lavenue, H. L. (A)
Lerman, H. (M)
Levine, A. (A)
Linder, A. (M)
MacFarlane, W. F. (M)
Machorro, R. A. (M)
Maniere, N. E. (A)
Martellotto, N. A. (M)
Mattila, P. A. (A)
McCabe, R. A. (A)
McDermott, J. P. (M)
McDonald, D. F. (M)
Metal, D. (A)
Meyers, J. G. (SM)
Miller, L. N. (M)
Miller, R. M. (SM)
Moran, W. B. (A)
Munk, M. R. (A)
Muscolino, J. V. (M)
Neuwirth, P. (M)
Newdow, I. (M)
Nissman, I. J. (M)
O'Hare, T. F. (M)
Olick, J. (A)
Oppenheim, J. (M)
Oppenheimer, H. N. (M)
Orenstein, A. (A)
O'Sullivan, T. J. (M)
Pechner, B. J. (A)
Pellinen, A. D. (M)
Pendergrass, H. L. (A)
Perlman, D. J. (M)
Philactos, C. J. (M)
Pimtelf, R. H. (SM)
Pleshko, P. (M)
Portante, R. R. (M)
Portnoy, A. (M)
Ragazzini, J. R. (F)
Reich, S. M. (M)
Reiss, E. V. (A)
Rimal, E. (M)
Rivers, R. D. (M)
Roberts, H. (SM)
Rocchio, J. J., Jr. (M)
Roher, N. J. (A)
Rosenheck, B. M. (A)
Rossnick, M. (M)
Rothbart, A. (M)
Rotondaro, J. A. (A)
Rubin, D. K. (M)
Rubinstein, R. B. (M)
Ruotolo, M. (M)
Ruttenberg, K. A. (M)
Sachs, G. I. (A)
Sales, M. (M)
Salichs, E. (A)
Salit, M. (M)
Schachter, H. (M)
Scharf, C. (M)
Schick, W. (M)
Schimanke, D. (M)
Schirtzer, M. M. (M)
Schlisser, G. (M)
Schmeltzer, R. A. (M)
Schneider, G. (M)
Schneider, P. S. (M)
Schreiner, E. H. (M)
Schutzman, E. (M)
Schwartz, H. H. (M)
Schwartz, J. H. (M)
Schwartz, M. E. (A)
Schwartz, W. J. (M)
Sciglio, R. (A)
Scipione, A. S. (M)
Seidman, H. A. (M)
Selden, N. (M)
Shegirian, P. (M)
Sherman, S. (M)
Sigal, H. (M)
Silveri, R. A. (M)
Slavin, M. J. (M)
Smith, H. E. (A)
Sommer, R. C. (M)
Sonder, E. (A)
Spann, L. B. (M)
Spector, G. (M)
Spiegel, R. E. (M)
Spielberg, J. R. (A)
Spock, R. E. (M)
Sporty, S. (A)
Stangel, J. J. (M)
Starace, N. L. (A)
Stern, E. N. (M)
Stettiner, R. L. (M)
Stewart, B. J. (M)
Stiefel, A. A. (M)
Suarez, A. (A)
Sullivan, E. (M)
Sweeney, D. J. (M)
Torrusio, J. (A)
Trott, G. G. (M)
Ungar, S. G. (M)
Victor, H. W. (SM)
Vogel, S. (A)
Volpe, G. (M)
Wagner, I. L. (A)
Wald, A. S. (M)
Weber, D. D. (M)
Weinstein, R. L. (A)
Weisman, I. (M)
Weiss, S. R. (A)
Weissman, F. S. (A)
Weltman, I. (M)
Wexelbaum, R. I. (M)
Woelgesy, J. D. (M)
Wolfson, R. B. (M)
Worthen, G. B. (M)
Yablon, M. (M)
Zadanowsky, L. (A)
Zaslavsky, S. (M)
Zechnowitz, A. L. (M)
Zenchoff, P. (M)
Zinn, A. W. (M)
Zuckerbraun, J. S. (M)
Zupan, B. (M)
Zywokarte, M. D. (M)

Bronxville (NY-W-2)
Angevine, R. A. (M)
Bein, W. (SM)
Davis, M. (M)
Egnuss, E. M. (M)
Genz, W. F. (M)
Golden, D. (SM)
Grossman, H. (SM)
Halperin, A. (M)
Halsal, M. (A)
Julie, J. (SM)
Langley, R. H. (F)
Lerner, N. C. (M)
McCoy, R. D. (F)
McNulty, W. A. (A)
Rie, C. L. (A)
Whitlock, J. R. (M)
Whittemore, D. B. (A)

Brooklyn (NY-2)
Aaronson, G. (M)
Abllock, S. (M)
Abramowitz, J. L. (M)
Abrams, S. J. (A)
Adams, H. G. (M)
Adlerstein, S. A. (M)
Albanese, P. (A)
Alster, S. D. (A)
Altomare, V. A. (M)
Ameres, L. A. (A)
Amster, G. S. (M)
Anderson, C. L. (A)
Angelastro, S. P. (A)
Angelo, E. J., Jr. (SM)
Anton, N. G. (F)
Appleman, S. (M)
Arain R. A. (A)
Aronoff, M. (M)
Arrow, A. (M)
Arthur, W. (M)
Arzt, G. D. (A)
Asclone, N. R. (M)
Asclone, R. (A)
Bazade, E. C. (A)
Bader, B. (M)
Baggia, M. E. J. (M)
Baker, L. C. (M)
Ball, I. R. (A)
Balsamo, D. C. (A)
Bambara, J. E. (SM)
Banner, L. (M)
Barbiero E. (A)
Barish, B. T. (M)
Barth, A. M. (A)
Basilico, A. (A)
Bayer, I. (SM)
Beach, R. (SM)
Becker, L. (SM)
Beidler, S. (M)
Belluck, R. E. (M)
Belove, C. (A)
Berger, M. (M)
Bergstein, L. E. (A)
Berk, M. A. (M)
Berkowitz, B. (M)
Berkowitz, P. S. (A)
Berlin, J. (M)
Berliner, J. M. (M)
Berman, H. (A)
Bernfeld, M. (M)
Bernstein, J. L. (M)
Bernstien, K. (A)
Besmertnik, J. (A)
Bessen, A. S. (M)
Bethea, J. W. (A)
Biederman, A. B. (M)
Bierman, H. (M)
Bigel, G. I. (M)
Bing, C., Jr. (A)
Birnbaum, J. (M)
Blackmore, F. E. (M)
Blaustein, P. H. (M)
Blauvelt, A. J. (A)
Blazek, W. J. (M)
Blecher, F. (M)
Blichfeldt, E. (M)
Blish, E. J. (A)
Bloomberg, H. (M)
Boesch, F. T. (M)
Bollen, I. (M)
Bolognovsky, G. (M)
Borowski, E. (A)
Bower, J., Jr. (M)
Boyle, B. (A)
Brathwaite, A. (A)
Bressi, N. P. (M)
Bressner, G. (M)
Brill, H. A. (M)
Broder, L. J. (M)
Brodie, P. M. (M)
Broman, H. F. (M)
Bromberg, N. S. (M)
Bronzo, F. J. (A)
Brosch, W. A. (M)
Brown, A. L. (A)
Brown, E. A. (M)
Brown, P. R. (A)
Brownstein, M. (A)
Burrill, S. (M)
Burnett, L. E. (M)
Butler, W. I. (M)
Butta, R. S. J. (A)
Callguiri, H. J. (M)
Camer, H. J. (A)
Cammer, H. R. (M)
Cane, P. (M)
Canfora, A. E. (A)
Caretto, H. L. (M)
Carlin, H. J. (F)
Casazza, C. A. (M)
Cassidy, F. T. (M)
Castagnaro, D. (SM)
Catanese, J. P. (M)
Cattelona, J. A. (M)
Chays, S. (SM)
Chwick, A. (M)
Cicek, T. G. (M)
Cocuzza P. J. (M)
Cohen, A. N. (M)
Cohen, G. (M)
Cohen, H. (M)
Cohen, L. D. (M)
Cohen, L. (A)
Cohn, E. M. (M)
Coltun, L. (A)
Colucci, J. A. (A)
Corinos, R. (M)
Conroe, A. H. (A)
Cooper, N. (M)
Corbellini, J. G. (M)
Corbin, S. A. (A)
Cosentino, L. S. (M)
Cottam, R. W. (A)
Crego, J. M. (M)
Crump, J. F. (A)
Curcio, A. T. (A)
D'Amato, R. J. (SM)
D'Anna, A. J. (A)
Danziger, A. (M)
Dattilo, W. P. (M)
Davidson, S. R. (M)
Davis, M. C. (M)
Day, G. (SM)
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Drosin, A. B. (M)
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Minerva, L. P. (A)
Minogue, J. P. (M)
Misciagna, J. J. (A)
Mishkin, E. (SM)
Mitchell, S. L. (A)
Monacchio, E. N. (A)
Monteleone, T. A. (A)
Moore, J. B. (F)
Mordkowitz, I. (M)
Morgan, E. K. (A)
Morgenstern, M. (A)
Moriwaki, Y. (SM)
Morrison, J. A. (M)
Morton, A. R. (SM)
Moskowitz, N. (A)
Moskowitz, S. (M)
Mullen, H. F. (M)
Musacchio, A. A. (M)
Navon, V. (M)
Navot, I. (A)
Nazerian, H. H. (A)
Nelson, H. C. (M)
Nelson, W. (A)
Nelson, W. F. (M)
Nicolosi, J. P. (M)
Nisenzuk, C. J. (M)
O'Donnell, J. P. (M)
Ogonlak, T. J. (A)
Okada, S. (M)
Oliner, A. A. (SM)
Orbach, S. (M)
Ortolani, F. P. (M)
Ostrov, B. (M)
Oswald, H. J. (M)
Osholm, J. M. (A)
Oxley, J. E. (M)
Ozdoba, M. (A)
Pazer, J. (M)
Pearlman, L. (M)
Pecoraro, C. J., Jr. (M)
Pedersen, C. R. (M)
Pelitsch, E. J. (M)
Penikas, G. (M)
Perlman, I. (M)
Perry, L. (M)
Petroulakis, S. G. (A)
Phillimore, H. R. (A)
Piccione, N. A. (M)
Pinck, E. (M)
Pinck, M. (M)
Pivnik, S. I. (A)
Pizzinusso, A. J. (M)
Plasters, G. T. (A)
Platzman, M. M. (M)
Plawsky, M. I. (M)
Plevy, A. L. (M)
Plotkin, B. (M)
Polen, E. (M)
Pollack, H. W. (SM)
Poor, L. D. (M)
Popper, J. N. (M)
Posklensky, G. (A)
Posner, W. (M)
Post, B. S. (A)
Prensky, S. D. (M)
Pries, J. J. (M)
Principe, A. J. (A)
Privor, H. L. (M)
Pugliese, L. (SM)
Pullman, M. (M)
Quinn, J. C., Jr. (A)
Rafale, M. J. (SM)
Rall, H. L. (M)
Rappoport, J. F. (M)
Rattner, A. (M)
Reader, M. (M)
Reid, J. J. (M)
Rente, F. A. (M)
Richer, J. (M)
Richmond, J. F. (A)
Rifkind, H. M. (M)
Ritter, R. E. (A)
Roberts, R. P. (M)
Robinson, L. (M)
Robinson, R. M. (M)
Rock, S. A. (M)
Roen, S. A. (M)
Rogers, F. A. (M)
Romano, S. A., Jr. (M)
Rosenberg, D. (M)
Rosenfeld, M. I. (M)
Rosenthal, M. P. (M)
Roth, E. J. (M)
Rothenstein, S. (M)
Rowe, I. (M)
Roy, R. J. (M)
Rubertone, A. (M)
Rubertone, M. A. (A)
Rubin, A. (A)
Rubin, I. S. (M)
Ruderfer, M. (M)
Rudner, B. S. (SM)
Ruddofsky, B. I. (M)

Ryan, E. H. (M)
Salzman, D. (A)
Sandler, H. M. (A)
Sandstrom, W. H. (M)
Sarter, L. B. (M)
Sawelson, A. I. (SM)
Schaja, H. B. (M)
Schechner, C. B. (M)
Schere, J. L. (M)
Schillinger, A. G. (M)
Schnall, E. (A)
Schwartz, P. (A)
Schwartz, R. (M)
Schwartzman, L. (M)
Scinto, L. L. (A)
Scire, F. J. (M)
Sclafani, D. A. (M)
Seewald, E. J. (M)
Segal, J. B. (M)
Segreto, A. J. (M)
Semmelhaack, C. F. (M)
Sendrovitz, M. (A)
Shafiroff, H. (SM)
Shaley, Y. (M)
Shapiro, P. (M)
Sherman, S. A. (M)
Shmoys, J. (SM)
Shooman, M. L. (M)
Shore, B. (M)
Shostack, S. (A)
Shufer, M. (M)
Shuhandler, M. B. (M)
Siclari, V. (A)
Sienkiewicz, J. M. (A)
Silberman, B. (M)
Silver, A. N. (M)
Silver, B. L. (M)
Silver, M. (M)
Silvera, R. V. (M)
Silverberg, J. (M)
Silversmith, G. B. (M)
Silverstein, S. C. (M)
Simon, H. (M)
Simonyan, K. G. (M)
Sinclaire, F. S. (M)
Sisskind, S. G. (M)
Sistino, F. J. (A)
Slatic, G. A. (A)
Smilen, L. I. (SM)
Smith, E. T. (A)
Smith, E. J. (M)
Smith, R. J. (A)
Smola, H. (M)
Smykowski, C. P. (M)
Soares, M. L. (M)
Sobel, A. (SM)
Sochet, E. (A)
Sokol, L. L. (M)
Soller, J. (M)
Sonkin, R. M. (M)
Sottile, M. R. (M)
Spector, P. H. (M)
Speer, S. (M)
Spencer, R. J. (A)
Spierer, E. D. (M)
Stabile, J. C. (M)
Stein, H. S. (M)
Stein, H. H. (M)
Steinman, S. (M)
Sterman, I. I. (M)
Stern, S. (M)
Sternberg, M. (M)
Stillman, M. (M)
Strassberg, I. D. (A)
Strauss, L. (SM)
Summerville, R. W. (A)
Susman, L. (M)
Sweet, L. O. (M)
Szydlowski, J. J. (A)
Talish, I. M. (M)
Talley, D. (SM)
Tamir, T. (M)
Tarshis, T. T. (M)
Tashjian, A. (M)
Teichman, L. (A)
Teitelbaum, M. (M)
Temple, W. J. (A)
Thomas, R. O. (M)
Toamsulo, V. D. (M)
Tragila, P. J. (A)
Travis, E. (M)
Treanor, E. F. (M)
Trendowski, C. R. (M)
Trusinoff, B. (A)
Truxal, J. G. (F)
Tscheme, R. A. (M)
Turano, M. J. (A)
Turchin, M. J. (M)
Turczyn, W. A. (M)
Ubillos, P. (M)
Urevith, S. J. (A)
Ustian, S. D. (M)
Van Der Bokke, L. (M)
Varrone, E. (M)
Veder, A. (M)
Velardi, L. A. (M)
Viola, R. D. (M)
Viola, V. (M)
Vitrogan, D. (SM)
Volk, J. (A)
Volpe, C. P. (M)
Vulcan, V. A. (M)
Waas, G. J. (M)
Wade, G. A. (A)
Wagner, R. C. (M)
Warnock, F. W. R. (M)
Warshauer, J. A. (M)
Washington, H. A. (M)
Watine, M. N. (A)
Webber, G. (M)
Weber, E. (F)
Wechsler, G. G. (M)
Weil, J. L. (A)

Wein, F. A. (M)
Weinberger, R. C. (M)
Weiner, L. H. (A)
Weingarten, A. (M)
Weinstein, D. C. (M)
Weinstein, H. M. (M)
Weinstein, S. M. (M)
Weintraub, S. (A)
Weiss, A. J. (M)
Weiss, D. (M)
Weissbaum, S. E. (M)
Welt, S. (M)
Wertheim, L. A. (M)
Wexler, I. (M)
Wheeler, R. R. (A)
Wiener, M. I. (M)
Williams, L. (M)
Williams, L. A. (M)
Wilson, S. L. (M)
Wilson, F. B. (A)
Wishna, S. (M)
Witlin, J. J. (A)
Wolf, E. M. (M)
Wolff, E. J. (A)
Wolk, N. (SM)
Wolsky, M. (M)
Wong, Y. O. (A)
Wood, J. D. (M)
Young, K. (M)
Yurechko, J. J. (A)
Zadro, A. P. (A)
Zanger, H. H. (M)
Zaretsky, A. (M)
Zarouni, A. (M)
Zecca, A. A. (M)
Zelger, L. B. (M)
Zeman, J. (M)
Zetekolf, A. (M)
Zohar, S. (M)
Zourides, V. G. (M)

Brooktondale (ITH-1)
Freedman, W. A. (M)

Brookville (LI-2)
Platzman, P. M. (M)

Buchanan (NY-W-2)
Foln, W. C. (M)

Buffalo (BN-1)
Ames, R. W. (A)
Appel, H. G., Sr. (M)
Atkins, W. J. (M)
Bachman, C. G. (M)
Barczys, D. A. (M)
Bargman, M. (A)
Barrowcliff, T. A. (A)
Bartnik, J. C. (M)
Bauman, N. C. (M)
Beach, J. B. (M)
Beneke, J. (A)
Bergner, V. D. (M)
Berkovits, B. V. (M)
Bernhardt, C. C. (M)
Bock, D. H. (M)
Brenner, C. H. (M)
Brown, J. E. (M)
Budwey, J. N. (M)
Burdette, L. R. (M)
Cannavo, J. A. (A)
Card, A. A. (M)
Carroll, T. J. (M)
Caserta, J. N. (M)
Catallino, F. M. (M)
Chapman, S. (SM)
Chimera, A. J. (M)
Chudzik, M. W. (M)
Clark, D. C. (M)
Clark, J. J., Jr. (M)
Clausen, E. B. (M)
Clune, E. F. (M)
Cuthill, W. R. (M)
Cutter, R. H. (A)
Davis, J. E. (M)
De Joseph, A. (M)
Diab, K. M. (M)
Diehl, J. H. (M)
Dmytrijuk, W. (M)
Dybowski, A. J. (M)
Ezmes, F. M. (A)
Eckert, E. H. (M)
Falk, T. (M)
Farber, M. (A)
Feigenbaum, M. L. (A)
Feinberg, E. J. (M)
Fertig, J. C., Jr. (A)
Fischer, F. P. (SM)
Flood, W. A., Jr. (M)
Flynn, D. J. (M)
Forbath, F. P. (SM)
Freund, H. G. (M)
Galler, H. (M)
Gavin, R. F. (M)
Hamilton, D. T. (M)
Hansen, C. T. (M)
Hayman, R. A. (M)
Hill, L. L. (M)
Hoffman, K. B. (SM)
Holmes, W. S. (SM)
Horton, A. B., Jr. (M)
Horvath, J. O. (A)
Hoyler, E. T. (A)
Huber, C. W. (M)
Hunt, R. A. (M)
Huthmacher, J. E. (A)
Jackman, C. A. (M)
Jackson, R. W. (A)
Jacobson, L. (M)
Jocoy, E. H. (M)
Johnson, R. C. (A)
Jondle, J. J. (M)
Jones, D. R. (M)

Kahn, D. A. (M)
Kell, R. E. (M)
Kelley, J. E. (M)
Kingsley, R. J. (M)
Kintner, P. J. (M)
Kitchin, H. W. (SM)
Lampone, D. J. (M)
Lauer, C. A. (A)
Lautz, C. F., Jr. (M)
Lawton, J. G. (M)
Leipold, W. H. (M)
Leland, H. R. (M)
Leonard, R. J. (M)
Levin, K. L. (SM)
Levitt, M. (A)
Malm, R. (SM)
Mancone, J. G. (M)
Marshall, J. F. (M)
Marso, R. (M)
Martin, F. C. (M)
Mason, H., Jr. (M)
Matay, I. M. (A)
McClanahan, J. M. (M)
Meese, H. F. (M)
Meidenbauer, K. G. (M)
Michaelis, T. D. (M)
Michnik, L. (M)
Militello, P. G. (M)
Mitscher, R. W. (A)
Moncton, H. S. (M)
Murphy, G. V. (M)
Myers, J. F. (SM)
Noyes, R. J. (M)
Odden, R. B. (M)
Olmstead, J. A. (M)
Parker, R. R. (M)
Plummer, D. K. (M)
Polwat, J. S. (A)
Powell, F. D. (SM)
Pritchard, E. E. (A)
Puttick, A. W. (A)
Radvany, I. E. (M)
Raney, J. J. (SM)
Ratajczak, R. A. (M)
Renau, J. (M)
Ridgeway, F. B. (M)
Rosenblatt, F. (M)
Rowe, W. D. (M)
Rusnak, W. (M)
Rynaski, E. G. (M)
Salz, N. P. (SM)
Schultz, W. C. (M)
Schwartz, E. C. (M)
Schwartz, R. N. (A)
Shub, L. (SM)
Siegel, V. H. (M)
Singleton, R. J. (M)
Slaven, R. R. (M)
Solsnes, L. B. L. (A)
Spooner, M. G. (M)
Stalford, W. F., Jr. (A)
Steeb, E. C., Jr. (M)
Stengel, C. J., Jr. (M)
Stieber, A. (SM)
Stock, R. M. (M)
Taylor, F. E. (M)
Uncapher, M. E. (M)
Unger, W. J. (M)
Vaitkevicius, L. A. (M)
Vasek, J. (A)
Veath, M. S. (A)
Wagner, R. W. (M)
Ward, V. E., Jr. (M)
Watson, W., II (M)
Weber, F. A. (M)
Welch, D. P. (SM)
Welkner, J. C. (A)
Welsh, J. P. (SM)
Werlink, R. (A)
Wilson, J. E. (M)
Wolf, A. H., Jr. (M)
Zimmerman, E. A. (A)

Burnt Hills (SCH-1)
Hesse, M. H. (M)
Milton, R. T. (M)
Speck, R. S. (M)

Caledonia (ROC-1)
Angevine, O. L., Jr. (SM)

Cambria Heights (LI-2)
Crauwels, G. L. (A)
Gach, L. M. (M)
Koenig, R. H. (M)
Kruk, R. J. (SM)
London, M. M. (M)
Pyros, I. E. (M)
Smith, P. (M)
Swain, J. A. (A)
Zelnes, B. (SM)

Camden (RU-1)
Hickey, J. B. (A)
Rose, W. C. (M)

Camillus (SYR-1)
Arnold, R. D. (M)
Ast, H. C. (M)
Cooner, W. M. (M)
Gaffney, W. D. (M)
Gordon, R. T. (M)
Hornback, A. B. (M)
Lambert, J. M. (M)
Makris, J. (M)
Marlatt, R. L. (M)
Petrie, A. F. (M)
Pfeiffer, A. W. (M)
Place, J. F. (M)
Schweers, O. H. (SM)
Strawn, R. K. (M)
True, T. T. (M)
Wall, J. J. (M)





Campbell Hall (NY-MH-2)
Martin, G. B., Sr. (A)

Canajoharie (SCH-1)
Davis, J. L. (M)

Canandaigua (ROC-1)
Harrold, G. B. (M)
Knapp, A. J. (A)
Waddell, R. B. (A)

Candor (BING-1)
Fulk, L. A. (M)
Jenkins, W. S. (A)

Carle Place (LI-2)
Bossinger, A. L. (SM)
Chesnes, G. J. (M)
Drasney, G. C. (A)
Gengarelly, T. (A)
Hekaros, J. S. (A)
Lincoff, W. (M)
Smith, C. I. (M)
Vadus, J. R. (SM)

Carmel (NY-MH-2)
Fredrick, A. H. (M)
Lewinski, J. (SM)

Cato (SYR-1)
Sproul, S. S. (M)

Catskill (NY-MH-2)
Gardner, C. B. (M)

Cazenovia (SYR-1)
Casselberry, R. L. (M)
Chamberlain, P. L. (A)
Frenzel, R. P. (SM)
Haller, G. L. (F)
Hart, J. E. (M)
Hodges, G. W. (A)
Kidder, M. S. (A)
Kinsey, R. R. (M)
Learned, A. J. (M)
Morse, H. W. (M)
Sleeper, W. H. (SM)
Winslow, W. R. (M)

Cedarhurst (LI-2)
Bromley, D. L. (M)
Dick, T. M. (M)
Durbin, E. (M)
Goodman, J. D. (M)
Mercier, A. E. (SM)
Merlin, A. G. (A)
Norris, S. (M)
Shapiro, D. L. (M)

Cementon (NY-MH-2)
Krisniski, S. V. (M)

Centereach (LI-2)
Clark, M. J. (A)
Levine, S. (M)
Mussmann, G. F. (A)
Nunziata, A. (A)
Tlemey, T. J. (M)

Centerport (LI-2)
Deroanc, W. (M)
Klaus, G. H. (SM)
Pichert, J. (M)
Rezek, R. M. (M)

Central Islip (LI-2)
Grant, J. G. (M)
O'Donohue, R. E., Jr. (M)
Samoluk, P. (A)

Central Square (SYR-1)
Boyd, L. E. (M)
Cooper, C. W. (A)

Central Valley (NY-MH-2)
Arnold, R. G. (M)

Chadwicks (RU-1)
Kapfer, V. C. (A)

Chappaqua (NY-W-2)
Becher, W. E. (M)
Buttolph, J. D. (M)
Fenmer, M. E. (SM)
Goldman, E. H. (SM)
Hawkins, G. V. (M)
Horwitz, L. P. (M)
Humphrey, W. S. (SM)
Humperford, E. A., Jr. (M)
Kellogg, D. S. (SM)
Lawson, C. C. (M)
Little, J. B. (SM)
Novak, W. D. (M)
Speller, J. B. (SM)
Vladimir, L. O. (SM)

Cheektowaga (BN-1)
Aldrich, F. E. (M)
Celer, R. R. (M)
Lewicki, W. M. (M)
Maclag, W. J. (M)
Slater, R. H. (M)
Staloff, M. (M)
Wartella, A. (M)
Whitney, R. W. (M)

Chenango Bridge (BING-1)
Carpenter, J. F. (A)

Chenango Forks (BING-1)
Lewandowski, F. P. (M)

Chittenango (SYR-1)
Combes, E. T. (M)

Jackson, J. M. (SM)
Little, D. W. (M)
Wallman, E. J., Jr. (M)

Churchville (ROC-1)
Allen, S. E. (M)
Jackson, R. W. (A)

Clay (SYR-1)
Brady, D. J. (M)
Bray, T. E. (A)
Butler, E. H. (M)
Carlson, E. R. (SM)
Hsu, H. (SM)
Knickerbocker, L., Jr. (M)
Marshall, J. C. (M)
Morton, C. T. (M)
Smith, E. E. (A)
Tehon, S. W. (SM)

Clarence (BN-1)
Bennett, J. E. (M)
Gray, R. D. (SM)
Greatbatch, W. (M)
Holfelder, R. G. (M)
Kellerman, R. E. (M)
Neprud, R. W. (SM)
Semiuk, W. (SM)
Swonger, C. W. (M)
Vanacore, T. (M)

Cleverdale (SCH-1)
Mead, M. S., Jr. (SM)

Clifton Springs (ROC-1)
Morris, I. A. (M)

Clinton (RU-1)
Baldwin, G. F. (SM)
Blumberg, D. (M)
Butler, G. T., Jr. (M)
Crockett, G. R. (M)
Holzel, R. W. (M)
Knoke, P. J. (M)
Luthiger, R. (M)
Philpott, L. R. (SM)
Piepho, J. B. (A)
Rasmussen, C. P. (M)
Smith, A. E. (M)
Tenney, R. F. (M)
Turner, M. L., Jr. (M)
Wheeler, J. P. (SM)

Cohocton (ELM-C-1)
Fox, R. A. (M)

Cohoes (SCH-1)
Piwnica, W. M. (M)

Commack (LI-2)
Anzalone, A. T. (M)
Bonasera, J. T. (M)
Brady, J. P. (M)
Bryant, B. L., Jr. (M)
Cappadona, W. L. (M)
Cataldo, T. J. (M)
Cohen, B. (A)
Crosville, W. B. (M)
DiNardo, A., Jr. (M)
Fahey, W. P. (M)
Feldman, S. (A)
Ferry, J. B. (M)
Frimet, S. H. (M)
Gillin, G. F. (M)
Kelley, E. J. (M)
Lichtenstein, H. (M)
Lopez, A. R. (M)
Loss, M. B. (M)
Lynch, J. T. (A)
Mac Donald, L. A. (M)
Maffei, E. V. (M)
Matylewich, T. D. (A)
Morris, J., Jr. (M)
Ofiut, W. B. (M)
Paulson, J. O. (M)
Renkowitz, D. (M)
Rigby, R. T. (M)
San Giovanni, C., Jr. (M)
Stenecker, R. G. (M)
Trias, J. J. (M)
Wilks, E. G. (M)
Wrobel, R. E. (M)
Zopf, V. R. (M)

Corning (ELM-C-1)
Allen, R. E. (M)
Bell, A. N. (M)
Benjamin, L. P. (A)
Brouneus, H. A. (M)
Cammen, M. M. (M)
Dates, H. F. (M)
Davis, J. K. (SM)
Deegan, G. M. (M)
Gordon, P. E. (M)
Grlest, E. M. (M)
Guyer, E. M. (SM)
Halaby, S. A. (M)
Hamilian, R. V. (M)
Herczog, A. (M)
Hocker, J. P. (M)
Hunt, M. H. (M)
Jenkins, W. H. (M)
Lapp, M. C. (A)
Layton, M. M. (M)
Leffel, P. C., Jr. (M)
Lineweaver, J. L. (M)
MacDonell, P. A. (A)
Mann, R. H. (A)
Munier, J. H. (M)
Nitsche, J. E. (M)
Pinkston, J. C., III (M)
Pollock, K. G. (M)
Rexford, H. E. (M)

Sackinger, J. P. (M)
Sheldon, J. L. (F)
Smith, G. P. (M)
Sprague, L. G. (M)
Szupillo, R. E. (M)
Trementozzi, F. J. (M)
Wetmore, W. L. (A)

Clyde (ROC-1)
Robbins, W. G. (M)

Cold Spring Harbor (LI-2)
Burr, R. P. (SM)
Tyndall, R. M. (M)

College Point (LI-2)
Belock, H. D. (SM)
Dubin, L. (M)
Friedensohn, G. (A)
Fury, A. E., Jr. (A)
Hoffman, R. A. (A)
Huxhold, H. P. (A)
Mannarino, S. R. (M)
Oranges, D. F. (M)
Parker, R. J. (A)
Rilling, J. C. (A)
Steiver, N. O. (M)
Stiepel, G. W. (A)

Conklin (BING-1)
Emmons, D. W. (M)

Constantia (SYR-1)
Elhoff, W. C. (M)

Copiague (LI-2)
Hightower, S. G. (M)
Hollis, W. C. (SM)
Maldonado, R. (M)
Mautner, R. S. (SM)
Pull, H. L. (M)
Rennie, F. P. (M)

Corinth (SCH-1)
Willman, E. S. (A)

Cornwall-On-The-Hudson (NY-MH-2)
Peck, N. D. (M)

Corona (LI-2)
Balacki, S. J. (M)
Barbasso, S. (M)
Blanchini, P. J. (M)
Gennaino, G. (A)
McGovern, F. X. (M)
Pafundi, M. T. (A)
Spatz, S. (M)

Cortland (SYR-1)
Breden, W. W. (M)
Ciccoricco, F. A. (M)

Cowlesville (ROC-1)
Wightman, C. W., Jr. (M)

Crestwood (NY-W-2)
Fine, E. M. (M)
Krauer, O. (A)

Crompond (NY-W-2)
Isenberg, J. F., Jr. (M)

Croton-On-The-Hudson (NY-W-2)
Cheng, T. (M)
Gomberg, L. (M)
Haibi, L. (M)
Kolankowsky, E. (M)
Levy, H. B. (A)
Mausler, R. (M)
Tomasulo, R. M. (M)
Thorpe, R. A. (M)

Cuba (ELM-C-1)
Griffin, S. J. (M)
Miller, E. A. (M)

Dansville (ROC-1)
Blum, R. J. (M)

Deansboro (RU-1)
Palmer, P. D. (M)

Deer Park (LI-2)
Axel, A. J. (M)
Bond, D. W. (M)
Bostrom, R. C. (M)
Burghard, A. R. (M)
Castellano, J. G. (A)
Close, R. N. (SM)
Dantus, G. (A)
Dudick, G. R. (M)
Hectman, H. (M)
Ihrig, L. C. (M)
Katz, E. H. (A)
Loughren, A. V. (F)
Matchett, M. W. (M)
Morton, G. W. (M)
Neveroski, W. J. (M)
Oxild, P. E. (M)
Propper, M. (A)
Sawyer, N. S. (M)
Schlesinger, J. (M)
Schwartz, R. H. (M)
Shalat, J. (A)
Stephey, H. M. (M)
Tangredi, G. F. (M)
Tolles, W. E. (F)
Torn, L. J. (SM)
Tressa, F. J. (M)
Turkish, S. (M)
Warren, S. D. (M)
Wolkov, D. (SM)

Depew (BN-1)
Diener, H. C., Jr. (M)
Herold, C. D., Jr. (M)
Hettich, R. D. (M)
Hyer, H. C. (M)
Newton, D. J., Jr. (M)
Reed, E. K. (M)
Ruda, E. V. (M)
Whitbeck, R. F. (M)
Wiggin, E. E. (M)

De Witt (SYR-1)
Adams, W. B. (A)
Andrews, W. A. (M)
Briggs, A. S. (M)
Brown, J. S. (SM)
Burroughs, E. H. (M)
Byars, W. F. (M)
Casey, K. T. (M)
Clark, H. T. (SM)
Clements, D. A., Jr. (M)
Converse, L. M. (M)
Coop, J. H. (SM)
Coulbourn, J. M. (M)
Davis, R. J. (M)
Deal, D. L. (M)
Dickey, F. R., Jr. (SM)
Dominquez, M. J. (A)
Flashner, G. (M)
Grisetti, R. S. (M)
Harnett, D. E. (F)
Hyde, H. I. (M)
Hyres, W. J. (M)
Jacobson, I. J. (M)
Kovacs, F. M. (M)
Kraiman, H. (M)
Leeds, L. M. (F)
Lothes, R. N. (M)
Lowry, H. R. (A)
Marin, I. L. (SM)
Perkins, D. W. (M)
Records, J. K. (M)
Scalzetti, M. R. (M)
Shain, E. (M)
Silverman, B. (M)
Silverman, L. (A)
Simon, C. J. (M)
Slaughter, J. E. (M)
Spear, A. C. (SM)
Stankosky, J. J. (M)
Stillwell, H. R. (M)
Taylor, F. W. (M)
Watts, D. E. (SM)
West, A. A. (A)
Wilson, G. G. (M)
Withun, H. D. (M)
Woods, C. R. (M)
Zahora, L. J. (SM)

Dix Hills (LI-2)
Rafferty, W. G. (M)

Dobbs Ferry (NY-W-2)
Buohl, E. A. (A)
Holm, C. H. (M)
Miller, D. H. (M)
Mitchell, D. D. (M)
Parbulescu, A. (SM)
Singer, L. W. (A)
Weinchardt, H. H. (M)
Young, R. O. (M)

Douglaston (LI-2)
Batcher, R. R. (F)
Cohen, S. A. (M)
Collard, A. C. (M)
Dumaresq, J. (A)
Dunn, S. B. (M)
Durnovo, C. P. (M)
Grover, H. G. (SM)
Hertzberg, R. E. (A)
McClellan, G. B. (SM)
Milkman, N. (M)
Neeck, J. E. (A)
Pollack, A. S. (SM)
Shanck, R. B. (SM)
Tyson, B. F. (F)
Weinstein, G. (M)

Dryden (TH-1)
Shelton, G. L., Jr. (M)

Dunkirk (ERI-1)
Niles, R. O. (A)

East Aurora (BN-1)
Hopkins, J. E. (M)
Tribou, P. W. (M)

Eastchester (NY-W-2)
Collison, P. B. (SM)
Dunn, C. J. (M)
King, K. L. (SM)
Lundgren, P. R. (A)
Masucci, C. (M)
McGinnis, F. (SM)
Sarahan, B. L. (M)
Schimmel, H. (M)

East Elmhurst (LI-2)
Capon, J. (M)
Greene, E. L. E. (A)
Immarco, A. E. (M)
Segota, A. S. (M)
Somin, M. E. (M)

East Greenbush (SCH-1)
Anastas, D., Jr. (M)
Merry, F. J. (M)

East Islip (LI-2)
Bolum, D. R. (A)

East Meadow (LI-2)
Basil, A. (M)
Bossolini, J. J. (M)
Breheney, R. F. (A)
Brownman, H. L. (M)
Burgess, E. G., Jr. (M)
Byron, M. (A)
Cerino, R. (M)
Chadwick, J. S. (M)
Colbert, R. P. (A)
Conigliaro, S. A. (SM)
Farber, B. (M)
Frost, S. (M)
Garrett, B. R. (A)
Glasser, H. (A)
Goldstein, I. (A)
Grizzel, R. W., Jr. (M)
Grob, B. (M)
Grodzinsky, S. (SM)
Gruber, P. (M)
Herzel, J. S. (M)
Iorio, S. A. (M)
Kaplan, M. (M)
Kunz, A. B. (A)
La Cascia, N. (A)
McGowan, J. G. (M)
Newman, S. O. (SM)
Nichik, J. J. (M)
Parker, S. (M)
Pollard, R. E. (M)
Redovian, M. (M)
Reichfield, S. (M)
Reizes, H. N. (A)
Rosenthal, S. A. (M)
Schwartz, A. (M)
Scordato, M. (A)
Silbiger, R. J. (M)
Sills, M. M. (M)
Smith, C. R. (M)
Trunk, E. G. (SM)
Turner, G. C. (M)
Weisfeld, B. R. (A)
Wohl, C. (M)
Yuni, W. (M)

East Northport (LI-2)
Andersen, A. H. (M)
Benz, J. K. (M)
Bumby, E. A. (A)
Chomet, M. (M)
Christiansen, H. C. (M)
Clinton, R. E. (A)
Cope, R. H., Jr. (SM)
Cullen, W. P. (M)
Ellis, F. W. (M)
Ferrara, J. P. (M)
Hallock, H. B. (SM)
Holland, J. W. (M)
Knoche, C. H. (M)
Koehler, K. G. (M)
Kos, S. M. (M)
Krasnick, S. (M)
Kuehn, C. W. (M)
Kulper, C. R. (M)
Kuskowski, L. J. (M)
Leslie, R. E. (A)
Mahoney, T. J., Jr. (A)
Marcus, M. S. (A)
Masak, R. J. (A)
Middlebrook, V. S. (M)
Muth, R. N. (M)
Ness, C. H. (M)
Oakes, R. E. (M)
Oswald, L. H. (M)
Phagan, R. J. (M)
Philbin, J. P. (M)
Reynolds, L. G. (M)
Rumph, G. F. (M)
Salmon, H. A. (M)
Schleher, D. C. (M)
Siegel, R. (M)
Smith, K. M. (A)
Spann, R. G. (M)
Spinner, C. R. (A)
Tepper, H. H. (M)
Wallace, R. A. (M)
Weinberger, J. (F)
Wright, M. L. (M)
Zinke, R. L. (M)

East Norwich (LI-2)
Barry, H. P., Jr. (M)
Boecker, A. (SM)
Churchill, D. B. (M)
Davis, S. (M)
Fishman, G. N. (M)
Fowler, C. A. (M)
Garretson, C. M. (SM)
Mogul, E. (SM)
Plunkett, R. (M)
Saltzberg, B. (F)

East Rochester (ROC-1)
Bass, G. A. (M)
Hosking, M. B. (M)
Numann, G. W. (A)
Pellegrino, P. P. (M)
Wobig, W. H. (M)

East Rockaway (LI-2)
Albert, A. M. (M)
Brown, W. (M)
Cohen, G. (M)
Gruber, A. E. (A)
Helmer, R. L. (M)
Mahnken, W. J. (M)
Wallach, D. M. (M)
Wind, M. (SM)

East Syracuse (SYR-1)
Arnold, D. W. (M)
Chamberlain, L. W. (M)
Doggett, F. F. (SM)

London, F. H. (M)
Loth, P. A. (SM)
Lowe, D. B., Jr. (M)
Maloney, R. T. (SM)
Marcuvitz, N. (F)
Markson, M. D. (M)
Mayerson, M. I. (M)
McBee, W. D. (SM)
Melhado, W. K. (M)
Milazzo, P. J. (M)
Miller, C. R. (M)
Milton, J. (M)
Milton, L. (M)
Mindell, M. I. (M)
Morgan, F. (M)
Morrison, M. (M)
Moyer, J. W. (SM)
Mulligan, J. R. A., Jr. (M)
November, F. D. (M)
Nover, E. P. (M)
Onyskin, M. (M)
Padovano, R. J. (M)
Paley, W. D. (M)
Planteroth, J. A. (M)
Putzre, R. E. (M)
Radnay, L. S. (A)
Redlien, H. W., Jr. (M)
Reid, W. (A)
Rella, J. D. (M)
Reuther, D. W. (M)
Riddell, R. B. (A)
Ripple, J. W. (M)
Roake, W. C. (M)
Robin, N. (A)
Rosanes, A. P. (M)
Rosenberg, S. L. (M)
Rosky, G. H. (M)
Roth, A. M. (M)
Rudich, I. (M)
Sadler, L. R. (M)
Saladna, J. C. (M)
Schimmel, H. (M)
Schmidt, E. R. (M)
Schneider, R. M. (SM)
Schwartz, J. M. (M)
Schwartz, L. S. (SM)
Segall, R. P. (M)
Service, R. C. (M)
Shutterly, H. B. (A)
Skank, H. D. (M)
Sperling, J. G. (M)
Spero, R. E. (M)
Stanley, A. G. (M)
Sterns, R. B. (M)
Stone, S. M. (M)
Sussman, H. (SM)
Sweem, L. (SM)
Taffet, M. S. (M)
Tanenbaum, M. S. (SM)
Tenenbaum, F. (M)
Toll, P. A. (A)
Tuminaro, R. D. (M)
Vaupel, G. E. (M)
Vehslage, E. P. (M)
Ward, W. C., Jr. (M)
Wathen, R. L. (M)
Weill, A. E. (M)
Wheeler, H. A. (F)
Whitfield, E. W. (M)
Williams, F. H. (SM)
Wohl, R. J. (M)
Zbar, P. B. (M)
Zellers, J. E., Jr. (A)
Ziegler, F. W. (SM)
Zion, H. (SM)

Greenlawn (LI-2)
Fussa, B. J. (A)
Graham, W. T. (M)
Johnston, H. (M)
Kinney, D. D. (A)
Lisy, B. J. (M)
Morse, R. V. (M)
Nelson, R. T. (SM)
Shoenfeld, K. (M)
Shergalis, L. D. (M)
Sokoloff, L. (M)
Weindling, F. (M)
Woodard, G. F. (M)

Greenport (LI-2)
Shipman, J. W., III (M)

Greenvale (LI-2)
Best, R. A. (M)
Di Paolo, E. M. (M)
Goldsmith, K. G. (M)
Hansel, P. G. (F)
Harrison, A. E. (SM)
Siegmund, E. L. (M)

Griffiss AFB (RU-1)
Colburn, L. J. (A)
Crane, R. B. (A)
Dausin, L. R. (M)
Debnam, T. F., Jr. (M)
Dillow, J. C. (M)
Disher, A. J., Jr. (M)
Glushko, W. (M)
Graul, D. P. (SM)
Kohlhaas, R. L. (M)
Marlow, H. C. (A)
McCumber, W. H. (SM)
Rabe, R. E. (M)
Snider, D. E., Jr. (M)
Strother, J. F. (M)
Wheeler, J. B., Jr. (A)
Yarbrough, L. A. (M)

Guilderland (SCH-1)
Hannam, H. J. (M)

Halesite (LI-2)
Donnelly, F. L. (A)
Laivo, O. W. (M)
Larson, A. F. (SM)
Tengelsen, W. E. (M)
Warner, W. V. (A)

Hamburg (BN-1)
Gurley, F. R. (A)
Epersen, G. C. (M)
Euler, J. R. (M)
Fiedler, L. (M)
McBride, N. G. (M)
Talbot, R. D. (M)

Hamilton Beach (LI-2)
Pihl, R. L. (A)

Hammondsport (ELM-C-1)
Pear, R. L. (M)

Hampton Bays (LI-2)
Havel, J. F. (A)
Turner, F. T. (M)

Harpursville (BING-1)
Lawrence, N. S. (M)

Harrison (NY-W-2)
Carpinielli, F. (A)
De Pasquale, R. H. (SM)
Gallone, W. J. (A)
McIntyre, F. P. (M)
Speranza, A. A., Jr. (A)

Hartsdale (NY-W-2)
Belchis, S. (M)
Bonney, H. W. (M)
Byrne, R. M. (M)
Codina, J. G. (A)
Engelhardt, G. B. (SM)
Gillette, D. (A)
Hammond, R. A. (SM)
Hurst, K. J. (M)
Koved, F. L. (M)
Medoff, H. (M)
Rabinowitz, M. (M)
Robertson, H. E. (M)
Seelbach, W. C. (M)
Sherr, S. (SM)
Simon, M. L. (M)
Sobel, I. J. (A)
Vogt, H. T., Jr. (M)

Hastings-On-Hudson (NY-W-2)
Archibald, R. W. (SM)
Batchelor, J. C. (SM)
Garman, R. L. (F)
Hohberger, H. P. (A)
Lodge, W. B. (F)
Popp, F. G. (M)
Ripp, H. (M)

Hauppauge (LI-2)
Scheller, J. A. (A)
Thomson, G. W. (M)

Hawthorne (NY-W-2)
Augustine, R. O. (M)
Hales, E. B. (M)

Hempstead (LI-2)
Allen, C. M. (M)
Austin, G. A. (M)
Baker, W. G. (M)
Bedingfield, S. G. (M)
Bellmar, C. L. (M)
Calligiurn, J. F. (M)
Cardwell, R. A. (M)
Coggins, W. J. (M)
Comitz, P. (M)
Crosslin, M. E. (M)
Dixon, F. E. (A)
Eklund, K. E. (M)
Epstein, I. (M)
Fener, H. (M)
Gelling, R. B. (A)
Gould, G. A. (M)
Hansard, H. H. (M)
Hernandez, J. (A)
Johnson, H. E. (A)
Kaplan, R. M. (M)
Keonjian, E. (SM)
Kilmer, T. W. (A)
Lesser, J. (SM)
Mandle, G. P. (SM)
Manzolillo, D. C. (M)
Michaels, G. M. (M)
Morris, R. C., Jr. (A)
Peters, J. L. (SM)
Philbin, M. J. (M)
Plinick, C. (SM)
Rudnick, I. M. (A)
Selig, M. J. (M)
Selkirk, W. J. (M)
Skirrow, J. E. (A)
Stewart, J. W. (A)
Stringham, R. H. (M)
Westover, T. A. (SM)
Williams, J. H. M. (M)
Wolff, M. F. (M)
Zimbalatti, A. G. (M)

Henderson (SYR-1)
Mitchell, J. H., Jr. (M)

Henrietta (ROC-1)
Ablon, L. J. (M)
Carey, J. J. (M)

Hewlett (LI-2)
Kahgan, J. J. (M)

Hewlett Harbor (LI-2)
Cahan, L. C. (M)

Hicksville (LI-2)
Abjanich, G. S. (M)
Baggia, R. J., Jr. (M)
Bassett, W. H., Jr. (A)
Blackstone, H. (SM)
Brecht, L. R., Jr. (M)
Brooks, M. S. (A)
Brown, G. C. (M)
Cady, R. T. (M)
Chaber, R. K. (SM)
Clines, S. M. (A)
Colgan, G. P. (M)
Cooper, D. J. (M)
Cosonas, A. (M)
Daum, A. (SM)
Dircks, H. F. (M)
Dolin, M. (M)
Dorgelo, E. G. (SM)
Emillo, G. A. (A)
Fein, A. (M)
Figlia, J. R. (M)
Flink, A. (SM)
Freier, M. (M)
Fry, W. H. (M)
Goodman, L. (M)
Gould, L. J., Jr. (M)
Hagedorn, H., Jr. (A)
Hall, J. D. (M)
Haller, K. A. (M)
Hartman, A. (M)
Hayes, W. A. (A)
Kawaller, J. (M)
Kennedy, J. B. (M)
Kleves, J. K. (A)
Klkta, M. S. (A)
Klliphuis, J. (M)
Kramer, S. (M)
Kretzing, J. C. (M)
Langebartels, L. A. (M)
Leahy, R. E. (M)
Lonschein, J. F. (A)
Marino, J. (M)
Martin, R. W. (M)
McNamara, D. J. (M)
Meagher, E. (M)
Melrowitz, R. L. (M)
Meyer, F. (M)
Monahan, D. P. (M)
Naftulin, A. D. (M)
Nieminski, W. V. (M)
Noland, J. A. (M)
Noneman, F. A. (SM)
Oberlies, J. L. (M)
Pavalow, M. (SM)
Poulos, E. (M)
Rabin, G. C. (M)
Rehbehn, J. E. (M)
Rennie, M. (A)
Roth, B. J. (M)
Rousselet, C. A. (A)
St. John, K. M. (SM)
Seckel, J. P. (M)
Sherry, L. I. (M)
Sicuranza, C. A. (M)
Sikalis, C. (M)
Simon, I. A. (M)
Slusarchyk, G. J. (M)
Spence, H. W. (M)
Sposato, F. J. (M)
Steenbeke, H. M. (M)
Strong, J. J., Jr. (M)
Suttenberg, S. (M)
Szalay, A. P. (A)
Tilly, V. F. (M)
Tomes, S. R. (SM)
Varlano, V. V. (M)
Waller, H. H. (M)
Wasson, L. (M)
Weiner, M. L. (A)
Weinrauch, A. (M)
Williams, G. W. (M)
Wolfschmidt, L. A. (A)
Wolk, B. (M)
Zampino, F. J. (A)
Zimmerman, H. (M)

Highland (NY-MH-2)
Schaefer, W. C. (M)

Hillburn (NY-W-2)
Teso, W. A. (M)

Hillsdale (NY-MH-2)
Sabeff, S. S. (M)

Holbrook (LI-2)
Bernardini, R. (A)

Holcomb (ROC-1)
Barker, J. R. (A)
Hudson, D. M. (M)

Holland Patent (RU-1)
Cale, T., Jr. (SM)
Gaige, J. C. (M)
Ladwig, H. A. (M)
Millet, J. F. (A)
Pulhamus, W. R. (M)
Ryerson, J. L. (M)
Stahlberger, W. C. (M)

Hollis (LI-2)
Arra, G. J. (A)
Auerbach, A. A. (M)
Caputo, N. J. (M)
Edell, J. J. (M)
Gustavus, H. (M)
Lurin, E. S. (M)
McDuffie, T. E. (M)
Prior, F. J. (A)
Ransom, V. L. (M)
Richter, I. P. (A)
Samuels, M. (A)
Schlafly, H. J. (SM)
Walko, D. G. (M)

Hollliswood (LI-2)
Marcus, P. (M)

Honeoye Falls (ROC-1)
Laniak, D. K. (A)

Hoosick Falls (SCH-1)
De Luca, A. P. (M)
Case, C. C., Jr. (M)

Hopewell Junction (NY-MH-2)
Allen, C. A. (M)
Barney, D. A. (M)
Butler, R. A. (A)
Lear, E. F. (A)
Macmullen, J. H. (M)
Meyers, M. M. (A)
Nidermayor, V. A., Jr. (A)
Slobodzinski, E. J. (M)
Spence, T. M. (M)
Templeton, H. S. (M)
West, R. L. (SM)

Hornell (ELM-C-1)
Deegan, T. E. (M)

Horseheads (ELM-C-1)
Alexander, J. J. (A)
Bamford, A. J. (M)
Betts, B. J. (M)
Bruster, H. E., II (A)
Canty, B. R. (M)
Clayton, R. H. (M)
Delchman, G. A. (M)
Gerard, W. A. (M)
Gleason, C. H. (SM)
Groo, H. R., III (M)
Larson, R. G. (SM)
Long, E. D. (M)
Mansfield, W. O., Jr. (M)
Playfoot, K. C. (A)
Powell, K. D. (M)
Rial, W. S. (M)
Sadler, J. G. (SM)
Staples, R. L. (M)
Welton, D. A. (M)
White, R. A. (SM)

Howard Beach (LI-2)
Green, M. (M)
Janis, I. R. (A)

Hudson (NY-MH-2)
Pazera, J. A. (A)

Hudson Falls (SCH-1)
Clark, N. R. (M)
Cohen, M. (A)
Scoville, M. E. (SM)

Hughsonville (NY-MH-2)
Walter, G. (A)

Huntington (LI-2)
Abbott, J. J. (A)
Alber, J. D. (M)
Altura, G. M. (M)
Baehr, R. E. (M)
Ball, L. X. (M)
Beers, M. I. (SM)
Benisch, N. E. (M)
Bennett, A. I. (SM)
Billhimer, R. D. (A)
Bolton, R. H. (M)
Booste, G. H., Jr. (M)
Bubbers, J. J. (M)
Burke, E. W., Jr. (SM)
Buzzanca, V. J. (M)
Carlstrom, R. A. (M)
Carroll, J. M. (M)
Caswell, J. N. (SM)
Comstock, G. E., III (M)
Daly, R. T. (SM)
Dannals, H. J. (M)
Daskam, E., Jr. (M)
De Rocher, W. C. (SM)
Di Petto, F. A. (M)
Dosch, T. J. (M)
Douglas, W. S. (A)
Duryea, J. C. (SM)
Eicher, H. G. (M)
Evans, R. L. (A)
Evans, T. L. (M)
Feltham, C. F. (M)
Feng, S. C. (M)
Ferrier, D. T. (SM)
Fetterwitz, L. (M)
Forsberg, K. E. (M)
Fried, G. (A)
Fugazzi, C. (M)
Gilbert, R. C. (SM)
Giunta, S. T. (M)
Gore, J. H. (M)
Gretz, R. W. (M)
Grieser, T. F. (SM)
Grossman, B. C. (SM)
Guessaulus, L. A. (M)
Gutlove, N. M. (M)
Hanley, G. L. (M)
Hansen, C. A. (SM)
Hansen, J. A. (SM)
Hartman, L. A. (M)
Hauck, H. O. (SM)
Hinchey, R. L. (M)
Hinz, H. E. (A)
Holcombe, P. G. (M)
Howell, S. N. (A)
Hoxie, I. R., Jr. (A)
Hutchison, T. C. (M)
Johnson, R. L., Jr. (M)
Joss, E. T. (M)
Jurman, H. R. (A)
Kahan, J. G. (M)
Kam, D. R. (M)
Karpen, E. W. (M)
Kenyon, D. E. (SM)
Keogh, R. J. (M)
Klose, R. C. (M)
Kulik, H. S. (M)
Leibholz, S. W. (M)
Levine, I. (SM)
Lippke, J. A. (M)
Loecher, G. S. (M)
Losee, W. B., Jr. (M)
Loughlin, B. D. (F)
Lurye, J. R. (M)
Lyons, R. C. (M)
Maher, T. F. (SM)
Manner, A. E. (A)
Mazzochi, J. J. (M)
Mac Donald, W. W. (SM)
Matthews, L. M. (M)
Mc Coy, J. H. (SM)
Michalski, E. H. (M)
Muller, W. M. (M)
Narodny, L. H. (M)
Nehrbas, T. C. (M)
Newman, J. (M)
Packard, K. S., Jr. (SM)
Palter, N. H. (SM)
Peddicord, D. J. (M)
Perry, J. S. (M)
Poppe, C. W. (A)
Poznanski, Z. (M)
Ramsay, J. F. (A)
Rosar, M. T. (M)
Russell, J. A., III (M)
Sachs, B. K. (M)
Safran, M. (M)
Sanial, A. J. (SM)
Sard, E. W. (M)
Schaefer, A. E. (M)
Schroeder, K. R. (SM)
Search, R. W. (M)
Setaro, J. E. (M)
Sherman, C. M. (A)
Simons, R. F. (SM)
Soboleski, W. P. (M)
Spacie, R. W. (A)
Stengel, J. F., Jr. (A)
Strathman, L. R. (M)
Sturgeon, W. S. (SM)
Swenson, W. J. (A)
Takach, R. V. (A)
Tinto, J. M. (M)
Toy, H. D. (M)
Tyler, E. M. (M)
Vincent, E. F. (M)
Vogel, E. (SM)
Weaver, S. E. (M)
Weber, R. L. (M)
Wheeler, R. B. (M)
Winslow, R. G. (M)
Wohleking, W. G. (M)
Woolard, J. L. (M)
Wright, A. (M)
Yamamoto, G. H. (M)

Huntington Bay (LI-2)
Van Davelaar, F. S. (SM)

Huntington Station (LI-2)
Adams, B. L. (M)
Agree, I. (M)
Ahman, A. J. (M)
Arguin, R. G. (M)
Bernay, R. A. (M)
Blank, C. A. (M)
Brandt, G. (M)
Buehrle, W. E., Jr. (M)
Burke, H. E., Jr. (M)
Cermignani, D. J. (M)
Connolly, T. W. (M)
Connor, W. E., Jr. (A)
Copel, M. (SM)
Coronis, A. A. (A)
Dauer, F. G. (M)
De Troy, B. A. (A)
Dickerson, N. I. (M)
Domchick, R. J. (M)
Driscoll, F. X. (M)
Emerson, J. (SM)
England, J. W. (A)
Evans, J. M. (SM)
Farkas, J. J. (M)
Feavearyear, J. E. (M)
Fox, J. L. (M)
Fraser, R. (M)
Frasier, D. A. (M)
Freundlich, M. M. (SM)
Gilmartin, J. J., Jr. (M)
Goldstein, A. (M)
Graven, C. J. (M)
Grayson, C. M. (A)
Grib, B. F. (M)
Gross, S. H. (SM)
Hall, R. L. (SM)
Harder, J. F. (M)
Hein, R. W. (M)
Horne, W. J., Jr. (M)
Hultmark, R. S. (M)
Jacquette, J. H. (M)
Jaffe, H. (M)
Johnson, W. A. (M)
Joline, E. S. (M)
Jolly, E. F. (M)
Kerzner, N. A. (M)
Kiel, J. H. (A)
Kintner, P. M. (SM)
Kishi, H. J. (M)
Knecht, R. A. (SM)
Koppel, A. U. (SM)
Krusos, D. A. (M)
Kuhn, K. H. (M)
Ladd, G. T. (M)
Lahm, G. P., Jr. (M)



Lamb, H. M. (SM)
Lane, J. J. (M)
La Plante, R. A. (M)
Larsen, G. R. (A)
Leeds, D. (M)
Lehr, P. (SM)
Lemberger, S. (M)
Lenehan, J. J. (SM)
Levine, S. (M)
Liguori, A. (SM)
Loaec, G. L. (M)
Lyons, T. M. (M)
Marchesano, J. E. (M)
Marcus, J. A. (M)
McDermott, F. A. (M)
McMenamin, J. M. (M)
Megrdichian, M. O. (M)
Melchner, F. T. (M)
Merrigan, M. T. (A)
Mesecher, M. G. (M)
Miller, M. P. (M)
Morrow, A. J. (M)
Moss, L. A. (M)
Nelson, E. P. (M)
Newdale, E. I. (M)
Nishimura, J. Y. (A)
Noji, T. T. (SM)
Olson, C. W. (M)
Orford, R. J. (M)
Paine, L. W. (M)
Papamarcos, G. (M)
Peck, H. E. (M)
Popyllsen, D. J. (M)
Prisco, L. C. (A)
Proctor, D. W. (M)
Remily, W. M. (M)
Richardson, C. M. (M)
Richter, F. G. (A)
Richter, H. E. (M)
Ritchey, N. B. (SM)
Rock, P. (A)
Roller, W. P. (A)
Rosen, M. (SM)
Rossoff, A. L. (SM)
Sammis, S. L., Jr. (M)
Schauerman, J. R. (M)
Schramm, C. T. (M)
Schroter, R. G. (M)
Schwalnger, J. W. (M)
Schwartz, B. (M)
Schwelsberg, E. (M)
Shergalis, D. J. (M)
Sperber, A. O. (SM)
Strazzulla, R. L. (M)
Trogdon, W. H. (M)
Uzzo, A., Jr. (M)
Vandenburgh, A. A. (A)
Vetter, R. F. (M)
Vetter, W. F. (SM)
Walker, A. C. (M)
Walker, C. E. (M)
Wanty, B. G. (M)
West, J. L. (SM)
Williams, H. R. (A)
Williams, R. J. (SM)
Wochinger, R. (SM)
Zwack, H. W. (M)

Hurley (NY-MH-2)
Hofler, J. J. (M)
Plonsky, A. T. (M)
Powers, R. L. (M)
Stern-Montagny, F. H. (M)
Turner, J. M. (M)
Weber, J. L. (M)

Hyde Park (NY-MH-2)
Bell, R. A. (M)
Coopper, R. A. (M)
Dammann, J. E. (M)
Davies, D. M. (M)
Dettling, A. K. (A)
Eckelman, P. F. (M)
Gordon, F. J., Jr. (A)
Grubb, D. S. (M)
Gnoedl, A. J. (M)
Hartwig, A. D. (M)
Henle, R. A. (M)
Hohmann, R. E. (M)
Muenzer, B. M. (M)
Patti, M. J. (M)
Repchuk, J. S. (A)
Rodiguez, L. H. (A)
Steigerwalt, G. F. (M)
Trimble, L. F. (M)
Whitenack, R. M. (M)

Ilion (RU-1)
Budney, A. R. (A)
Daily, B. A. (M)
D'Hoostelaere, A. C. (M)
Eisenschmied, M. D. (M)
Fifield, N. N., Jr. (A)
Momberger, P. E. (M)
Pierce, D. C. (M)
Polomoscanik, M. (M)
Speth, R. E. (A)
White, G. S. (M)
Whitehead, R. E. (A)

Inwood (LI-2)
Geske, R. N. (A)

Irvington (NY-W-2)
Sommer, E. I. (M)
Thorley, B. V. (M)

Irvington-On-Hudson (NY-W-2)
Auerbacher, W. F. (SM)
Espersen, G. (F)
Hipple, J. A. (SM)
Kohler, T. R. (SM)
Le Croy, W. O., Jr. (M)
Maps, C. E. (A)
Schaefer, L. E. (M)

Island Park (LI-2)
Horowitz, H. (M)
Marino, P. J. (M)
Preisler, M. (M)

Islip (LI-2)
Aichroth, J. W. (M)
Daubaras, E. J. (M)

Islip Terrace (LI-2)
Monsees, F. G. (A)

Ithaca (ITH-1)
Ankrum, P. D. (M)
Ares, M. (M)
Baker, H. D. (M)
Bilinski, J. R. (M)
Blott, E. J. (M)
Bolgiano, R., Jr. (M)
Booker, H. G. (F)
Brierley, D. H. (M)
Bryant, N. H. (M)
Bullock, A. J., Jr. (M)
Cameron, B. (M)
Campbell, J. B. (M)
Charton, P. W. (SM)
Cohen, M. H. (M)
Colbert, S. M. (M)
Curtice, W. R. (M)
Dalman, G. C. (SM)
Davis, M. I. (M)
De Clark, N. (M)
Dobyns, R. A., Jr. (M)
Dysinger, J. H. C., Jr. (M)
Eastman, L. F. (M)
Edwards, H. H. (M)
Farrell, G. F., Jr. (M)
Ferris, E. E. (A)
Ford, L. H. (M)
Gilmour, G. A. (M)
Gordon, W. E. (SM)
Greer, D. L. (M)
Hackett, C. M., Jr. (M)
Hansell, P. D. (M)
Harris, D. C. (M)
Harris, J. E. (M)
Hautanlemi, B. W. (M)
Heydt, H. L. (M)
Hildreth, R. F. (M)
Holden, W. D. (M)
Hollar, M. E. (M)
Howland, I. R. (SM)
Humphrey, L. C. (SM)
Ingalls, C. E. (SM)
Jankowski, H. (M)
Johnson, E. M. (M)
Kerns, G. P. (M)
Knoeller, R. W. (M)
Kram, W. P. (M)
Lind, E. R. (M)
Lipp, J. P. (M)
Lohne, W. E. (M)
Malamud, E. I. (M)
Maresca, T. J. (A)
May, J. C. (M)
Mayer, H. F. (F)
McGaughan, H. S. (SM)
McGovern, E. (M)
McIsaac, P. R. (A)
McLean, T. (SM)
Meserve, W. E. (SM)
Mitchell, E. E. (SM)
Mitchell, M. E. (M)
Nepveux, D. L. (M)
Nichols, B. (SM)
Nitzberg, R. (A)
Perry, A. D., Jr. (SM)
Perry, F. M. (SM)
Pressly, W. H., Jr. (M)
Ravi, G. J. (M)
Rider, L. S. (M)
Roberts, C. R. (M)
Robins, R. S. (SM)
Rogers, R. G. (A)
Rooney, T. J. (M)
Ruck, H. C. (M)
Sanford, J. R. (M)
Schwarz, F. C. (M)
Scudder, H. J., III (M)
Sedlor, R. J. (M)
Seymour, M. E. (M)
Sherman, W. W. (M)
Schnurer, F. (M)
Smith, H. G. (M)
Struckman, K. A. (M)
Swana, J. J. (M)
Teegarden, W. M. (M)
Thornton, R. D. (M)
Toblas, D. L. (M)
Townley, R. K. (SM)
Turri, R. N. (M)
Vrana, N. (M)
Wang, C. C. (F)
Warr, R. E. (M)
Weaver, P. F. (M)
West, N. H. (M)
Wheeler, N. D. (M)
Whyland, W. P. (M)
Wilt, H. R. (A)
Young, M. C. (M)
Zandl, W. W. (M)
Zimmerman, S. W. (SM)

Jackson Heights (LI-2)
Alvazian, S. G. (A)
Alford, J. R. (M)
Balan, J. C. (M)
Berlly, E. (M)
Bila, P. (M)
Brenner, A. (A)
Trachtenberg, J. M. (A)
Trieb, M. (M)
Vaher, E. (M)
Weisman, L. S. (M)
Weiss, J. (M)
Zacharlou, H. (M)
Ziblatt, R. (A)

Jamaica Estates (LI-2)
Seibmann, R. W. (M)

Jamestown (ERI-1)
Crissey, D. L. (A)
Jazbutis, A. (M)

Jamesville (SYR-1)
Batz, J. C. (M)
Biggs, J. P. (M)
Raper, J. A. A. (M)

Jericho (LI-2)
Barbella, A. M. (M)
Barr, P. (M)
Baumel, I. D. (M)
Berman, H. M. (SM)
Brower, J. D. (M)
Bryerman, G. J. (M)
Cohen, H. (M)
Goodman, I. (M)
Hartel, R. (M)
Hasenfus, R. G. (M)
Hoffick, R. M. (M)
Houseworth, G. H. (SM)
Jacobson, N. (M)
Kurz, F. A. (M)
Leight, J. (M)
Levinson, E. (M)
Locker, M. H. (M)
Mehlman, S. J. (SM)
Metzner, P. (M)
Miller, G. E. (A)
Novick, M. (M)
Pace, R. A. (M)
Pincus, M. (M)
Snyder, J. B. (M)
Torgow, E. N. (SM)
Trevisin, R. F. (M)
Zadoff, S. A. (M)

Jewell (RU-1)
Markham, I. F. (M)

Johnson City (BING-1)
Allen, G. W. (M)
Barbieri, G. (A)
Bene, J. F. (M)
Black, T. L. (M)
Bodak, H. J. (M)
Bosman, E. H. (M)
Carros, J. R. (M)
Caulfield, J. T. (M)
Damron, D. H. (A)
Demer, F. M. (A)
Dervay, W. (A)
Deskur, K. J. (A)
Dickinson, M. M., Jr. (M)
Duran, F. A., Jr. (SM)
Fournier, L. E. (M)
Fry, L. D. (M)
Fuchiek, R. J. (M)
Garr, D. E. (SM)
Gingerich, L. (M)
Gordon, A. (A)
Gula, N., Jr. (M)
Herzig, D. F. (M)
Hill, T. W. (M)
Ingram, J. J. (M)
Johnson, M. R. (SM)
Jones, R. A. (M)
Lundry, D. W. (M)
Mason, P. R., Jr. (M)
Masters, R. J. (M)
Miller, H. T., Jr. (A)
Monohan, P. D. (M)
Moore, R. P. (M)
Moyer, R. G. (A)
Nasoni, D. E. (M)
Neyhart, P. L. (M)
Peercy, R. L., Jr. (M)
Pitsley, E. L. (M)
Pratt, R. L. (M)
Rangitsch, E. L. (M)
Roehm, F. J. (SM)
Rudwick, B. H. (SM)
Rusnak, M. E. (M)
Samuel, J., Jr. (M)
Sims, J. R. (M)
Sullivan, D. L. (M)
Szczech, R. W. (M)
Tunis, C. J. (M)
Tye, G. (A)
Warrick, A. C. (SM)
Weston, J. E. (M)
Wilts, J. R. (M)

Johnstown (SCH-1)
Vunk, A. C. (M)

Katonah (NY-W-2)
Bender, R. R. (A)
Cassidy, J. J. (M)
Davison, R. D. (A)
Hilliard, W. P. (M)
Krongelb, S. (M)
Stuckert, P. E. (M)
Weller, D. R. (SM)

Keeseville (SCH-1)
Bezio, B. R. (A)

Kenmore (BN-1)
Anderson, E. W. (M)
Arthur, R. J. (M)
Bechtel, M. E., Jr. (M)
Brown, R. M. (A)
Browne, J. F. (M)
Constantino, J. C. (M)
Cooke, D. E. (A)
Dietrich, R. W. (M)
Fleming, R. W. (M)
Franclemont, H. J., Jr. (A)
Hessinger, W. A. (M)
Iverson, R. W. (M)
Kaushagen, W. M. (SM)
Klingenmeier, P. L. (M)
Koncsol, A. E. (M)
Lamy, R. H. (M)
Leggiere, D. D. (M)
Le Van, W. I. (M)
Oxley, V. C. (M)
Riggs, J. H. (SM)
Rupp, E. W., Jr. (SM)
Spears, R. E. (A)
Stephenson, H. B. (M)
Swartzlander, D. E. (A)
Warren, F. H. (M)
Welmers, E. T. (SM)

Kerhonkson (NY-MH-2)
Greenberg, H. (M)

Kew Garden Hills (LI-2)
Gittelman, A. I. (M)
Levene, L. F. (M)
Saarts, H. (A)

Kew Gardens (LI-2)
Barber, D. (M)
Benscher, W. (A)
Bidner, H. (M)
Devito, M. F. (M)
Espenschied, L. (F)
Friedman, I. (M)
Fu, C. (M)
Fuller, H. W. (A)
Glorit, I. (A)
Hannwacker, J. (M)
Jacobs, M. (M)
Jensen, A. J. (M)
Kipperman, W. (M)
Kovensky, D. J. (M)
Kraker, D. I. (M)
Landauer, A. (A)
Lerner, S. D. (M)
Maranitz, S. B. (A)
Mohr, W. L. (A)
Okress, E. C. (SM)
Poletti, G. (M)
Reuter, P. J. (SM)
Robertson, J. H. (M)
Robinson, H. L. (M)
Rosenberg, M. (M)
Schultz, M. L. (A)
Schwarz, J. (M)
Seltzer, A. D. (M)
Slotsky, G. J. (M)
Smith, C. R. (SM)
Spielman, S. (M)
Stock, D. C. (M)
Taylor, J. M. (M)
Warren, D. M. (M)
White, G. R. (M)
Wiesner, L. (M)

Kings Park (LI-2)
Goodman, K. G. (M)
Liverios, D. T. (M)
Logrieco, M. G. (M)
Pretl, L. L. (SM)
Reichel, H. (M)
Williamson, L. A. (A)

Kingston (NY-MH-2)
Ambrosini, F. (M)
Anderson, C. I. (M)
Baxter, D. W. (A)
Beatty, H. J., Jr. (M)
Bliss, B. E. (A)
Breiding, E. J. (M)
Broadman, I. S. (M)
Brown, M. E. (M)
Brown, W. J. (M)
Capasso, G. F. (M)
Carlson, J. W. (M)
Carroll, W. N. (A)
Clarke, R. L. (M)
Cleveland, J. L. (M)
Cooley, H. E. (M)
Counihan, R. G. (M)
Craft, B. G. (M)
D'Antonio, R. A. (M)
Dobberstein, E. A. (M)
Dolan, P. A. (M)
Dougherty, R. L. (M)
Douglas, R. M. (M)
Dowski, J. J. (M)
Dumas, A. M. (M)
Elsenstein, A. M. (M)
Elder, C. B. (A)
Foster, G. L. (M)
Frechette, G. A. (M)
Geller, H. (M)
Gibbs, D. E. (A)
Gilman, W. L. (M)
Glass, D. H. (M)
Gordon, C. R. (A)
Grau, W. C. (A)
Greer, R. S. (M)
Hairabedian, B. Z. (M)
Hayden, H. P. (M)
Heassler, R. A. (M)
Hottis, L. L. (M)
Hughes, M. W. (M)
Hunt, R. W. (M)
Jenny, F. F. (M)
Johnson, E. L. (M)

Kaufman, H. B. (M)
Kenney, R. C. (M)
Kloepping, J. (A)
Krause, H. W. (M)
Kronick, H. E. (M)
Kurzman, D. Z. (M)
Laird, J. A., III (M)
Lampe, A. W. (M)
Linton, J. H. (M)
Malaccorto, A. E. (M)
Malden, A. E. (M)
Markow, G. R. (SM)
Mazrott, E. V. (M)
McNellis, J. G. (A)
Mine, G. D. (A)
Nallin, E. J. (M)
Newton, J. D. (M)
Olivo, J. F. (M)
Onysyk, J. (A)
O'Reilly, J. P. (M)
Pearson, K. A. (M)
Perlmutter, T. W. (M)
Phillips, E. L. (M)
Pinsly, A. L. (SM)
Pomeranz, R. (M)
Proudfoot, G. D. (M)
Reid, G. M., Jr. (M)
Rolfe, R. C. (M)
Roth, C. G. (M)
Schaaf, S. (A)
Schiff, A. (A)
Schlam, D. (A)
Schoepf, D. B. (A)
Schuler, H. J. (A)
Sebasky, G. M. (M)
Siphers, J. W. (M)
Skerritt, J. W. (M)
Smith, C. L. (M)
Sossner, A. P. (M)
Tuchman, W. L. (M)
Tutwiler, K. E. (M)
Wajda, E. S. (M)
Ware, N. E., Jr. (M)
Warren, D. J. (M)
Washburne, J. R., Jr. (M)
Waters, L. E. (M)
Watkins, D. L. (M)
Whalen, R. J. (M)
Williams, C. W. (M)
Woltz, J. R. (M)
Yanoschak, V. (A)
Zetkov, J. R. (A)
Zucco, V. S. (M)

Kirkville (SYR-1)
Grunden, C. A. (M)
Smith, S. L. (M)

Lackawanna (BN-1)
Fetterolf, W. F. (A)

Lafayette (SYR-1)
Jutila, S. T. (M)

La Grangeville (NY-MH-2)
Christ, J. G. (A)
Kingston, W. J. (A)
Mahar, T. F. (M)

Lake George (SCH-1)
Strempel, E. L. (M)

Lake Katrine (NY-MH-2)
Di Costanzo, J. A. (M)
Foley, J. H. (M)
Georgallis, G. C. (M)
George, G. A. (A)
Metrick, J. (M)
Mikonis, P., Jr. (M)
Salzillo, E. M. (M)
Skatrud, R. O. (A)
Snell, L. W. (M)
Zuckerman, Y. N. (A)

Lake Mahopac (NY-MH-2)
Milflicker, D. J., Jr. (A)

Lake Ronkonkoma (LI-2)
Funderburk, D. G. (M)
Tanney, R. B. (M)

Lake Sucess (LI-2)
Barnes, R. S. (M)
Barrow, W. L. (F)
Delany, F. J. (SM)
Wagner, W. Q. (A)
Wasserman, F. N. (A)
Zimbalist, A. (M)

Lancaster (BN-1)
Lightburn, R. C. (M)
Meller, G. L. (M)
Rimlinger, D. C. (M)

Larchmont (NY-W-2)
Adler, B. (SM)
Adler, J. T. (A)
Basile, G. I. (M)
Brownell, H. R. (M)
Gordon, J. E. (A)
Kerby, G. A. (M)
King, S. (A)
Kline, A. (M)
Levy, M. L. (SM)
Rudd, W. C. (M)
Schneider, J. R. (A)
Stein, D. R. (M)
Viebranz, A. C. (M)

Latham (SCH-1)
Campese, N. H. (A)
Fitzgibbons, J. J. (M)
Hemingway, J. R. (M)
Mortenson, K. E. (SM)

Laurelton (LI-1)
Antin, J. (M)
Bogner, B. F. (M)
Cohen, D. (M)
Epstein, M. (M)
Glaser, M. (SM)
Groner, P. S. (A)
Hirschel, J. (A)
Josepher, A. (A)
Kellner, A. S. (M)
Marin, F. L. (M)
Seligson, A. L. (M)

Lawrence (LI-2)
Simberg, R. S. (M)
Zacharia, H. (M)

Lee Center (RU-1)
Brunette, G. E. (M)
De Minco, A. P. (SM)
Kunze, A. A. (SM)

Le Roy (ROC-1)
Lapp, R. S. (M)
Lapp, S. P. (A)
Stefani, R. D. (M)

Levittown (LI-2)
Bargeski, A. J. (M)
Beamer, F. E. (M)
Berger, C. D. (SM)
Bolnick, F. I. (M)
Brandstetter, R. W. (A)
Brenner, W. (SM)
Brown, L. E. (M)
Catlin, R. G. (M)
Clarke, G. M. (M)
Clune, W. T. (M)
Corwin, J. J. (M)
Craig, A. F. (M)
Crush, J. F. (M)
D'Agostino, J. V. (M)
Di Matteo, P. L. (M)
Di Meglio, E. (A)
Duda, J. A. (A)
Dumas, E. G. (A)
Dunn, J. (M)
Fishel, J. I. (A)
Flynn, W. J. (M)
Friedman, H. (A)
Gassler, J. H. (M)
Gerity, R. J. (M)
Heacock, W. J., Jr. (M)
Kayne, F. (A)
Kulba, N. S. (M)
Lavendol, L. G. (M)
Lee, G. C. (M)
Lo Presti, K. R. (A)
McArthur, W. G. (M)
Mehr, A. (A)
Nickel, W. S. (SM)
Piccione, S. C. (M)
Prebster, M. T. (M)
Rice, W. F. (M)
Rich, A. L. (SM)
Roglch, S. G. (M)
Sant Angelo, M. A. (M)
Schenck, T. M. (M)
Schultz, R. D. (A)
Shepherd, L. P. (M)
Sinnott, J. (SM)
Stolzman, B. R. (M)
Strickland, R. D. (M)
Tatz, A. (SM)
Walker, C. M. (A)
White, J. D., Jr. (M)

Lewiston (BN-1)
Buranich, G.F. (SM)
Heston, W. S. (M)
Jachlewski, R. H. (M)

Lincolndale (NY-W-2)
Bruns, W. H. (M)

Lindenhurst (LI-2)
Buda, P. V. (M)
Church, T. A. (A)
McDonald, J. F., Jr. (M)
Morgenstern, O. A. (SM)
Persh, H. R. (M)
Rohner, G. J. (SM)
Royce, R. C. (M)
Siele, W. A. (A)
Suchanek, C. F. (A)

Little Neck (LI-2)
Allen, A. (M)
Bailey, W. F. (F)
Beam, R. L. (SM)
Berendsen, C. G. (M)
Boos, F. H., Jr. (M)
Cosby, J. C. (M)
Dean, C. E. (F)
Eeler, G. A. (M)
Erickson, T. (M)
Hana, T. C. (SM)
Hershkowitz, B. (A)
Kapo, C. E. (A)
King, W. F. (M)
Kunickly, B. F. (M)
Lampert, N. I. (A)
Levin, H. L. (A)
Lewiss, D. B. (M)
Mac Donald, W. A. (F)
Marks, R. (A)
Maurer, S. J. (M)
Nagel, K. H. (A)
Nelson, R. G. (M)
Page, C. E. (SM)
Pressman, R. (M)
Rosenblum, H. (SM)
Rosin, A. (A)

Roth, R. F. (M)
Spector, N. (M)
Spiegel, R. M. (M)
Stein, P. J. (M)
Taft, R. J. (A)
Tobin, M. W. (M)
Tucker, S. A. (SM)
Weinberg, S. (SM)
Wilson, W. H. (M)
Young, V. J. (SM)
Zimmer, E. W. (M)

Liverpool (SYR-1)
Allen, A. E. (A)
Alvira, A. (SM)
Andrews, J. V. (M)
Angus, A. C. (M)
Applebaum, S. P. (SM)
Bear, D. R. (M)
Benfey, R. L. (M)
Boothroyd, D. C. (A)
Bowman, D. C. (M)
Boyce, H. K. (A)
Breckner, C. N. (M)
Brown, W. W. (SM)
Browne, D. E. (M)
Burns, D. L. (M)
Burris, H. A. (M)
Casey, N. V., Jr. (M)
Clanton, E. A. (M)
Clark, M. E. (SM)
Cover, N. W. (M)
Cripe, C. W. (M)
Crissey, K. L. (M)
Demo, R. D. (M)
Driskill, R. D. (M)
Eber, L. O., Jr. (A)
Eriksen, B. K. (M)
Feldman, A. W. (A)
Fisk, R. E. (M)
Fitzpatrick, J. J. (A)
Flood, J. L. (M)
Frazier, J. P. (M)
French, R. W. (M)
Gentry, F. E. (SM)
Gillett, R. L., Jr. (M)
Gingrich, W. G. (M)
Hall, R. W. (M)
Hanson, R. E. (M)
Hatfield, J. P. (M)
Henry, C. V., Jr. (M)
Hicks, C. L. (M)
Holstead, A. J. (M)
Hunting, R. A. (M)
Hwang, Y-C (M)
Jobes, S. S., Jr. (M)
Kelm, J. M. (M)
Kelly, C. R. (A)
Knight, W. W. (M)
Lane, J. R. (M)
Lee, A. E. (M)
Lewis, R. V. (SM)
Malagisi, C. S. (M)
McCoy, D. R. (M)
Millham, R. L. (SM)
Miner, A. R., Jr. (A)
Morgan-Voyce, A. M. (SM)
Nease, J. (M)
Nester, W. H. (M)
Noyes, J. E. (M)
Orendac, B. M. (M)
Paschetto, D. D. (M)
Perreault, D. A. (M)
Pfisterer, F. (A)
Pietro, L. R. (M)
Platts, G. F. (SM)
Pollto, L. J. (A)
Pollock, A. H. (M)
Potter, H. C. (M)
Rowley, N. P. (M)
Salamy, A. E. (M)
Sanderson, R. F. (M)
Sharon, A. U. (M)
Sirline, R. C. (M)
Smith, H. W. (M)
Smith, J. M. (M)
Smith, L. D. (M)
Sparks, J. E. (M)
Stern, E. (M)
Swing, M. (SM)
Vanderlaan, H. J. (M)
Walker, O. F. (SM)
Wall, J. A. (M)
Waruga, S. (M)
Ward, D. D., Jr. (M)
Welch, R. F. (M)
Williams, G. R. (M)
Williamson, J. C. (M)

Lockport (BN-1)
Bulmore, H. R. (A)
Cress, R. B. (M)
French, P. M., Jr. (M)
Janowsky, R. H. (A)
Lee, B. W. (M)
Rupp, R. B. (M)

Lockwood (BING-1)
Vanderpool, R. F. (M)

Locust Valley (LI-2)
Barber, R. G. (M)
Bouteiller, C. E. (A)
Geddy, G. B. (M)
Ray, G. T. (M)
Shaw, R. F. (SM)
Whipple, G. D. (M)

Long Beach (LI-2)
Adler, J. I. (M)
Allen, E. H. (M)
Auerbach, V. (M)
Brown, C. A. (M)

Brown, R. M. (A)
Ellis, N. (A)
Keim, A. (M)
McNells, P. J. (M)
Mertz, P. (F)
Smook, R. R. (M)
Weiss, R. (M)
Wurman, G. (M)

Long Island City (LI-2)
Alfieris, M. (M)
Ashley, H. R. (A)
Astwood, E. J. (A)
Balamuth, L. (M)
Bodaky, A. J. (A)
Cabeen, S. K. (A)
Camilleri, C. M. (A)
Cohen, H. (M)
Como, A. (M)
Dolid, W. A. (A)
Douglas, D. A. (A)
Elsenbroek, M. C. (A)
Fleishman, G. (M)
Freud, E. L. (M)
Geen, W. E. (A)
Ginters, F. A. (M)
Goodman, H. (M)
Haring, L. L. (M)
Hartman, R. K. (M)
Hecht, G. (SM)
Heinrich, F. R. (A)
Hurley, J. C. (M)
Jacobs, B. (A)
Jurison, J. (M)
Kelly, J. J. (A)
Kessler, F. (A)
Klein, W. L. (M)
Lesmez, J. J., Jr. (M)
Lewyt, A. M. (SM)
Loui, J. S. (M)
Madden, E. J. (M)
Marzoli, A. (M)
McConnell, J. H. (SM)
Monturo, J. B. (M)
Morse, F. (M)
Odessey, P. H. (M)
Osherowitz, J. M. (A)
Rubin, S. W. (SM)
Scott, T. J. (M)
Shulman, I. (A)
Simmonds, J. (A)
Skwarek, F. J. (SM)
Snyder, S. J. (M)
Spera, R. L. (A)
Stahl, A. S. (SM)
Valge, J. (A)
Vignali, J. J. (M)
Wald, D. (A)
Walker, W. (M)
Zeidner, S. (A)
Zimet, M. M. (M)

Loudonville (SCH-1)
Gisser, D. (M)
Jernskolf, G. (M)
Rullson, J. P. (M)

Ludlowville (ITH-1)
Deutch, H. M. (SM)
Kascha, G. E. (M)
Prochazka, A. M. (M)
Rasmussen, J. M. (M)
Sherman, R. G. (M)
Wild, E. C. (M)

Lynbrook (LI-2)
Backus, C. H. (A)
Davidoff, F. (M)
Dixon, L. G. (M)
Doherty, T. F. (A)
Duttera, W. S. (SM)
Giarglana, J. A. (M)
Granville, R. W., Jr. (M)
Granville, R. W. (M)
Haus, G. R. (M)
Kirchner, C. W. (A)
Koch, R. F. (SM)
Magin, J. J. (M)
Mondschein, M. (M)
Parkins, G. (M)
Richardson, K. (A)
Rosenfeld, R. I. (SM)
Ruopoi, A. E. (M)
Selter, R. S. (A)
Seliger, V. H. (SM)
Shmurak, B. (M)
Smith, J. S. (SM)
Squassoni, G. F. (SM)
Surette, W. E., Jr. (M)

Macedon (ROC-1)
Wesenberg, C. L. (M)

Mahopac (NY-MH-2)
Bernstein, R. (M)
Griffin, J. F., Jr. (M)
Moyer, J. J. (M)
Renke, A. (M)
Seelig, S. M. (M)

Malden-On-Hudson (NY-MH-2)
Galtc, K. W. (M)

Malverne (LI-2)
Beck, A. T. (M)
Clemens, R. W. (A)
Deans, W. L. (A)
Gurevics, D. (A)
Hepburn, J. C. (SM)
Kelly, F. J. (M)
Levine, B. (SM)
Mirman, I. (SM)
Pollack, I. (M)

Schneider, R. E. (M)
Shanney, W. I. (M)
Sharpe, L. E. (M)
Spencer, B, F. (SM)
Tanck, H. (M)
Van Rosenbergh, W. (M)
Werman, H. M. (M)
Zettler, S. G. (M)

Mamaroneck (NY-W-2)
Backstrom, E. F. C., Jr. (A)
Carlisle, S. F., Jr. (M)
Cavallere, J. R. (M)
Conover, D. G. (A)
Faiola, A. R. (A)
Johnson, R. K. (M)
Kemeny, E. S. (M)
Morgan, G. T. (M)
Mullenger, K. E. (M)
Robbins, I. M. (A)
Romero, R. F. (M)
Scher, S. M. (A)
Steinberg, M. I. (A)
Stevens, A. M. (F)
Vollenweider, A. D. (M)

Manhasset (LI-2)
Bell, W. W., III (M)
Bowle, R. M. (F)
Brown, R. W. (M)
Davis, W. J. (M)
Della-Corte, J. P. (SM)
Ebert, J. E. (SM)
Fitzpatrick, J. A. (M)
Gorrill, W. S. (SM)
Grosselfinger, W. H. (SM)
Hamlett, R. T. (SM)
Hathaway, J. L. (SM)
Jackson, B. A. (M)
Jones, M. E. (M)
Knights, C. F. (M)
La Placa, A. P. (A)
Nickel, F., Jr. (M)
Pores, E. B. (SM)
Rimmler, F. F. (A)
Scott, R. (A)
Tennis, J. E. (M)
Traenkle, J. W. (M)
Weibel, G. E. (SM)
Woods, W. C., Jr. (M)

Manlius (SYR-1)
Bessette, D. U. (M)
Budin, G. W. (M)
Chamberlin, C. C. (M)
Edwards, K. A. (SM)
Greenhalgh, K. D. (M)
Hartman, D. K. (M)
Hartmann, R. G. (M)
Heartz, R. A. (M)
Jacobs, G. B. (SM)
Johnson, T. T. (SM)
Oleyar, M., Jr. (M)
Webb, T. E. (M)
White, P. K. (M)

Marathon (SYR-1)
Kaye, G. A., Sr. (M)
Pruitt, D. C. (SM)
Wilson, R. M. (A)

Marcellus (SYR-1)
Budell, L. A. (M)
Devine, G. F. (SM)
Sauer, W. A. (M)

Marcy (RU-1)
Bickelhaupt, M. H., Jr. (M)
Blake, H. C. (M)
La Salle, R. H. (M)
Weiss, H. R. (M)

Maspeth (LI-2)
Bergamo, M. V. (M)
Braunstein, A. (M)
D'Andreano, L. D. (A)
Howard, R. F. (M)
Jaworowski, B. R. (A)
Jaworowski, E. V. (A)
McAllister, J. P. (M)
McLaughlin, T. R. (M)
Melnick, M. M. (M)
Michal, R. L. (M)
Muller, R. (A)
Palaitnus, A. C. (M)
Pataki, E. (M)
Vogts, W. R. (M)

Massapequa (LI-2)
Alter, J. (SM)
Amodeo, C. F. (M)
Ashus, A. (A)
Bartsch, R. T. (M)
Baunach, E. L. (M)
Berler, R. (M)
Biegen, A. J. (M)
Bonner, W. A., Jr. (M)
Buff, C. (SM)
Capasso, L. V. (M)
Chapman, P. W. (M)
Cherry, M. (M)
Clark, G. J., III (A)
Crofford, M. (A)
Darden, R. R., Jr. (SM)
Di Toro, M. J. (F)
Enlow, P. M. (M)
Feldman, L. (M)
First, M. H. (M)
Gold, J. I. (M)
Goldstone, L. L. (A)
Hammond, R. J. (A)
Haneman, F. G. (M)
Hill, C. E. (M)



Husmann, D. (M)
Katz, S. H. (SM)
Kaye, M. (M)
Krueger, A. C. (M)
Lefkowitz, E. (A)
Leibfried, T. F., Jr. (A)
Lombardi, M. W. (M)
Lowell, N. (A)
Marcinkowski, E. R. (M)
McGaw, R. K. (M)
McGowen, T. C. (M)
Mehall, A. D., Jr. (M)
Mertens, R. G. (A)
Montzen, W. (M)
Morris, P. E. (M)
Murphy, G. N. (M)
Musketos, A. (M)
Rector, L. V. (M)
Ruvin, A. E. (M)
Sail, A. H. (M)
Salamy, M. S. (M)
Salz, J. S. (M)
Schmidt, R. J. (A)
Schulkind, D. (M)
Shapiro, H. L. (SM)
Sirota, N. (SM)
Staros, B. (SM)
Tepper, C. A. (A)

Massapequa Park (LI-2)
Arfin, A. D. (M)
Bailey, G. E. (M)
Brandon, J. M. (M)
Cipolla, A. P. (M)
Cronauer, E. A. (M)
Feerst, I. (SM)
Finken, K. R., Jr. (M)
Gallagher, J. H. (A)
Gans, M. L. (M)
Gioielli, R. R. (A)
Goodman, J. (M)
Green, R. (M)
Halpin, A. T., Jr. (M)
Heins, J. L. (SM)
Hermelin, L. S. (SM)
Karas, J. P. (M)
Lidell, D. (A)
Lizzio, J. (A)
Mansfield, E. C. (A)
Marderstein, S. (M)
Ogden, D. R. (M)
Redden, G. W. (SM)
Rickey, R. G. (A)
Romeo, A. (A)
Scharf, E. (M)
Smith, H. D. (M)
Swearingen, T. J. (SM)
Virgadamo, F. (M)
Yutkowitz, C. K. (M)
Ziegler, J. M. (M)
Zuzolo, P. R. (M)

Massena (SYR-1)
Bond, N. T. (M)

Mastic (LI-2)
Parmely, E. H., Jr. (A)

Mastic Beach (LI-2)
Fuelling, P. W. (M)

Mattydale (SYR-1)
Fiederer, J. A. (M)
Gannett, G. L. (M)
Humphrey, J. G. (M)
Wakefield, J. S. (M)

Mechanicville (SCH-1)
Belmonte, A. P. (M)

Medina (ROC-1)
Vosteen, R. E. (SM)

Medford (LI-2)
Ziegelmair, L. A. (M)

Melville (LI-2)
Arams, F. R. (SM)
Avery, R. E. (SM)
Cahill, F. C. (SM)
Caputi, W. J. (M)
Cohen, A. M. (M)
Comstock, G. C. (F)
Crist, P. W. (SM)
Fadem, R. J. (M)
Fromm, W. E. (SM)
Fubini, E. G. (F)
Gaus, A. (M)
Gery, S. W. (M)
Goldberg, J. (M)
Goldberg, R. M. (M)
Greenberg, D. L. (M)
Hendler, A. J. (M)
Kearney, J. W. (SM)
Kelly, F. X., Jr. (M)
Klug, S. H. (M)
Landauer, W. E. (SM)
Larson, R. A. (M)
Lebenbaum, M. T. (SM)
Lethin, J. E. (SM)
Lombardo, P. P. (A)
Lowman, R. V. (M)
Mesard, R. A. (M)
Minklewicz, M. D. K. (M)
Mueller, F. J. (M)
Okwit, S. (M)
Pomeranz, H. (M)
Radway, T. D. (M)
Schrader, L. W., Jr. (M)
Shilkoff, M. (M)
Siegel, J. R. (M)
Sneh, K. C. (SM)
Stephenson, J. G. (SM)

Stone, A. L. (M)
White, W. D. (F)
Williams, A. L. (M)
Woodward, B. A. (M)
Yale, W. H. (SM)

Memphis (SYR-1)
Conlber, G. A. (M)

Merrick (LI-2)
Baird, J. E. (M)
Bresler, A. D. (SM)
Casale, D. R. (M)
Friedman, J. W. (M)
Geismar, G. G. (M)
Hirsch, R. B. (M)
Knight, P. (M)
Kowalski, A. (M)
Lindenfelser, W. A. (M)
Loehr, R. A. (A)
Lory, B. (A)
Paul, I. (M)
Randall, G. A. (SM)
Sahm, E. J. (M)
Squitieri, A. (M)
Tackel, H. W. (SM)
Wolff, H. (M)
Zeller, J. F. (M)

Middle Island (LI-2)
Adams, T. H. (A)

Middletown (NY-MH-2)
Carroll, I. (M)
Daugherty, R. M. (SM)
Pajak, A. W. (M)

Middle Village (LI-2)
Blatz, R. E. (M)
Donop, D. A. (M)
King, C. N. (M)
Lyons, J. W. (M)
Merkel, J. F. (A)
Muller, W. G. (A)
Parker, H. L. (A)
Shubel, E. J. (M)
Zamir, I. Z. (M)

Millbrook (NY-MH-2)
Florac, W. A., Jr. (M)
Gribble, L. V. (M)
Sussenguth, E. H., Jr. (M)
Wroblewski, E. J. (A)

Miller Place (LI-2)
Sanford, V. M. (M)
Watson, C. W. (M)

Mineola (LI-2)
Amling, J. L. (M)
Bisby, J. F. (SM)
Blank, S. J. (M)
Bradley, H. E. (M)
Brown, L. L. (A)
Brunet, W. J. (A)
Caddell, R. (A)
Canning, J. H. (SM)
Cramer, S. (M)
Crepeau, P. J. (M)
Epstein, J. N. (M)
Fagan, D. F. (M)
Fyme, M. G. A. (A)
Geffe, P. R. (M)
Goldman, L. (A)
Haag, E. J. (A)
Hockenjos, R. M. (M)
Ipolyi, G. (A)
Kezer, C. F. (M)
Klein, H. M. (A)
Knocklein, H. P. (M)
Lynch, W. A. (F)
Lyons, J. F., Jr. (M)
Mackeman, J. L. (M)
Mahler, J. (M)
McFarland, J. E. (SM)
Meyer, G. E. (A)
Miller, D. M. (SM)
Murphy, J. J. (M)
O'Neill, D. J. (M)
Oshiro, F. K. (M)
Owen, D. J. (M)
Parsons, B. L. (M)
Pepper, H. H. (A)
Polak, H. L. (A)
Rearwin, R. H. (A)
Reymann, J., Jr. (M)
Robertson, D. J. (M)
Rumrill, H. J. (M)
Sauer, H. E. (A)
Schaefer, G. H. (A)
Schweber, S. C. (A)
Schwenk, H. R. (M)
Shulman, A. (A)
Simonton, L. J. (M)
Skifter, H. R. (F)
Skrobisch, A. (M)
Tlonaytis, C. J. (A)
Whelehan, J. J., Jr. (M)
White, J. A. (M)
Willie, R. A. (A)
Young, R. J. (M)

Minoa (SYR-1)
Ernst, E. C. (M)
Hagnauer, R. A. (M)
Wilson, R. D. (A)

Mitchell AFB (LI-2)
Cammack, F. (M)
Venerella, J. A. (M)

Monroe (NY-MH-2)
Vollkommer, W. A. (M)

Monsey (NY-W-2)
Gradner, H. (A)
Kritz, A. (M)
Sargent, A. F. (M)
Selender, H. (M)

Montrose (NY-W-2)
Pullman, B. C. (M)

Mount Kisco (NY-W-2)
Brooks, F. P., Jr. (M)
Burden, R. W. (A)
Daley, W. E. (M)
Diou, L. J. (M)
Doyle, R. J. (A)
Dubbels, D. A. (M)
Grace, F. (SM)
Harmon, H. F. (M)
Machanic, E. D. (A)
Meagher, P. F. (M)
Mountain, J. D. (M)
Orell, F. M. (M)
Radke, W. A. (M)
Rochester, N. (F)
Schenck, L. S. (A)
Short, W. P. (SM)
Taggart, C. E. (M)

Mount Marion (NY-MH-2)
Aiken, L. W. (M)
Eickhorn, C. R., Jr. (M)
Kurtz, G. W. (M)
Murad, R. V. (M)
O'Hara, A. C., Jr. (M)
Reilly, T. J. (M)

Mount Vernon (NY-W-2)
Achtellik, G. (M)
Bannon, D. W. (M)
Bloom, F. J. (SM)
Brenner, B. (M)
Callahan, J. P. (M)
Campbell, C. H. (M)
Charleston, S. M. (A)
Desnoes, W. B. (A)
Douglas, R. H. (M)
Dowling, T. J. (M)
Duffy, J. J. (A)
Gedulidg, D. S. (M)
Green, J. L., Jr. (M)
Gurdus, H. W. (A)
Hendlin, H. M. (M)
Herz, H. L. (M)
Hineline, H. D. (M)
Hoffmann, W. H. (M)
Judge, E. M. (A)
Kramer, A. G. (M)
Krasnow, S. B. (M)
Kulka, E. R. (M)
Lang, H. M. (A)
Lee, V. C. (A)
Mason, C. A. (M)
Miller, D. C. (M)
Mitchell, D. C. (M)
Morrison, R. L. (M)
Napolitani, F. D. (M)
Nowak, M., Jr. (A)
Pasternak, J. M. (A)
Pestone, A. A. (A)
Redstone, C. W. (M)
Rosenbaum, A. H. (M)
Rosenberg, P. (SM)
Rotondi, G. L. D. (M)
Senseney, G. T. (A)
Slabicki, W. (A)
Sonkin, D. (SM)
Spiterl, J., Jr. (A)
Stronqin, J. (M)
Strum, N. (M)
Wallace, M. (SM)
Wines, A. J., Sr. (A)

Munsey Park (LI-2)
Heindel, H. J. (SM)

Nanuet (NY-W-2)
Strauss, G. M. (M)
Went, J. J. (A)

Nassau (SCH-1)
Merchant, R. (M)
Smith, G. H. (M)

Neponsit (LI-2)
Goldfein, S. F. (M)
Sylvane, A. A. (SM)

Nesconset (LI-2)
Cannon, R. R. (A)

Newark Valley (BING-1)
Flanders, E. S. (M)
Sullivan, R. M. (M)

Newburgh (NY-MH-2)
Ahern, J. T. (M)
Digenova, F. (A)
Eilman, R. P. (M)
Galage, D. J. (M)
Konczal, F. D. (M)
Podell, S. (M)
Rhodes, J. F. (A)
Schaffer, E. J. (A)
Schoch, D. L. (A)
Vecchiarelli, N. (M)
Vlahos, P. G. (A)
Webb, J. C. (M)
Weinman, M. (A)
Youngblood, H. R. (M)

New City (NY-W-2)
Doellner, L. J. (M)
Feldner, L. (M)

Greenwald, M. H. (M)
Hastings, L. S., Jr. (A)
Matarese, J. (M)
Webb, C. E. (M)

New Hartford (RU-1)
Barrick, W. E. (M)
Benjamin, H. L. (M)
Brennan, J. F. (M)
Brown, C. D. (M)
Bussey, H. C. (M)
Dennis, U. E. (M)
Dial, A. R. (M)
Dover, B. M. (M)
Estey, H. E. (M)
Fitz-Hugh, C. D., Jr. (M)
Geiser, D. T. (M)
Golder, A. J. (M)
Griswold, J. H. (M)
Harris, L. D. (M)
Hogan, E. V., Jr. (SM)
Hornak, P. M. (M)
Kramer, R. S. (M)
Kuehl, W. J. (SM)
Larkin, R. M. (SM)
Lyness, H. J. (M)
Magnuson, R. A. (M)
Markwalter, J. L., Jr. (SM)
Matt, S. (M)
McCabe, K. E. (M)
Olson, F. A. (M)
Pangburn, L. R. (M)
Pashby, C. A. (M)
Pincombe, A. L. (A)
Powers, R. (M)
Priest, F. R. (SM)
Ricci, B. E. (M)
Scanlan, R. E. (M)
Smith, S. B. (A)
Staudaher, F. M. (M)
Walker, R. K. (M)
Walthall, W. C., Jr. (M)
Wardner, E. A. (M)
Watts, P. M. (M)
Yoder, D. F. (A)
Zachary, R. A., Jr. (SM)

New Hyde Park (LI-2)
Adler, L. L. (M)
Amacher, W. E. (M)
Bell, V. J., Jr. (M)
Berger, M. (M)
Berkowitz, B. (M)
Berman, N. (M)
Bertan, L. L. (M)
Bodd, R. R. (M)
Bomzer, H. W. (SM)
Bruns, E. A. (M)
Callaghan, E. P. (A)
Camp, S. N. (M)
Collins, W. G. (M)
Comis, D. (M)
Contrastan, D. P. (A)
De Lorenzo, J. D. (M)
Detwiler, S. P. (SM)
Dittenhefer, H. F. (M)
Duffy, A. F. (A)
Eisenhauer, F. E. (M)
Farber, R. J. (SM)
Fishbein, M. (SM)
Friedman, I. (M)
Giese, J. E. (A)
Goebeler, W. H., Jr. (M)
Hudelson, R. L. (M)
Huebscher, H. (SM)
Hyman, A. (M)
Isaacs, P. J. (M)
Jackson, F. S. (M)
Janlesch, H. R. (M)
Jung, C. W. (M)
Kaplan, M. (A)
Lenefsky, S. (M)
Liebman, H. S. (A)
Livant, W. (M)
Lohkemper, O. A. (M)
Loughlin, R. G. (SM)
Madrick, S. A. (A)
Magid, M. (SM)
Marshall, J. C. (M)
Marsman, J. H. (SM)
McKenna, K. F. (M)
McMahon, J. R. (M)
Moretti, W. W. (M)
Mulholland, G. T. (A)
Odom, C. H. (A)
Orazio, A. F. (M)
Palmieri, C. A. (M)
Proscia, P. A. (M)
Richter, H. H. (A)
Ries, C. A. (SM)
Sheetz, E. P. (A)
Sherbin, L. E. (SM)
Sherry, R.S. (SM)
Simonelli, N. A. (M)
Stamos, G. M. (M)
Stein, J. W. (A)
Tarantino, T. C. (M)
Vinarub, M. E. (M)
Wittenberg, R. C. (M)
Wolf, E. G. (M)
Wozniak, L. M. (M)
Yorinks, A. (SM)
Zalkin, S. P. (M)

New Platz (NY-MH-2)
Culver, R. S. (M)
Demers, M. E. (M)
Du Bois, G. E. (M)
Fritz, F. J. (M)
McCoy, W. B. (M)
Pechloff, J. (M)
Stone, F. A. (M)
Wilson, P. J. (M)

New Rochelle (NY-W-2)
Andraud, R. J. (A)
Appelbaum, G. (M)
Auditore, C. J. (SM)
Baker, L. S. (A)
Benjamin, S. K. (SM)
Berke, L. C. (M)
Bower, C. M. (M)
Burnett, L. J., Jr. (M)
Dana, A. W. (M)
Dryden, W. G. (A)
Dubiller, W. (F)
Feldman, E. F. (SM)
Fisher, S. G. (A)
Gaffney, D. T. (A)
Gage, L. S. (SM)
Goldberg, M. I. (A)
Goldfischer, L. I. (SM)
Greibach, E. H. (SM)
Harnack, W. P. (M)
Harris, C. M. (SM)
Hirsch, J. D. (M)
Kaiser, L. A. (M)
Karp, J. R. (SM)
Landis, J. C. (M)
Lee, G. F. (M)
Lurie, W. B. (SM)
Lywood, D. W. (M)
Mathis, C. E. (M)
Murphy, M. J. (M)
Nunan, K. W., Sr. (A)
Pels, E. (M)
Perutz, R. A. (M)
Petzal, R. (M)
Polansky, P. (A)
Reed, J. (SM)
St. Clair, B. W. (M)
Saltman, R. G. (M)
Schlenger, J. I. (M)
Schlessel, B. (M)
Schwartz, H. E., Jr. (M)
Shapiro, H. (M)
Sherman, P. D. (M)
Sinuk, S. (M)
Temple, D. I. (SM)
Wank, P. J. (M)
White, F. E., Jr. (M)
Williams, J. E. (M)
Wood, C. R. (M)
Woog, D. H. (A)
Wu, W. I. L. (SM)
Zuschin, H. L. (A)

New York City (NY-2)
Abbot, E. A. (SM)
Abraham, I. (A)
Abrahamsen, A. (A)
Acheson, M. A. (F)
Adams, M. D. (SM)
Addamo, J. A. (A)
Adler, C. (A)
Adler, R. H. (M)
Afshar, G. H. (M)
Aghib, E. G. (A)
Aldag, H. R. (M)
Aldahonda, C. L. (A)
Aldor, E. (M)
Alexander, H. W. (A)
Alexander, L. (M)
Alexandro, F. J., Jr. (M)
Allen, C. L. (M)
Almquist, M. L. (F)
Altschuler, H. M. (SM)
Amy, E. V. (SM)
Andrasko, J. P. (M)
Andres, R. K. (M)
Angelari, R. D. (A)
Angelos, J. D. (M)
Anis, J. (A)
Appel, H. W. (SM)
Appelbaum, S. J. (M)
Arm, W. (M)
Armstrong, G. S. (M)
Arnold, J. W. (SM)
Arons, E. L. (A)
Aronson, F. (M)
Asen, R. (A)
Ash, R. B. (M)
Atwood, S. (SM)
Auriema, A. (A)
Avanessians, A. A. (M)
Aviv, D. G. (M)
Axelrod, J. (M)
Backer, M. (SM)
Baer, T. M. (M)
Baerst, L. R. (A)
Bailey, G. W. (F)
Bang, H. R. (A)
Barasch, H. P. (M)
Barash, L. F. (M)
Barghout, J. M. (M)
Barr, S. M. (SM)
Bart, C. P. (M)
Bartlett, S. C. (SM)
Barton, T. H. (M)
Bashkow, T. R. (M)
Batty, W. E., Jr. (M)
Baum, L. (M)
Baum, M. C. (M)
Baumann, R. H. (M)
Baumgartner, J. G. (A)
Bechtold, H. P., Jr. (M)
Bederman, S. (A)
Bednar, F. J. (A)
Beers, Y. (M)
Belfi, J. L. (M)
Beller, W. C. (M)
Bemis, E. W. (SM)
Benedikt, J. (A)
Bennett, L. (A)
Berber, J. (A)
Bereza, A. (M)
Berger, L. (M)

Bergherr, W. (A)
Berkner, L. V. (F)
Bernstein, R. I. (SM)
Bertero, E. P. (A)
Bickel, H. J. (M)
Bigelow, S. C. (M)
Bitner, R. F. (A)
Black, D. G., Jr. (SM)
Blanchard, E. P., Jr. (A)
Bland, G. F. (M)
Blocker, T. B. (M)
Blomqvist, E. A. (M)
Bloxsome, J. L. (M)
Blume, R. J. (A)
Blumentnal, H. W. (M)
Bocharoff, G. M. (M)
Bock, M. (M)
Bodin, M. (M)
Bogustawski, H. A. (SM)
Bohn, W. C. (M)
Bolton, A. (M)
Bomberger, D. C. (M)
Bonner, M. K. (M)
Borner, R. C. (M)
Borst, J. M. (M)
Bose, J. H. (SM)
Bostwick, L. G. (M)
Boughtwood, J. E. (M)
Bourque, A. R. (M)
Bowen, J. S. (A)
Boyarsky, D. (M)
Boyd, R. C. (M)
Boyd, W. L. (A)
Bradley, F. R., Jr. (M)
Brady, T. D. (M)
Brainard, T. (A)
Braunfeld, M. T. (M)
Braverman, M. (A)
Brayman, P. J. (A)
Bray, P., Jr. (A)
Brender, D. M. (M)
Brenner, E. (SM)
Breuel, J. W. (A)
Bristol, R. W. (M)
Brociner, V. (M)
Brodheim, E. (M)
Brolin, S. J. (M)
Bromberg, J. J. (A)
Brookner, E. (M)
Brown, F. L. (M)
Brown, H. S. (M)
Brown, P. M. (A)
Brown, R. L. (M)
Brown, S. (M)
Bruckmann, F. E. (M)
Brudner, H. J. (M)
Brunet, M. (SM)
Bryant, C. D. (M)
Buell, H. (M)
Buffo, B. (SM)
Bugnolo, D. S. (M)
Bulkley, D. D. (M)
Bullock, W. S. (A)
Burghard, G. E. (SM)
Burstein, I. (A)
Busch, A. (M)
Butterworth, J. S. (A)
Buttner, H. H. (F)
Byam, L. A., Jr. (SM)
Cake, A. F. (A)
Cambridge, C. G. (SM)
Cameron, D. B. (M)
Campana, C. R. (A)
Campbell, E. A. (A)
Campbell, R. D. (F)
Canniff, C. J. (A)
Carlebach, W. M. (M)
Carlson, E. C. (A)
Carreau, G. (M)
Carter, R. W. (SM)
Carothers, R. S. (SM)
Casey, R. G. (M)
Cassell, J. L. (M)
Casselman, W. G. B. (A)
Cassidy, M. E. (M)
Cauvin, G. A. (SM)
Cawein, M. (F)
Chaffee, J. G. (F)
Chamberlain, A. B. (F)
Chandler, J. A. (A)
Chaney, W. G. (SM)
Chang, S. S. L. (SM)
Charas, S. (M)
Chen, T-S. (M)
Chernin, S. (M)
Chernoff, D. P. (M)
Chesnes, A. A. (SM)
Chin, D. B. (M)
Chin, Y. H. (A)
Chinn, H. A. (F)
Chirlian, P. M. (M)
Chisholm, T. L., Jr. (A)
Christian, H. K. (M)
Chryssopoulos, T. (A)
Cinelli, H. L. (M)
Claassen, F. S. (M)
Clarke, K. K. (M)
Clemens, G. J. (M)
Clewell, D. H. (F)
Clinton, P. J. (M)
Cohen, A. J. (M)
Cohen, C. B. (M)
Cohen, E. (M)
Cohen, H. D. (A)
Cohen, J. (A)
Cohen, M. M. (M)
Cohen, M. (A)
Cohn, H. (SM)
Cohn, I. H. (M)
Cole, L. N. (A)
Coleman, J. H. (M)
Coleman, S. F. (M)
Coleman, S. T. (A)

Colman, S. (M)
Comeau, E. A. (A)
Cone, R. M. (A)
Connelly, J. H. (M)
Connelly, J. J. (M)
Connor, G. C. (M)
Cooley, A. G. (F)
Cooper, F. S. (M)
Cooper, M. (A)
Coplein, G. D. (M)
Corderman, W. P. (SM)
Corey, H. E., Jr. (SM)
Cornerotto, A. (A)
Correa, H. A. (A)
Cosentino, A. A. (M)
Costello, A. W. (M)
Cothron, W. C. (SM)
Cotter, M. A. (M)
Cottin, R. S. (M)
Cowan, S. R. (A)
Crane, P. H. (A)
Cravis, H. (M)
Crawford, W. J. (SM)
Crews, F. H. (M)
Cronin, D. (A)
Crowson, F. B. (SM)
Cumming, L. G. (SM)
Cumming, M. J. (M)
Curtis, R. B. (M)
Cutting, F. (F)
Daggett, B. I. (A)
Dahlbom, C. A. (SM)
Daiger, J. G. (A)
Davidovits, M. (A)
Davies, R. H. (SM)
Davis, E. W. (M)
Davis, L. B. (SM)
De Boer, J. J. (M)
De Bragga, J. W. (A)
Deely, R. M. (M)
Deland, T. (A)
De Laney, T. M. (A)
De Maios, J. (M)
Demaree, F. E. (A)
De Martino, J. P. (A)
De Mello, W. (SM)
Demin, A. N. (A)
De Muro, T. M. (M)
Demuth, R. L., Jr. (M)
De Neuf, D. K. (SM)
Denny, C. R. (M)
Desnoes, A. B. (M)
De Thomasson, M. M. L. (M)
Deuth, A. F. (SM)
Deutsch, E. M. (M)
Devine, P. J. (M)
Dewey, G. C. (M)
Diamond, S. (M)
Dibenedetto, G. J. (M)
Diebold, J. T. (A)
Dietrich, E. S. (A)
Dietrich, F. (M)
Dilson, J. (M)
Dixon, R. K. (M)
Doherty, W. H. (F)
Doktor, T. L. (M)
Donald, D. D. (SM)
Donovan, W. E. (SM)
Dorf, R. H. (M)
Dowds, H. M. (M)
Dressel, H. O. (M)
Driscoll, B. K. (M)
Dubs, E. E. (A)
Duffus, R. A., Jr. (M)
Dulberger, L. H. (M)
Durocher, J. D., Jr. (A)
Duskis, E. F. (A)
Eason, L. (M)
Echtman, L. (M)
Edmonds, R. H. (M)
Edwards, H. M. (M)
Egert, S. S. (M)
Eggert, J. (SM)
Ehrenpreis, D. B. (SM)
Ehrlich, C. N. (A)
Eichwald, B. (SM)
Eisenberg, L. (M)
Eisenberg, M. H. (M)
Eisner, P. H. (M)
Elderkin, C. J. (M)
Ellem, F. (M)
Ellis, A. E., Jr. (M)
Ellis, P. V. (M)
Ellis, R. (M)
Ellner, D. M. (A)
Ellwood, W. B. (SM)
Elsea, I. W. (M)
Emberson, R. M. (SM)
Engel, J. S. (M)
Engle, V. M. (M)
English, C. (A)
Engstrom, E. W. (F)
Engstrom, H. T. (F)
Enslow, R. M., Jr. (A)
Eoyang, T. T. (SM)
Ettlinger, A. B. (M)
Evans, A. P., Jr. (M)
Fabbroni, J. P. (M)
Fagin, S. L. (M)
Fairchild, S. M. (A)
Falk, H. (M)
Falknor, F. B., Jr. (M)
Farkas, F. S. (SM)
Farley, J. (A)
Farmer, O. J. (M)
Federing, A. M. (M)
Feher, E. (A)
Feiner, H. A. (A)
Feldman, S. (A)
Feldman, S. (M)
Felker, J. H. (F)
Ferrell, O. P. (A)
Fezer, H. (M)

Fifer, S. (SM)
Fine, C. R. (SM)
Finkel, J. (M)
Finkelstein, M. J. (M)
Fish, P. (SM)
Fishberg, S. (M)
Fisher, A. (A)
Fisher, G. J. (M)
Fisher, K. (M)
Fitch, W. A. (SM)
Fleischer, P. E. (M)
Flemming, F. L. (M)
Flick, R. A. (M)
Flynn, R. E. (M)
Fordham, R. J. (M)
Forman, A. J. (M)
Forman, I. (M)
Forman, J. B. (A)
Fortoul, J. I. (A)
Foster, O. C. (M)
Fox, S. (M)
Frank, G. (M)
Frankel, S. (A)
Franklin, K. L. (A)
Freed, A. (A)
Freed, L. (A)
Freed, R. D. (M)
Freiberger, H. (M)
Freiman, C. V. (M)
Freseman, W. L. (SM)
Freudenberg, B. (SM)
Frezzolini, D. (M)
Friedes, A. (S)
Friedland, B. (M)
Frishauf, S. H. (M)
Fritsche, A. J. (A)
Fritschi, W. W. (SM)
Fritz, C. B. (M)
Fruehauf, M. C. (SM)
Fruhner, E. T. (SM)
Furedi, J. E. (A)
Furth, E. (A)
Furth, F. R. (SM)
Fury, A. E. (A)
Gabel, R. J. (M)
Gaines, A. M. (M)
Galvin, J. P. (M)
Gancher, L. (A)
Gandolph, A. A. (A)
Gardner, R. S. (M)
Garson, E. L. (A)
Gast, R. W. (SM)
Gates, V. (M)
Generales, C. D. J., Jr. (SM)
Gensler, B. N. (A)
Georgia, A. (M)
Gerard, D. R. (M)
Gerb, B. (M)
Gersch, W. M. (M)
Geyer, A. J. (A)
Ghirardi, A. A. (SM)
Gibbons, J. (A)
Gibson, O. B. (SM)
Gill, P. (A)
Gillette, E. H. (A)
Gilman, G. W. (F)
Giovanni, G. (M)
Girdwood, J. (M)
Gladston, H. (M)
Glasser, L. J. (M)
Glesnes, R. W. (M)
Glickstein, J. (A)
Goetz, F. M. (M)
Gold, S. R. (M)
Goldfarb, A. T. (M)
Goldschmidt, K. (M)
Goldsmith, A. N. (F)
Goldway, S. (M)
Gomez, N. (A)
Gonda, T. (A)
Goodman, A. S. (M)
Goodman, L. D. (M)
Goodman, S. J. (M)
Goon, G. J. H. (A)
Gordon, L. (A)
Gorstein, M. (M)
Gourgey, A. A. (A)
Goyder, C. W. (SM)
Grace, F. C. (M)
Gray, S. B. (M)
Green, J. D. (M)
Green, J. R. (M)
Green, R. R. (SM)
Greenbaum, M. (M)
Greene, I. (A)
Greenstein, P. (M)
Greig, J. H. (M)
Grimza, E. (A)
Grosch, H. R. J. (SM)
Gross, R. D. (M)
Grossner, N. R. (M)
Gruebel, A. H. (A)
Gruen, W. (M)
Grundfest, H. (SM)
Guenther, R. (M)
Guild, B. (SM)
Gunderson, R. W. (M)
Gunn, D. W. (M)
Gustafson, W. G. (M)
Gutenstein, R. G. (A)
Guterman, H. C. (SM)
Haas, M. (A)
Haase-Dubosc, A. A. (M)
Hackenberg, J. H. (M)
Haenschke, D. G. (M)
Haertig, M. M. (M)
Hagerty, G. E. (M)
Hahn, S. (M)
Halperl, H. (M)
Halstead, W. S. (SM)
Handler, T. M. (M)
Haney, F. (M)
Hanft, J. (M)

Hannibal, J. O. (M)
Hara, B. (M)
Harberts, H. H. (A)
Hardy, A. N. (A)
Hare, V. C. M., Jr. (M)
Harford, J. J. (A)
Harkavy, H. A. (M)
Harmatz, H. J. (M)
Harmon, R. N. (F)
Harris, C. M. (SM)
Harris, H. E. (M)
Hart, L. (M)
Hartley, S. H. (M)
Hartog, E. (M)
Harty, L. T. (A)
Harvey, W. W. (A)
Hata, J. H. (M)
Hatchwell, J. A. (M)
Hauptschein, A. (SM)
Haymes, H. M. (M)
Haywood, O. G. (SM)
Hedlund, H. E. (M)
Heier, L. D. (M)
Heilbruun, M. (A)
Heller, G. W. (A)
Heller, T. (A)
Hendrickson, J. F. (M)
Henry, J. L. (M)
Hermans, M. E. A. (M)
Hertsch, G. (M)
Herz, H. (M)
Herzer, I. (M)
Higgins, J. N. (A)
Hilton, A. M. (M)
Hinkley, J. W. (SM)
Hodges, A. R. (SM)
Hoefler, F. J. (A)
Hoelderich, W. A. (M)
Hoffart, H. M. (A)
Hoffman, J. D. (SM)
Hogan, J. V. L. (F)
Holahan, J. P. (M)
Hollander, L. J. (M)
Hollander, S. (SM)
Holzer, P. J. (M)
Horelick, D. (M)
Horn, V. M. (M)
Hornung, S. A. (A)
Horowitz, N. (M)
Hough, J. B. (A)
Housman, H. (M)
Hoyngaard, O. M. (SM)
Howard, W. A. (SM)
Howells, F. W. (SM)
Hsieh, T. T. H. (A)
Huber, L. J. (M)
Hull, R. B. (M)
Hultquist, J. A. (M)
Hung, J. C. (M)
Hunter, G. T. (M)
Hurd, C. C. (A)
Hurlbut, P. R. (M)
Hyatt, W. R., Jr. (SM)
Hylton, A. W. (A)
Hyneman, J. R. (SM)
Inglis, R. S. (A)
Inguili, C. N. (A)
Irvine, P. L. (A)
Isele, H. A. (A)
Itzkan, I. (M)
Jackson, H. H. (M)
Jacobs, A. B. (M)
Jasson, W. A. (SM)
Jatlow, J. L. (SM)
Javid, M. (M)
Javitz, A. E. (M)
Joerg, E. A. (M)
Johnson, H. C. L. (A)
Johnson, H. W. (SM)
Johnson, N. J. (M)
Johnson, R. L. (M)
Johnson, W. D. (M)
Jones, D. D. (A)
Jones, H. S. (SM)
Jones, H. W. (SM)
Jones, T. A. (M)
Julie, L. (M)
Jung, C. K. (M)
Kabat, C. L. (A)
Kadonaga, H. (A)
Kahn, I. (A)
Kallmann, H. E. (F)
Kaltman, A. H. (A)
Kampschoer, J. F. (M)
Karachuk, S. T. (M)
Karda, W. O. (M)
Karmin, I. (M)
Katz, S. (A)
Kauders, A. (A)
Kaufman, G. L. (A)
Kavanagh, J. J. (M)
Kavee, R. C. (M)
Kelb, A. J. (M)
Keller, A. C. (SM)
Kelly, J. J. (M)
Kennedy, E. P. (M)
Kennedy, J. M. (M)
Kent, G. J. (SM)
Kievit, B. (SM)
Kilian, L. H. (A)
Kim, W. H. (SM)
King, F. (SM)
Kinn, J. M., Jr. (SM)
Kiriloff, A. (SM)
Kirschen, C. B. (M)
Kirschenbaum, J. (SM)
Klapper, J. (M)
Klein, L. (A)
Klein, R. M. (SM)
Koehler, A. O. (M)
Koff, R. M. (A)
Kolker, N. (A)
Konig, W. F. (M)

Korek, M. (SM)
Korman, J. (M)
Kosinski, F. J. (A)
Kramer, B. H. (A)
Kranc, G. (M)
Krause, A. M. (M)
Kretschek, R. O. (A)
Kuhn, A. S. (SM)
Kukasch, H. L. (M)
Kunc, F. (M)
Kunik, I. J. (M)
Kurrelmeyer, B. (SM)
Kurzrok, R. M. (SM)
Laas, I. E. (A)
Lacey, J. C. (A)
La Flandra, J. (M)
Lainer, G. (SM)
Laity, I. A., Jr. (M)
Lala, J. J. (M)
Lambert, L. B. (M)
Lamneck, W. J. (M)
Landwersiek, J. E. (A)
Lapadulk, D. (A)
Lapatine, S. (SM)
Laruccia, W. A. (A)
Lashinsky, H. (M)
Laufer, J. (M)
Lavi, Y. (M)
Lawson, R. H. (M)
Layton, H. M. (M)
Leake, A. (M)
Leary, M. T. (M)
Lebel, C. J. (SM)
Lebowitz, F. (M)
Lederman, A. (SM)
Lee, R. H. (M)
Le Fevre, K. G. (A)
Legedza, Z. (M)
Lemly, F. W. (A)
Leni, J. (M)
Lennon, T. J. (M)
Lenz, E. L. (A)
Lesman, E. (SM)
Lesnick, R. (M)
Levens, L. M. (SM)
Levi, L. (M)
Levin, H. S. (M)
Levine, B. I. (A)
Levine, E. (M)
Levine, L. (M)
Levine, N. M. (A)
Levine, P. (M)
Levit, M. (A)
Levy, C. (M)
Levy, H. J. (M)
Levy, M. G. (M)
Lewin, J. (M)
Lewis, P. A. W. (M)
Liebell, E. (M)
Lieberman, D. (M)
Lienhard, J. W. (M)
Lindner, N. J. (M)
Lines, K. A. (A)
Linton, L. (A)
Litchman, W. S. (M)
Llewellyn, F. B. (F)
Lockwood, L. W. (M)
Lokomowitz, L. I. (M)
Loomis, A. L. (F).
Loshin, A. M. (M)
Lovett, R. S. (M)
Low, C. L. (M)
Lowenstein, M. (A)
Lukashewitz, P. (A)
Lukianoff, L. (A)
Luntz, J. D. (SM)
Lynn, E. L., Jr. (M)
Mabuchi, K. K. (M)
Mabuchi, O. (A)
Machover, C. (M)
Mack, N. B. (M)
Mackey, L. B. (A)
MacNeil, J. A. (M)
Maedel, G. F. (SM)
Magid, A. (M)
Maier, F. S. (M)
Mandell, M. (M)
Mandl, H. J. (M)
Mansky, L. (A)
Mapes, C. M. (SM)
Marcinkowski, H. L. (M)
Marentis, C. (M)
Mariner, T. H. (A)
Markel, R. (A)
Marolda, J. (M)
Marron, D. B. (A)
Martin, A. E. (SM)
Martin, J. A. (M)
Martin, J. F. P. (M)
Martinez, M. E. (M)
Marvin, P. R. (SM)
Marx, E. A. (SM)
Marx, F. L. (SM)
Mason, W. (SM)
Mastrandrea, R. J. (M)
Match, I. (M)
Mattison, G. H. (M)
Mattson, R. A. (M)
Mauro, A. (A)
Mauzey, P. T. T. (M)
Mayer, C. G. (SM)
Mayer, R. O. (M)
McClelland, H. (A)
McCluskey, V. (M)
McConnell, K. R. (SM)
McCusker, R. F. (M)
McCutchen, B. S. (F)
McDermott, B. (M)
McDonald, J. R. (M)
McFarlane, R. (M)
McGiffert, S. Y. (SM)
McGrath, J. J. (M)
McKnight, R. W. (M)



McLaughlin, N. C. (M)
McManus, T. J. (M)
McMillin, R. R. (A)
McPherson, J. C. (SM)
McVity, L. H. (A)
Meadows, A. (A)
Mehta, S. H. (A)
Meler, P. J. (M)
Meltzer, G. (M)
Menikoff, A. T. (A)
Meserole, W. E. (M)
Meslener, G. J. (A)
Meyerson, A. H. (M)
Michael, H. (M)
Michl, W. L. (A)
Migliore, S. P. (M)
Millar, J. Z. (F)
Miller, B. (M)
Miller, H. G. (SM)
Miller, K. S. (SM)
Miller, T. S. (A)
Millet, M. J. (A)
Millman, J. (F)
Minich, C. H. (A)
Minkow, M. (A)
Mitchell, C. W. (M)
Mitchell, D. (F)
Mitchell, H. F., Jr. (M)
Mitchell, I. A. (M)
Mitchell, L. B. (A)
Mitchell, T. H. (SM)
Molnar, R. J. (A)
Monahan, G. W. (A)
Monk, N. (SM)
Moore, S. F. (M)
Morand, G. D. (A)
Morel, P. (M)
Morse, M. (A)
Mosley, J. De S. (M)
Moss, H. (M)
Mower, C. P. (A)
Muirhead, D. E. (A)
Muller, J. H. (SM)
Mulvey, R. J. (M)
Murbach, J. F. (M)
Murino, C. C. (M)
Murphy, O. J. (SM)
Myer, D. A. (SM)
Myers, M. C., Jr. (M)
Nai, P. (A)
Nalbantian, J. H. (SM)
Nancoz, A. P. (A)
Napoli, A. E. (M)
Nashman, A. E. (SM)
Nathan, A. M. (M)
Neary, J. A. (M)
Nedell, E. (M)
Neeman, C. (A)
Nelson, M. (M)
Nelson, W. L. (M)
Nestor, R. P. (M)
Neubauer, J. R. (SM)
Nevitt, H. J. B. (SM)
Nexon, V. J. (M)
Nicholides, E. C. (M)
Nielsen, H. V. (M)
Nissen, J. H. (M)
Norman, N. C. (M)
Noto, J. W. J., Jr. (A)
Novik, W. (M)
Nuttall, A. F. (A)
O'Brien, J. V. (A)
O'Brien, R. S. (SM)
O'Byran, H. M. (SM)
O'Connor, D. G. (SM)
Okoronkwo, K. (A)
Olcott, E. W. (M)
Olsen, M. V. (M)
Onder, K. (SM)
O'Neill, L. H. (SM)
Onyshkevych, L. S. (M)
Orenstein, N. (M)
O'Shea, M. C., Jr. (M)
Osiatinsky, L. (SM)
Ostheimer, F. R. (A)
Ostrolenk, S. (M)
Ottoson, P. E. (M)
Owen, C. H. (M)
Oxer, H. (A)
Ozolins, L. (M)
Pagano, C. N. (M)
Paley, W. S. (A)
Palmisano, G. A. (A)
Palocz, I. (SM)
Palocz, S. (M)
Paniaqua, R. (A)
Parisier, M. (A)
Parker, J. D. (SM)
Parodi, H. A. (M)
Parzen, B. (SM)
Paskin, M. (M)
Pasquier, C. J. (M)
Passavant, C. A. (M)
Paul, G. S. (M)
Pearson, H. (M)
Peborde, R. J. (A)
Pegler, H. M. (M)
Pegler, J. A. (A)
Pekarowitz, R. (M)
Pellegrinelli, G. L. (A)
Pelton, R. G. (M)
Peterson, E. (F)
Petranek, L. (A)
Petrides, T. (SM)
Pfeffer, P. (M)
Phelps, C. H., Jr. (M)
Philbin, S. H. (A)
Phinney, E. D. (SM)
Pietrzyba, G. J. M. (M)
Pincus, R. M. (M)
Plore, E. R. (F)
Pitre, V. H. (A)
Pizzuti, F. D. (M)

Plesset, K. (A)
Plishner, P. J. (M)
Plottel, R. (A)
Poggi, G. P. (M)
Polin, H. S. (A)
Pollak, J. P. (SM)
Pollak, R. H. (M)
Pommet, J. A. (M)
Pomeron, R. D. (M)
Pooko, R. (M)
Popolow, R. H. (M)
Porter, R. W. (SM)
Poss, E. (A)
Post, R. D. (M)
Potter, N. S. (SM)
Price, A. S. (A)
Price, G. W. (M)
Privitera, P. S. (A)
Pucci, D. J. (A)
Pullman, I. (M)
Quirk, W. B. (M)
Rabinowitz, J. (M)
Rabinowitz, S. J. (M)
Racker, J. (M)
Radner, M. A. (M)
Raffone, J. J. (M)
Ragland, R. M. (A)
Rahmes, R. E. (SM)
Rainwater, L. J. (SM)
Rait, C. M. (M)
Rankin, R. L. (SM)
Rarity, J., Jr. (M)
Raship, M. (M)
Raymond, R. (A)
Read, O. (A)
Reaser, R. R. (M)
Rehm, M. P. (M)
Reicher, M. D. (M)
Reiner, D. G. (M)
Reiner, M. (M)
Reinke, E. E. (M)
Reiss, L. (A)
Relson, M. (M)
Renne, H. S. (SM)
Revzin, T. A. (M)
Reynolds, G. (A)
Richter, G. H. (A)
Rider, J. F. (M)
Rider, P. M. (A)
Ridings, G. H. (M)
Rigg, R. W. (M)
Rigoglioso, A. B. (M)
Rinder, R. M. (A)
Rios, E. O. (A)
Rivera, J. J. (A)
Robbins, G. H. (M)
Robbins, G. J. (A)
Robertson, C. B. (M)
Robinson, F. F. (A)
Rochwarger, M. M. (M)
Rocke, A. J. (A)
Roehrig, H. W. (A)
Rogan, J. J. (SM)
Rogers, D. W. (M)
Rogoff, J. B. (A)
Roldan, J. A. (A)
Rolland, R. G. (A)
Roman, S. (M)
Romnes, H. I. (SM)
Rosaler, R. C. (SM)
Rose, A. F. (SM)
Rose, T. T. (A)
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Rosen, S. R. (M)
Rosenbaum, P. L. (M)
Rosenberg, H. J. (A)
Rosenfeld, A. (M)
Rosenheim, D. E. (SM)
Ross, H. D., Jr. (M)
Roth, J. E., Jr. (M)
Roth, S. A. (A)
Rothenstein, E. M. (M)
Rothschild, R. S. (M)
Rothschild, R. S. (M)
Rothschild, R. F. (M)
Rubenstein, A. L. (A)
Rubin, J. (M)
Rubin, J. S. (M)
Rubinstein, B. (M)
Ruddley, J. (M)
Rugge, R. A. (SM)
Runyon, C. R., Jr. (SM)
Ruttenberg, S. (A)
Sabto-Agami, J. C. (M)
Sackson, M. M. (M)
Sadenwater, P. O. (M)
Safir, R. (SM)
Safran, P. (M)
Sager, N. (A)
Sahud, L. R. (A)
Salin, J. A. (M)
Sanders, R. G. (A)
Saporta, L. J. (SM)
Sarachik, P. E. (M)
Sarnoff, D. (F)
Sasaki, T. (M)
Saunders, H. M. (M)
Sautner, J. (M)
Sawka, R. J. (A)
Schaffer, E. (M)
Schaller, J. (A)
Schauffler, F. A. (A)
Schetzen, M. (M)
Schiller, H. H. (SM)
Schilling, D. L. (M)
Schilling, W. A. (M)
Schlaikjer, J. E. (SM)
Schlenger, S. B. (M)
Schlesinger, S. P. (M)
Schmertz, R. C., Jr. (M)
Schmidt, H. (A)
Schoenfeld, R. L. (M)

Schoenfuss, A. F. (SM)
Schooley, C. E. (SM)
Schreiner, K. E. (M)
Schulz, P. R. (M)
Schuster, G. M. (M)
Schwartz, H. T. (M)
Schwartz, M. J. (A)
Schwartz, M. (SM)
Schwarz, R. J. (SM)
Schweitzer, M. P. (A)
Schwenzfeger, E. E. (A)
Scott, R. H. (SM)
Sedacca, J. M. (A)
Sellinger, S. (M)
Shain, M. D. (A)
Shamos, M. H. (M)
Shapiro, E. S. (A)
Shapiro, J. (M)
Shapiro, M. H. (M)
Sharpe, E. (A)
Sheldon, E. E. (A)
Sheldon, M. (M)
Shelley, E. F. (SM)
Shepard, W. H. (A)
Sher, F. D. (M)
Sherman, J. B. (SM)
Sherman, M. (A)
Shiepe, E. M. (M)
Shipman, W. A. (SM)
Shlank, M. (A)
Shokkos, C. (M)
Shonnard, J. R. (M)
Shulman, C. (SM)
Shustek, G. (SM)
Silber, A. (A)
Silbey, S. A. (M)
Silverberg, B. H. (M)
Silverman, R. A. (SM)
Simon, E. J. (F)
Simon, P. F. (A)
Sims, R. E. (A)
Sims, S. P. (A)
Slater, D. (M)
Smith, A. R. (M)
Smith, A. V. (M)
Smith, G. M. (SM)
Smith, I. R. (M)
Smith, J. H., Jr. (M)
Smithline, H. (M)
Snyder, R. L. (M)
Solomon, A. H. (M)
Solomon, M. N. (M)
Soman, R. O. (M)
Sonsky, C. N. (M)
Sontz, C. (M)
Spampinato, P. (A)
Spampinato, R. (A)
Spangenberg, L. F. (SM)
Spiegelman, D. (M)
Spira, J. S. (M)
Spitalny, M. (M)
Sponable, E. I. (SM)
Sprafkin, H. M. (M)
Spratt, E. L. (A)
Sprung, J. (M)
Stadnitski, R. K. (M)
Stalemark, F. R. V. (A)
Stanfield, F. L. (M)
Stanton, F. (SM)
Stanton, L. J. (M)
Star, A. A. (M)
Stearns, R. (M)
Stehn, J. W. (M)
Steigman, P. (M)
Stein, H. S. (M)
Stein, P. (M)
Steinberger, N. (M)
Stelzer, I. (A)
Stenhammer, H. T. (M)
Stepic, W. W. (M)
Stern, E. (M)
Stern, F. G. (M)
Stern, J. L. (M)
Stern, K. (M)
Stern, R. M. (M)
Stern, T. E. (M)
Stevens, L. D., Jr. (SM)
Stewart, A. E. (A)
Stiefel, R. C. (A)
Stiles, K. P. (SM)
Stobbe, J. A. (SM)
Stock, D. A. R. (A)
Stone, E. W. (F)
Stone, W. G. (A)
Strack, R. R. (A)
Strack, W., Jr. (M)
Streifus, C. A. (M)
Strickland, H. A., Jr. (SM)
Striker, R. G. (M)
Strobel, H. M. (M)
Stubbs, L. W., Jr. (M)
Stuff, A. O. (M)
Sullivan, H. W. (A)
Sussman, A. I. (M)
Sverdlik, S. S. (A)
Symon, M. S. (M)
Szava, M. Z. (A)
Szucs, A. S. (A)
Tabor, J. H. (A)
Tatishoff, J. (SM)
Talley, T. J., III (M)
Tamiya, Y. (A)
Tanne, S. (M)
Taub, H. (M)
Taylor, C. H. (F)
Taylor, I. M. (M)
Taylor, K. A. (M)
Taylor, R. M. (M)
Taylor, W. H., Jr. (SM)
Temes, G. L. (M)
Temmer, S. S. (M)
Thayer, G. N. (F)
Thieblemont, A. H. (M)

Thomas, L. (A)
Thompson, M. A. (M)
Thompson, R. G. (SM)
Tietjen, H. (A)
Tilley, H. H. (SM)
Tillistrand, C. O. (M)
Tint, G. (M)
Tolopko, L. N. (A)
Tompos, A. (M)
Tower, W. S., Jr. (A)
Townes, C. H. (SM)
Trachtenberg, A. (M)
Traver, H. A. (M)
Trevor, J. B., Jr. (M)
Trotter, H., Jr. (SM)
Trucksess, D. E. (SM)
Tsai, L. (A)
Tuckerman, L. S. (M)
Tung, F. F. C. (M)
Turchiano, M. W. (M)
Tutoli, J. G. (A)
Tuttle, C. W. (A)
Tykulsky, A. (M)
Utsunomiya, T. (M)
Uttal, J. A. (M)
Uttendorfer, E. A. (SM)
Valakos, A. (SM)
Van Delft, R. N. (M)
Van Dyck, E. A. (M)
Van Gelder, H. (M)
Van Horn, R. H. (SM)
Van Valkenburgh, R. P. (A)
Van Wynen, K. G. (SM)
Vehling, R. H. (M)
Velitchko, W. A. (M)
Vetter, A. J. (M)
Vigue, K. J. (SM)
Vinarub, E. I. (M)
Vogel, R. P. (M)
Volgin, V. V. (A)
Volonnino, F. P. (M)
Vorhes, D. M. (M)
Voss, R. M. (A)
Voulgaris, N. (M)
Vulcan, A. I. (M)
Wagner, E. G. (M)
Waks, L. I. (A)
Wales, N. B., Jr. (M)
Walker, R. M. (SM)
Wallace, A. (M)
Walrath, D. J. (M)
Walsh, A. L. (A)
Walsh, J. B. (SM)
Walsh, M. A. (M)
Walton, J. S. V. (A)
Ward, J. S. (A)
Warshauer, W. J. (M)
Wartell, R. (M)
Wasserman, R. (M)
Watkins, J. E. (M)
Watts, W. W. (A)
Weaver, A. (M)
Weber, G. A. (A)
Weber, J. H. (M)
Weber, L. A. (M)
Wehrlin, R. E. (A)
Weiblen, R. E. (M)
Weigert, H. (M)
Weil, R. T., Jr. (SM)
Weinman, M. (M)
Weinstock, G. D. (M)
Weiss, G. D. (M)
Weiss, M. R. (M)
Weiss, S. I. (SM)
Weissman, D. E. (M)
Weissman, E. (M)
Weitz, G. (A)
Wenglin, S. (M)
Werner, D. T. (A)
Werner, R. L. (SM)
Wernick, J. I. (A)
Wernlein, C. E., Jr. (M)
Westheimer, M. (M)
Wexler, P. S. (M)
Whalen, B. F. (A)
White, G. C. (M)
White, S. D. (SM)
Wiberg, H. J. (M)
Wichtendahl, W. J. (M)
Wiesendanger, M. U. (A)
Willett, E. (M)
Williams, H. D. (A)
Willner, P. (M)
Wilson, I. G. (SM)
Wing, O. (M)
Winkler, A. (M)
Winner, B. A. (M)
Winner, L. (M)
Winters, A. (A)
Wise, R. J. (SM)
Wolder, S. (M)
Wolf, C. F. (A)
Wolf, H. (SM)
Wolfson, H. S. (M)
Wolfthal, D. A. (M)
Wong, A. S. (A)
Wong, E. (M)
Wong, W. K. T. (A)
Woo, K. D. (A)
Wood, J., Jr. (M)
Wouk, V. (M)
Wuorinen, J. H., Jr. (M)
Wyatt, F. A. (A)
Wyatt, K. S. (A)
Yarmus, L. (M)
York, A. (A)
Young, H. H. (A)
Young, W. R., Jr. (SM)
Yuen, E. (M)
Yusem, S. (M)
Zak, M. A. (M)
Zalkin, D. M. (M)
Zaman, M. K. (A)

Zeamans, H. R. (M)
Zeigler, K. I. (M)
Zimmerman, J. (A)
Zinsser, H. H. (M)
Zippler, W. N. (M)
Zysman, B. (M)

New York Mills (RU-1)
Huss, J. P. (M)

Niagara Falls (BN-1)
Albin, J. F. (M)
Bowman, D. S. (M)
Bruton, J. V. (M)
Cadzow, J. A. (M)
Cassert, C. R. (M)
Collins, F. M. (M)
Emes, H. R. (M)
Gleason, M. H. (M)
Haney, C. A. (A)
Hardy, L. H. (M)
Hill, I. T. (A)
Howells, W. B., Jr. (M)
Krupper, J. A. (M)
Leming, J. G. (M)
Leonard, D. J. (M)
Libby, M. E. (A)
Potter, C. E. (M)
Rowe, R. G. (SM)
Sarkees, Y. T. (M)
Shulman, H. (A)
Teal, H. E. (M)

Nichols (BING-1)
Schwarz, D. F. (M)

Niskayuna (SCH-1)
Shea, R. F. (F)

North Babylon (LI-2)
Baron, A. R. (M)
Burmeister, W. W. (M)
Gertler, E. (M)
Goldstein, S. (A)
Hart, G. K., Jr. (M)
Klar, I. (A)
Laughlin, S. I. (M)
Millar, W. M. (M)
Olszewski, W. R. (A)
Predmore, E. E. (M)
Revere, R. W. (A)

North Baldwin (LI-2)
Kappelmann, G. E. (A)
Schaten, P. (M)
Witt, C. J. (M)

North Bellmore (LI-2)
Beckhardt, T. (M)
Bischoff, J. J. (A)
Brook, R. H. (M)
Burton, M. E. (M)
Dolin, R. (SM)
Doundoulakis, G. J. (M)
Duckstein, S. (A)
Eisenbach, J. (M)
Furia, N. J. (M)
Johl, M. J. (SM)
Lipkin, W. (M)
Shaw, D. (M)
Tenenbaum, E. (M)

North Chili (ROC-1)
Previte, P. E. (A)

North Massapequa (LI-2)
Adams, G. P. (A)
Algeo, J. J. (A)
Johnson, J. H., Jr. (A)
Kaelin, B. A., Jr. (M)
Kant, M. (M)
Kornbluth, A. E. (SM)
Prunty, P. F. (M)
Quinn, J. A. (M)
Sokol, A., Jr. (M)

North Merrick (LI-2)
Bissenger, C. A. (M)
Branker, H. E. (M)
Drogin, E. M. (M)
Legolo, J. (SM)
Schneiderman, W. (M)
Takach, A. (M)
Thogersen, G. O. (A)

North Pelham (NY-W-2)
Wolfson, R. (M)

Northport (LI-2)
Ballinger, R. F. (M)
Chubb, E. (M)
Dano, J. M. (M)
Davis, F. S. (A)
Dickerman, J. J. (M)
Guido, L. A. (A)
Hans, M. W. (M)
Helmerle, R. K. (M)
Huntington, A. (M)
Jacobson, R. S. (SM)
Kilsheimer, R. L. (M)
Lamensdorf, C. M. (M)
Litchford, G. B. (SM)
Lockwood, M. D. (M)
Mansberg, H. (M)
Othmer, R. E. (SM)
Ripnitz, A. (M)
Rudish, R. M. (M)
Shively, R. P. (M)
Stanklewicz, S. (SM)
Stodola, E. K. (SM)
Striegl, H. F. (M)
Tedford, W. E. (M)
Thomson, H. C. (M)

Waller, W. E. (M)
Wertwijn, G. (SM)
Yourdon, F. R. (M)

North Rockville Centre (LI-2)
Melman, I. J. (SM)

North Syracuse (SYR-1)
Ackley, R. A. (M)
Adamthwaite, F. V., Jr. (M)
Arnold, W. J. (M)
Ashley, R. B. (A)
Baker, V. L., Jr. (M)
Barnett, W. P. (SM)
Bauer, R. C. (M)
Beane, M. I. (A)
Becker, D. A. (M)
Besenfelder, E. R. (M)
Blackstock, R. S. (M)
Bockstiegel, R. B. (M)
Bough, C. F. (M)
Boyd, C. R. (M)
Cadwell, E. B., Jr. (M)
Cady, W. R. (SM)
Carr, J. K. (M)
Carson, R. E. (SM)
Chynoweth, W. R. (SM)
Cleary, C. J., Jr. (M)
Colley, L. E. (M)
Crow, E. D. (M)
Cunningham, J. H. (M)
Dahl, F. J., Jr. (M)
Davidson, H. A. (M)
Day, G. D. (M)
Denslow, J. H., Jr. (M)
Dickson, W. H. (A)
Donegan, J. H. (M)
Duncan, M. R. (SM)
Dunlap, I. J., Jr. (M)
Eachus, E. D. (M)
Eibeck, A. C. (M)
Eichel, J. H. (SM)
Elkins, R. A. (M)
Ellis, C. L. (SM)
Ellis, C. R. (M)
Ellis, S. S. (M)
Fehlau, C. E. (M)
Fisch, E. A. (M)
Flaherty, T. J. (A)
Forney, J. F. (M)
Frederick, L. G. (M)
Freestone, H. T. (M)
Friant, R. J., Jr. (M)
Garrett, D. E., Sr. (SM)
Gerling, H. B. (SM)
Gerwig, C. H., Jr. (M)
Geyer, B. H., Jr. (SM)
Gibson, V. R., Jr. (SM)
Glinder, M. E. (M)
Gordon, S. S. (M)
Grauberger, W. E. (M)
Grimm, H. H. (SM)
Harmon, R. E. (A)
Haussig, L. (M)
Hoefling, J. E. (M)
Horsch, J. R. (A)
Hundstad, C. E. (M)
Jacobs, T. E. (M)
Jenkins, W. M. (M)
Johnson, F. P. (M)
Johnson, G. L. (M)
Johnson, W. G., Jr. (M)
Jones, M. E. (SM)
Jones, W. H. (M)
Jordan, J. F. (M)
Karr, A. L. (M)
Kenyon, R. W. (M)
Kirkpatrick, G. M. (SM)
Koprowski, E. M. (SM)
Krause, L. O. (SM)
Krauss, D. M. (M)
Kuhn, D. H. (M)
Larosche, J. R. (M)
Letizia, A. (M)
Linnertz, R. C. (A)
Lowther, F. E. (M)
Maloney, W. J. (M)
Mandale, W. R. (M)
Marcum, D. (M)
Markes, R. T. (M)
Mayo, B. R. (M)
McClure, R. C. (M)
McLean, R. C. (M)
Meehan, J. A. (A)
Merriam, R. H. (M)
Michalek, A. R. (M)
Miller, H. G. (M)
Moncrief, L. E. (SM)
Montella, D. T. (M)
Morris, A. E. (M)
Muschamp, R. A. (SM)
Nelson, W. D. (M)
Neppel, W. C. (M)
Ostrowski, R. E. (M)
Pachillis, E. V. (M)
Palladino, M. J. (SM)
Pell, W. (M)
Phillips, K. G. (M)
Pickard, L. A. (M)
Playcan, C. T. (A)
Popejoy, I. J. (M)
Rausch, R. H. (M)
Robbins, J. H. (A)
Rose, T. E. (Lt)
Schultz, R. E. (SM)
Schulz, E. R. (M)
Schumacher, G. B. (M)
Schwartz, N. (SM)
Schwarz, E. G. (M)
Selin, B. A. (M)
Shumway, N. R. (M)
Skovholt, R. L. (M)
Spence, J. W. (M)
Stabler, E. P. (M)
Staslor, R. A. (A)
Stewart, N. J. (M)
Stokes, C. L. (M)
Taylor, R. A. (M)
Thielking, R. C. (M)
Thompson, D. F. (M)
Thompson, R. T. (M)
Tidwell, B. B. (M)
Tillman, J. T., Jr. (M)
Vandeven, D. W. (M)
Voth, N. D. (A)
Wagner, B. F. (M)
Warren, R. A. (M)
Wassilak, E. J. (M)
Webb, R. S. (M)
White, W. C. (M)
Whiteside, J. S., Jr. (M)
Wich, H. C. (M)
Wick, R. S. (M)
Wightman, E. E. (M)
Wintle, H. C. (SM)
Zenon, Z. (M)
Zizza, L. R. (M)

North Tarrytown (NY-W-2)
Palmquist, C. A. (M)

North Tonowanda (BN-1)
Arsem, A. D. (SM)
Arrison, C. R., Jr. (M)
Dunn, J. L. (SM)
Johnston, G. D. (M)
Juda, H. J. (M)
Knorr, W. G., Jr. (M)
Lubs, W. J. (A)
Purnell, R. F. (M)
Schmidt, F. M. (SM)
Taber, R. F. (A)

North Wantagh (LI-2)
Hellering, H. L. (M)
Retzger, L. I. (A)

North White Plains (NY-W-2)
Foglia, H. R. (M)
Koblick, S. N. (A)

North Woodmere (LI-2)
Frieling, E. (M)
Gross, S. B. (A)

Norwich (BING-1)
Bates, W. R. (M)
Hamilton, O. M. (A)
Knudson, L. I. (M)
Ryan, F. W. (A)

Nyack (NY-W-2)
Efremov, O. (M)
Koulomzin, N. J. (A)
Miller, H. M. (SM)
Murphy, R. P. (SM)
Perry, A. C. (A)

Oakfield (ROC-1)
Sulim, J. S. (A)

Oceanside (LI-2)
Addison, G. H. (M)
Binder, D. I. (M)
Cohen, M. (SM)
Diamond, G. H. (M)
Eisenberg, A. J. (SM)
Giampiccolo, P. M. (A)
Gleimer, B. (M)
Greenberg, I. G. (SM)
Kramer, H. (M)
Pattison, W. L., Jr. (A)
Schrader, W. A. (M)
Urbanik, J. G. (M)

Olcott (BN-1)
Ketcham, W. R. (A)

Old Bethpage (LI-2)
Bernstein, M. H. (M)
Birnbaum, W. H. (M)
Davidson, R. (SM)
Di Franco, J. V. (M)
Dombro, L. (A)
Herman, J. H. (M)
Kaden, P. A. (M)
Kenny, M. (M)
Kushner, D. (M)
Miller, M. H. (A)
Rudis, M. (M)
Schwartz, P. (A)

Old Westbury (LI-2)
Feldmann, H. (SM)

Olean (BN-1)
Bosworth, O. T. (A)
Jarboe, R. A. (M)
Jenner, W. C. (M)
Zakrewski, J. E. (M)

Oneida (SYR-1)
Boyko, L. L. (A)
Fostar, M. (M)
Simchik, R. J. (A)

Orangeburg (NY-W-2)
Adelsberg, J. (A)
Clynes, M. E. (SM)

Orchard Park (BN-1)
Earl, H. D. (SM)

Oriskany (RU-1)
Harris, G. T. (M)

Ossining (NY-W-2)
Akin, R. M. (M)
Bertram, J. E. (M)
Booth, R. R. (M)
Boyce, J. (M)
Brown, R. D. (M)
Caputo, J. G. (A)
Clanton, P. D. (M)
Dennard, R. H. (M)
Fraim, N. R. (M)
Garifo, N. A. (M)
Hurley, P. J. (M)
Komei, O. (SM)
Kruse, L. C. (M)
Le Hane, R. L. (M)
Lescarboura, A. C. (SM)
Lowdenslager, J. R. (A)
Magnino, J. J., Jr. (M)
Mandelbrot, B. B. (SM)
Miles, F. A. (M)
Motchok, E. P. (M)
Nienburg, R. E. (SM)
Penafiel, H. R. (A)
Prudden, A. L. (M)
Rickert, H. H. (SM)
Ruedisueli, R. W. (M)
Saron, R. B. (M)
Smith, L. A. (SM)
Terlet, R. H. (M)
Trifari, F. R. (SM)
Webb, W. J. (M)
Yu, H. N. (M)

Oswego (SYR-1)
Gill, L. R. (A)
Shutts, B. C. (A)
Shutts, D. M. (M)

Owego (BING-1)
Anderson, D. D. (M)
Armstrong, R. A. (M)
Arnold, O. E. (M)
Barlow, J. P. (M)
Bowles, P. L. (M)
Brown, L. E. (M)
Carroll, A. B. (M)
Coonradt, T. (M)
Davis, R. V. (A)
Dearden, Z. T. (M)
Doolittle, G. V. (A)
Giroux, P. H. (M)
Glenn, H. L. (M)
Grant, R. A. (M)
Handley, J. W. (M)
Hansen, R. R. (M)
Hofecker, W. J. (M)
Hundley, J. C., Jr. (M)
Huopana, R. O. (M)
Hyde, P. L. (A)
Johnson, C. I. (SM)
Johnson, G. W. (A)
Kapeghian, R. H. (M)
Kilmer, F. G. (M)
Knox, L. A. (SM)
Kuehn, R. E. (SM)
Larson, D. M. (A)
Lazarus, P. (M)
Martin, A. G., Jr. (M)
Mathers, H. W. (M)
Melville, R. W. (M)
Motes, J. H. (M)
Pulford, S. R. (M)
Rantz, R. R. (A)
Rowe, J. B., Sr. (M)
Stalma, J. F. (M)
Stoops, E. H. (M)
Summers, W. P. (SM)
Vance, V. G. (M)
Van Horn, J. F. (M)
Vinai, A. W. (M)
Winkler, S. (SM)

Oyster Bay (LI-2)
Bailey, J. W. (M)
Brack, W. (M)
Bruhns, W. H. (A)
Cooney, F. A. (M)
Dyer, J. N. (F)
George, B. A. (A)
George, H. A. (A)
Messner, W. S. (M)
Mills, J. J. (A)
Pogust, F. B. (M)
Roelofs, D. D. (M)
Swanson, E. H. (SM)

Oyster Bay Cove (LI-2)
Busby, J. W. (SM)

Ozone Park (LI-2)
Bazylevsky, G. (M)
Canavan, J. F. (A)
Cava, F. C., Jr. (A)
Fiorletta, A. A. (M)
Martinson, C. D. (A)
Mellard, J. (A)
Nuscher, L. E. (A)
Stone, K. A. (M)
Tieman, F. V. (M)
Watson, W. C. (A)

Painted Post (ElM-C-1)
Carpenter, N. R. (M)
Coolidge, J. C. (A)
Frazier, J. F. (M)

Palisades (NY-W-2)
Ward, B. R. (M)

Patchogue (LI-2)
Fishman, T. (M)
Malkiewicz, J. F. (M)
Marshall, R. H. (M)
Wise, A. (M)

Pattersonville (SCH-1)
Dodge, A. O. (SM)

Pearl River (NY-W-2)
Butenkoff, G. G. (M)
Cohn, D. A. (M)
Dague, L. P. (M)
Feinerman, B. (M)
George, R. E. (M)
Pacifico, E. M. (M)
Porter, H. A. (A)
Schwartz, C. S. (M)

Peconic (LI-2)
Oates, J. P., Jr. (A)

Peekskill (NY-W-2)
Arcate, J. A. (M)
Baskin, H. B. (M)
Brennan, P. A. (M)
Foxe, M. (M)
Golden, R. K. (M)
Guarino, R. J. (M)
Heizman, C. L., Jr. (M)
Huff, F. R. (M)
Hyde, A. E. (M)
Juanillo, J. J. (M)
Koepcke, R. W. (A)
Kusnick, A. A. (SM)
Lee, H. T. (M)
McDermid, W. L. (M)
Schreiner, R. J. (M)
Slawsky, S. M. (M)
Todd, S. E. (M)
Walder, B. (M)
Winkelstein, R. A. (M)
Yourke, H. S. (M)

Pelham (NY-W-2)
Aaltonen, T. K. (A)
Skinner, F. J. (SM)

Pelham Manor (NY-W-2)
Burnell, N. (A)
Callan, J. M. (M)

Penfield (ROC-1)
Atwood, B. E. (SM)
Berch, W. H. (M)
Heit, J. C. (M)
Huie, J. A. (M)
Pomroy, R. A. (A)
Potter, F. J. (M)
Schwittek, E. W. (M)
Sharp, D. D. (M)
Shirman, J. (M)
Tubinis, M. P. (M)
Wyman, B. D. (M)

Penn Yan (ROC-1)
Emerson, L. E. (A)

Phoenix (SYR-1)
Pacia, E. (M)
Pavetto, J. C. (M)
Smith, D. L. (SM)

Pittsford (ROC-1)
Ashbaugh, R. R. (M)
Bond, H. A. (SM)
Burkhardt, J. R. (A)
Franco, G. A. (M)
Jorgensen, O. A. (M)
Nelson, J. A. (M)
Straehl, R. N. (M)
Taylor, R. B. (SM)
Walker, W. F. (M)

Plainview (LI-2)
Abramson, J. (M)
Absatz, S. I. (M)
Alper, R. (M)
Altschul, E. R. (M)
Ammirati, S. (M)
Atlas, Z. (M)
Barna, G., Jr. (M)
Bedolan, B. (A)
Berens, J. (SM)
Berge, P. J. (M)
Bernstein, H. (M)
Berton, J. F. (M)
Bloom, G. M. (M)
Brown, A. R. (M)
Brubaker, A. E. (M)
Caplan, N. (M)
Case, S. W. (M)
Chatterton, E. L. (SM)
Cilluffo, J. S. (M)
Cohen, B. C. (A)
Cohen, J. B. (A)
Courounis, S. P. (M)
Craib, J. F. (SM)
Crane, R. (M)
Cretella, S. A. (M)
Dalessandro, J. A. (M)
Davis, H. M. (SM)
Dickman, A. (SM)
Dinbart, M. (M)
Dorman, D. (M)
Feltzin, A. (M)
Fine, A. M. (M)
Fox, E. I. (M)
Friedman, E. D. (SM)
Frisch, I. J. (M)
Fucci, S. (SM)
Gertzis, S. (M)
Gewirtz, A. (M)
Gold, I. (M)
Gordon, R. L. (A)
Gorelick, G. (M)
Greenwald, M. S. (M)
Gronlund, A. G. (A)
Gross, J. (M)
Hall, S. F. (M)
Halpern, M. (M)
Hastings, R. (M)
Hebel, E., Jr. (A)
Heichlinger, C. L. (A)
Heiss, W. H. (SM)
Heller, Z. H. (M)
Helms, M. E. (M)
Herman, S. (M)
Imgram, R. H. (M)
Intraub, J. (A)
Iverson, R. W. (M)
Jacobson, R. I. (SM)
Kahl, D. S. (SM)
Kanner, M. (M)
Kelley, F. (M)
Kimball, L. R. (M)
Klein, R. C. (M)
Kogan, M. A. (A)
Lanning, W. C. (SM)
Lapidus, H. J. (A)
Leichtman, J. A. (A)
Lesser, D. (M)
Levine, S. (M)
Marchese, T. L. (A)
Marcus, M. A. (M)
Marsden, W. Y. (A)
Martin, M. B. (M)
McGuire, J. P. (M)
McInnis, T. F. (M)
Meri, K. C. (M)
Milukas, V. V. (A)
Nesenoff, N. (M)
Oken, S. (M)
Perzley, W. (M)
Pighi, L. H. (M)
Pugnataro, F. P. (M)
Pizzicara, D. J. (SM)
Pizzutiello, R. (M)
Potter, J. T. (A)
Prew, H. E. (M)
Radzka, B. (SM)
Raffer, M. (M)
Richmond, C. H. (M)
Rose, S. I. (M)
Ross, C. J. (M)
Ross, G. F. (SM)
Sadowski, H. (M)
Salit, L. (SM)
Sayer, G. (M)
Schroeder, R. P. (M)
Schuster, D. (A)
Schwartz, L. H. (M)
Schwint, K. F. (A)
Shaw, D. (A)
Sherman, P. (A)
Shinners, S. M. (M)
Simkins, R. S. (M)
Sims, N. L. (M)
Sleven, R. L. (M)
Slocum, G. V. (M)
Smith, R. H. (M)
Stamler, L. (SM)
Steen, R. D. (M)
Steinberg, C. A. (M)
Szabo, J. A. (A)
Taboski, A. F. (M)
Taub, J. J. (M)
Terry, H. P. (A)
Tramposch, A. F. (M)
Turner, E. (M)
Van Dercreek, L. M. (M)
Vasilos, M. G. (M)
Wasserman, J. (M)
Weil, W. M. (M)
Weinberg, M. (M)
Weiner, W. (M)
Wexler, H. (M)
Zaremba, C. J. (M)
Zinaman, H. J. (M)

Plandome (LI-2)
Blackwell, G. B. (F)
Blasl, J. D. (SM)
Dunning, O. M. (F)
Michel, J. J. A. (M)
Spellman, F. C. (M)
Winship, L. T. (M)

Point Lookout (LI-2)
Begley, J. F. (M)

Pleasant Valley (NY-MH-2)
Beck, W. E. (A)
Herscovitch, H. (M)
Howie, G. S. (M)
Taylor, O. P. (SM)
Yeager, R. J. (M)

Pleasantville (NY-W-2)
Campbell, J. P. (SM)
Berger, F. B. (SM)
Bernstein, E. (M)
Dewhirst, T. P. (M)
Dieter, N. H., Jr. (M)
Eisele, W. A. (A)
Finkler, R. A. (M)
Forrest, J. C. (M)
Fraser, J. T. (SM)
Gamertsfelder, G. R. (SM)
Glueckler, E. J. (M)
Grayson, Y. A. (A)
Grove, A. C. (SM)
Hannahs, W. H. (M)
Honig, A. R. (M)
King, G. W. (M)
Kleckner, C. C. (M)
Kolb, O. J. (M)
Kowalsky, J. (M)



Kranz, F. W. (SM)
Lee, R. W. (SM)
Lehman, W. (M)
Lehr, S. (M)
Losler, J. A. (M)
McGuire, E. C. (A)
McKendry, J. K. (M)
Michalec, G. W. (M)
Miller, A. G. (A)
Nagy, T. (M)
Odell, T. W. (M)
Paine, G. R. (M)
Pourciau, L. L. (M)
Reed, H. J., Jr. (SM)
Rolfs, J. C. (M)
Rosenberg, H. J. (SM)
Rossero, H. P. (M)
Sakson, P. J. (M)
Saltzman, H. (M)
Silberberg, M. Y. (M)
Siples, G. W. (M)
Tull, W. J. (SM)
Warnick, G. H. (M)
Williams, E. W. (A)
Wood, A. G. (M)
Ziolkowski, A. (SM)
Zola, M. J. (M)

Poestenkill (SCH-1)
Fleming, F. L., Jr. (M)

Poland (RU-1)
Williams, E. E. (A)

Port Byron (SYR-1)
Breese, H. R. (M)

Port Chester (NY-W-2)
Anderson, A. E. (A)
Barker, D. R. (M)
Botwin, L. (SM)
Flannelli, C. F. (M)
Goldberg, H. D. (A)
Houck, G. B., Jr. (M)
Kalt, C. G. (M)
Luedtke, P. R. (A)
Stevens, R. E. (A)
Toman, J. J. (A)
Woloschak, K. (SM)

Port Jefferson (LI-2)
Coffman, B. C. (SM)
Coyle, D. L. (M)
Fields, W. H. (A)
Munzer, L. F. (M)

Port Jefferson Station (LI-2)
Giordano, S. (M)
Jacobson, L. A. (A)
Kolarcik, J. J. (M)
Schniebolk, R. J. (M)

Port Jervis (NY-MH-2)
MacCallum, W. F. (A)
Weill, R. L. (A)

Portville (BN-1)
Thornton, J. A. (M)

Port Washington (LI-2)
Aitken, R. K. (M)
Barker, C. G. (A)
Baston, W. M. (M)
Bergel, T. C. (M)
Bicknese, F. H. (M)
Blodgett, D. F., Jr. (M)
Burroughs, H. A. (SM)
Cahalan, I. W. (M)
Carduner, W. (M)
Craig, D. R., Jr. (M)
Davidson, W. F. (SM)
Dawson, T. F. (M)
Doersam, C. H., Jr. (SM)
Dunn, B. B. (M)
Edquist, H. W. (A)
Falco, E. E. (M)
Friedland, I. (M)
Gabor, A. (A)
Giba, J. J. (SM)
Greenberg, S. (M)
Herzog, A. W. (M)
Hickey, J. H. (SM)
Hoag, O. (SM)
Hylas, A. E. (M)
Kfoury, N. F. (M)
King, R. W., Jr. (M)
Knouff, S. B. (A)
Larson, J. E. (A)
Lazich, B. (SM)
Little, D. S. (SM)
Lubkin, Y. J. (M)
Mahoney, J. J. (A)
Marantz, D. R. (M)
Marcus, S. (A)
Marshall, J. H. (M)
Massengale, D. W. (M)
McCaskill, W. K. (M)
Murdoch, A., Jr. (SM)
Naybor, E. V. (M)
Nelson, E. L., Jr. (M)
Nixon, W. E. (A)
O'Connor, J. F. (M)
Okrent, J. J. (SM)
Pacent, H. C. (M)
Pasek, D. M. (SM)
Pasqua, L. (A)
Robberson, E. L. (A)
Salenius, A. G. (M)
Scrofani, J. (A)
Spencer, N. A. (SM)
Staten, R. J. (M)
Stellwagen, F. W. (SM)
Strawbridge, R. B. (M)
Streif, D. G. (A)
Thompson, J. M. (SM)
Trautman, DeF. L. (SM)
Volpe, I. D. (M)
Weston, S. (SM)
Williams, G. W., Jr. (M)
Willkom, D. C. (A)
Winter, N. L. (M)
Witmer, F. S. (M)
Wolf, F. J., Jr. (SM)

Potsdam (SYR-1)
Landon, J. V. (A)
Martin, A. R. (A)
Reed, G. W. (A)
Sanford, R. S. (A)

Poughkeepsie (NY-MH-2)
Acton, E. E. (M)
Acton, F. C. (M)
Adem, R. (M)
Agusta, B. (M)
Anderson, J. V. (M)
Anderson, R. L. (M)
Andrews, M. C. (SM)
Ang, W. S. (M)
Ashar, K. G. (M)
Atkins, J. B. (M)
Atwood, L. W. (M)
Austin, J. M. (M)
Bahret, R. W. (M)
Baird, J. (SM)
Barber, A. E. (A)
Bardell, P. H., Jr. (M)
Barnes, D. E. (M)
Barta, N. J. (M)
Bartelt, J. E. (A)
Bauer, E. W. (M)
Baumgarte, P. H. (M)
Beausoleil, W. F. (M)
Beesley, J. P. (M)
Benson, A. B. (M)
Berger, A. W. (M)
Berger, B. L. (M)
Beverly, N. E. (M)
Blaauw, G. A. (M)
Blessing, R. R. (SM)
Bloch, E. (M)
Blosk, R. T. (M)
Blust, C. D. (M)
Boden, R. C. (M)
Boehm, H. G. (M)
Boland, L. J. (M)
Bonevac, S. (M)
Branin, F. H., Jr. (SM)
Brennemann, A. E., Jr. (M)
Brosseau, E. F. (M)
Brown, D. T. (M)
Bruce, G. D. (M)
Brunschweiger, A. (M)
Bryson, B. L. (M)
Buchholz, W. (SM)
Buckley, W., Jr. (M)
Buley, T. L. (A)
Burke, E. J. (M)
Button, C. H. (M)
Cadden, W. J. (M)
Carleton, E. O. (A)
Carlsen, R. W. (M)
Carlson, F. A. (M)
Carpenter, E. J., Jr. (M)
Carruthers, G. H. (M)
Carter, W. C. (M)
Case, P. W. (M)
Chang, H. (M)
Chin, F. W. (M)
Christiansen, C. L., Jr. (M)
Chrysler, L. F. (M)
Cobb, R. W. (A)
Conroy, E. D. (M)
Constantine, G., Jr. (M)
Cooper, D. K. (A)
Coughlin, J. J. (M)
Courtois, J. R. (A)
Crane, A. E. (M)
Crawford, D. J. (M)
Crawford, J. K. (A)
Crawford, W. A. (A)
Credle, A. B. (M)
Cunningham, B. E. (M)
Davis, C. W. (A)
Davis, E. M., Jr. (M)
Dean, K. W. (M)
De Lano, R. B., Jr. (M)
De Witt, D. (SM)
Dill, F. H., Jr. (M)
Disney, J. V. (A)
Dix, D. S. (A)
Domenico, R. J. (M)
Doody, D. T. (M)
Druckerman, M. (M)
Dundatscheck, E. P. (M)
Dunwell, S. W. (M)
Eggenberger, J. S. (M)
Eibsen, R. L. (M)
Einolf, C. W. (M)
Esaki, L. (SM)
Evin, N. I. (M)
Farrell, J. F. (M)
Fidanza, W. (A)
Fleisher, M. D. (M)
Fletcher, R. P. (A)
Flores, T. G. (M)
Folsom, R. M. (M)
Fox, P. E. (SM)
France, N. A. (M)
Frese, S. J., Jr. (A)
Fritz, E. L. (A)
Frizzell, C. E. (SM)
Fuegel, E. F. (SM)
Fuhrmeister, P. F. (M)
Gannon, P. M. (M)
Gayle, A. (M)
Geary, J. I. (M)
Gedney, R. W. (M)
Genser, M. (A)
Gindi, A. M. (A)
Goble, A. S., III (M)
Granito, G. D. (M)
Grant, P. M. (M)
Grecco, J. A. (M)
Greene, K. F. (M)
Greene, N. E. (M)
Greer, F. G. (M)
Grisolf, S. F. (A)
Gulland, G. R. (SM)
Gutwin, O. A. (M)
Hack, G. E. (M)
Hahn, E. F. (M)
Hallock, D. G. (M)
Hanson, E. E. (M)
Harrison, B. A. (M)
Hartman, F. B. (M)
Hasbrouck, L. J. (A)
Hauptman, G. (M)
Haynes, M. K. (M)
Heath, H. F., Jr. (M)
Heer, J. (M)
Hellerman, L. (M)
Hill, R. A. (M)
Hnat, S. (M)
Hoernes, G. (M)
Homrig, L. L. (M)
Horchos, L. A. (M)
Hoskinson, W. C. (M)
Hotchkiss, G. L. (M)
Houldin, R. J. (M)
Howell, R. S. (M)
Hung, J. W-C. (M)
Hunter, L. P. (SM)
Husson, S. S. (M)
Isole, J., Jr. (M)
Jackson, P. W. (M)
Jensen, R. A. (SM)
Johnson, D. D. (M)
Johnson, J. R. (M)
Jones, R. P. (M)
Jordan, E. I. (A)
Joyal, H. J. (M)
Jung, P. (M)
Kanter, L. E. (M)
Karan, C. (SM)
Kassan, I. D. (M)
Kauffmann, J. A. (A)
Kennard, A. G., Jr. (M)
Kennedy, G. F. (M)
Kerr, J. W. (M)
Kilcrease, D. L. (A)
King, L. E. (M)
King, R. M. (M)
Klein, M. (M)
Knueppel, R. G. (M)
Koblenz, A. M. (M)
Koelsch, A. C., Jr. (M)
Komyathy, D. L. (M)
Koskos, A. (M)
Kwei, T. C. L. (M)
Lang, W. W. (M)
Lawrence, D. G. (M)
Lawrence, G. (A)
Lawrence, W. W., Jr. (M)
Lehtonen, R. (M)
Ligon, G. C. (M)
Lindquist, A. B. (M)
Ling, E. W. (M)
Lippel, B. (M)
Lo, A. W. (SM)
Lockett, D. E. (M)
Logue, J. C. (SM)
Lorenz, E. J. (A)
Low, P. R. (M)
Lyon, R. (M)
Mackay, J. B. (A)
MacSorley, O. L. (SM)
Maling, K. (M)
Marcy, H. T. (M)
Marshall, J. G., Jr. (M)
Martin, R. R. (SM)
Maryon, M. K. (A)
Masterson, F. H. (M)
Mathews, E. G. (A)
McCarter, G. B. (M)
McMillan, E. C. (A)
Melan, E. H. (M)
Merrill, R. E. (M)
Merrill, R. L. (A)
Merwin, R. E. (M)
Meyers, N. H. (SM)
Miano, S. V. (M)
Miller, E. W. (M)
Mitta, L. A. (M)
Monroe, G. R. (M)
Montgomery, H. C. (M)
Montren, J. J. (M)
Moore, J. G. (M)
Moore, J. W. (M)
Morey, G. A. (M)
Morris, E. F. (M)
Moses, A. I. (M)
Murphy, J. J. (M)
Mutter, W. E. (SM)
Myers, A. S., Jr. (M)
Nanes, M. (M)
Necol, J. C. (M)
Nelson, V. A. (A)
Newman, E. G. (M)
Nippe, L. O. (M)
Northrup, C. D. (A)
Nortman, J. J. (M)
O'Farrell, J. J., Jr. (M)
Oliva, F. J. (M)
Olsen, E. C. (M)
O'Neill, G. R. (M)
Ordemann, F. A., Jr. (M)
Ostapkovich, P. L. (M)
Ostrowski, E. A. (M)
Padegs, A. (M)
Patrick, R. M. (M)
Paulsen, R. C. (M)
Peil, E. F. (M)
Perlini, R. (A)
Peters, R. M. (M)
Peterson, W. W. (M)
Pfirman, W. S. (A)
Phelps, B. E. (M)
Phillip, R. J. (M)
Phillips, F. G., Jr. (M)
Pierpont, J. E., Jr. (M)
Pietras, C. M. (M)
Pinto, M. A. (M)
Pitowsky, S. (M)
Plaut, T. Z. (M)
Pliskin, W. A. (SM)
Plummer, R. W. (A)
Pomerene, J. H. (M)
Post, F. L. (M)
Preiss, R. J. (M)
Quick, A. E. (M)
Rebh, W. R. (M)
Reed, S. G. (M)
Reid, F. A. (M)
Reiner, W. D. (M)
Reynolds, D. J. (M)
Rice, R. (M)
Riley, W. B. (M)
Riordan, E. R. (M)
Robins, R. D. (M)
Robinson, J. D. (A)
Rubsam, K. G. (M)
Russell, G. E. (M)
Russell, L. A. (A)
Rutz, R. F. (M)
Rynaszewski, E. J. (SM)
Sartino, L. (A)
Sawyer, D. E. (M)
Schaal, W. C. (A)
Schiavone, R. N. (M)
Schmookler, M. S. (M)
Schroeder, C. E. (A)
Schulman, F. D. (M)
Schultz, D. D. (M)
Scott, A. E. (M)
Scott, T. R. (M)
Seaman, P. H. (M)
Sharp, E. M. (M)
Shelford, L. L. (M)
Shen, M-N. (M)
Sheppard, D. M., Jr. (M)
Shirk, R. W. (M)
Shultz, G. L. (M)
Siegall, B. (M)
Sih, K. Y. (M)
Simek, R. L. (A)
Simkins, Q. W. (M)
Sindelar, F. J. (A)
Singer, D. F. (A)
Singer, S. (M)
Sippel, R. J. (M)
Skelly, D. J. (M)
Skov, R. A. (M)
Slade, B. N. (SM)
Slonaker, R. D. (M)
Smith, G. H. (M)
Smith, J. W. (A)
Smith, W. J. (M)
Smoyer, C. K. (M)
Snedecor, P. A., Jr. (M)
Sobol, H. (M)
Soltanzadeh, P. (M)
Spatz, P. (A)
Spencer, D. R. (M)
Spencer, G. W., II (M)
Staciokas, L. J. (M)
Stafford, T. S. (M)
Standeven, J. D. (M)
Stephens, C. E. (M)
Stetler, I. H. (A)
Stevens, W. Y. (M)
Stevenson, M. J. (M)
Stoughton, P. N. (M)
Swenson, W. G. (M)
Taren, W. J. (M)
Tasini, B. (M)
Thompson, D. B. (M)
Thomson, L. J. (A)
Thornton, W. G. (M)
Title, R. S. (M)
Trachy, R. A. (M)
Trampel, K. M. (M)
Tritschler, R. J. (M)
Twicken, S. (M)
Ulfsparre, L. O. (A)
Underhill, G. H. (M)
Unger, G. G. (M)
Vandewinckel, A. W. (M)
Van Winkle, H. E., Jr. (M)
Ventura, J. J. (M)
Verdiebello, A. A. (A)
Verven, S. J. (M)
Vitek, W. J. (M)
Walsh, J. L. (M)
Warner, J. H., III (A)
Waxman, R. (M)
Weiss, D. H. (M)
Wenner, J. W. (M)
Whalen, R. M. (M)
Whitmore, D. C. (M)
Wild, H. K. (M)
Wilser, W. C. (M)
Wilson, E. S. (SM)
Wilson, R. F. (M)
Winger, W. D. (A)
Winkler, V. D. (M)
Wirth, E. D. (M)
Wittenberg, W. M. (SM)
Wolensky, W. (M)
Wolfersperger, D. B. (A)
Wolff, C. H. (M)
Wolff, H. P. (SM)
Wood, E. C. (M)
Wright, W. V. (M)
York, J. J. (A)
Zantow, W. F. (M)
Zentgraf, H. J. (M)

Poundridge (NY-W-2)
Tingley, G. R. (A)

Putnam Valley (NY-MH-2)
Cravitt, S. (SM)
Lupano, E. L. (A)

Queens (LI-2)
Elsenhuth, A. J. (M)

Queens Village (LI-2)
Bracken, T. C. (A)
Bracken, W. B. (A)
Bulwin, E. B. (A)
Cegelski, R. M. (A)
Cornell, R. (M)
Fredericks, R. J. (M)
Gerych, W. E. (M)
Gould, N. (M)
Griemsmann, J. W. E. (F)
Hagen, A. A. (M)
Hansen, E. L. (SM)
Hill, E. B. (A)
Hoffer, L. H. (A)
Johansson, P. (A)
Johnson, C. W. (M)
Kleinoder, J. (A)
Klumpen, R. D. (A)
Laoping, A. M. (M)
LaWare, H. D. (M)
Lielbriedis, K. (M)
Mayer, H. A. (M)
Peters, W. G. (A)
Pezzullo, G. (A)
Schmidt, H. P. (A)
Selvaggio, N. J. (M)
Trelewicz, E. R. (M)
Tribo, J. R. (M)
Wassermann, C. I. (M)
Yeager, J. R. (M)
Zimmerman, L. (A)

Red Hook (NY-MH-2)
Bannon, R. D. (M)
Gerbitz, C. G. (A)
Heineck, A. W. (M)
Holmes, F. L., Jr. (M)
Lancto, R. C. (M)
Neason, S. J. (A)
Newnham, A. G. (M)
Rhodes, R. (M)
Sevigny, G. D. (M)
Shortle, J. W. (M)
Thompson, F. E. (A)
Trombly, R. L. (M)
Wood, J. R. (M)

Rego Park (LI-2)
Adams, E. T. (M)
Berman, E. L. (A)
Boorstyn, R. R. (M)
Buccolier, A. A. (A)
Eisenstein, N. I. (A)
Finn, P. L. (M)
Fleig, W. J. (M)
Friedman, L. (M)
Fruth, W. J. (M)
Gold, M. R. (M)
Herrmann, W. J. (SM)
Krygier, G. F. (SM)
Matz, B. (M)
Metzner, J. J. (M)
Ottenberg, E. C. (M)
Ottenberg, L. A. (M)
Packer, B. S. (M)
Rabinovici, B. (SM)
Shostak, M. (M)
Walsh, W. J. (M)
Waly, A. (M)
Weissman, S. (M)
Wong, N. F. (M)

Remsen, (RU-1)
Grant, R. D. (M)

Rensselaer (SCH-1)
Stuarts, A., Jr. (M)

Rexford (SCH-1)
Cobine, J. D. (F)
De Witt, J. S. (M)
Stutt, C. A. (M)

Rhinebeck (NY-MH-2)
Beeby, P. A. (M)
Burawski, J. A. (M)
Coburn, W. I. (M)
Conklin, R. N. (M)
Cox, T. C. (M)
Crowe, J. W. (M)
Cypser, R. J. (M)
Ellersick, F. W. (M)
Foster, B. D. (M)
Gmeiner, P. (M)
Howe, C. K. (A)
Lynch, C. F. (SM)
Vislocky, J. (M)
Vize, J. F. (M)
Warren, L. H. (SM)

Richfield Springs (SCH-1)
Kitts, D. E. (A)

Richmond Hill (LI-2)
Arnell, E. B. (A)
Clark, A., Jr. (A)
Coles, W. T. (A)

D'Angelo, F. (M)
Della Salle, L. R. (M)
Egan, W. G. (M)
Fees, H. W. (A)
Giorgi, D. A. (A)
Guthrie, T. F. (A)
Iorio, J. (M)
Johannesen, W. (M)
Kaufman, F. M. (M)
Letvenko, W. (A)
Marek, J. R. (A)
Mazzi, A. L. (SM)
Roche, M. J. (A)
Scaturro, M. R. (A)
Schenkerman, S. (M)
Schimsky, D. (M)
Scilo, J. A. (M)
Selnick, L. L. (A)
Sieminski, P. J. (A)
Trump, E., Jr. (M)
Uretsky, C. L. (M)
Vambutas, E. (M)
Winer, J. D. (M)
Yellen, A. F. (A)
Zarnchkowsky, M. (M)

Ridgewood (LI-2)
Condy, J. (A)
Engelfried, R. E. (M)
Krueger, A. M. (A)
La Presti, P. (A)
Oehling, G. (M)
Pace, G. V. (M)

Riverdale (NY-2)
Baker, J. R. (M)
De Beer, B. C. (M)
Einson, S. E. (M)
Frechlich, C. (SM)
Harder, D. (M)
Helfer, J. L. (M)
Karlan, J. H. (A)
Kellner, R. (M)
Martinson, O. M. (A)
Rosenthal, S. W. (SM)
Stahl, C. (M)

Riverhead (LI-2)
Atwood, J. B. (SM)
Braaten, A. M. (SM)
Goldman, S. (M)
Herbig, A. J. (M)
King, E. E. (M)
Leis, W. S. (M)
Lontka, R. E. (M)
Moore, H. A. (M)
Olsen, W. E. (A)
Peterson, H. O. (F)
Schock, R. E. (SM)
Schoenborn, F. J. W. (M)
Shipley, D. G. (A)
Taylor, H. A. (SM)
Wagner, R. J., Jr. (M)
Wickizer, G. S. (SM)
Zimmerman, R. (A)

Rochester (ROC-1)
Abernathy, W. J. (M)
Agalides, E. (M)
Agel, C. W. (A)
Aguais, R. W. (M)
Alexander, H. R. (M)
Alphenaar, A. W. (M)
Anderson, J. G. (A)
Anderson, R. T. (M)
Andzer, A. (A)
Andzer, A. L. (M)
Arao, R. S. (SM)
Amts, F. D., Jr. (M)
Auer, J. H., Jr. (M)
Babcock, T. R. (M)
Bailey, C. E. (A)
Baker, A. A., Jr. (M)
Baker, M. (M)
Baldwin, L. D. (A)
Balling, A. W. (M)
Bangs, R. G. (A)
Baron, E. A. (M)
Barr, E. M. (M)
Bartholomay, D. R. (A)
Bartlett, W. F. (A)
Bayer, W. L. (SM)
Beaman, L. W. (M)
Beardsley, R. R. (SM)
Bellor, W. F. (M)
Bendel, S., Jr. (SM)
Bender, J. W. (A)
Benedict, C. F. (M)
Biggar, R. A. (SM)
Billin, A. G. (SM)
Blow, A. W. (M)
Boehly, M. A. (A)
Bogart, C. C. (A)
Bonaventura, J. J. (A)
Bouchard, G. O. (M)
Bouyoucos, J. V. (M)
Bowen, B. D. (A)
Bowin, W. F. (M)
Brady, T. W. (A)
Braggins, R. D. (M)
Brant, S. J. (A)
Brennan, A. T. (SM)
Brewer, W. L. (SM)
Brock, E. G. (SM)
Broutman, C. A. (M)
Brown, C. S. (M)
Brown, G. A. (M)
Browning, R. (M)
Brumley, C. H. (M)
Bryzinski, T. F. (M)
Carlsten, E. E. (M)
Carson, R. E. (A)
Chesna, J. (A)
Cieslak, A. B. (M)
Cirelli, J. B. (A)
Clark, H. E. (M)
Clark, G. J. (A)
Clayton, K. (M)
Clement, M. A. (M)
Clickner, G. M. (M)
Close, S. W. (M)
Cohen, G. H. (M)
Conley, D. (M)
Coombs, W. F., Jr. (M)
Cotter, W. F. (SM)
Cullen, F. P. (SM)
Cumley, R. L. (M)
Curry, R. C. (M)
Curtis, S. R. (SM)
Czora, W. G. (M)
Dailor, F. E. (M)
Dasburg, A. V. (M)
Davidson, R. C. (A)
De Haas, T. (M)
Dobson, H. R. (M)
Douglas, J. L. (M)
Dowell, V. L., Jr. (M)
Dubin, D. (M)
Dunklin, R. A. (M)
Eason, T. S. (M)
Eisaman, L. C. (M)
Elliott, G. (SM)
Ellis, F. H. (M)
Ellis, J. R. (M)
Ellis, T. E., Jr. (M)
Engard, W. J. (A)
England, W. B. (SM)
Engleman, R. (M)
Engler, C. D. (M)
Enslein, K. (SM)
Erbelding, J. C. (A)
Erdman, R.C. (M)
Ertman, R. J. (M)
Federici, J. T. (M)
Ferrell, H. M. (M)
Fine, L. (M)
Fink, E. J. (M)
Fischer, A. N. (M)
Fisher, C. R. (SM)
Fondrk, J. S. (M)
Fiorniola, A. F. (A)
Foster, G. C. (M)
Foster, S. J. (M)
Freehafer, J. E. (M)
Freilingaus, K. H. (A)
Gardner, K. J. (M)
Garland, J. E. (M)
Gaspar, A. F. (M)
Gerace, R. E. (M)
Gilson, R. J. (SM)
Goebel, H. K. (M)
Grammer, R. A., Jr. (M)
Gray, M. B. (M)
Gruner, H. W. (M)
Guenther, J. H. (SM)
Gutzmer, R. F. (A)
Hahnel, A. (SM)
Hailey, W. D. (SM)
Hamlett, D. W. (M)
Hardi, F. R. (M)
Harris, T. J. (M)
Harrison, B. H. (M)
Hattersley, T. E. Jr. (SM)
Haupt, G. H. (SM)
Hausler, W. B. (M)
Hayes, G. V. (A)
Healy, D. W., Jr. (SM)
Heath, R. (M)
Hecht, N. E. (M)
Heise, E. R. (M)
Hewitt, C. G. (M)
Hicks, H. F., Jr. (SM)
Higgs, H. P. (A)
Hoeft, R. H. (M)
Holmes, L. C. (F)
Holstrom, A. (SM)
Houde, R. A. (A)
Huntington, M. B. (M)
Irish, R. N. (A)
Jaensch, K. H. (M)
Johnstone, N. J. (M)
Karas, W. P. (SM)
Karker, E. C. (M)
Kay, R. H. (M)
Keane, J. E. (A)
Keim, D. Y. (M)
Keiman, F. J. (M)
Kellam, J. C., Jr. (A)
Kellock, D. E. (M)
Kelly, R. A. (A)
Kendall, H. C. (SM)
Kende, G. (SM)
Kennedy, R. P., Jr. (M)
King, H. G. (A)
Klemmer, A. E. (M)
Klumb, H. J. (M)
Kralicy, R. L. (M)
Kreckel, K. H. (M)
Kreim, W. J. (M)
Krishan, B. (M)
Kushel, V. (M)
Lachs, G. (M)
Ladd, J. H. (M)
Lake, A. E., Jr. (A)
Lawson, H. W., Jr. (M)
Landgraf, R. C. (M)
Laythe, R. F. (M)
Leavens, C. F. (M)
Le Brun, R. L. (M)
Lins, H., Jr. (M)
Long, J. J. (M)
Luhowy, G. J. (M)
Luke, L. M. (M)
Lusted, L. B. (F)
Lyke, E. F. (M)
Malorino, G. S. (A)
Manson, R. H. (F)
Margeson, R. L. (M)
Mariotti, D. J. (M)
Martin, E. L. (A)
Mateyk, W. (M)
Mavis, G. W. (M)
Mazel, L. G. (M)
McArdle, B. L. (SM)
McQueeney, L. G. (A)
Messenger, P. R. (A)
Miller, H. A. (SM)
Mitchell, F. A. (M)
Morken, D. A. (M)
Morris, G. F. (M)
Morrison, R. F., Jr. (M)
Morse, J. E. (M)
Mumma, H. A., Jr. (SM)
Murphy, W. L. (M)
Navarra, J. A. (A)
Neff, W. H. (M)
Nelson, D. E. (M)
Nelson, R. L. (M)
Nichols, N. B. (SM)
Nieratt, F. (M)
Nixon, R. C. (A)
Norwood, W. R. (A)
Nugent, J. A. (M)
Orlowski, J. S. (M)
Ormsby, T. R. (M)
Oster, S. (M)
Ota, L. Y. (M)
Pascrey, P. F. (M)
Parkhill, D. F. (M)
Parks, W. J. (SM)
Partis, D. C. (A)
Patton, D. W. (A)
Paul, A. N. (M)
Payne, R. C. (M)
Payne, W. T., Jr. (A)
Peach, J. A. (M)
Pelham, K. F. (SM)
Perkins, J. C., Jr. (M)
Phipps, A. R. (M)
Pitlik, H. (M)
Platnick, D. (M)
Porter, G. C. (A)
Prasil, A. (M)
Qualich, A. (M)
Ramos, A. S. (A)
Randall, J. M. (M)
Raymond, R. S. (M)
Resch, G. W. (M)
Reynolds, C. H. (M)
Richards, J. B. (A)
Richards, W. H., Jr. (A)
Ridob, W. (M)
Robbins, R. E., Jr. (SM)
Rodatus, E. J. (SM)
Rodgers, J. A. (SM)
Rogers, R. J. (M)
Ronan, R. J. (SM)
Ronbeck, J. E. (M)
Ross, H. J. (M)
Ross, L. A. (A)
Rubeya, R. (M)
Saeli, J. J. (A)
Sage, F. D. (A)
Sahba, D. R. (M)
Samuelson, J. R. (A)
Savchuk, V., Jr. (SM)
Schiff, S. (M)
Schilino, A. G. (M)
Schneider, G. O. K. (M)
Schreder, K. D. (M)
Schwartz, L. S. (M)
Schwarz, A. H. (M)
Schwertz, F. A. (M)
Searcy, C. E. (M)
Sheehan, J. F. (M)
Sheve, H. C. (M)
Shook, C. G. (M)
Slaymaker, F. H. (SM)
Smart, R. L. (A)
Smith, D. S. J. (SM)
Smith, G. H. (M)
Smith, M. D. (M)
So, H. (M)
Sowers, A. E. (M)
Spence, R. (M)
Staples, W. D. (SM)
Steck, A. F., Jr. (M)
Stern, M. A. (M)
Stevenson, H. (M)
Stewart, F. B. (M)
Stewart, L. C. (M)
Stillwater, J. (A)
Stone, D. J., Jr. (M)
Stoutz, C. O., Jr. (M)
Strack, H. O. (A)
Stump, T. M. (M)
Taormoux, P. J. (SM)
Tartanian, C. N. (M)
Taylor, H. M. (A)
Terseano, H. W. (A)
Thalstrup, H. (SM)
Timm, O. C. A. (A)
Tolliver, P. M. (M)
Tomaszewski, C. A. (M)
Torpie, J. D. (M)
Traino, C. (M)
Traub, R. A. (A)
Trost, H. K. (M)
Trott, M. (M)
Tryon, L. E. (M)
Turner, W. (M)
Tyrlick, W. V. (M)
Updike, B. P. (M)
Van Arsdell, J. C., Jr. (M)
Van Deloo, P. A. (M)
Vandervoort, Q. D. (M)
Van Sandwyk, J. (M)
Veal, T. G. (M)
Velie, J. L. (A)
Vincent, A. W. (SM)
Waldron, L. F., Jr. (A)
Wang, F. B. (M)
Weller, R. (SM)
Wheeless, L. L., Jr. (M)
Whitman, R. N. (M)
Wilber, W. D. (M)
Wilburn, B. A. (M)
Williams, R. C. (M)
Wilson, J. E. (M)
Wise, C. M. (M)
Wojtaszek, E. J. (M)
Wolcott, J. R. (M)
Wolf, A. A. (M)
Wolff, R. L. (M)
Worth, J. H. (M)
Wurtz, J. N. (A)
Yeaton, E. C. (A)
Young, E. A. (M)
Young, F. C. (SM)
Young, J. W. (A)
Zarcone, C. J. (A)
Zelting, A. H. (M)
Zemis, J. J. (M)

Rock Stream (ROC-1)
Shepard, W. H. (M)

Rockville Centre (LI-2)
Bensen, H. (M)
De Weese, H. W. (SM)
Duke, V. J. (SM)
Fay, F. A. (A)
Gilman, B. S. (M)
Ginsberg, M. P. (SM)
Grevious, J. S. (M)
Harnett, L. T. (M)
Hawkes, T. A. (A)
Hopkins, J. J. (SM)
Lee, R. L. (M)
Leutentz, H. C. (M)
Mason, J. D. (M)
McCartney, E. (A)
Meehan, J. D. (M)
Potter, N. (A)
Quatraro, W. (M)
Rich, E. M. (M)
Rutstein, I. (SM)
Shakun, M. F. (M)
Sinsheimer, W. J. (A)
Tuck, C. A., Jr. (A)
Uzmann, J. G. (SM)
White, H. A. (A)
Wolff, F. (SM)
Wolff, G. (A)

Rocky Point (LI-2)
Callahan, J. L. (F)
Carter, P. S. (F)
Goldstine, H. E. (SM)
Kahn, A. (SM)
Martin, C. A. (SM)
Peterson, L. E. (M)

Rome (RU-1)
Akerman, S. (A)
Allen, R. F. (M)
Anderson, S. E. (M)
Atkinson, M. H. (A)
Ballentine, E. C. (SM)
Bartley, L. S. (M)
Bayless, H. A. (M)
Beauchamp, A. J. (SM)
Beers, R. H. (M)
Benoit, R. C., Jr. (SM)
Bethke, W. P. (SM)
Blymiller, A. L. (M)
Bratge, J. R. (M)
Brendiar, D. E. (M)
Bromley, J. E. (M)
Brooks, R. M. (M)
Brown, D. E., Jr. (M)
Brownstein, H. S. (M)
Burrows, W. R. (M)
Byrne, R. D. (M)
Cagney, W. M. (A)
Carlson, H. A. (SM)
Carney, P. G. (M)
Chapin, C. J. (M)
Chapin, E. J., Jr. (M)
Chrestien, C. A. (A)
Christie, R. L. (M)
Colangelo, L. P. (SM)
Cook, B. S. (M)
Cooper, B. (M)
Coppola, A. (M)
Craigiow, L. H. (M)
Crowley, H. J. (SM)
Cruickshank, J. E. (SM)
Dakan, D. L. (SM)
Davis, H. (M)
Dayton, W. P. (M)
De Mesne, T. A. (M)
Diamond, F. I. (M)
Dieter, M. R. (A)
Dimon, G. H., Jr. (M)
Donovan, B. M. (A)
Eannarino, J. M. (SM)
Eidman, F. E., Jr. (M)
Eitches, I. (SM)
Fallik, J. (M)
Feiner, A. (A)
Ferlo, O. F. (A)
Fishner, S. (A)
Forte, M. P. (SM)
Fouts, W. L. (M)
Frank, F. W. (M)
French, E. O. (M)
Frohlich, A. J. (M)
Gabelman, I. J. (SM)
Glaviano, C. R. (M)
Gordon, C. W. (SM)
Graettinger, W. F. (A)
Graham, R. C. (M)
Green, K. B. (A)
Griffiths, J. D. (A)
Grzesik, J. (A)
Hadwick, R. E. (M)
Harcar, A. R. (A)
Harris, H. N., Jr. (M)
Hartolil, P. E. (A)
Harvey, D. M. (M)
Headle, H. W., Jr. (M)
Heidgen, B., Jr. (M)
Holberger, R. R. (M)
Howe, W. P. (M)
Huckaby, J. R. (M)
Jaeger, M. (M)
Jeys, F. H. (M)
Kaeding, D. A. (M)
Kaufman, J. (A)
Kelly, W. S. (A)
Krupinski, J. A. (M)
Larsen, P. N. (M)
Leinbach, H. J., Jr. (M)
Lemoine, J. S. (M)
Levy, G. (M)
Libby, R. L. (M)
Lindeman, B. (SM)
Long, G. A. (M)
Loreto, D. R. (M)
Maggio, T. (M)
Marks, R. L. (SM)
Marshall, J. P. (M)
Martensen, M. D. (A)
Martin, C. T., Jr. (M)
Mason, W. F. (SM)
McFee, J. E. (A)
McLaughlin, R. L. (M)
Meyer, C. H., III (M)
Miles, R. A. (M)
Miller, C. R. (M)
Miottke, T. F. (M)
Modlin, C. J. (M)
Moore, F. F. (A)
Morelli, M. (M)
Morenoff, E. (M)
Moss, J. F. (M)
Munzer, E. N. (SM)
Naresky, J. J. (M)
Neeley, A. C. (A)
Nicholson, C. L. (M)
Niebuhr, K. E. (M)
Nilsson, N. J. (M)
Nisbett, J. R. (A)
Oglesby, R. G. (M)
O'Neel, W. E. (M)
Pappas, C. P. (M)
Peacock, J. T. (A)
Pendleton, E. E. (A)
Petersen, J. A. (A)
Pope, J. N., Jr. (M)
Pope, W. T., Jr. (M)
Pranke, J. A. (M)
Pulido, G. G., Jr. (M)
Quail, S. E. (M)
Quanrud, O. G. (M)
Redwine, C. H. (M)
Retterer, B. L. (M)
Richards, M. V. (M)
Richter, H. (M)
Riechman, S. D. (M)
Roberts, W. L. (SM)
Root, R. A., Jr. (M)
Rudensey, M. B. (M)
St. John, C. G. (M)
Schley, D. R. (M)
Selover, E. E. (M)
Shapiro, H. (M)
Sharki, P. (M)
Shiner, G. A. (M)
Simpson, P. D. (M)
Stemlicht, L. (M)
Storrs, E. N. (SM)
Story, R. T. (SM)
Story, V. V. (SM)
Strom, C. A., Jr. (SM)
Sues, L. B. (A)
Szalach, F. E. (M)
Taffel, B. R. (M)
Tallman, D. G. (SM)
Tepper, S. J. (M)
Thomas, A. R. (M)
Ticknor, J. M. (A)
Trone, G. R. (A)
Vaccaro, J. (A)
Voegtlen, H. D. (M)
Vogelman, J. H. (F)
Warner, M. (M)
Waszkiewicz, L. R. (M)
Watkins, B. D. (M)
Weaver, C. E. (A)
Webb, H. E. (M)
Weber, J. V. (M)
Weiss, E. H. (A)
Werle, B. D. (M)
Wiejek, A. J. (SM)
Wilcox, C. R. (M)
Williams, T. G. (M)
Wilson, H. L. (A)
Winbigler, W. K. (M)
Winkler, E. H. (SM)
Wolf, J. K. (M)
Woodruff, W. D. (M)
Worthington, D. T. (M)
Worthington, J. W., Jr. (SM)
Wright, R. O. (M)

Ronkonkoma (LI-2)
De Muria, V. J. (M)
Gold, T. (M)

Roosevelt (LI-2)
Adachi, W. Y. (M)
Brown, E. M. (SM)
Darch, N. S. (M)



Forster, E. E. (M)
Fragola, C. F. (SM)
Kushner, J. (M)
Ladue, J. A. (M)
Randazzo, J. J. (A)

Rosedale (LI-2)
Avignone, A. J. (A)
Cavallari, J. D., Jr. (M)
Damm, G. W. (A)
Stio, W. V. (A)
Sweeney, J. N. (M)
Weiner, F. (A)
Zang, G. R. (M)

Roslyn (LI-2)
Easton, A. (SM)
Haback, D. H. (M)
Hicks, W. M. (A)
Kahrilas, P. J. (SM)
Kamen, I. (SM)
Kennedy, S. A. (M)
Leibfried, W. P. (M)
Lessler, A. L. (M)
Margulies, F. (M)
Match, M. J. (M)
Nash, A. (M)
Sontag, H. M. (M)
Stern, D. L. (M)
Susskind, S. E. M. (A)
Wild, J. J. (M)

Roslyn Estates (LI-2)
Shanley, J. H. (M)
Skeist, S. M. (M)

Roslyn Harbor (LI-2)
Aaron, B. D. (SM)
Evans, R. A (A)
Minc, A. (M)

Roslyn Heights (LI-2)
Ashley, A. (M)
Boltz, J. H. (SM)
Boop, W. E. (M)
Bourke, W. A. (SM)
Corwin, A. (SM)
Daelemans, G. L., Jr. (M)
Deutsch, S. (M)
Dmytrasz, J. N. (M)
Duffy, J. P., Jr. (M)
Dumey, A. I. (SM)
Feldmann, F. (SM)
Fiddeman, D. (M)
Gaines, B. (SM)
Gonzalez, V. M. (M)
Gray, J. E. (A)
Hauer, W. B. (M)
Hochman, R. J. (M)
Jackson, T. T. (SM)
Johnston, W. A., Jr. (SM)
Kohn, S. A. (M)
Loesing, J. B., Jr. (A)
Martin, J. B. (M)
McLinden, J. E., Jr. (SM)
Morris, A. R. (A)
Morris, J. J. (M)
Pride, D. W. (M)
Roberts, A. K. (SM)
Rod, R. L. (SM)
Roth, H. H. (SM)
Scopin, L. (A)
Seeley, S. W. (F)
Skipper, L. C. (SM)
Solov, E. G. (M)
Speilberger, S. C. (SM)
Star, J. (SM)
Van Deusen, R. B. (M)
Weinmann, R. H. (M)
Willenbecher, J. F. (SM)
Yelsey, B. (M)
Zetkov, G. A. (M)

Rotterdam (SCH-1)
Peek, N. A. (M)

Roxbury (BING-1)
Fryling, J. L. (M)

Rush (ROC-1)
Kohl, W. B. (A)

Rye (NY-W-2)
Bolton, W. D. (M)
Borck, A. (SM)
Davis, D. (M)
Deri, H. B. (A)
Eaves, A. J. (SM)
Greenberg, E. P. (M)
Haselton, M. L. (M)
Lamarque, J. W. (M)
Van Ness, H. J. (M)

St. Albans (LI-2)
Bastien, R. C. (A)
Behr, J. (A)
Brown, A. R. (M)
Ceccanti, L. P. (A)
Edmonds, S. T. (A)
Elmquist, J. F. (M)
Johnson, R. L. (A)
Keicher, A. J. (M)
Keicher, R. J. F. (M)
Kirsch, W. A. (SM)
Kuchlewski, E. C. (A)
Kuchlewski, T. R. (A)
Peyton, W. B. (A)
Reasor, G. E. (M)
Rothenberg, S. M. (SM)
Smikle, K. R. (M)

St. James (LI-2)
Grayson, R. (M)
Jolas, G. C. (M)
Schubert, T. H. (A)

Salem Center (NY-W-2)
Smith, G. J. (A)

Salt Point (NY-MH-2)
Howson, J. C. (M)
Taylor, R. L. (A)

Sarbom (BN-1)
Mosser, F. D. (M)

Sands Point (LI-2)
Callahan, E. C. (SM)
Deakin, G. (M)
Hayward, G. H. (A)
Hollister, D. G. (SM)
Langerman, H. (A)
Leonard, E. V. (M)
Moore, F. H. (SM)

Saratoga (SCH-1)
Goldstein, S. L. (A)

Saratoga Springs (SCH-1)
Ant, E. B. (M)
Cavenaugh, D. E. (M)
Saslow, S. (M)

Sauqerties (NY-MH-2)
Allen, G. W. (M)
Bading, C. E. (M)
Bright, D. W. (M)
Buck, R. D. (SM)
Byle, B. J. (A)
Cart, R. E. (M)
Conard, L. J. (A)
Gaglianello, J. W. (A)
Gibble, C. P. (M)
Goldberg, M. (M)
Kelly, D. A. (M)
Lett, A. S. (A)
Luiggi, R. H. (A)
Moynihan, J. D. (SM)
Newcomb, C. E. (A)
Nitschke, N. E. (M)
Patterson, D. A. (M)
Peavy, W. R. (M)
Pocalyko, P. N. (M)
Posklensky, D. (A)
Rooney, W. V. (M)
Rosenberger, G. B. (M)
Sawutz, G. (M)
Schoenherr, H. W. (M)
Slaney, E. G. (M)
Surman, G. R. (M)
Sweet, A. J., Jr. (M)
Yonesi, M. (A)
Young, F. G. (M)

Saugerties (NY-MH-2)
Allen, G. W. (M)
Bading, C. E. (M)
Bright, D. W. (M)
Buck, R. D. (SM)
Byle, B. J. (A)
Cart, R. E. (M)
Conard, L. J. (A)
Gaglianello, J. W. (A)
Gibble, C. P. (M)
Goldberg, M. (M)
Kelly, D. A. (M)
Lett, A. S. (A)
Luiggi, R. H. (A)
Moynihan, J. D. (SM)
Newcomb, C. E. (A)
Nitschke, N. E. (M)
Patterson, D. A. (M)
Peavy, W. R. (M)
Pocalyko, P. N. (M)
Posklensky, D. (A)
Rooney, W. V. (M)
Rosenberger, G. B. (M)
Sawutz, G. (M)
Schoenherr, H. W. (M)
Slaney, E. G. (M)
Surman, G. R. (M)
Sweet, A. J., Jr. (M)
Yonesi, M. (A)
Young, F. G. (M)

Sauquoit (RU-1)
Krusemark, K. A. (M)

Sayville (LI-2)
Kussmaul, E. A. (M)
Potter, D. W. (M)
Sprague, R. M. (M)

Scarborough (NY-W-2)
Garretto, L. A., Jr. (M)

Scarsdale (NY-W-2)
Alpert, N. (SM)
Axelrod, A. (M)
Burnell, L. G. (SM)
Carlson, R. E. (SM)
Davidoff, S. (SM)
Dubbs, B. (M)
Fein, M. J. (SM)
Fox, W. C. O. (M)
Heller, S. (M)
Jarl, R. B. (M)
Keegan, R. R. (M)
Lichtenstein, M. J. (SM)
Maser, H. (SM)
McKirdy, R. W. (M)
Misisco, E. J. (SM)
Monroe, R. B. (SM)
Oppenheimer, F. W. (M)
Scholand, R. M. (M)
Seitz, F. A. (M)
Skalski, C. A. (M)
Slaybaugh, C. W. (SM)
Snyder, R. F. (SM)
Stephens, M. C. (A)
Turner, A. (M)
Walsh, W. J. (A)
Worthington, J. H. (A)

Schenectady (SCH-1)
Abraham, L. G., Jr. (A)
Acton, E. S. (M)
Adams, H. J. (M)
Alexanderson, E. F. W. (F)
Allen, C. C. (SM)
Amoth, V. W. (SM)
Anderson, J. M. (SM)
Anderson, R. E. (SM)
Barlow, D. P. (M)
Begqs, J. E. (F)
Bolster, M. F. (M)
Borner, E. F. (M)
Bottone, S., Jr. (M)
Bowne, W. L. (M)
Boyd, M. R. (M)
Branch, G. M., Jr. (SM)
Brandes, P. D. (M)
Broughton, W. G. (M)
Buchhold, T. A. (SM)
Buddenhagen, D. A. (M)
Burke, H. K. (M)
Buscher, R. G. (M)
Chernoch, J. (M)
Chestnut, H. (SM)
Coates, C. L., Jr. (M)
Coghill, H. D. (M)
Cohen, A. (M)
Collins, R. N. (M)
Concordia, C. (SM)
Craig, E. J. (M)
Cruger, B. W. (A)
Cummings, J. C. (M)
Curtis, T. P. (SM)
Dabul, A. (M)
Day, H. R. (SM)
Debiase, R. G. (M)
Dehn, R. A. (SM)
De Santis, V. J. (SM)
Dickinson, T. M. (M)
Dodson, G. C., Jr. (M)
Duckwald, G. S., Jr. (M)
Ellert, F. J. (A)
Ender, R. C. (M)
Eshbach, J. R. (M)
Farrell, G. A. (M)
Felker, G. E., Jr. (M)
Fick, C. G. (F)
Fink, L. R. (F)
Fisher, J. C. (M)
Ford, W. A. (SM)
Frick, G. W. (SM)
Friedman, D. B. (M)
Frischmann, P. G. (M)
Gable, A. C. (SM)
Gittinger, N. C. (M)
Glow, A. E., Jr. (M)
Goldman, R. G. (SM)
Goodwin, J. M. (M)
Grover, F. W. (F)
Hall, R. N. (F)
Hamilton, J. J. (SM)
Harnden, J. D., Jr. (SM)
Hawkins, D. W. (SM)
Heiden, C. M. (SM)
Henyan, G. W. (M)
Herrmann, G. M. (SM)
Hess, P. N. (M)
Hickey, J. S., Jr. (SM)
Hoffman, T. R. (SM)
Hughes, R. M. (M)
Jackson, E. J. (SM)
Jacobs, E. (M)
Jakomat.. C. V. (M)
Jensen, A. O. (M)
Kamen, W. J. (A)
Kaufmann, R. H. (A)
Keenan, P. P. (M)
Keister, J. E. (F)
Kessler, G. W. (M)
King, F. E. (M)
Kirkmayer, L. K. (M)
Kohl, H. F. (A)
Kowalczyk, A. C. (A)
Lafferty, J. M. (F)
Lang, J. M. (M)
Larson, R. W. (SM)
Lawson, J. L. (SM)
Lee, E. S. (SM)
Lennerman, E. R. (SM)
Lemmond, C. Q. (M)
Lewis, P. M., II (M)
Linville, T. M. (SM)
Lippitt, D. L. (M)
Maginniss, F. J. (M)
McAllister, J. F., Jr. (SM)
McArthur, E. D. (F)
McKeehan, W. F. (A)
Meahl, R. R. (SM)
Merz, D. M. (M)
Mihran, T. G. (SM)
Moles, F. J. (SM)
Morgan, R. E. (M)
Morrison, A. (SM)
Newhouse, V. L. (M)
Numrych, E. C. (M)
Owen, J. K. (A)
Owens, O. C. (M)
Page, R. L. (M)
Pashler, P. E. (SM)
Patterson, F. G. (M)
Paxton, E. B. (M)
Pester, R. F. (SM)
Peters, P. H., Jr. (SM)
Pravda, M. F. (M)
Prince, D. C. (SM)
Quine, J. P. (M)
Rankin, A. E. (SM)
Raschke, R. R. (M)
Reed, R. T. (SM)
Reiling, G. H. (M)
Rich, J. A. (SM)
Rivest, E. L. (SM)
Rocha, H. A. F. (A)
Rodbell, D. S. (M)
Rosner, C. H. (M)
Rothe, F. S. (M)
Russ, R. B. (SM)
Sampson, E. S. (SM)
Shinn, B. J. (SM)
Shuey, R. L. (SM)
Speray, M. R. (M)
Storm, H. F. (SM)
Stromer, P. R. (A)
Stupp, R. J., Jr. (SM)
Suits, C. G. (F)
Summerhayes, H. R., Jr. (SM)
Swann, D. A. (M)
Szalewski, F. J. (M)
Taylor, J. E. (M)
Taylor, L. A. (M)
Teare, W. H. (SM)
Teasley, R. C. (M)
Thal, H. L., Jr. (M)
Thayer, R. W. (A)
Thorson, H. L. (SM)
Tiemann, J. J. (M)
Tomlinson, J. M. (M)
Troutman, P. H. (M)
Turrentine, R. E. (SM)
Verzulli, J. U. (M)
Volkers, W. K. (SM)
Wade, W. T. (M)
Waldron, W. K. (M)
Ward, R. H. (A)
Wargo, P. (M)
Watkins, K. E. (M)
Watson, R. P. (SM)
Watters, R. L. (M)
Webster, H. F. (SM)
Weinstein, M. (M)
Welch, D. I. (M)
White, F. A. (M)
White, G. M. (M)
White, W. C. (F)
Wolfe, J. E. (SM)
Young, C. M. (SM)
Young, J. D. (M)
Yu, S. P. (M)

Scipio Center (SYR-1)
Maturizch, J. D. (A)

Scotia (SCH-1)
Alexander, N. W. (M)
Bailey, W. E., Jr. (M)
Bondley, R. J. (SM)
Brougham, R. W. (M)
Chambers, D. E. (F)
Cook, E. D. (F)
Coolidge, A. W., Jr. (M)
Day, B. E. (M)
Eisenacher, P. L. (M)
Elder, T. A. (SM)
Fraenckel, V. H. (M)
Gardiner, P. C. (SM)
Gardner, G. F. (M)
Gauper, H. A., Jr. (SM)
Granat, W. G. (M)
Griffin, G. J., Jr. (M)
Hamaker, C. W. (SM)
Hanrahan, L. R. (A)
Harris, L. A. (M)
Henry, R. J. (M)
Iler, G. W. (SM)
Knickerbocker, C. H. (M)
Mayer, C. B. (SM)
Moore, G. F. D. (M)
Roberts, S. (M)
Sendzuk, G. T. (M)
Travis, E. F. (SM)
Vaughan, J. R. M. (SM)
Wade, E. J. (M)
Wagoner, C. A. (SM)
Wellinger, R. P. (M)
Younger, C. (A)

Scottsville (ROC-1)
Benin, Z. (SM)

Sea Cliff (LI-2)
Beer, A. E. (M)
Black, E., Jr. (SM)
Gross, R. I. (M)
Hine, E. A. (M)
Hulland, B. L. (M)
Maturszek, F. A. (A)
Roherty, T. M. (M)
Shane, D. C. (M)
Singleton, C. M. (M)
Solt, H. B. (M)

Seaford (LI-2)
Bartolotta, M. (M)
Battle, F. H., Jr. (M)
Beckham, C. L. (SM)
Catenaro, R. D. (M)
Cometz, W. (M)
Diehlmann, J. T. (M)
Eachus, W. J. (M)
Ferraro, J. P. (M)
Flanholtz, P. (A)
Flattau, W. (M)
Goodman, D. M. (SM)
Klauber, M. (M)
Krammer, J. (A)
Krutman, J. M. (A)
McEvoy, H. G. (M)
McPherson, D. L., III (M)
Meyer, W. C. (A)
Norman, T. E. (A)
Oliver, O., Jr. (M)
Perlmutter, A. M. (M)
Perreira, D. G. (A)
Perzeszty, T. S. (A)
Purdy, R. L. (A)
Selby, A. R. (M)
Walker, A. S. (M)
Weiner, G. (A)
Wolin, S. (A)

Seaford Harbor (LI-2)
O'Maley, J. B. (M)

Searingtown (LI-2)
Barney, K. H. (SM)
Hammer, R. M. (SM)

Seneca Falls (ROC-1)
Burroughs, F. L. (SM)
Cowden, D. G. (M)
Dangremond, J. L. (M)
Dickinson, W. A. (SM)
Dowse, E. C., Jr. (M)
Eisengrein, R. H. (M)
Faust, A. C. (A)
Fogg, G. E., Jr. (M)
Gessford, R. K. (SM)
Greenberg, I. D. (M)
Haas, P. (M)
Holcumb, W. A. (A)
Kahl, M. I. (SM)
Keen, A. W. (SM)
Krawitz, M. (SM)
Loughlin, J. H. (SM)
Mackey, D. G. (A)
Ottemiller, W. H., Jr. (SM)
Peck, H. D., Jr. (M)
Shields, R. R. (M)
Stone, E. O. (M)
Stone, R. W. (SM)
Swan, R. A., Jr. (M)
Vogel, R. Q. (M)
Whitten, A. C. (A)

Setauket (LI-2)
Carpenter, J. J., Jr. (M)
Jacke, S. E. (M)
Mason, R. P. (M)

Sherburne (BING-1)
Brown, H. H. (M)
Drake, J. E. (M)
Fowler, A. K. (M)
Leitner, R. T. (M)
Lundahl, T. (SM)
Powers, R. E. (A)
Sleeper, G. B., Jr. (M)
Voorhaar, F. R. (M)

Shoreham (LI-2)
Sheridan T. R. (SM)

Shrub Oak (NY-W-2)
Shapiro, E. (M)

Sidney (BING-1)
Delaney, M. J. (M)
Knak, J. L. (M)
Stevens, W. P. (M)
Struble, R. C. (A)

Silver Creek (ERI-1)
Burris, H. A. (A)
Gull, R. A. (SM)

Skaneateles (SYR-1)
Biele, R. J. (SM)
Clark, P. B. (M)
Dean, W. W. (SM)
Hackley, C. L. (M)
Leeder, H. A., Jr. (M)
Lloyd, C. G. (SM)
Rist, D. H. (M)
Wiggin, J. F. (A)
York, R. A. (SM)

Slingerlands (SCH-1)
Bowie, W. G. (SM)
Dillenback, G. V., Jr. (M)
Longley, J. F. (SM)
Rechnitzer, B. W. (A)
Roderick, R. A. (A)

Smithtown (LI-2)
Bernhardt, C. A. (M)
Bertolino, A. P. (M)
Bies, R. K. (M)
Elliott, W. A. (M)
Fawcett, R. T. (M)
Fincke, W. H. (M)
Hanratty, R. J. (M)
Hastings, D. F. (M)
Kelly, J. H. (A)
Knudson, D. R. (M)
Leary, J. B. (M)
Leidich, A. J. (M)
Lerner, D. (M)
Miller, J. S. (M)
O'Connor, J. L. (M)
O'Neill, E. P. (M)
Pawelko, M. J. (M)
Rosa, J. (M)
Roth, W. B. (A)
Sinniger, J. O. (M)
Wengenroth, R. D. (M)
Wethington, T. G. (M)

Smithville Flats (BING-1)
Rotherforth, D. E. (A)

Snyder (BN-1)
Batint, A. T. (SM)
Blair, D. J. (M)
Breeden, F. C. (M)
Halsted, G. P. (M)
Hultberg, C. A. (SM)
Melling, W. P. (SM)
Mulock, R. B. (M)
Richmond, G. E., Jr. (M)
Robins, B. W. (SM)
Sanders, E. R. (SM)
Tittle, H. C. (M)
Whyman, E. W. (SM)

Solvay (SYR-1)
Fragnito, J. P. (M)
Shofstall, N. F. (SM)
Wagner, Z. G. (A)

South Fallsburg (NY-MH-2)
Stieglitz, C. B. (M)

South Farmingdale (LI-2)
Moreira, N. M. (A)
Morishita, N. (M)

South Hempstead (LI-2)
Dopman, W. G. (M)
La Rosa, R. (SM)

South Huntington (LI-2)
Borghard, A. A. (A)

South Lansing (ITH-1)
Bray, D. W. (SM)

South Ozone Park (LI-2)
Calabrese, A. (A)
Gilmore, J. F. (M)
Glickman, H. (M)
Helm, R. R. (M)
Marro, M. J. (M)
Neiland, A. C. (A)
Rogers, W. (A)
Simmons, C. H. (A)

South Salem (NY-W-2)
Becker, H. R. (A)
Smith, J. C. (M)

Sparkill (NY-W-2)
Weschler, W. A. (M)

Spencerport (ROC-1)
Krueger, R. K. (M)
McGarvey, C. F. (M)
Reynolds, H. J. (A)
Sibley, H. C., Jr. (SM)

Springfield Gardens (LI-2)
Berthold, R. V. (M)
Davey, D. F. (M)
James, A. V. (A)
Martin, L. E. (A)
Philips, L. E. (A)
Stiles, A. P. (M)

Spring Valley (NY-W-2)
Bohlke, W. K. (A)
Braunstein, L. J. (A)
Broussely, M. (A)
Cook, S. (M)
Faist, C. A. (A)
Rosenbaum, J. (M)
Semer, M. (M)
Staniloff, S. A. (A)
Welan, I. (M)

Staatsburg (NY-MH-2)
Norlan, R. (M)

Staten Island (NY-2)
Anderson, A. L. (A)
Arne, O. R. (M)
Aurlema, R. C. (M)
Bridge, J. A. (M)
Brown, A. L. (A)
Cerasoli, A. (M)
Codd, B. E. (M)
Correard, L. P. (M)
Culicetto, P. J. (M)
De Rosa, H. M. (M)
Gonthier, R. R. (M)
Goretsky, L. M. (A)
Droste, G. T. (M)
Duslo, E. W. (M)
Gunther, F. A. (SM)
Hamilton, C. W. (M)
Harney, P. J., Jr. (M)
Howarth, H. F. (M)
Klein, W. T. (M)
Kopecky, G. F. (M)
Levine, M. E. (SM)
Lewis, L. C. (SM)
Lilenfeld, J. (M)
Loesch, C. A. (M)
Luse, J. D. (M)
Martenson, R. B. (A)
Miller, S. S. (M)
Molinell, R. J. (M)
Myslicki, R. L. (M)
Panicello, T. B. (M)
Phillips, B., III (A)
Platt, S. (M)
Plant, R. E. (A)
Radgowski, S. P. (M)
Reeves, J. F. (M)
Reinhardt, N. J. (M)
Rietmeyer, H. W. F. (M)
Rodwin, G. (SM)
Rosenquist, J. H. (A)
Russell, L. H. (M)
Sclan, H. (A)
Shanley, J. J. (A)
Stueble, J. G. (M)
Tesse, M. J. (A)
Viens, R. F. (A)
Weinberg, T. L. (A)
Weinmann, R. W. (A)
Yagerline, J. I. (A)
Zucker, S. M. (A)

Stewart Manor (LI-2)
Garrigan, T. E. (A)
Norton, R. S. (SM)
Quell, C. H. (M)
Ruddy, W. R. (M)

Stittville (RU-1)
Corey, S. A. (M)
Lege, A. C. (M)
Williams, R. L. (M)

Stone Ridge (NY-MH-2)
Darrell, R. D. (A)
Raymond, A. H., Jr. (M)
Winnard, J. R. (M)

Stony Brook (LI-2)
Beukers, J. M. (M)
Beverage, H. H. (F)
Holmes, D. D. (M)
Keefe, G. (A)
Lurch, E. N. (M)
Medd, J. S. (SM)
Meranda, J. I. (M)
Nash, R. W. (M)
Tramposch, W. J. (M)
Woodward, J. E. (M)

Suffern (NY-W-2)
Brendle, T. A. (A)
Frachtman, H. E. (M)

Sunnyside (LI-2)
Axler, M. F. (M)
Fried, S. J. (M)
Maylinger, A. (M)
Taylor, A. (M)
Young, J. M. (M)

Swan Lake (NY-MH-2)
Turetsky, N. (M)

Syosset (LI-2)
Abrams, C. F. (M)
Ashinsky, M. (M)
Barlam, T. (M)
Beardsworth, R. (A)
Berg, R. S. (A)
Bergman, S. I. (SM)
Bosse, W. F. (SM)
Calpena, J. (M)
Cammer, M. (M)
Campbell, T. A. (M)
Caruthers, F. P. (SM)
Casper, S. D. (SM)
Cataldi, J. T. (M)
Charlton, J. (M)
Chow, W. T. (SM)
Clark, A. E., Jr. (A)
Espenlaub, W. C. (M)
Freeman, S. M. (M)
Freiman, M. J. (M)
Funk, R. W. (SM)
Goldmuntz, L. A. (M)
Goodwin, R. L. (M)
Gorowitz, M. (M)
Graham, W. (M)
Cole, L. G. (M)
Collstra, W. P. (M)
Crosby, M. G. (F)
Dagavarian, H. O. (SM)
D'Avino, R. F. (A)
De Bolt, H. E. (A)
Djinis, W. (SM)
Engle, D. C. (M)
Erickson, J. S. (SM)
Greenleaf, F. D. (SM)
Helenek, A. R. (M)
Hershkowitz, P. (M)
Hess, J. C., III (A)
Hodgson, R. (SM)
Hoffman, R. R., Jr. (M)
Holst, P. F. G. (SM)
Irwin, R. P. (M)
Jarva, W. (A)
Kluschner, A., Jr. (M)
Knight, R. W. (M)
Koletsky, H. (M)
Kuhn, J. J. (M)
Lasolo, C. A. (M)
Leavitt, B. W. (SM)
Lehtonen, E. W. (M)
Leslie, M. W. (SM)
Lovell, J. A. (M)
Lublin, I. (M)
Marcus, D. H. (M)
McKeown, P. J. (M)
Moerman, N. A. (M)
Nittoli, A. J. (M)
Pace, F. P. (M)
Perry, J. W. (M)
Price, D. (M)
Putland, R. J. (M)
Raber, S. (SM)
Rein, C. A. (A)
Reisch, R. P. (M)
Rowinski, S. J. (M)
Sherman, E. H. (SM)
Smith, R. (A)
Sornberger, E. A. (A)
Stallone, M. J. (SM)
Staschover, L. (M)
Statsinger, J. (SM)
Stella, R. (M)
Thomas, E. U. (SM)
Tisdale, J. G. (M)
Unruh, G. E. (M)
Vander Veer, J. H. (M)
Wachspress, M. H. (SM)
Walcule, D. (M)
Weidmann, L. J. (M)
Werst, M. C. (M)
White, R. C. (M)
Wing, R. (A)
Wylie, T. F., Jr. (M)

Syracuse (SYR-1)
Abeyta, J. P., Jr. (M)
Abrahams, I. C. (SM)
Allmansky, M. (M)
Allen, J. E. (SM)
Allen, S. I. (M)
Anderson, A. F. (A)
Anderson, C. T. (M)
Andrews, P. D. (SM)
Andrews, R. S. (A)
Apple, L. S. (M)
Aronson, C. A. (SM)
Ashcroft, D. L. (SM)
Astemborski, T. J. (M)
Bachman, C. H. (F)
Baker, L. T. (M)
Baker, W. R. G. (F)
Balabanian, N. (SM)
Barlow, L. C. (A)
Barnhart, H. D. (M)
Bartle, N. D., II (M)
Barton, L. M. (SM)
Beard, C. E. (SM)
Beldner, G. M. (M)
Bennett, S. P. (A)
Berlin, R. D. (A)
Berlind, R. (M)
Bernkopf, W. C. (M)
Best, R. C. (M)
Blas, F. J. (SM)
Blenvenu, M. L. (M)
Blsson, E. W. (SM)
Bluhm, V. A. (M)
Bogosta, W. (M)
Bogusch, R. L. (M)
Bostick, G. (SM)
Boucheron, P. H., Jr. (SM)
Bowen, B. A. (M)
Brandli, A. (M)
Bronikwitz, L. E. (M)
Brown, L. C. (A)
Brule, J. D. (SM)
Buchta, J. C. (M)
Burkart, H. H. (SM)
Burke, T. H. (M)
Cabaniss, E. H. (SM)
Caffrey, T. P. (A)
Cain, W. E., Jr. (M)
Calucci, E. J. (M)
Campbell, V. C. (SM)
Caputo, S. A. (A)
Card, W. H. (M)
Carr, W. C. (A)
Carrillo, E. B. (M)
Chafaris, G. J. (M)
Chaixanien, S. (M)
Chapman, J. K. (SM)
Cheng, D. K. (F)
Chevli, N. A. (M)
Chismark, A. H. (M)
Chivers, C. C. (M)
Chovan, J. L. (M)
Chow, W. F. (SM)
Chu, R. H. (M)
Clark, A. A. (M)
Clark, M. M. (M)
Clement, R. R. (M)
Cleverley, D. S. (M)
Cochran, N. B. (M)
Colburn, J. H. (M)
Cole, B. H. (M)
Colegrove, C. D. (M)
Collins, N. E. (M)
Conger, W. H. (M)
Connors, T. J., Jr. (M)
Cook, C. L. (M)
Countryman, D. J. (M)
Cox, T. M. E. (M)
Coykendall, J. C. (SM)
Crosby, H. M. (SM)
Curry, T. F. (M)
Danielson, G. H. (M)
Davis, M. M., Jr. (SM)
De Dufour, W. F. (A)
Dee, P. L. (M)
Demkowski, W. P. (M)
Denny, J. H. (M)
Di Bartolo, J. J. (M)
Docter, S. (A)
Doherty, D. T. (M)
Dome, R. B. (F)
Dostal, C. A. (A)
Drum, J. J. (M)
Duronio, K. B. (M)
Earls, H. G. (SM)
Eaton, R. D. (M)
Eckert, T. A. (M)
Egan, J. J. (A)
Egtvedt, M. D. (M)
Eicholzer, A. J. (M)
Elias, H. J. (M)
Embree, C. R. (M)
Evans, H. J. (SM)
Ewing, L. M. (SM)
Fanning, J. E., Jr. (M)
Farrell, J. J. (F)
Fazio, J. A. (M)
Fedorowycz, B. W. (M)
Fields, H., Jr. (M)
Fishman, H. (SM)
Fitzmorris, S. R. (M)
Fong, K. (M)
Foster, R. F. (SM)
Friedman, H. J. (M)
Fritschel, P. G. (A)
Frost, R. R. (M)
Fruin, R. E. (M)
Fulton, C. K. (A)
Galbraith, R. A. (SM)
Gallagher, B. D. (M)
Ganter, C. F. (M)
Garber, S. M., Jr. (M)
Garcia, R. R. (M)
Garfein, A. (A)
Garry, G. A. (M)
Geasey, R. E. (M)
Gerlack, R. Z. (M)
Gernand, M. E. (M)
Ghandhi, S. K. (SM)
Gibbons, E. H., Jr. (M)
Gimenez, M. S. (A)
Glasford, G. M. (SM)
Gleichauf, P. H. (SM)
Goldman, S. (F)
Golubjatnikov, O. (M)
Good, W. E. (F)
Gordon, F. D. (M)
Gorman, D. F. (M)
Gottlieb, E. (M)
Greenbaum, J. R. (M)
Greenwood, R. R. (M)
Gruenberg, H. (M)
Guckenheimer, E. (M)
Gussak, M. (A)
Gutman, W. J. (M)
Haedecke, A. D. (SM)
Hamlett, J. G. (M)
Hanousek, R. A. (M)
Harbourt, C. O. (M)
Harrington, R. F. (M)
Harris, P. E. (M)
Hatch, B. D. (SM)
Healy, R. G. (M)
Heaton, H. T. (M)
Heckelmax, R. W. (M)
Heinzerling, E. W. (M)
Heising, C. R. (M)
Herzog, E. E. (M)
Hertzog, E. F. (F)
Hicks, R. B. (M)
Hjortzberg, A. B. (M)
Hoefer, W. G. (M)
Hoffman, J. (M)
Hogan, M. B. (SM)
Holland, J. T., Jr. (M)
Holmes, K. O. (SM)
Holonyak, N., Jr. (M)
Holtz, R. E. (M)
Holtzaw, B. L. (M)
Honigman, R. L. (M)
Howells, P. W. (F)
Hu, M. K. (SM)
Hu, Y. S. (SM)
Hull, C. O., Jr. (M)
Humeniuk, P. (SM)
Hunter, N. E. (M)
Hurley, D. T. (M)
Hutchins, C. M. (M)
Intrator, A. M. (M)
Irwin, J. M. (M)
Jeffers, W. M. (A)
Johnson, R. A. (SM)
Johnson, R. M. (M)
Johnson, S. O. (M)
Jost, J. W., Jr. (M)
Jureller, J. F. (M)
Kantor, S. D. (A)
Katz, H. W. (M)
Keaner, R. M. (M)
Keener, M. A. (A)
Kelly, P. E. (M)
Kennedy, A. (SM)
Kent, G. (M)
Kenyon, S. W. (A)
Kille, R. W. (M)
Kinzie, M. E. (M)
Klpp, K. J. (M)
Klrk, R. L. (M)
Kirkendall, J. T. (M)
Klade, W. F., Jr. (M)
Kleiner, S. (A)
Kletsky, E. J. (M)
Knights, J. E. Jr. (SM)
Knox, R. L. (M)
Koch, A. R. (SM)
Korolenko, A. V. (M)
Korolenko, K. V. (M)
Kosso, E. V. (M)
Krackhardt, E. M. (M)
Krall, W. F. (M)
Kreitzer, N. H. (M)
Krentel, W. D. (M)
Kunz, L. C., Jr. (M)
Laughton, W. J., Jr. (M)
Lazar, H. (M)
Le Clair, J. E. (M)
Lederer, E. H. (SM)
Leinweber, L. F. (M)
Lepage, W. R. (F)
Lesk, I. A. (SM)
Levine, A. (A)
Levitt, R. S. (M)
Lightstone, J. B. (M)
Lipnitz, J. W. (A)
Lippert, H. B. (SM)
Liu, T. P. L. (M)
Lombard, W. A. (M)
Longacre, A. (SM)
Lucas, V. M. (M)
Ludwiczak, T. A. (M)
Lurie, A. B. (A)
Lynch, I. E. (M)
Lynn, L. H. (SM)
Mac Leod, W. R. (M)
Mader, G. E. (M)
Maier, L. C., Jr. (M)
Mark, R. C. (M)
Marriott, D. F. (M)
Martin, H. R. (A)
Marvin, H. B. (F)
Masnik, M., Jr. (M)
Mather, D. L. (M)
Maxwell, D. E. (SM)
Mayer, R. C. (M)
McCarthy, J. J. (M)
McFee, R. (M)
McGeiver, S. F. (M)
McGilvra, G. E. (M)
McMurtrie, K. A. (SM)
Merrigan, C. F. (M)
Merrill, J. H. (M)
Merrithew, R. F. (M)
Metzler, D. H. (A)
Meyer, B. H. (M)
Mikaelian, M. (M)
Millman, G. H. (SM)
Moerth, W. J. (A)
Muir, D. A. (SM)
Mullen, E. B. (M)
Mullin, L. A. (SM)
Murphy, M. F. (M)
Muth, R. M. (M)
Myers, C. H. (A)
Neelands, L. J. (M)
Neely, L. E. (M)
Nonnekens, A. C. (SM)
Norton, C. T. (SM)
Novak, R. L. (M)
Oberrender, G. F., Jr. (M)
Ocko, R. (SM)
Ohms, D. V. (A)
Olesen, A. (M)
Osinski, W. M. (A)
Paganelli, T. I. (SM)
Page, E. R. (M)
Pardee, O. O. (M)
Passarelli, W. F. (M)
Payne, G. W. (M)
Penn, W. A. (M)
Perini, J. (A)
Perry, H. E. (M)
Perry, J. L. (M)
Peterson, E. O. (M)
Peterson, E. H., Jr. (M)
Pollisse, L. F. (M)
Potter, J. M. (M)
Powell, F. E., Jr. (A)
Priest, C. A. (F)
Prosser, A. M. (A)
Prostine, R. U. (M)
Pustelnyk, M. (M)
Putman, R. E. (M)
Quinn, H. H., Jr. (M)
Raillard, H. (M)
Ramp, H. O. (M)
Randall, D. P. (SM)
Reale, J. D. (A)
Ream, C. E. (M)
Redman, D. A. (M)
Relbert, F. A. (M)
Reynolds, A. G. (M)
Reynolds, D. E. (M)
Reynolds, F. M. (M)
Reza, F. (M)
Richardson, R. L. (M)
Roberts, E. G., Jr. (SM)
Roesch, R. G. (A)
Romey, L. M. (M)
Rosenblatt, A. (A)
Rosenqreen, A. (M)
Rothenberg, H. C. (SM)
Rcussin, A. G. (M)
Rubin, I. E. (M)
Rush, S. (SM)
Ruterman, E. R. (M)
Sadowsky, S. S. (M)
Sanders, A. E. (M)
Scheelar, J. M. (M)
Schermerhorn, R. E. (A)
Schlecht, M. F. (M)
Schuh, R. P. (M)
Schupp, G. A., Jr. (SM)
Scott, K. J. (M)
Scrivner, J. H. (SM)
Seidel, R. E. (M)
Selig, T. R. (M)
Sensinger, W. A. (M)
Seshu, S. (M)
Shaw, C. A. (M)
Shepp, R. E. (M)
Shetler, R. L. (M)
Shields, C. J. (M)
Shuart, O. H. (M)
Silvagolo, J. A. (A)
Smith, B. J. (M)
Smith, R. L. (SM)
Smith, W. F., Jr. (A)
Snitke, J. A. (A)
Somers, L. E. (M)
Spann, F. G. (SM)
Spear, E. D. (SM)
Spitzak, E. W. (M)
Stack, J. F. (M)
Starkey, G. M. (M)
Stauffer, J. W. (M)
Stearns, C. M. (M)
Steputis, D. M. (M)
Stern, A. P. (SM)
Stone, E. W. (SM)
Stone, W. R. (M)
Stonig, J. W. (A)
Straub, W. W. (M)
Sullivan, H. M. (SM)
Sullivan, P. E. (M)
Sullivan, R. M. (M)
Suran, J. J. (SM)
Swank, W. B. (M)
Swanson, R. W. (M)
Sylvan, T. P. (M)
Tanakaya, S. T. (M)
Taylor, J. M. (M)
Teich, P. J. (M)
Thies, C. H. (SM)
Thomson, T. N. (M)
Thor, R. C. (M)
Towlson, H. G. (SM)
Tymann, T. J. (A)
Vandling, G. C. (M)
Von Fange, E. K. (M)
Waller, A. A. (M)
Walser, R. J. (SM)
Warner, D. P. (M)
Wayne, C. R. (SM)
Weber, E. V. (M)
Wechsler, L. D. (M)
Weir, I. R. (F)
Wellman, C. E., Jr. (M)
Wellner, F. R. (SM)
Wessel, G. K. (SM)
Whistler, W. T. (M)
Widmann, L. C. (M)
Wild, A. F. (A)
Wilder, R. L. (A)
Wingrove, E. R., Jr. (M)



Witkowski, R. J. (SM)
Woodward, R. M. (M)
Wright, T. C. (M)
Wurdinger, E. D. (M)
Wyrick, R. F. (M)
Wysocki, T. C. (A)
Yamaoka, J. H. (M)
Yang, G. C. C. (M)
Yerlan, C. S. (SM)
Zecher, R. O. (M)
Zeldenbergs, G. (M)
Zierdt, C. H., Jr. (SM)

Tappan (NY-W-2)
Petrakos, N. (M)
Yamasaki, A. A. (M)

Tarrytown (NY-W-2)
Bevan, R. K. (M)
Cartoon, G. P. (M)
Feile, R. H. (A)
Guzik, I. M. (M)
Love, G. V. (M)
Marshall, S. J. (A)
Norton, J. M. (M)
Passman, A. J., Jr. (M)
Rae, J. R. (SM)
Sumoski, T. (M)
Taylor, E. R., Jr. (A)
Williamson, C. R. (M)

Thornwood (NY-W-2)
Belcher, R. D. (M)
Burfeindt, K. L. (M)
Burns, G. D. (A)
Du Bois, N. L. (M)
Hall, H. D. (M)
Levine, R. J. (M)
MacDonald, J. N. (M)
Matsuoka, M. E. (M)
Orth, F. (M)
Thiele, P. O. (M)
Washburn, C. A. (M)

Tillson (NY-MH-2)
Hamoshire, J. R. (M)
Mangan, B. A. (A)

Tioga Center (BING-1)
Leightner, R. A. (M)

Tonawanda (BN-1)
Archibald, W. R. (M)
Babcock, L. F. (M)
Banshak, W. G. (A)
Baumler, F. R. (M)
Bossler, F. B. (M)
Burke, J. J. (M)
Calhoun, S. H. (A)
Carlson, R. E. (M)
Chipchak, J. S. (M)
Cooper, G. S. (M)
Dole, L. H. (M)
Ess, H. E. (M)
Gordy, E. (A)
Groth, L. H. (M)
Harp, G. E. (A)
Harpster, W. T. (SM)
Janushevich, A. (M)
Koons, E. E. (M)
Leichman, D. K. (SM)
Lepley, R. C. (SM)
Limburg, M. A., Jr. (M)
Mahany, T. D., Jr. (M)
Mefdrum, M. A. (M)
Mennen, H. (M)
Morrison, H. V. (M)
Nelson, R. E. (M)
Noye, P. R. (M)
Paley, D. A. (M)
Pate, A. R. (A)
Plicato, W. L. (A)
Popovich, B. (SM)
Reese, J. S. (M)
Roess, T. L. (M)
Sano, J. P. (M)
Schlichter, E. S. (M)
Shaler, P. M., Jr. (M)
Shuart, J. F. (M)
Smolarek, E. J. (A)
Staples, Z. B. (M)
Telep, E. (A)
Timberlake, F. A. (SM)
Walbesser, W. J. (M)
Wasserman, B. (SM)
Wiedemann, W. C. (M)
Wixson, E. S. (M)
Zehr, R. M. (M)

Troy (SCH-1)
Babits, V. A. (F)
Banga, M. M. (M)
Bashford, H. L. (M)
Beam, W. R. (SM)
Beers, R. F. (SM)
Close, C. M. (M)
Dmytero, J., Jr. (M)
Gotkis, S. J. (M)
Harris, H. D. (M)
Hogan, R. B. (M)
Holt, E. H. (M)
Jenkins, K. W. (M)
Kunz, C. J., Jr. (M)
Libelo, F. (M)
Love, A. L. (M)
McClintock, W. G. (M)
Norvik, F. J. (SM)
Servis, W. A. (A)
Van Den Biggelaar, H. (M)

Trumansburg (ITH-1)
Beers, R. B. (M)

Tuckahoe (NY-W-2)
Austin, K. B. (M)
Avakian, E. A. (M)
Bollari, L. (A)
Drew, C. E. (SM)
Gallios, G. C. (M)
Jurafsky, A. J. (M)
Nerenberg, R. I. (M)
Suppa, P. P. (M)
Walsh, J. V. (M)

Tuxedo (NY-MH-2)
Obolensky, A. C. (A)

Ulster Park (NY-MH-2)
Waldenmayer, D. W. (M)

Union (BING-1)
Morgan, W. A. (M)

Uniondale (LI-2)
Aha, P. S. (M)
Bean, J. E. (M)
Brenner, M. (M)
Delligatti, S. F. (M)
Gould, R. V. (SM)
Keen, H. S. (M)
Kushner, G. (M)
Lenett, S. D. (M)
Levinson, S. (M)
Mann, A. (M)
Ricker, N., Jr. (M)
Schmidt, J. G. (M)
Von Koenigseck, P. (M)
Weich, M. D. (M)

Upton (LI-2)
Adams, R. R. (M)
Bittner, J. W. (M)
Blewett, J. P. (SM)
Chase, R. L. (M)
Constant, T. N. (M)
Cowan, F. P. (M)
Fine, S. (M)
Fischer, J. (M)
Haiama, H. J. (M)
Higinbotham, W. A. (F)
Kuper, J. B. H. (F)
Plotkin, M. (SM)
Rankowitz, S. (M)
Rheaume, R. H. (SM)
Tucker, S. M. (M)

Utica (RU-1)
Ahladas, J. P. (M)
Ainsworth, M. G. (A)
Alexander, H. A. (M)
Anderson, J. M. (M)
Augustine, J. A. (M)
Babicz, R. J. (A)
Baran, A. S. (M)
Barker, J. (SM)
Bauman, J. D. (M)
Beams, C. E. (M)
Beaublen, W. H. (M)
Benvenga, F. T. (M)
Bertram, R. H. (A)
Boram, R. J., Jr. (M)
Brehm, W. R. (A)
Brodzik, D. A. (A)
Brown, R. J. (M)
Buckman, A. R. (M)
Campbell, W. J. (M)
Carlson, W. A. (M)
Chanatry, Y. D. (A)
Civin, C. J. (M)
Close, J. N. (A)
Cohen, J. J. (A)
Colin, L. (M)
Conrad, G. A. (M)
Corning, J. J. (M)
Cotton, L. J. (M)
Cottrell, C. J. (M)
Cranshaw, R. H. (A)
Crow, D. (M)
Darrow, F. M. (M)
Daun, J. E. (M)
Dean, J. E. (M)
Demick, D. (A)
Dondero, R. L. (M)
Dowdell, J. T. (A)
Doyle, C. M. (A)
Durfey, T. C. (M)
Eakin, K. G. (SM)
Everts, W. J. (M)
Feldman, H. (M)
Feldman, I. (A)
Gardner, R. J. (SM)
Glaser, G. J. (M)
Goodman, I. (M)
Gubbins, L. J. (M)
Habeck, G. L. (A)
Harris, R. L. (M)
Hart, G. W. (M)
Harvey, R. R. (A)
Hiatt, W. R. (M)
Homan, R. E. (M)
Horner, R. E. (A)
Hurlburt, R. C. (A)
Ignatz, R. R. (M)
Isaac, M. G. (M)
Jaros, W. F., Jr. (M)
Jeanne, C. E. (M)
Katz, H. (M)
Kelca, M. M. (M)
Kinsey, L. F. (M)
Kinsley, R. B. (M)
Klein, J. A. (M)
Klion, J. (M)
Krajewski, S. J. (M)
Krassowsky, S. (M)
Kurnik, J. G. (M)
La Forte, J. T. (M)
Lehman, M. L. (M)
Lemon, S. G. (M)
Liiv, H. H. (A)
Lovecchio, J. A. (M)
Maroulis, N. J. (M)
McComb, D. S. (M)
McGee, R. A. (M)
McLoughlin, B. A. (M)
Metzger, D. L. (M)
Metzger, F. J. (M)
Miles, R. J. (M)
Mills, G. M. (A)
Moldoff, S. (M)
Mongesku, W. O. (M)
Mortlock, C. E., Jr. (M)
Muntz, W. E. (SM)
Murray, W. H. (M)
Nicholson, D. W. (M)
Nishimura, H. G. (M)
Noble, M. L. (A)
North, F. J. (M)
Okamura, M. K. (A)
O'Leary, J. J. (SM)
Ost, R. F. (A)
Pacini, H. P. (M)
Panasiewicz, J. J. (M)
Pearlman, J. (M)
Peterossi, A. F. (M)
Pelowski, E. H. (M)
Perry, F. M. (M)
Peterpaul, C. A. (M)
Philip, R. M. (M)
Phillips, J. N. (SM)
Pietrafesa, D. (A)
Pino, J. P. (M)
Plehn, J. G. (SM)
Puopolo, J. W. (M)
Quinn, W. M., Jr. (SM)
Reiner, J. (M)
Reveal, C. A. (M)
Richardson, R. D. (M)
Ring, R. B. (M)
Robichaud, L. P. A. (M)
Robichaud, R. H. (M)
Romanelli, P. A. (SM)
Rosenberg, M. W. (A)
Ross, P. C. (SM)
Rubenstein, S. E. (M)
Rugari, A. D. (M)
Rusho, E. W. (M)
Salerno, A. (SM)
Satinoff, D. (A)
Schiffman, M. (SM)
Seideman, S. (M)
Serbyn, M. R. (M)
Siegel, G. H. (SM)
Smith, D. R. (M)
Smith, M. J. (M)
Sperling, L. (M)
Stehle, D. (M)
Stewart, D. A. (M)
Still, E. W. (M)
Streeter, J. P. (M)
Stuart, H. D. (M)
Stubbles, J. E. (M)
Suntop, M. A. (M)
Thomas, K. W. (M)
Thornton, J. W. (M)
Tibbitts, J. R. (M)
Tourtelot, E. E. (M)
Uryniak, A. J. (A)
Wagner, R. A. (SM)
Walls, G. R. (M)
Walls, W. J. (M)
Walters, J. E. (M)
Washington, R. W. (M)
Waters, M. F. (A)
Webb, J. K. (SM)
Wendt, R. F. (M)
Werner, W. F. (M)
Willard, C. H. (M)
Williams, H. A., Jr. (M)
Wilson, D. E. (M)
Young, J. S. (M)
Zawada, J. D. (A)
Zielinski, C. A. (M)

Valhalla (NY-W-2)
Bernstein, S. (SM)
Dworetzky, L. H. (SM)
Hodapp, E. W., Jr. (A)
MacAdam, W. K. (SM)
Parr, A. F. W. (M)

Valley Stream (LI-2)
Apess, M. C. (M)
Albanese, V. J. (SM)
Albaum, M. H. (M)
Bahnsen, R. J. (M)
Barnell, E. J. (A)
Bischof, C. C., Jr. (M)
Bittan, D. R. (A)
Blumenstock, A. (M)
Borkum, D. B. (M)
Chas, J. (A)
Clarke, J. F. (A)
Cohen, H. (M)
Davis, S. (M)
Deller, P. P. (A)
Drum, W. A. (A)
Freeman, P. S. (M)
Gamrat, S. (A)
Gangale, F. S. (A)
Goldman, G. (M)
Goodstein, J. (M)
Grossman, M. (M)
Haase, W. E. (A)
Holmes, R. P. (M)
Jacobs, E. C. (M)
Jeffreys, F. R. (M)
Johnson, A. E., Jr. (M)
Kappauf, E. F. (M)
Kern, J. R. (A)
King, L. H. (SM)
Lidz, S. (SM)
Lo Cascio, G. P. (M)
Magenheim, B. (M)
Mancke, R. B. (M)
Mauser, C. A. (A)
Mazziota, D. R. (M)
Meixner, V. G. (A)
Melnick, H. (M)
Miller, G. (A)
Minneman, M. J. (SM)
Misail, G. (A)
Morgenstern, A. (A)
Peyser, W. P. (SM)
Piheil, L. J. (A)
Platt, S. (M)
Quigley, M. F. (M)
Redding, J. D., Jr. (M)
Rokosz, A. J. (A)
Rothenberg, N. (M)
Sandler, P. L. (A)
Schlang, A. (M)
Schwarz, H. E. (A)
Shaw, W. J. (M)
Spector, L. (M)
Tillman, L. (M)
Wessbecher, F. W. (M)
Woerner, R. G. (A)
Woodbury, W. F. (SM)
Ziegler, G. W. (A)

Vernon (RU-1)
Boothroyd, G. A. (M)
Butler, H. E. (SM)
Francis, H. G. (SM)

Verona (RU-1)
Clark, D. R. (M)
Ulrey, H. J. (M)

Vestal (BING-1)
Aldrich, D. H. (M)
Baron, R. G. (M)
Battison, A. H. (M)
Beckland, R. C. (M)
Bertelsen, B. I. (M)
Blossom, E. L. (M)
Bowen, E. C. (M)
Breedlove, P. H. (M)
Brocklington, H. F. (M)
Bujnoski, F. J. (M)
Busch, D. F. (M)
Busse, C. C. (M)
Bussey, R. L. (M)
Calkins, G. T. (M)
Carpenter, L. C. (M)
Coleman, W. J. (M)
Cooper, A. E. (SM)
Cooper, J. V. B. (M)
Dapkin, D. R. (M)
Deno, D. W. (M)
Droege, F. J. (A)
Dudek, S. J. (A)
Elsbree, W. F. (A)
Farr, L. E., Jr. (A)
Greene, J. E. (M)
Gwin, J. D. (M)
Hancock, W. L. (M)
Harford, H. D. (M)
Jergel, R. F. (M)
Koranye, T. D. (M)
Krysiuk, G. (M)
Lawson, E. R. (M)
Lewis, G. N. (M)
Linardos, S. G. (M)
Lloyd, J. W., Jr. (A)
Lord, P. A. (M)
Lorscheider, E. B. (M)
Lozier, W. B., Jr. (A)
MacLeod, D. S. (M)
Markle, R. E. (M)
Martin, C. L. (M)
Mason, R. K. (M)
Meyers, J. W. (M)
Miglore, C. (M)
Minnick, A. W. (M)
Newman, C. A., Jr. (M)
Nuss, H. C. E. (M)
Oates, K. H. (M)
Porterfield, F. B. (M)
Pouyard, R. E. (M)
Rehage, T. A. (M)
Rogers, M. D. (M)
Schneider, E. N. (SM)
Sykas, A. J. (M)
Taylor, E. E. (A)
Touchton, C. F., III (M)
Trest, L. S., Jr. (M)
Vacca, L. N. (M)
Weisser, D. R. (M)
Wright, W. F. (M)

Victor (ROC-1)
Holmes, R. W. (SM)

Wading River (LI-2)
Harter, R. H. (A)

Wallkill (NY-MH-2)
Parker, R. G. (A)

Walton (BING-1)
Meyer, J. W. (A)

Wantagh (LI-2)
Abrams, G. L. (M)
Arndt, W. R. (SM)
Bauer, W. C. (M)
Bloom, L. (M)
Breese, M. E. (M)
Brown, C. J. (M)
Crane, R. L. (M)
Ely, R. C. (M)
Fausteck, W. S., Jr. (M)
Feingold, F. A. (M)
Gibbs, E. D. (M)
Giesecke, O. W. (SM)
Gottheim, E. (M)
Greeley, J. J. (M)
Greene, J. C. (M)
Gutman, J. H. (M)
Herring, F. G. (M)
Hickman, W. C. (M)
Hodder, R. M. (M)
Hoffman, C. (M)
Hughes, J. G. (M)
Idlings, G. E. (SM)
Jaudt, R. H. (SM)
Jordan, D. B. (M)
Kesney, E. S. (A)
Kirschner, D. D. (M)
Kramer, H. A. (M)
Leib, K. G. (M)
Lesher, R. H. (M)
McManus, J. T. (A)
Mills, N. B. (M)
Nelson, R. P. (M)
Orth, C. A. (M)
Osroff, A. (M)
Ostendorf, J. F. (A)
Pernick, H. L. (M)
Pollack, P. (M)
Posner, S. (M)
Price, C. R. (A)
Ramitz, H. (M)
Reed, S. I. (M)
Riker, W. E. (M)
Rosen, A. (M)
Salzberg, A. (A)
Sarfaty, J. (A)
Schiebel, T. (M)
Schiffres, P. (M)
Seckler, P. J. A. (M)
Sferrazza, P. J. (M)
Shulman, A. R. (M)
Silverman, S. (M)
Silvermetz, D. (M)
Stateman, M. J. (SM)
Steen, D. R. (M)
Sternberg, W. A. (M)
Strauss, A. (M)
Sunder, J. E. (M)
Vuono, R. A. (A)
Ward, W. P. (M)
Weinstein, M. (M)
Weiss, L. M. (M)

Wappingers Falls (NY-MH-2)
Apgar, H. E., Jr. (M)
Armstrong, R. M. (M)
Beetham, J. P. (M)
Bielawa, F. R. (M)
Brandt, W. E. (M)
Brodd, W. D. (M)
Buelow, F. K. (M)
Bullard, R. L. (M)
Carrea, F. V. (M)
Clark, R. W., Jr. (M)
Councill, E. D. (M)
Cramsie, G. J. (A)
Crumb, D. F. (M)
Cullen, J. W. (M)
Delninger, C. R. (M)
Desautels, P. M. (M)
Di Marco, A. F. (M)
Donohue, D. C. (A)
Dorwitt, S. J. (M)
Ewing, J. E. (M)
Eyre, C. (M)
Feitler, J. (M)
Fernekees, J. E. (M)
Geisler, H. J. (M)
Gledow, F. C., Jr. (M)
Graff, W. S. (M)
Groce, D. C. (M)
Grossnickle, J. R. (M)
Headrick, L. L. (M)
Hipp, J. A. (M)
Hultman, H. A., Jr. (M)
Jacks, R. G. (M)
Jensen, P. S. (M)
Johnson, J. D. (M)
Kahn, A. A. (M)
Kerr, G. L. (M)
Marquis, J. F., Jr. (M)
Marshall, M. R. (M)
McDougall, J. C. (M)
Medla, E. (M)
Nelson, R. A. (M)
Nick, H. H. (A)
O'Brien, H. A. (M)
O'Connor, R. J. (M)
Ohlhorst, W. R. (M)
Paul, A. J., Jr. (M)
Platz, E. F. (M)
Powers, D. M. (M)
Price, J. E. (A)
Pricer, W. D. (M)
Richards, R. K. (M)
Roberts, W. (M)
Rudy, G. J. (M)
Russell, R. A. (A)
Szyary, D. L., Jr. (M)
Selmes, M. S. (A)
Shahan, V. T. (M)
Silkman, W. D. (M)
Skwierz, R. J. (M)
Snyder, J. E. (M)
Stallard, L. B. (M)
Sumner, M. (M)
Thomas, E. M. (M)
Tsilibes, G. N. (M)
Turnbull, J. R., Jr. (M)
Vilas, J. M. (M)
Vogl, N. G., Jr. (M)
Webster, J. J. (M)

Williams, R. J. (M)
Zauchner, J. (A)
Zucker, M. S. (M)

Warners (SYR-1)
Pannacciulli, F. R. (A)
Radford, E. R. (M)
Walsh, L. F. (A)

Waterford (SCH-1)
Michon, G. J. (M)

Waterloo (ROC-1)
Allen, R. J. (A)

Water Mill (LI-2)
Delbert, C. R. (M)
Luke, R. O. (M)

Waterville (RU-1)
Cooper, F., Jr. (SM)
Seller, R. T. (A)

Watervliet (SCH-1)
Lavoo, N. (M)
Merrill, H. B., Jr. (M)

Waverly (BING-1)
Cooney, J. O., Jr. (M)
Long, R. E. (M)
Owen, F. D. (M)

Webster (ROC-1)
Beetz, H. J. (M)
Blake, B. F. (A)
Ceranowicz, H. N. (M)
Clarke, W. B. (M)
Coleton, J. W. (M)
Daly, J. P. (M)
De Groat, P. H. (M)
Deming, R. L. (SM)
Evans, R. W. (A)
Fox, R. S. (M)
Fox, R. M. (M)
Hunderup, A. R. (M)
King, P. F. (M)
Larkin, W. D. (M)
Matteson, R. G. (M)
May, P. J. (M)
Neugebauer, H. E. J. (SM)
Otone, K. (SM)
Piotrzschke, C. F. (M)
Price, C. C. (M)
Proctor, T. (M)
Reinke, R. V. (M)
Richards, G. L. (M)
Styner, T. L. (M)
Vosefski, J. R. (M)
Wheeler, J. L. (M)
Wood, R. A. (M)
Zogg, F. E. (SM)

Weedsport (SYR-1)
Jeffords, J. M. (M)

Wellsville (ELM-C-1)
La Dieu, F. A. (A)

West Babylon (LI-2)
D'Angelo, H. (M)
Gernler, H. J. (A)
McMullin, R. E. (M)

Westbury (LI-2)
Abajian, H. B. (M)
Abrahams, S. (M)
Adelman, S. (M)
Adler, W. (M)
Aloisio, R. R. (M)
Becker, N. (M)
Beley, E. G., Jr. (A)
Bergdahl, L. A. (M)
Berkoff, S. (M)
Bove, K. G. (M)
Chapman, P. L. (M)
Chin, J. H. S. (M)
Cohen, S. B. (M)
Collins, J. F. (M)
Deoul, N. (M)
Dick, A. I. (M)
Dorne, A. (SM)
Ellis, P. H. (SM)
Esposito, J. A. (A)
Fialkov, H. (M)
Forker, L. W. (A)
Friedman, J. (M)
Gannon, J. A., Jr. (A)
Gitlin, S. A. (M)
Gittleman, R. (A)
Glixon, H. R. (M)
Goldstein, H. (M)
Graber, L. J. (SM)
Harjes, F. W. (M)
Hellmann, R. K. (F)
Hoffman, G. (SM)
Hofman, H. L. (M)
Kelleher, R. L. (SM)
Kil, G. H. (M)
Kritz, J. (M)
Levine, N. (M)
Levine, S. W. (SM)
Liguori, M. A. (A)
Luce, P. P. (A)
Mahr, M., Jr. (M)
Mankin, A. H. (M)
Marston, R. S. (M)
Martines, L. T. (M)
McGregor, J. C. (SM)
Mesch, R. M. (M)
Mordechian, R. (M)
Mohr, R. J. (M)
Morganstern, K. H. (SM)
Moscarello, M. A. (SM)
Muligano, G. A. (SM)
Napolin, S. (A)
O'Meara, T. J. (M)
Petrack, P. (M)
Pinkham, G. E. (M)
Piwinski, W. (M)
Price, R. C. (SM)
Proskauer, R. (M)
Richards, G. F. (M)
Rush, S. (M)
Rustad, A. C. (SM)
Savet, P. H. (A)
Schuhlein, C. M. (M)
Schumacker, A. L. (M)
Schwiebert, H. (M)
Shaw, W. R. (M)
Shostak, R. B. (SM)
Simon, J. M. (SM)
Smith, H. M. (A)
Smith, W. J. (M)
Stein, D. B. (M)
Stitch, M. (SM)
Stone, N. L. (M)
Tichy, B. W. (M)
Troop, J. (A)
Truhlar, G. (M)
Vavoudis, S. N. (M)
Volpe, C. D. (M)
Whitford, J. R. (M)
Wilson, L. B. (M)
Winson, P. (M)
Zaklad, S. (M)

West Elmira (ELM-C-1)
Gauthier, R. V. (A)

Westernville (RU-1)
Hanna, P. D. (A)
Mackey, C. L. (M)

Westhampton (LI-2)
Goodman, J. A. (M)

West Hempstead (LI-2)
Bifano, V. J. (M)
Bonne, A. W. (M)
Buck, J. D. (A)
Cohen, N. L. (M)
Dean, M. A. (M)
Erdheim, W. (M)
Fairweather, R. W. (M)
Frank, R. J. (M)
Goldman, B. (A)
Karasz, J. (M)
Lammer, L. H. (M)
Lazarich, M. R. (A)
Levine, H. A. (SM)
Malchman, F. L. (A)
Multari, A. M. (M)
Saffitz, I. M. (M)
Seifer, S. (M)
Seisler, M. (M)
Shnitkin, H. (M)
Thiede, F. C. W. (M)
Voelpel, J. (A)
Weintraub, I. A. (SM)
Westman, H. P. (SM)

West Hurley (NY-MH-2)
Heermans, J. W. (M)
Mirick, H. L., Jr. (M)
Saxe, I. N. (M)

West Islip (LI-2)
Ayers, J. G., Jr. (M)
Bell, R. W. (M)
Bushor, W. E. (M)
Collock, H. (A)
De Cesare, J. F., Jr. (A)
Gager, C. H. (M)
Koch, E. J. (M)
Leedham, R. (M)
Rodriguez, J. (M)
Rosenthal, R. F. (M)
Russo, A. J. (A)
Schecker, E. J. (A)
Welch, A. J. (M)

West Monroe (SCH-1)
Fiet, J. H., III (A)

Westmoreland (RU-1)
Van Etten, P. (A)

West Nyack (NY-W-2)
Lawrence, E. D. (M)
Stilwell, G. R., Jr. (M)
Wolff, J. H. (M)

West Point (NY-MH-2)
Cutler, E. C., Jr. (M)
Friend, H. C. (SM)
Fullerton, G. R. (M)
Gillette, E. C., Jr. (M)
Koch, R. A., Jr. (M)
Mitchell, J. D. (M)
Schulke, H. A., Jr. (SM)
Strohm, W. E. (M)

Westport (SCH-1)
Farnsworth, M. M. (A)

West Seneca (BN-1)
Nowicki, J. J. (A)

West Webster (ROC-1)
Bettin, R. (M)
Fischer, R. E. (M)

White Plains (NY-W-2)
Asch, B. (M)
Aslan, E. E. (M)
Bauer, A. K. (M)
Bernardi, A. R. (A)
Bloom, W. E. (A)
Bolsey, E. J. (A)
Borden, E. D. (A)
Brailey, M. L. (M)
Buhlmann, R. P. (A)
Chanzit, L. (M)
Cohen, H. P. (M)
Cohn, E. (A)
Coles, G. F. (A)
Day, R. C. (M)
Deas, J. M. (M)
Eisenreich, W. (A)
Enoch, D. G. (A)
Fauo, J. J. (M)
Fearing, J. L. (M)
Ferguson, H. F. (M)
Flower, R. A. (M)
Gano, A. S. (SM)
Gazzigli, J. J. (A)
Gerling, J. E. (M)
Gilbert, J. (M)
Glancy, R. C., Jr. (SM)
Gottesman, E. (M)
Gottlieb, G. J. (M)
Gresko, J. J. (M)
Greunke, O. V. (SM)
Gronner, A. (SM)
Guttman, J. (M)
Haber, F. (M)
Hackett, A. J. (M)
Haddad, J. A. (M)
Halpern, W. (M)
Hanft, H. (M)
Harris, E. R. (M)
Holzman, G. R. (M)
Houle, L. A. (M)
Ikeda, T. (M)
Janone, V. (M)
Jenkins, H. C. (M)
Kalenich, W. A. (A)
Kaye, H. W. (M)
Lake, J. R. (M)
Lebid, J. (M)
Lewis, J. R. (M)
Lida, S. L. (M)
Lisk, H. H. (M)
Macdonald, W. D. (SM)
Markham, G. W. (M)
Merritt, N. A. (M)
Metcalfe, D. (SM)
Millman, J. H. (M)
Newman, L. (M)
Petersen, G. E. (A)
Petrillo, B. J. (M)
Pinz, B. M. (A)
Polenz, D. L. (M)
Preston, F. S. (SM)
Reiner, S. (M)
Richmond, I. D. (A)
Ryder, R. R. (M)
Sachs, H. L. (M)
Sandock, J. (M)
Sands, E. A. (A)
Sansevero, V. J. (M)
Sarasohn, H. M. (M)
Scheiner, M. L. (M)
Schleicher, M. (A)
Schleider, N. (A)
Shaw, D. B. (SM)
Spitalny, A. (M)
Stzysko, W. J. (A)
Sulds, I. P. (A)
Svigals, J. (M)
Tudbury, C. A. (M)
Wright, P. H. (M)
Wright, R. G., Jr. (A)
Yadoff, O. (SM)
Zlserman, M. (SM)

Whitesboro (RU-1)
Anderson, W. (M)
Benman, E. J. (SM)
Brady, C. E. (M)
Cole, F. G. (SM)
Davis, D. M. (M)
Diab, M. A. (M)
Edgett, R. S. (M)
Egan, G. E. (M)
Erwin, R. L., Jr. (M)
Fleming, J. A. (M)
Gaffney, R. E. (SM)
Gibson, J. A. (SM)
Grimm, R. S. (M)
Harding, G. S. (A)
Hartnett, G. C. (M)
Hauge, H. R. (M)
Ketchum, P. M. (SM)
Kulmus, R. J. (M)
Lanzara, E. M. (M)
Levesque, R. W. (M)
Littlepage, C. R., Jr. (M)
Lutze, R. J. (SM)
McGuffin, A. L. (M)
Miles, R. J. (M)
Miller, R. L. (M)
Mills, J. B. (M)
Oberg, A. C. (M)
Orear, E. R. (SM)
Pfefer, B. L. (SM)
Power, H. J. (M)
Radnor, R. R. (M)
Ramsey, A. P. (A)
Raymond, F. W. (M)
Reaves, D. H. (SM)
Rowland, E. A. (M)
Sarle, S. V. (M)
Schatz, F. W. (SM)
Sill, D. B. (M)
Stark, J. A. (M)
Steel, J. W. (M)
Stitt, R. P. (M)
Sweet, R. E. (A)
Walker, G. H. (A)
Wallenfels, W. B. (M)
Winn, D. H. (SM)
Withington, A. (M)
Wolf, D. A. (M)
Woodruff, J. G., Jr. (M)

Whitestone (LI-2)
Abruzzi, P. W. (M)
Chun, B. (M)
Cohen, S. L. (M)
Dunefsky, M. (M)
Franchina, M. A. (SM)
Fraun, S. I. (SM)
Friedman, E. H. (M)
Greenberg, E. (M)
Hunter, E. M. (M)
Lidsky, R. J. (M)
Magnusen, H. F. (M)
Merten, D. J. S. (SM)
O'Connell, T. P. (A)
Pedowicz, J. M. (M)
Pelner, N. (M)
Piller, S. E. (M)
Pokorny, J. S. (M)
Pollak, F. (M)
Pomerantz, M. (M)
Rubin, W. L. (SM)
Saalborn, O. E. (M)
Sachs, M. (M)
Sandler, H. (M)
Schadelbauer, B. F. (M)
Schischa, E. (M)
Schneiderman, S. (M)
Shanahan, W. J. (M)
Smith, J. W. (SM)
Steckler, I. (A)
Stone, G. F. (A)
Vogt, J. J. (M)
Wappler, A. C. (A)
Way, F. L. (A)
Welda, R. L. (M)

Whitney Point (BING-1)
Read, L. P., Jr. (M)
Ticknor, S. L. (A)

Williamsville (BN-1)
Baker, D. W. (M)
Becker, H. D. (M)
Benedict, T. R. (M)
Bergerson, C. W. (A)
Billings, N. (M)
Black, P. B. (SM)
Bordner, G. W. (M)
Carr, F. S. (M)
Corp, D. E. (M)
Culverhouse, E. F. (A)
Di Nicolantonio, F., Jr. (M)
Fryer, W. D. (M)
Gerber, W. J. (M)
Gibbons, H. M. (A)
Giori, F. A. (M)
Hart, W. E. (M)
Henderson, P. M., II (M)
Herbert, R. B. (M)
Hmelar, S. L. (M)
Laurien, I. M. (M)
Lerner, T. (M)
Lindsay, J. E. (M)
Mackechnie, H. K. (SM)
Maylott, C. F. (SM)
Maynard, H. M. (M)
Merle, C. W. (SM)
Mock, L. R. (M)
Novo, R. B. (M)
Pelton, F. M. (M)
Pifer, M. J. (SM)
Price, E. L., Jr. (SM)
Prybyl, R. P. (M)
Sacha, R. J. (M)
Sante, D. P. (SM)
Scheetz, H. A. (M)
Schlosser, G. A. (M)
Sears, R. A. (M)
Shannon, F. T. (M)
Snyder, W. W. (SM)
Tona, C. J. (M)
Torode, S. W. (SM)
Torres, J. F. (A)
Weponer, B. H. (M)
Wittman, J. H. (A)
Wolf, E. H. (A)
Wood, F. S. (M)

Williston Park (LI-2)
Fay, A. H. (M)
Ffatlau, T. (M)
Gillespie, C. H., Jr. (M)
Grandizio, L. A. (M)
Jennison, R. E. (A)
Kelly, M. J. (M)
Losow, H. C. (M)
Maisto, N. S. (M)
Perkowski, T. F. (M)
Rothstein, M. (SM)
Schaetzl, F. R. (A)
Schaetzl, R. J. (A)
Sullivan, L. D. (M)
Weidle, C. M., Jr. (A)
Zwick, G. (M)

Wilmington (SCH-1)
Preston, H. D. (A)

Windsor (BING-1)
Cox, L. T. (M)
Van Billiard, L. A. (A)

Woodbury (LI-2)
Fricker, J. N. (M)
Hanulec, J. D. (A)
Henrich, W. H. (SM)
Novikoff, E. B. (M)
Roel, E. L. (M)
Woodhaven (LI-2)
Bassett, A., Jr. (M)
De Size, L. K. (M)
Glus, H. P. (M)
Hardiman, J. A. (M)
Hess, D. T. (M)
Jacobs, F. (SM)
Reitlinger, A. (M)
Schneider, L. J. (M)
Sloan, R. R. (M)
Sweetland, J. G. (M)
White, C. F. (M)
Winter, D. W. (A)
Wolber, W. O. (M)

Woodmere (LI-2)
Cohen, A. L. (M)
Crystal, F. H. (A)
Farkas, R. D. (M)
Nachtigall, S. (SM)
Zweiffler, I. (M)

Woodside (LI-2)
Altmayer, F. V. (M)
Berger, L. M. (M)
Bibbero, R. J. (SM)
Cabot, J. H. (M)
Chin, J. E. (M)
Culver, A. R. (A)
Desiero, J. M. (M)
Dore, N. J. (A)
Dostal, F. X. (A)
Felcheck, M. (M)
Gautherin, G. A. (M)
Greenberg, E. L. (M)
Halko, J. W. (M)
Harris, J. T. (M)
Hlavna, R. S. (M)
Johnston, W. F. (A)
Keith, W. S. (M)
Kroessler, A. W. (M)
Martin, A. L., II (M)
O'Sullivan, D. R. (A)
O'Sullivan, J. K. (M)
Peduto, R. J. (M)
Perle, R. C. (M)
Plutchok, H. (M)
Pocze, T. (M)
Rafferty, J. J. (M)
Reuman, W. H. (A)
Ricci, T. M. (A)
Rowney, E. A. (A)
Stapler, B. (A)
Tucker, A. G. (A)
Varza, G. (A)
Wetzler, C. E. (M)
Zlachevsky, B. (A)

Woodstock (NY-MH-2)
Barton, H. J. (M)
Bradt, G. (M)
Brown, D. L. (M)
Buckminster, I. H. (A)
Buton, E. C., Jr. (M)
Carney, W. K. (A)
Collins, M. (M)
Gray, R. G. (M)
Heck, N. A. (M)
Jacob, W. P. (M)
Kossen, D. J. (A)
Kutcher, M. M. (M)
Larys, B. A. (M)
Leaycraft, E. C. (M)
Lewis, N. T., Jr. (M)
Lindsay, R. L. (M)
Menard, E. A., Jr. (M)
Riffsburg, R. E. (M)
Selfridge, J. J. (A)
Spencer, D. L. (M)
Van Rijn, J. C. (SM)

Wyandanch (LI-2)
Berman, D. C. (M)
Logan, R. W. (M)
Thompson, W. G. (A)
Totah, E. J. (M)

Yonkers (NY-W-2)
Altieri, J. R. (M)
Arbuthnott, J., Jr. (M)
Armani, L. J. (M)
Avrutik, R. F. (M)
Balletta, A. G. (M)
Bernardi, U. A. (M)
Blumberg, J. (M)
Bolz, R. A. (M)
Booth, H. H. (M)
Buchalter, M. (M)
Burger, E. (M)
Castriota, L. J. (SM)
Cugliari, N. (M)
Defloria, R. N. (M)
Diamond, J. E. (M)
Fliderblum, D. D. (A)
French, C. C. (SM)
Friedman, S. N. (M)
Gehrig, J. W. (A)
Goetzl, M. (M)
Goldman, A. L. (M)
Grabowski, J. L. (A)
Griffin, G. A. (A)
Hesse, G. L. (SM)
Hillman, P. L. (SM)
Hirschhorn, R. I. (M)
Humphrey, R. M. (M)
Jones, D. H. (A)
Knauert, W. F. (M)
Komar, W. J. (M)
Korewick, J. (M)
Levy, P. M. (SM)
Lilienfeld, H. J. (M)

Yorkshire (RU-1)
Panklewicz, C. L. (M)

NORTH CAROLINA

Albemarle (NC-W-3)
Almond, J. A. (M)

Asheville (NC-W-3)
Hamrick, W. H. (M)
Hayes, W. L. (M)
Kennedy, R. A. (M)
McConnel, W. G. (SM)
Smith, I. A., Jr. (M)
Sprague, G. F. (SM)

Banner Elk (N-CAR-3)
Kalbfleisch, A. M. (A)

Benson (NC-E-3)
Johnson, P. B. (M)

Boone (N-CAR-3)
Isenhour, C. N. (M)
Littleton, W. W. (M)

Burlington (N-CAR-3)
Apple, H. L. (M)
Barlow, J. E. (SM)
Barnes, W. P. (M)



Lisewski, E. E. (A)
Loebl, W. W. (M)
Looney, L. A. (M)
Lynch, D. F., Jr. (A)
Mishkoff, S. (M)
Murphy, R. J. (M)
Namerow, V. C. (A)
Ondroczky, O. A. (M)
Orefice, G. T. (M)
Oswald, H. (M)
Pelavin, M. H. (M)
Perelle, I. B. (A)
Picciano, J. K. (M)
Reilley, A. G., Jr. (M)
Resnicow, L. (M)
Richter, J. G. (A)
Robinson, R. J. (M)
Rosenstark, S. (M)
Roth, S. S. (A)
Samuels, A. A. (A)
Schachat, T. (SM)
Schiller, G. J. (A)
Schornstein, M. L. (M)
Schreiber, W. B., Jr. (M)
Schwartz, L. (M)
Simms, J. P. (A)
Singer, R. E. (M)
Solins, R. (M)
Speth, A. J. (M)
Staudt, W. (A)
Stein, R. S. (SM)
Sterk, A. A. (M)
Szymanski, L. A. (M)
Taffet, W. (A)
Troster, M. (M)
Ullman, R. S. (M)
Ungvarsky, W. J. (M)
Valle, L. J. (A)
Wohlfort, W. R. (M)
Woods, B. L. (M)
Youla, D. C. (SM)
Zatorsky, E. F. (M)

Yorktown Heights (NY-W-2)
Allen, R. G. (M)
Arcand, A. T. (M)
Backus, J. W. (M)
Butler, S. A. (M)
Callinan, T. D. (SM)
Cedarholm, J. P. (M)
Chang, H-W. (M)
Chien, R. T. (A)
Cohen, M. (A)
Coombs, J. M. (M)
Deerhake, W. J. (SM)
Drake, J. R. (M)
Ellis, I. T., Jr. (M)
Essinger, P. (A)
Farber, A. S. (M)
Funk, H. L. (M)
Galli, E. J. (A)
Gamo, H. (M)
Gilchrist, B. (A)
Griffith, J. E. (SM)
Havens, B. L. (SM)
Heilerman, H. (M)
Hensley, C. B. (M)
Juliusberger, H., Y. (M)
Kiseda, J. R. (M)
Lambert, J. (M)
Lentz, J. J. (M)
Luhn, H. P. (M)
Mayeda, W. (M)
Mezel, J. E. (M)
Miller, R. E. (M)
Nakagawa, N. (A)
Narud, J. A. (M)
Potok, E. R. (M)
Roland, P. A. (A)
Royer, G. H. (M)
Samuel, A. L. (F)
Saslovsky, S. (M)
Schlig, E. S. (M)
Sholtz, P. N. (M)
Smith, M. G. (M)
Spruth, W. G. (M)
Strohm, W. G. (M)
Teschmacher, H. W. (SM)
Trapnell, F. M., Jr. (M)
Verma, Y. P. (A)
Ward, R. L. (M)
Wilser, R. E. (M)

Yorkville (RU-1)
Panklewicz, C. L. (M)

NORTH CAROLINA

Albemarle (NC-W-3)
Almond, J. A. (M)

Asheville (NC-W-3)
Hamrick, W. H. (M)
Hayes, W. L. (M)
Kennedy, R. A. (M)
McConnel, W. G. (SM)
Smith, I. A., Jr. (M)
Sprague, G. F. (SM)

Banner Elk (N-CAR-3)
Kalbfleisch, A. M. (A)

Benson (NC-E-3)
Johnson, P. B. (M)

Boone (N-CAR-3)
Isenhour, C. N. (M)
Littleton, W. W. (M)

Burlington (N-CAR-3)
Apple, H. L. (M)
Barlow, J. E. (SM)
Barnes, W. P. (M)
Brown, C. J. (SM)
Byrne, J. J., Jr. (A)
Casey, J. B. (M)
Cassidy, J. T. (A)
Clark, M. (M)
Cobb, H. E. (M)
Collins, J. L. (M)
Davis, D. A. (M)
De Loach, H. H. (M)
Donaldson, E. E., Jr. (M)
Dorris, H. N. (M)
Evans, G., Jr. (A)
Fox, M. L. (M)
Golf, H. B. (M)
Harris, R. H. (M)
Hastings, C. L. (SM)
Hoover, V. M. (M)
Huffstetler, J. P. (M)
Hurst, E. (A)
James, H. C. (SM)
Jones, W. G. (M)
Kelly, C. J. (A)
Kelly, I. E. (M)
Lackowski, D. H. (M)
Lockard, D. T. (M)
MacCallum, J. L. (A)
Mann, J. H. (A)
Massey, E. H. (M)
Mears, D. F. (M)
Miller, O. R. (M)
Mincey, J. H. (M)
Moore, C. G. (M)
Myrick, W. D. (M)
Nahser, P. J. (M)
Nance, R. L. (M)
Nimmcke, F. E. (SM)
North, T. G., Jr. (M)
Palmer, D. B. (M)
Peake, M. W. (M)
Perry, L. A. (M)
Ratchford, L. M. (M)
Riley, M. H., Jr. (M)
Rodisill, J. A., Jr. (M)
Rodisill, M. E. (M)
Savoie, L. P. (M)
Sees, J. H. (M)
Shackley, E. R., Jr. (M)
Smith, C. P. (M)
Smith, K. E. (M)
Stuart, J. C. (M)
Thomas, B. J. (M)
Thorne, J. C. (M)
Thrash, W. D. (M)
Troussoff, G. B. (SM)
Vance, R. L. (SM)
Vogler, C. M. (M)
Watkins, D. C. (M)
Wheeler, T. J. (M)
Winfield, O. M., Jr. (M)
Wolfgang, W. W. (M)
York, D. R., Jr. (M)

Buxton (N-CAR-3)
Carroll, W. D. (M)

Carrboro (NC-E-3)
Bell, W. C. (A)

Cary (NC-E-3)
Dawkins, L. L. (SM)

Chapel Hill (NC-E-3)
Jackson, H. L. (M)
Macintyre, A. B. (M)
Thurstone, F. L. (M)

Charlotte (NC-W-3)
Baldwin, C. M., Jr. (M)
Barron, J. I. (SM)
Bateman, F. F. (M)
Blackwell, T. E. (A)
Brown, F. R. (A)
Bush, T. K. (M)
Caldwell, H. S. (A)
Carey, J. G. (SM)
Caudle, L. L., Jr. (M)
Chaney, A. L., Jr. (M)
Deyton, B., Jr. (M)
Elam, J. E. (A)
Hager, M. F. (A)
Hicklin, W. H., Jr. (M)
Honess, C. B. (A)
Howard, T. E. (M)
Howell, L. M. (A)
Kickler, E. M. (A)
Larson, F. P., Jr. (M)
Livingston, T. C. (M)
Mallard, E. P. (M)
Massey, M. T. (M)
McCray, H. R., Jr. (M)
Minor, M. J. (SM)
Mullis, C. B. (M)
Murphy, B. (M)
Nakamura, F. T. (M)
Poole, Z. V. (M)
Ramsey, R. W. (M)
Ramsey, R. W., Jr. (M)
Scoggin, W. G., Jr. (A)
Tomlinson, Z. G. (A)
Townsend, A. P. (A)
Vucile, C. E. (M)
Waynick, J. T. (A)
White, K. N. (M)
Whitley, C. W. (M)

Cherry Point (NC-E-3)
Welch, C. H. (A)

Clemmons (N-CAR-3)
Buckle, G. J., Jr. (A)
Woodford, M. J. (M)
Cordova (NC-W-3)
Parker, C. D. (M)

Durham (NC-E-3)
Chenery, P. J. (SM)
Edwards, F. D. (M)
Fullen, R. E. (A)
George, R. T., Jr. (M)
McKnight, D. R. (M)
Owen, H. A., Jr. (M)
Perry, W. T., Jr. (M)
Seeley, W. J. (SM)
Vail, C. R. (SM)
Young, D. B. (M)

Elizabethtown (NC-E-3)
Baird, J. W. (A)

Elon College (N-CAR-3)
Baynard, J. S., Jr. (M)
Berryman, J. W. (M)

Fayetteville (N-CAR-3)
McNulty, J. L. (A)

Fort Bragg (NC-E-3)
Gordon, S. (M)
Megna, J. J. (M)
Saunders, R. G. (M)

Garner (N-CAR-3)
Nelson, M. (A)

Gastonia (NC-W-3)
Halstead, W. R. (M)

Germanton (N-CAR-3)
Long, E. S. (A)

Goldsboro (NC-E-3)
Bennett, N. A. (A)
Hastle, L. U. (M)
Hicks, J. M. (M)
Olson, L. C. (M)
Trueblood, D. B. (M)

Graham (N-CAR-3)
Abbott, J. D. (M)
Hoffman, S. P. (M)
Jones, E. D. (M)
Lowe, J. H. (M)
Miller, A. R. (A)
Pope, M. G. (M)
Rountree, R. H. (M)

Greensboro (N-CAR-3)
Adams, T. N. (M)
Aitkenhead, J. (M)
Annas, P. D. (M)
Atcheson, S. E. (M)
Bescherer, E. A. (SM)
Best, R. H. (M)
Bezera, G. (M)
Boatenreiter, W. K. (M)
Bowers, E. J. (M)
Buelin, A. T. (A)
Coble, R. P., Jr. (M)
Coordsen, J. F., Jr. (M)
Ebhardt, C. A. (M)
Fennell, T. C. (M)
Gardiner, J. G. (SM)
Gregory, L. C. (M)
Hambright, W. A., Jr. (M)
Johnson, W. H. (M)
Joseph, F. T. (M)
Lowe, A. L. (A)
Lupton, C. C. (A)
Marteena, J. M. (M)
McLaughlin, N. R. (M)
Morris, R. E. (M)
Porter, G. R. (M)
Schaffer, L. I. (M)
Sharpe, E. F. (M)
Shearin, A. M. (M)
Small, G. M. (M)
Smith, R. F. (A)
Stafford, O. C. (M)
Strandberg, C. F. (M)
Thayer, P. H., Jr. (M)
Wilder, G. R. (M)

Greenville (NC-E-3)
Behr, L. V. D. P. (A)

Guilford (N-CAR-3)
Hurt, C. V. (M)
Thompson, F. E. (M)

Hamlet (NC-W-3)
Drescher, N. W., Jr. (A)

Havelock (NC-E-3)
Lindeman, W. D. (A)

Hendersonville (NC-W-3)
Hawks, J. D. (M)
Howell, E. K. (M)
Kelley, H. P., Jr. (M)
Nuckolls, J. A. (M)

Hickory (NC-W-3)
Long, T. E. (A)
Roberts, W. L. (A)

High Point (N-CAR-3)
Bivins, J. F. (SM)
Caldwell, D. J. (SM)
Cherry, W. H., Jr. (M)
Palmer, O. A., Jr. (A)
Portaro, S. A. (M)
Tolley, F. N. (M)
Jacksonville (NC-E-3)
Manke, J. A. (M)
McLendon, J. T., Jr. (A)

Jamestown (N-CAR-3)
Moore, R. L. (M)

Kannapolis (NC-W-3)
Shaver, J. L., Jr. (A)

Kernersville (N-CAR-3)
Goslen, M. B. (M)
Manning, G. B. (M)

Laurinburg (NC-E-3)
Phillips, G. W. (A)

Marion (N-CAR-3)
Dowdle, J. F. (M)

Mount Airy (N-CAR-3)
Epperson, R. H. (A)
Hale, G. K. III (A)

New Bern (NC-E-3)
Haire, B. G. (M)

Pfafftown (N-CAR-3)
Brunelle, A. A. (A)
Garrison, W. H. (M)
Taylor, C. M. (M)

Raleigh (NC-E-3)
Ashford, D. A. (SM)
Barbot, J. C. (A)
Barclay, W. J. (SM)
Bell, N. R. (SM)
Buck, J. H. (M)
Butler, R. M. (A)
Caviness, L. L. (M)
Colvert, F. T. (A)
Cormack, W. J., Jr. (M)
Corns, R. B. (M)
Duncan, V. D. (M)
Fitch, L. T. (M)
Goetze, A. J. (M)
Higgins, J. F. (A)
Hight, T. R. (M)
Hill, J. S. II (M)
Hoadley, G. B. (SM)
Horne, W. H. III (M)
Hulick, H., Jr. (SM)
Idol, C. A. (M)
Kahn, S. H. (M)
Kern, W. J. (M)
Lambright, C. M. (M)
Manning, E. G. (SM)
McGibbon, D. A. (M)
Moore, C. H. (M)
Mott, H. (SM)
Neuse, D. H. (A)
Pace, V. A., Jr. (M)
Park, D. M. (A)
Parkin, H. C. (M)
Rainbird, K. V. K. (M)
Rennaker, R. B. (M)
Rothrock, T. H., Jr. (M)
Rothstein, R. I. (A)
Silva, C. (A)
Sloop, W. B. (A)
Speed, W. J. (M)
Sugg, C. H. (A)
Thompson, H. W., Jr. (M)
Voss, C. H., Jr. (M)
Weinberg, D. I. (M)
Zryd, R. A. (M)

Rural Hall (N-CAR-3)
Collins, T. J., Jr. (M)
Helms, C. M. (M)

Salisbury (NC-W-3)
Barker, D. E. (M)

Sanford (NC-E-3)
Buchanan, T. B. (A)

Southport (NC-E-3)
Guest, W. T. (SM)

Thomasville (N-CAR-3)
Ward, D. L. (M)

Trinity (N-CAR-3)
Hill, K. R. (A)

Warsaw (NC-E-3)
Scott, C. S. (A)

Waynesville (NC-W-3)
Reece, C. J., Jr. (M)

Welcome (N-CAR-3)
Leonard, P. T. (M)

Wendell (NC-E-3)
Todd, M. C. (M)

Wilmington (NC-E-3)
Elliott, W. F. (A)
Peebles, N. A. (M)

Winston-Salem (N-CAR-3)
Adams, J. G. (M)
Adkins, F. L., Jr. (M)
Amend, R. N. (M)
Anderson, F. B. (SM)
Applegate, I. D. (SM)
Arnold, H. H. (SM)
Baity, A. C., Jr. (M)
Balden, J. M. (M)
Banks, I. (A)
Baran, M. (SM)
Barnett, H. A., Jr. (A)
Beach, O. R. (M)
Beard, C. E. (M)
Becker, S. D. (M)
Beckett, R. R. (M)
Behrens, C. E., Jr. (A)
Bentoni, A. (M)
Bernath, W. A. (M)
Berry, R. L. (M)
Bertie, C. E. (SM)
Bishop, C. R. (A)
Boatwright, J. H. (M)
Bobst, W. A. (M)
Borgeman, C. E. (M)
Boriack, F. L. (A)
Bridges, C. S., Jr. (M)
Bright, J. Q. (SM)
Bright, W. S. (M)
Brooks, R. E. (SM)
Brune, W. L. (SM)
Bunney, E. (M)
Burnett, J. W. (M)
Cantrell, M. E. (M)
Carlisle, H. C., Jr. (A)
Caskey, L. F. (M)
Chastain, O. J. (A)
Clabough, E. M. (M)
Clayton, F. R. (M)
Climer, F. A. (M)
Coan, J. O., Jr. (A)
Cockrell, H. H., Jr. (M)
Coggins, J. M., Jr. (M)
Cole, L. M., Jr. (A)
Connelly, J. W. (M)
Conte, P. F. (A)
Coon, W. M. (M)
Coonen, J. J. (M)
Corderman, R. C. (SM)
Corn, M. (A)
Cottrell, B. P. (SM)
Cox, C. W. (M)
Crawford, K. E. (M)
Daque, G. I. (A)
Dearing, M. (A)
Disher, R. S. (M)
Dozier, E. C. (M)
Driggs, B. W. (M)
Edwards, G. W. (M)
Eidson, H. G., Jr. (A)
Elias, L. W. (M)
Epperson, J. P. (M)
Estes, F. B. (M)
Evans, R. D. (A)
Feeney, C. J. (A)
Fisher, R. W. (M)
Fowler, J. D. (M)
Fox, E. D. (M)
Fulp, W. M. (M)
Geeslin, H. A. (A)
Gegenheimer, W. C. (SM)
Genaille, R. A. (M)
George, A. A. (A)
Gourley, R. T. (A)
Greer, L. H. (A)
Haase, W. D. (A)
Hagaman, J. R. (M)
Haines, A. B. (M)
Hamilton, R. D. (A)
Hanks, W. R. (M)
Heard, B. E. (M)
Hedrick, P. F. (SM)
Hege, A. (A)
Heineman, J. T. (M)
Herb, J. W. (M)
Highsmith, H. P. (M)
Hilker, A. H. (M)
Hill, G. V. (SM)
Hirner, J. A. (M)
Hoffman, W. R. (M)
Holton, E. F., Jr. (M)
Hoole, C. R. (M)
Hopper, F. L. (F)
Huffman, J. C. (A)
Hundley, J. G., Jr. (M)
Hunter, P. H. (M)
Ivester, H. E. (M)
Jackson, C. E. (M)
Johnson, R. M. (M)
Johnston, H. R. (SM)
Keane, W. J. (M)
Kennelick, A. R. (A)
Kiger, J. C. (M)
King, L. C. (A)
Kirkland, F. E. (M)
Knowles, C. U. (M)
Kozanosky, C. (M)
Lanford, W. E. (M)
Laughter, F. H. (M)
Lee, R. E., Jr. (M)
Lehr, O. A. (A)
Leonard, A. B. (M)
Libby, V. A. (A)
Litot, P. A. (A)
Lumley, R. M. (M)
Lyle, D. A. (A)
MacKinnon, A. J. (M)
Maddox, H. D. (SM)
Malone, W. H. (M)
March, R. C. (M)
Masich, A. M., Jr. (M)
McAvoy, W. G. (SM)
McClung, H. A. (M)
Mc Farland, R. T. (M)
McLane, A. R. (M)
McMillin, D. L. (M)
Meredith, J. H. (A)
Miller, C. C. (M)
Mitchell, W. H., Jr. (M)
Mize, F. F. (M)
Molina, R. E. (M)
Moore, D. R. (M)
Moore, J. H. (SM)

Moore, W. C. (M)
Morrell, F. M., Jr. (M)
Mueller, H. W. (M)
Mulheron, A. R. (A)
Nagel, W. C. (M)
Needham, D. P. (M)
Neilson, C. C. (M)
Newland, E., Jr. (M)
Newsome, A. T. (M)
Nolovich, M. C. (A)
Norwood, C. A. (SM)
O'Dea, O. B. (M)
Oliver, C. W. (M)
Orr, W. C. (M)
Owen, F. R. (M)
Palmer, C. W. (SM)
Parish, R. (M)
Parks, S. (M)
Parlee, G. N. (SM)
Payne, R. C. (M)
Pfohl, J. T. (A)
Powell, L. H. (M)
Pratt, E. E. (M)
Pritchard, J. A. (A)
Rappa, J. (A)
Rasmussen, R. M. (M)
Reynolds, C. W. (SM)
Rice, J. C. (A)
Richardson, B. W. (M)
Ridgill, J. R. (M)
Robards, G. A. (M)
Robertson, J. D. (M)
Robinson, J. L. (M)
Rodriquez, R. A., Jr. (M)
Rosenberg, L. J. (M)
Rudroff, M. G. (M)
Shacklett, J. H. (A)
Shelor, G. M. (M)
Short, H. L. (M)
Sidelinger, S. G. (A)
Sims, J. V. (M)
Slaydon, J. F., Jr. (M)
Smith, A. D., Sr. (M)
Smith, C. M., Jr. (SM)
Smith, F. C. (M)
Spencer, M. P. (M)
Spikula, R. W. (M)
Stand, T. R. (A)
Starr, H. E. (M)
Stavrou, N. C. (A)
Stephenson, H. L. (A)
Stepka, A. J. (A)
Stewart, B. L. (M)
Stockberger, J. M. (A)
Stouse, L. E., Jr. (M)
Street, E. E. (M)
Swannack, C. H. (SM)
Tabat, L. E., Jr. (M)
Tanner, T. B. (M)
Tetzlaff, F. L. (M)
Theriot, E. J. (M)
Townsend, W. A. (A)
Turrini, J. J. (M)
Tyack, L. C. (SM)
Tynes, J. P. (M)
Van Doeren, C. A. (M)
Voorhees, H. A. (M)
Ward, C. D., Sr. (A)
Weeks, G. E. (M)
Wells, H. W. (M)
White, W. L. (A)
Wikstrom, D. E. (M)
Wilkins, D. R. (M)
Williams, J. M. (M)
Williams, R. B. (M)
Wilson, R. B. (M)
Witcher, C. L. (M)
York, R. E. (M)
Zammit, J. F. (M)

NORTH DAKOTA

Bismarck (TC-5)
Nelson, I. (M)
Vavra, H. G. (M)

Cavalier (TC-5)
Camann, R. F. (A)

Dickinson (TC-5)
Linster, J. J., Jr. (A)

Fargo (TC-5)
Anderson, E. M. (M)
Anderson, E. G. (SM)
Anderson, G. G. (M)
Hetland, J. M. (M)
Foerster, A. C. (A)
Hoaby, E. A. (M)
Miller, V. D. (M)
Pancratz, J. B. (M)
Peterson, D. E. (M)

Grand Forks (TC-5)
Bares, W. A. (M)
Christensen, T. P. (M)
Green, N. R. (A)
Haverty, M. B. (M)
Koontz, C. H. (A)
Scheibe, P. O. (M)
Thomforde, C. (M)

Hankinson (TC-5)
Vick, L. A. (M)

Lakota (TC-5)
Orseth, M. M. (M)

Minot (TC-5)
Haeusler, H. (A)
Maln, J. F. (A)
Moe, G. O. (M)
Schooley, C. H. (M)



Valley City (TC-5)
Amoo, L. R. (M)

OHIO

Ada (TOL-4)
Geyer, M. A. (M)
Klingenberger, J. L. (M)

Akron (AKR-4)
Anderson, G. D. (M)
Arkwright, L. P. (A)
Au, B. D. (M)
Barnett, C. B. (M)
Batcher, K. E. (M)
Bentley, D. E. (M)
Berkey, R. H. (A)
Blumenthal, L. J. (M)
Bock, A. W. (A)
Bock, E. D. (M)
Born, V. A. (M)
Bose, E. B. (M)
Bosomworth, G. P. (F)
Bowman, B. M. (M)
Bowyer, J. M. (M)
Brown, J. W. (M)
Buxton, A. C. (SM)
Caulkins, F. A. (M)
Chinera, V. J. (SM)
Chipner, R. W. (M)
Ciocca, F. J. (M)
Colletti, N. (M)
Cook, E. E. (M)
Crano, C. A. (A)
Di Caudo, V. J. (M)
Di Feo, V. P. (M)
Eddey, E. E. (A)
Flowers, H. L. (SM)
Foley, J. S. (M)
Forman, H. L. (A)
Grant, D. (M)
Gray, C. L. (M)
Hazlip, G. M. (M)
Hegbar, H. R. (F)
Heydorn, R. P. (M)
Higgins, R. B. (M)
Hlatky, M. G. (M)
Homa, G. D. (M)
Horowitz, M. (SM)
Huber, J. C., Jr. (M)
Iffland, H. L. (A)
Jonard, H. A. (M)
Jubin, T. A. (M)
Kanis, E. J. (A)
Kline, J. M. (M)
Kimmel, H. E. (A)
Knopp, I. L. (M)
Koelker, R. L. (M)
Kostolansky, V. A. (M)
Kristan, M. (M)
Lambert, C. O. (SM)
Lee, W. C. (A)
Leibowitz, S. (M)
Le Way, W. E. (M)
Link, T. V. (M)
Lofgren, E. W. (M)
McCarty, J. R. (M)
McColn, K. H. (M)
McMahon, W. D. (SM)
Midlik, W. M. (M)
Morrison, N. (SM)
Muirhead, R. B. (M)
Nank, W. A. (SM)
Paden, H. R. (M)
Pake, F. G. (M)
Papaioan, I. M. (M)
Pauken, D. J. (M)
Phares, D. P. (M)
Platner, F. J. (A)
Policny, J. (M)
Pressel, P. I. (M)
Rataski, C. P. (SM)
Redmond, J. F. (M)
Rice, W. D. (M)
Rybum, P. W. (M)
Shewchik, S. (A)
Shoemaker, J. R. (SM)
Silkman, H. G. (SM)
Steigerwalt, O. I. (M)
Steiner, W. L. (M)
Strang, J. R. (SM)
Sutherland, E. B. (M)
Tanenhaus, A. M. (SM)
Thompson, K. H. (M)
Van Buskirk, W. J. (A)
Van Sickle, R. G. (M)
Wagner, W. R. (M)
Watkins, W. H. (M)
Weinsheimer, W. E. (A)
Weyrick, R. C. (M)
Wold, J. E. (M)
Zatezalo, G. E. (A)
Zeigler, K. O., Jr. (A)

Alliance (AKR-4)
Smith, A. E. (A)

Amlin (COL-4)
Rife, W. E. (SM)

Arcanum (DAY-4)
Weber, S. E. (M)

Ashtabula (ERI-1)
Burjoice, R. A. (M)
Micksch, J. E. (A)

Athens (COL-4)
Hacker, H., Jr. (M)
Paulsen, G. R. (M)
Smith, R. D. (M)

Atwater (AKR-4)
Krzyzanos, S. M. (M)
Mellander, W. C. (M)

Avon Lake (CLE-4)
Coffe, S. A. (M)
Dobosy, J. F. (SM)
Ramaley, C. W. (M)

Barberton (AKR-4)
Austin, A. O. (F)
Brough, H. R. (A)
Dorsey, J. T. (M)
Farnsworth, N. B. (M)
Kane, C. G., Jr. (M)
Kelley, J. B. (M)
Klever, W. O. (A)
Maples, C. R. (M)
Miller, D. A. (M)
Whitchurch, N. E. (M)
Yanase, H. Y. (A)

Bay Village (CLE-4)
Didinger, G. H., Jr. (M)
Friswold, F. A. (M)
Harmon, J. L. (M)
Miller, F. E. (A)
Smith, C. W. (A)
Smith, T. H. (SM)
Wozniak, A. J. (M)

Beachwood (CLE-4)
Ulmer, R. M. (SM)

Bedford (CLE-4)
Belford, J. F. (M)
Jerome, W. R. (M)
Kessler, J. C. (A)
Seliga, J. (A)
Tapp, N. P. (A)
Washko, F. H. (M)

Bellbrook (DAY-4)
Brown, W. C. (M)
Carpanter, V. J. (SM)
Cunningham, R. F. (SM)
Ludwig, G. L. (M)
Nordstrom, D. R. (M)
Schroeder, H. (M)
Vance, T. L. (A)

Bellore (PIT-4)
Gottlieb, B. (A)

Berea (CLE-4)
Blackman, C. P. (SM)
Crozier, R. W. (A)
Epperson, J. B. (F)
Klinect, R. R. (M)
Lister, R. T. (M)

Berlin Center (AKR-4)
Palmer, D. R., Jr. (M)

Bexley (COL-4)
Brooke, E. F. (M)

Blacklick (COL-4)
Edens, S. V. (M)

Bluffton (TOL-4)
Triplett, M. M. (M)
Triplett, W. R. (M)

Boardman (AKR-4)
Dustman, H. C. (M)

Bowling Green (TOL-4)
Klopfenstein, L. R. (M)
Synnamon, J. H. (M)

Brecksville (CLE-4)
Csensich, J. E. (A)
Cull, R. R. (M)
Drunk, R. K. (A)
Dietrich, J. W. (M)
Hopwood, A. M., Jr. (M)
La Moreaux, D. D. (A)
Lippert, G. R. (SM)
Nace, A. S. (SM)
Roeger, R. E. (M)
Smith, C. E. (F)
Stadig, S. V. (M)
Ulrich, J. F. (SM)
Weaver, J. H. (M)

Brooklyn (CLE-4)
Lutke, T. A. (A)

Cambridge (PIT-4)
Peterson, R. P. (M)

Campbell (AKR-4)
Klimko, C. A. (M)

Canal Fulton (AKR-4)
Smith, P. C. (SM)

Canton (AKR-4)
Arnold, E. N. (SM)
Beckerman, L. M. (M)
Burtner, R. L. (SM)
Domer, D. J. (A)
Duff, J. E. (M)
Fehn, F. P., Sr. (M)
Greene, F. L. (M)
Jameson, W. B. (A)
Koenig, J. (M)
Leist, L. G. (M)
Naylor, J. T. (A)
Sole, A. R. (A)
Walker, N. S. (M)

Castalia (CLE-4)
Fabik, R. H. (A)

Centerville (DAY-4)
Gulden, E. V. (SM)
Meyer, G. B. (M)
Palmer, A. F. (M)
Rench, C. F. (M)
Schreiber, P. W. (M)
Wehrman, R. B. (A)

Chagrin Falls (CLE-4)
Berlincourt, D. A. (M)
Bird, J. R. (SM)
Dombos, L. J. (M)
Farr, H. J., Jr. (M)
Fisher, H. F. (M)
Gehman, J. B. (M)
Kilroy, J. W. (M)
McConnell, H. M. (M)
Saint-Amour, J. D. (A)

Chesterland (CLE-4)
Sallach, M. E. (SM)

Cheviot (CIN-4)
Espelage, P. M. (M)
Peter, J. P. (M)
Spinner, L. N. (M)

Chillicothe (CIN-4)
Hanson, M. L. (SM)
Pulliam, P. E. (M)

Cincinnati (CIN-4)
Adams, M. M. (M)
Adams, R. H. (M)
Ahrends, S. W. (M)
Apgar, R. R., Jr. (M)
Arleth, N. (M)
Ashman, A. B. (M)
Ayers, N. E. (M)
Bain, St. J. (M)
Baird, C. W. (A)
Balash, F. J. (M)
Bass, H. (SM)
Bass, L. (SM)
Bastian, D. W. (M)
Bates, F. E. (M)
Baylor, A. D. (SM)
Beam, L. W. (M)
Berberich, R. J. (A)
Bereskin, A. B. (F)
Berg, D. F. (M)
Bernhard, C. J. (M)
Besco, F. E., Jr. (M)
Blair, D. (M)
Blum, S. (M)
Bopp, C. (SM)
Borgstrom, J. H. (M)
Bowling, J. C. (M)
Bramble, C. A., Jr. (M)
Brandenburg, P. J. (A)
Braun, E. C. (M)
Breunig, W. H. (M)
Briles, W. F. (M)
Brouse, H. L. (SM)
Brown, L. W. (SM)
Brown, N. E. (M)
Buden, D. (M)
Burnett, A. A. (M)
Burrer, G. J. (M)
Busby, L. A. (M)
Bussard, E. J. H. (SM)
Caldwell, J. F. (M)
Campbell, D. J. (M)
Campisano, F. J. (M)
Carey, C. P. (SM)
Carleton, H. (M)
Carlton, E. O. (A)
Carpenter, C. P. (SM)
Cavanaugh, H. D. (A)
Charlton, A. E. (A)
Coble, R. B. (SM)
Collins, J. T. (A)
Congdon, K. P. (M)
Conklin, H. A., Jr. (M)
Crosby, R. H., Jr. (M)
Cunningham, G. W., Jr. (M)
Cunningham, T. W. (M)
Dale, W. L. (M)
Decker, R. H. (M)
Dickhoff, E. B., Jr. (A)
Diehl, J. A. (A)
Ditz, A. E., Jr. (M)
Dingus, D. R. (M)
Doctor, B. (M)
Doerr, W. H. (M)
Dolbeer, W. J. (A)
Dooley, E. B., Jr. (M)
Durnell, R. S. (A)
Dutton, C. E. (M)
Ebbeler, J. R. (M)
Ecker, J. L. (M)
Einbinder, L. W. (A)
Elms, J. C. (SM)
Emmerling, E. J. (M)
Engel, L. (M)
Engelmann, R. H. (SM)
Englert, R. W. (M)
Fausett, F., Jr. (A)
Fenstermacher, A. L. (M)
Ficeli, J. A. (M)
Finnigan, C. W. (SM)
Fisher, B. W. (M)
Fisher, L. R. (M)
Fleming, W. G. (M)
Fligor, P. D. (M)
Fomenko, J., Jr. (M)
Forman, H. R. (A)
French, B. V. K. (SM)
Frommer, J. C. (SM)

Gehring, M. C. (SM)
Geick, G. H. (SM)
George, P. H. (M)
Georger, L. J. (M)
Gerringer, C. K. (SM)
Gilligan, T. R. (M)
Glancy, P. A. (M)
Glover, D. (M)
Goode, J. P. (A)
Gray, C. E. (M)
Greschel, R. A. (A)
Grosse, R. H. (M)
Grossoehme, F. (M)
Grove, H. M. (M)
Gruber, J. R. (SM)
Gulden, W. W. (M)
Haas, R. W. (M)
Haehnle, C. G. (SM)
Hamilton, F. A. (M)
Harris, H. H. (M)
Harter, W. R. (M)
Hartley, R. R. (M)
Harvey, J. T. (M)
Haverkos, N. P. (M)
Headley, H. N. (M)
Heinzelman, G. J. (M)
Hellen, R. J. (M)
Helmbeckel, T. A. (M)
Hentz, E. G. (A)
Herrin, C. B. (M)
High, R. A. (M)
Himes, H. D. (M)
Hirashima, H. K. (SM)
Hoffman, S. (M)
Honan, C. M. (SM)
Hosea, R. A. (M)
Hulstrand, B. E. (M)
Humphrey, W. R. (M)
Inderhees, J. A. (M)
Jacobs, A. (M)
Jambor, L. D. (M)
Johnson, W. C. (M)
Jones, E. M. (SM)
Joyce, K. J. (M)
Kaesemeyer, W. W. (M)
Kammer, D. E. (M)
Kassler, R. (M)
Kelly, J. W. (M)
Kennedy, D. D. (SM)
Kerber, M. C. (M)
Kibby, J. R. (A)
Kidwell, E. W., Jr. (A)
King, F. W., Jr. (SM)
Kiss, J. S. (M)
Kline, A. J. (M)
Knoblaugh, A. F. (F)
Knoer, H. (SM)
Kober, C. L. (F)
Kramer, C. (A)
Krody, J. L. (M)
Kuecken, J. A. (M)
Lambert, R. (SM)
Lambert, V. L. (M)
Langstroth, T. A. (A)
Lawall, R. M. (M)
Lehman, R. H. (M)
Lehnhoff, R. G. (M)
Lenk, H. H. (M)
Lepple, H. (M)
Linblad, T. N. (M)
Livingston, E. (M)
Lorah, P. W. (M)
Luhn, P. J. (M)
Lundgren, C. W., Jr. (M)
Lykins, O. H. (M)
Lynn, G. A. (A)
Lytel, A. (M)
Magrish, C. J. (M)
Maher, E. J. (M)
Marhauer, H. H. (M)
Marlowe, E. W. (M)
Marren, B. T. (M)
Martin, D. W. (F)
Mast, C. E. (M)
Maxim, R. A., Jr. (M)
Mayleben, E. F. (M)
McDermott, E. P. (M)
McDonald, J. M. (SM)
McGregor, M. A. (A)
McNair, R. J. (M)
Meehan, J. P. (SM)
Mentink, A. F. (M)
Meredith, K. M., Jr. (M)
Metzger, F. W. (M)
Meyer, A. (SM)
Mika, J. I. (M)
Miller, R. W. (M)
Mitchell, W. W., Jr. (A)
Moellering, E. E. (M)
Mohaupt, K. R. (M)
Montgomery, W. D. (SM)
Montross, R. A. (A)
Morgan, C. L. (A)
Moulton, E. W. (SM)
Moxley, S. D., Jr. (M)
Murray, J. W. (M)
Nader, J. S. (SM)
Nason, D. B. (SM)
Nauman, J. G. (M)
Neal, N. D. (M)
Needles, W. F., Jr. (A)
Nistico, F. (M)
Nord, G. L. (M)
Novy, E. W. (M)
O'Connell, R. E. (A)
Oezer, J. J. (M)
Ohmart, P. E. (M)
Osterbrock, C. H. (M)
Overman, C. I. (A)
Parker, R. L. (A)
Perry, G. W. (M)
Pfeiffer, J. H., Jr. (M)
Pickett, T. A. (M)



Plenkowski, O. E. (M)
Pilkington, R. R. (M)
Plogstedt, A. E. (M)
Polanieckl, S. (M)
Pope, I. T. (M)
Quitter, J. P. (SM)
Quitter, W. M. (M)
Ragen, J. R. (M)
Rakel, R. H. (M)
Ranson, G. B. (SM)
Rea, R. C. (M)
Reardon, R. A. (A)
Reher, R. R. (A)
Richter, J. J. (M)
Riggs, R. H. (M)
Rockowitz, M. (M)
Rockwell, R. J. (F)
Roskos, R. G. (M)
Rowe, S. (M)
Ruppel, D. (M)
Russom, P. H., Jr. (M)
Ruther, D. M. (M)
Ruther, J. T. (M)
Sanders, H. E. (M)
Sapp, R. S. (M)
Schafer, G. E. (M)
Schenck, R. L. (M)
Schlemmer, R. P. (M)
Schmidt, R. F. (M)
Schneider, C. A. (M)
Schroeder, W. R. (M)
Schroer, P. E. (A)
Schumacher, T. J. (M)
Scott, V. J., Jr. (M)
Seichter, K. R. (A)
Sellingman, M., III (M)
Seward, G. J. (M)
Seyfried, J. E. (A)
Shadley, F. C. (M)
Shaw, C. B., Jr. (M)
Shekro, C. M. (M)
Sheridan, C. J. (M)
Shirk, W. B. (SM)
Silverman, S. (M)
Smith, D. L. (M)
Staab, P. C. (A)
Stacy, R. A. (SM)
Stallings, R. E. (M)
Steffee, J. W. (A)
Stegman, J. A. (M)
Stegman, T. E. (A)
Stelnhoff, E. A. (SM)
Stelten, G. L. (M)
Stephens, T. C. (SM)
Strief, D. A. (M)
Stubbins, W. F. (SM)
Taylor, G. O. (SM)
Thomas, D. E. (M)
Timperman, E. J. (M)
Toole, W. W. (M)
Topmiller, C. H. (M)
Truitt, J. R. (M)
Tulloh,, P. R. (M)
Tulloss, W. S. (M)
Tupman, L. M. (M)
Turrell, R. M. (M)
Tyberg, A. H. (M)
Vandoch, S. C. (A)
Varnum, J. B. (M)
Verkley, B. M. (M)
Vettese, L. (M)
Weaver, C. W. (M)
Weber, C. E. (M)
Wedig, F. L., Jr. (SM)
Weller, C. E. (A)
Westerlund, K. I. K. (M)
Wetz, R. H. (SM)
Whatley, R. L. (M)
White, N. (A)
Whittenberger, J. S. (M)
Williamson, G. F. (M)
Wills, T. C. (A)
Wilson, H. J. (A)
Wilson, J. W. (M)
Winder, C. F. (SM)
Wissel, F. A. (SM)
Wyre, W. F., Jr. (M)
Wyzenbeek, A. (A)
Yancey, W. D. (M)
Yaney, P. P. (M)
Yarbrough, H. B. (M)
Zimov, L. R. (SM)
Zoerner, J. R. (M)
Zwayer, B. E. (M)

Clayton (DAY-4)
Archer, R. F. (M)

Cleveland (CLE-4)
Ackerman, E. K. (SM)
Anderson, C. R. (M)
Anderson, F. D. (A)
Arndt, J. P. (SM)
Begun, S. J. (F)
Blank, G. F. (A)
Bletcher, A. L. (M)
Bopas, J. (A)
Bolz, R. W. (SM)
Briggs, R. F. (M)
Brincka, J. J. (M)
Brinkman, H. A. (M)
Buchspice, J. E. (A)
Buher, J. R. (A)
Burgener, D. R. (M)
Burhans, R. W. (M)
Busher, R. E. (M)
Butler, A. H. (M)
Campbell, J. H. (M)
Cannon, D. E. (M)
Caskey, H. B. (M)
Cerveny, W. J. (SM)
Chakerian, R. (M)
Chase, W. H. (SM)
Chemsky, C. (A)
Christiansen, M. E. (A)
Chulick, C. M. (M)
Collin, R. E. (M)
Costanza, J. L. (M)
Cowan, R. A. (A)
Crows, H. (M)
Cunningham, J. A. (A)
Curran, D. R. (SM)
Dambach, R. A. (SM)
Dambach, T. F. (M)
De Lany, R. H. (SM)
Dittenberger, R. J. (A)
Dombrady, S. E. (M)
Doyle, J. M. (A)
Edling, E. A. (A)
Elmendorf, D. E. (M)
Farrar, M. B. (M)
Feucht, R. W. (M)
Frankel, B. L. (M)
Franks, C. V. (M)
Frederico, B. D. (M)
Friedberg, M. R. (SM)
Gehrke, E. P. (M)
Geiger, D. L. (M)
Gerhan, C. F. (M)
Geyer, J. R. (M)
Gilbert, L. J. (M)
Giolitta, T. S. (M)
Glover, W. E. (A)
Grace, C. H. (SM)
Granger, L. V. (M)
Grossman, H. (A)
Hamann, K. R. (M)
Haner, L. (M)
Hansen, R. E. (A)
Havel, D. F. (M)
Hazony, D. (M)
Heller, H. H. (SM)
Hickok, R. D. (SM)
Homfeck, A. J. (SM)
Hough, R. R. (SM)
Howard, R. M. (A)
Hrabes, W. R. (A)
Hughes, R. O. (M)
Hujar, R. A. (A)
Humphrey, A. J. (M)
Jackson, W., Jr. (M)
Jaffe, H. (SM)
Jeffery, E. L. (A)
Jira, J. W. (M)
Kaine, E. (M)
Kazarian, R. (M)
Killian, W. H. (M)
Kinkald, J. C. (A)
Kliever, W. H. (SM)
Klivans, N. R. (M)
Klock, H. F. (M)
Krejny, E. L. (M)
Kres, A. J. (M)
Kriz, W. (A)
Laden, H. N. (M)
Lake, W. H. (M)
Lalli, V. R. (M)
Lannan, P. E. (SM)
Lee, J. M. (M)
Leemon, W. (A)
Lesyk, L. (M)
Lewis, A. M. (M)
Little, H. (A)
Little, R. V., Jr. (M)
Lomaz, D. D. (M)
Louis, W. B. (M)
Ludwig, S. (M)
Luehring, E. L. (M)
Lunzo, A. (M)
Maclag, E. T. (M)
Maisel, J. E. (M)
Majercak, J. V. (M)
Martin, E. E. (M)
Martin, J. R. (M)
Martin, M. L., Jr. (M)
McArdle, O. L. (A)
McCollister, D. R. (M)
McCollister, J. D. (M)
McCormick, J. R. (M)
McNeel, E. L. (A)
Mentzer, P. K. (M)
Mergler, H. W. (M)
Middleton, A. E. (M)
Misek, A. E. (M)
Molnar, L. S. (A)
Morrow, L. A. (M)
Munshower, R. M. (A)
Murray, J. H. (A)
Nash, H. C. (M)
Naylor, A. F. (M)
Newborg, D. S. (M)
Nice, A. W. (M)
Nunan, J. K. (M)
Oestermeyer, C. F. (A)
O'Hearn, W. F., Jr. (M)
Palmer, P. D. (A)
Pearson, D. M. (M)
Peirce, S. D. (SM)
Pettus, R. (A)
Plwonka, W. G. (M)
Plaisted, R. J. (M)
Plakadis, A. P. (M)
Plonsey, R. (M)
Praglin, J. (M)
Prechtel, C. J. (M)
Reash, C. W. (SM)
Reed, T. J. (M)
Relches, S. L. (SM)
Rienerth, G. R. (M)
Rittenhouse, J. W. (SM)
Rundel, G. L. (A)
Saby, J. S. (SM)
Saint-Amour, P. M. (A)
Saltzer, C. (M)
Sanderson, J. K. (M)
Schiff, D. W. (A)
Schneider, P. (A)
Schuler, R. G. (SM)
Seaton, G. (A)
Seely, S. (F)
Sharp, F. R. (M)
Sheetz, J. I. (M)
Shepherd, B. R. (M)
Sherman, K. S. (SM)
Smeallie, G. R. (M)
Smetana, J. (M)
Snedeker, M. L. (SM)
Sollock, L. (A)
Spears, W. F. (SM)
Stafford, K. E., Jr. (M)
Sturman, J. C. (M)
Taber, M. R. (M)
Thomas, G. E. (M)
Till, W. C. (M)
Todd, A. W. (A)
Tomarooy, J. A. (M)
Tozier, R. E. (M)
Trumble, W. M. (M)
Tuma, C. F. (A)
Uguccini, O. W. (M)
Varady, D. J. (M)
Walter, R. T. (M)
Webner, R. D. (M)
West, S. S. (M)
Whalen, P. P. (A)
Whittaker, B. H. (M)
Wiemelt, E. L. (M)
Wise, D. S. (SM)
Wood, R. M. (M)

Cleveland Heights (CLE-4)
David, B. W. (SM)
Galtner, P. H. (M)
Germano, C. P. (SM)
Gibson, J. L. (M)
Hartel, R. R. (M)
Hooper, J. R., Jr. (M)
Hudson, A. E. (M)
Ko, W. H. (M)
Livsey, R. A. (M)
Maloney, T. C. (M)
Manring, J. M. (M)
McIntosh G. A. (M)
Newman, H. B. (M)
Pastor, R. G. (M)
Pierce, D. E. (A)
Scott, E. P. (M)
Storey, W. T. (M)
Tame, J. S. (M)
Zorger, P. H. (M)

Clinton (AKR-4)
Shaklee, F. S. (M)

Columbus (COL-4)
Anthony, G. E. (M)
Antonevich, J. N. (M)
Austen, B. G. (M)
Autry, A. T. (A)
Bacon, J. (M)
Baeumler, H. W. (M)
Bailey, R. J. (A)
Bain, T. D., Jr. (M)
Battoclettl, F. E. (M)
Bauer, W. (M)
Beer, A. C. (M)
Bettenhausen, L. H. (M)
Bishop, A. B., III (M)
Bitler, D. W. (M)
Blake, R. E. (M)
Blessing, H. L. (M)
Boehnker, C. H. (A)
Bohannan. R. C. (M)
Boone, E. M. (F)
Boyers, J. S. (SM)
Brown, R. A. (M)
Bulman, W. E. (SM)
Burgess, J. Q. (M)
Burrus, W. R. (M)
Butterworth, G. S. (M)
Caldecott, R. (SM)
Campbell, R. M. (M)
Casto, A. E. (M)
Chang, W. S. C. (M)
Chapman, C. M. (M)
Chen, S. N. C. (M)
Chope, H. R. (SM)
Chope, W. E. (SM)
Clore, W. R. (SM)
Clymer, A. B. (M)
Cohen, D. (M)
Compton, R. T., Jr. (M)
Copeland, J. R. (M)
Cornetet, W. H., Jr. (M)
Cosgriff, R. L. (SM)
Crawford, R. W. (M)
Crone, W. R. (M)
Crooks, R. K. (SM)
Crow, W. F. (M)
Dabel, D. J. (M)
Damon, E. K. (M)
Daniels, W. L., Jr. (M)
Davis, B. D. (M)
Dawirs, H. N. (SM)
Deeter, C. R. (M)
Delapalana, R. L. (M)
Dennis, P. R., Jr. (M)
Distelzweig, F. J. (M)
Dobson, D. A. (M)
Dubrow, B. (A)
Dukes, J. R. (A)
Easterday, J. L. (M)
Eastwood, W. J. (A)
Ebert, D. H. (M)
Elter, W. F. (A)
Ellis, R. E. (A)
England, S. J. M. (A)
Everett, W. G. (M)
Falkenbach, G. J. (SM)
Felbel, R. L. (M)
Fell, C. F. (SM)
Forrest, J. G., Jr. (M)
Fragiotti, J. (M)
Francisco, G. E., Jr. (M)
Freundlich, J. J. (M)
Fromm, K. N. (M)
Gager, W. B. (M)
Gahm, W. L. (M)
Garbacz, R. J. (M)
Garrigus, N. F. (M)
Gay, J. W. (M)
Gilfert, J. C. (M)
Goetz, P. K. (M)
Gray, J. W. (M)
Guernsey, E. D. (M)
Gulcher, R. H. (M)
Haas, C. J. (M)
Habermann, C. L. (M)
Haid, H. R. (M)
Hame, T. G. (SM)
Harks, C. L. (M)
Harcarufka, J. F. (M)
Hayden, J. R. (M)
Hayes, A. J. (M)
Herren, P. C., Jr. (M)
Higgy, R. C. (SM)
House, R. W. (SM)
Hover, P. B. (M)
Hufford, J. N. (M)
Humphreys, R. F. (A)
Hunter, H. H. (M)
Jackson, A. J. (M)
Jackson, S. P. (A)
Jaeger, J. H. (SM)
James, R. B. (M)
Jastram, P. S. (M)
Jenkins, C. E. (M)
Johnson, E. W., Jr. (M)
Jones, E. A. (SM)
Jones, L. W. (M)
Joost, A. E. (M)
Josenhans, J. G. (M)
Kail, W. F. (M)
Kennaugh, E. M. (M)
Kirschbaum, H. S. (A)
Kisha, A. (M)
Klabo, S. T. (M)
Ko, H. C. (M)
Kouyoumjian, R. G. (A)
Kraus, J. D. (F)
Kreager, C. R. (A)
Kuba, R. E. (M)
Lackey, R. B. (M)
Larsen, W. L. (M)
Lawrence, G. M. (M)
Leonard, J. D. (SM)
Leonhard, C. P. (A)
Levadi, V. S. (M)
Levis, C. A. (SM)
Lindgren, W. A. (A)
Linsk, L. (A)
Litterer, J. E. (M)
Long, R. K. (M)
Looney, R. G. (A)
Martin, P. T. (M)
McFarland, R. H. (M)
McFarland, R. S. (M)
McNichols, H. B. (A)
McWilliams, P. B. (A)
Mehrholz, J. I. (M)
Merrill, R. L. (M)
Milford, F. J. (M)
Milligan, N. P. (M)
Mobley, M. D. (M)
Moffatt, D. L. (M)
Moll, M. (M)
Moore, D. P. (M)
Muldowney, J. F. (A)
Myers, O. C. (M)
Nafzger, L. H. (M)
Nash, R. T. (A)
Oppenheimer, S. L. (M)
Orr, W. (A)
Parg, T. C. (M)
Patzer, H. E. (A)
Peake, W. H. (M)
Perry, R. C. (M)
Peters, L. Jr. (SM)
Pierzchala, L. C. (M)
Pifer, P. M. (M)
Plugge, R. J. (M)
Porter, E. M. (A)
Potts, B. C. (M)
Querido, H. B. (M)
Ramey, D. E. (M)
Reed, T. W. (M)
Richmond, J. H. (SM)
Robertson, W. J. (M)
Roehm, J. D. (M)
Rose, G. C. (M)
Rosol, G. L. (M)
Ryan, J. F. (M)
Ryan, P. A. (M)
Schulman, B. L. (M)
Sespico, F. M. (SM)
Shankland, D. G. (M)
Sherwood, E. M. (M)
Sloan, C. B. (M)
Somerotski, F. W. (M)
Spell, R. W. (M)
Spero, A. F. (M)
Stafford, J. H. (M)
Stapf, M. R., Jr. (A)
Stedman, J. J. (M)
Steger, D. J. (A)
Stein, T. G. (M)
Stevens, R. H. (M)
Stone, E. W. (A)
Stoutenburg, D. V. (M)
Stuart, W. D. (M)
Studmann, G. H., Jr. (M)
Sullivan, R. P. (M)
Tamplin, G. R. (M)
Taylor, J. K., Jr. (M)
Thomas, A. C. (M)
Thurston, M. O. (SM)
Tice, T. E. (SM)
Tischer, F. J. (SM)
Travis, E. W. (M)
Trost, V. E. (A)
Troyan, J. F. (M)
Truxall, F. W. (M)
Tucker, R. E. (M)
Ulbrich, E. A. (M)
Vincent, C. J. (M)
Walter, C. H. (SM)
Warren, C. E. (SM)
Weaver, C. E. (SM)
Weed, H. R. (SM)
Weimer, F. C. (SM)
Wendt, R. B. (M)
Whitney, W. (SM)
Williams, R. D. (M)
Wolf, F. A. (SM)
Yaw, D. F. (SM)
Yerance, R. A. (SM)
Young, D. A. (M)
Young, G. W. (A)
Zimmer, C. C. (M)

Conneaut (ERI-1)
Dvorsky, A. L. (M)
Keskinen, A. R. (SM)
Morrell, G. A., Jr. (M)
Ryan, W. J. (A)

Cuyahoga Falls (AKR-4)
Burke, J. T. (SM)
Buynak, G. R. (M)
Cherveny, V. J. (M)
Chuma, N. (A)
Cobbs, E. R. (A)
Conley, R. E. (M)
Couture, C., Jr. (M)
Crosley, E. W., Jr. (M)
Davis, H. P. (M)
Diamantides, N. D. (M)
Dills, R. S. (M)
Evans, D. C. (M)
Fordham, C. E. (M)
Gibson, C. O. (A)
Greene, H. R. (SM)
Guthrie, F. W. (M)
Hakes, T. H. (M)
Hellman, B. H. (A)
Hermann, P. J. (SM)
Heller, J. R. (SM)
Horwitz, G. (A)
Ingalls, R. S. (M)
Jones, W. V., Jr. (SM)
Kelly, C. M. (SM)
Kult, M. L. (SM)
Long, C. W. (M)
Machan, R. D. (M)
Martin, T. A. (M)
Mason, D. F. (M)
Maxwell, D. W. (A)
Meneley, C. A. (SM)
Miller, R. E. (M)
Miller, R. F. (M)
Miller, W. W. (A)
Morrill, C. D. (SM)
Olseen, E. E. (A)
Robinson, G. E. (M)
Roth, J. (M)
Shackelford, W. T., III (M)
Sibila, K. F. (SM)
Sicheri, C. R. (M)
Snyder, E. W. (M)
Toman, W. J. V. (M)
Tracy, T. J. R. (M)
Trutko, J. M. (A)
Tuma, W. S. (M)
Welch, G. H. (M)
Yochelson, S. (SM)

Dayton (DAY-4)
Adams, E. L. (SM)
Ahalt, C. A. (M)
Allen, F. W. (A)
Allen, K. D. (A)
Althouse, J. M. (SM)
Amthein, O. C. (M)
Anderson, D. (SM)
Anderson, J. R. (A)
Anglin, D. (M)
Antzack, T. G. (M)
Arenstein, G. H. (SM)
Arnold, W. S. (M)
Ashby, G. L. (M)
Augustin, O. E. (M)
Bahret, W. F. (M)
Baillie, A. J. (M)
Ballard, J. W. (SM)
Barker, J. :. (M)
Barkley, M. M. (SM)
Bartman, H. M. (M)
Becker, R. H. (A)
Belitz, H. G. (A)
Bender, C. S. (M)
Bender, D. L. (A)
Bialer, M. (SM)
Biales, K. (A)
Biddle, W. G. (M)
Bissonette, A. G. (M)
Black, J. D. (M)
Boario, W. R. (SM)
Boedeker, H. F. (M)
Boettcher, B. K. (M)
Bolles, J. H. (M)

Bordewisch, J. F. (M)
Borgelt, E. H. (M)
Bornhorst, K. F. (M)
Botbyl, G. W. (M)
Boyle, H. G. (A)
Brenner, G. R. (M)
Braun, W. G. (M)
Breesman, R. N. (M)
Brobst, P. L. (M)
Brooks, R. D. (M)
Brown, A. C., Jr. (M)
Brown, F. M. (M)
Brown, G. T., Jr. (SM)
Brumfield, W. T. (M)
Bryan, C. R., Jr. (A)
Bryer, R. L., Jr. (A)
Bryson, V. E. (M)
Budde, E. V. (M)
Buhl, W. T. (M)
Burneka, C. R. (M)
Burns, J. H. (M)
Butsch, L. M., Jr. (A)
Buxton, R. W. (A)
Byrd, E. W. (M)
Calhoun, R. P. (A)
Callahan, J. G. P. (SM)
Carbone, A. J. (M)
Carr, M. G. (M)
Caskey, O. G. (A)
Catanzarite, F. J. (SM)
Cavender, J. T. (SM)
Chandler, J. A. (SM)
Chandler, R. M. (M)
Chandler, W. M. (M)
Charbonneaux, W. A. (SM)
Charnock, L. J. (SM)
Cherpeski, R. P. (M)
Chong, B. (A)
Christian, R. E. (M)
Christianson, L. L. (M)
Christie, J. B. (M)
Clark, A. D. (M)
Clark, A. H. (M)
Clark, P. H. (SM)
Clark, R. R. (M)
Cogan, J. T. (M)
Combs, J. A. (M)
Compton, L. L. (M)
Conhain, R. L. (A)
Conrad, C. G. (SM)
Coombs, C. C., Jr. (M)
Cooney, T. R. (SM)
Cooper, E. H. (SM)
Coop, R. S. (M)
Correll, E. G. (M)
Couch, L. J. (M)
Couch, P. W. (A)
Courtney, R. L. (M)
Coy, R. J. (A)
Cummins, S. E. (M)
Curp, W. C. (A)
Currie, J. D. (M)
Curtis, L. L. (A)
Cushing, W. J. (A)
Daubendick, A. W. (M)
Davis, C. H. (A)
Day, J. G. (M)
Dayton, M. S. (M)
Dean, R. F. (M)
Decker, E. E. (M)
Deeken, J. W. (M)
De Fries, W. G. (M)
De Luna, J. (SM)
Demarest, D. (M)
Dennis, J. L. (F)
Dicke, A. H. (M)
Drozd, C. J. (A)
Duckwitz, W. G. (SM)
Dupaul, O. K. (A)
Ecker, H. A. (M)
Eckert, C. C. (SM)
Elcan, W. C. (M)
Epers, W. C., Jr. (SM)
Falk, H. C. (M)
Falkowski, A. J. (SM)
Falvey, J. L. (M)
Fedotin, L. S. (M)
Feist, W. E. (SM)
Ferguson, J. L. (M)
Finocharo, J. J. (M)
Fischer, R. W. (M)
Fisher, P. A. (A)
Forsker, C. M. (M)
Forster, A. G. (M)
Fouse, G. T. (SM)
Franme, R. J. (SM)
Franklin, C. S. (SM)
Friedman, H. (M)
Fritz, A. D. (A)
Fulcher, J. A. (M)
Fulton, W. L., Jr. (M)
Ganger, G. M. (A)
Gauvey, M. P. (M)
Geis, J. H. (M)
Georgi, J. P. (SM)
Gerdes, C. V. (A)
Gerner, R. J. (M)
Gibbs, L. L. (M)
Gibson, J. D. S. (M)
Giesy, L. H. (M)
Giffin, E. L., Jr. (A)
Gilbert, D. F. (SM)
Glan, G. (SM)
Glass, W. (A)
Glidewell, J. J. (M)
Goff, R. L. (SM)
Goldman, A. (SM)
Goldman, C. C. (M)
Gould, W. B. (M)
Graebner, M. S. J. (M)
Granzow, D. B. (A)
Graves, R. C., Jr. (M)
Green, B. K. (M)
Green, J. E. (M)
Griffing, B. L. (SM)
Grillmeier, E. J. (A)
Grimes, W. H. (M)
Guest, T. W. (A)
Guzak, P. D. (A)
Hallman, L. B., Jr. (F)
Hammer, W. F. (M)
Hanley, N. B. (M)
Hannay, B. E. (A)
Hanneman, D. A. (M)
Harding, G. A. (A)
Harmon, W. L. (M)
Harnett, R. J. (A)
Harris, F. (SM)
Hausen, D. K. (M)
Hauser, P. D. (SM)
Hayes, T. J. (M)
Hazen, R. R. (M)
Hearsum, D. R. (M)
Heidenreich, J. (SM)
Helf, W., Jr. (SM)
Helldoerfer, C. S. (M)
Henderson, A. B. (SM)
Herrlin, R. C. (SM)
Herzog, W. F. (A)
Heyd, J. W. (SM)
Heywood, W. W. (M)
High, R. (M)
Hill, J. C. (SM)
Hill, M. A. (M)
Hilsabeck, D. M. (M)
Hilt, W. M. (SM)
Hobstetter, J. P. (A)
Hoefle, R. R. (SM)
Holley, J. S. (A)
Holloway, F. L. (SM)
Holmes, C. W. (A)
Horrigan, J. S. (A)
Horton, W. L. (SM)
Hovey, W. J. (M)
Howe, J. C. (M)
Huckaby, J. H. (SM)
Hucke, H. M. (SM)
Hull, R. S. (SM)
Husmann, F. W. (M)
Huster, L. W. (M)
Hutchinson, J. H. (M)
Hutchinson, K. R. (M)
Ittelson, R. W. (SM)
Jacobs, M. (SM)
Jacobs, Y. (SM)
James, R. L. (SM)
Jardine, R. A. (M)
Javorsky, J. (A)
Jent, J. H. (M)
Johnson, D. A. (M)
Johnson, R. A. (M)
Johnston, E. B. (M)
Johnston, E. F., Jr. (M)
Jones, F. A. (M)
Jones, K., Jr. (M)
Jones, O. D. (M)
Jones, R. C. (M)
Josefczyk, H. M. (M)
Kamp, F. S. (M)
Karabaich, F. (M)
Kellogg, R. E. (M)
Kennedy, J. S. (M)
Kerbs, W. A. (A)
Kerlakou, P. N. (M)
Kern, J. L. (M)
Kessler, C. W. (M)
Keto, J. E. (F)
Kidd, G. B. (M)
Kienker, J. E. (M)
Kilheffer, L. D. (SM)
Kimball, G. W. (M)
King, H. B. (SM)
Klein, W. (A)
Klingler, G. A. (SM)
Knight, A. R. (SM)
Kreitzberg, H. L., Jr. (M)
Krenzer, B. A. (M)
Kress, O. C. (A)
Kuppin, F. (M)
Ladd, E. L. (A)
Lamb, C. E. (M)
Landreman, G. R. (M)
Langston, G. A. (M)
Laureyns, G. A. (M)
Lawson, S. A. (SM)
Leland, H. E. (M)
Levine, H. M. (M)
Littell, C. C., Jr. (M)
Lloyd, L. H. (SM)
Lockwood, G. C. (M)
Logus, P. J. (M)
Long, G. A., Jr. (M)
Long, R. E. (M)
Lord, A. S. (M)
Lumpkin, R. C. (M)
Lupton, F. A., Jr. (A)
Madden, J. R. (M)
Magile, J. J. (M)
Mahlmeister, T. G. (M)
Malogorski, E. C. (M)
Markley, P. A., Jr. (M)
Martin, E. H. (M)
Martin, T. H. (M)
Matson, R. D. (M)
Matthew, R. E. (M)
Mawdsley, R. L. (SM)
Maybell, J. L. (SM)
McAdory, R. W. (M)
McCann, G. R., Jr. (M)
McClellan, K. C. (A)
McCormick, R. E. (SM)
McIlrath, R. J. (A)
McIntosh, V. C. (M)
McLaughlin, C. E. (M)
McLennan, M. A. (F)
McMillan, W. R. (M)
McRae, A. H. (SM)
Meeker, T. R. (M)
Mendelson, D. A. (SM)
Metzger, J. A. (M)
Meuche, C. H. (M)
Meulemans, J. I. (M)
Meyers, D. V. (A)
Midgley, V. E. (A)
Miller, E. H. (A)
Miller, P. C. (M)
Mirsky, M. M. (M)
Mitter, T. S. (M)
Moe, J. L. (M)
Moon, J. F. (A)
Moore, J. M. (M)
Moraff, H. (M)
Morrison, D. W. (SM)
Morse, B. K. (M)
Mountz, T. P., Jr. (M)
Moyer, D. F. (SM)
Mumma, R. E. (SM)
Myers, R. P. (M)
Newcomb, H. W. (A)
Nickels, J. L. (M)
Nisenoff, N. (M)
Noble, J. C. (M)
Norton, M. H. (M)
Notestine, D. D. (M)
Ogar, G. W. (M)
Overholser, W. E. (M)
Owen, H. W. (SM)
Papaiconomou, G. (M)
Pappas, M. J. (M)
Parker, A. P. (M)
Pasek, J. (A)
Peot, H. G. (M)
Perdzock, R. C. (M)
Perkins, P. E. (A)
Peters, A. L., Jr. (SM)
Petit, A. H. (SM)
Piety, E. W. (SM)
Pippenger, C. R. (M)
Pirie, F. E. (M)
Pitinsky, L. (M)
Planchak, E. (M)
Pleshek, L. J. (SM)
Pokorny, J. J. (SM)
Porter, L. E. (M)
Porter, W. J., Jr. (M)
Priddy, D. N. (M)
Pritchard, C. J. (M)
Purnell, M. V. (M)
Radke, C. E. (M)
Ramsey, J. T. (A)
Rawhouser, R. (SM)
Regnier, L. A. (M)
Reid, W. T. (M)
Rhude, D. P. (M)
Richard, C. W. (SM)
Richard, P. R. (A)
Richardson, T. L. (M)
Richmond, L. P. (SM)
Ricker, R. K. (M)
Rippin, J. F., Jr. (SM)
Robinson, W. C. (M)
Roesler, L. (M)
Rogers, A. J. (SM)
Rohlinger, D. J. (M)
Rook, J. S. (A)
Rook, L. W. (M)
Roschi, J. W., Jr. (A)
Rose, L. H. (SM)
Rosener, G. M. (M)
Rothammer, W. H. (SM)
Rottenberg, M. J. (SM)
Rounds, J. M. (A)
Ruble, H. E. (M)
Ruddell, E. E. (A)
Russ, F. J. (SM)
Russell, H. J. (M)
Ryan, F. A. (A)
Rychlik, R. F. (SM)
Rynda, T. C. (SM)
Sanderson, G. L. (M)
Sandor, L. K. (M)
Sansom, F. J. (M)
Sauer, R. J. (M)
Savoy, R. P. (M)
Schantz, G. W. (M)
Scheer, G. H. (SM)
Schelling, E. R. (M)
Schram, S. M., Jr. (SM)
Schreiber, E. J. (M)
Schwartz, N. F. (M)
Schwartz, S. J. (M)
Schwennesen, A. B. (M)
Schwitzgebel, W. C. (M)
Scott, J. E. (SM)
Scott, J. W. (M)
Semkow, J. W. (A)
Sen, W. J. (SM)
Senecal, T. L. (SM)
Seth, C. E. (M)
Shadburn, T. H. (M)
Shelfs, J. F. (A)
Sides, J. D. (A)
Siefker, R. G. (M)
Siak, J. R. (A)
Siff, R. G. (A)
Simopoulos, N. T. (M)
Singer, J. E. (M)
Skolnik, S. (SM)
Smith, D. A. (SM)
Smith, F. L. (M)
Smith, R. E. (A)
Smith, R. J. (A)
Smith, V. M. (M)
Snyder, A. R. (A)
Soerhoff, R. A. (A)
Sogn, L. T. (M)
Sonstegard, A. M. (A)
Soule, B. L. (M)
Speake, A. C. (M)
Spieler, R. J. (M)
Springer, P. W. (SM)
Sproule, J. H. (SM)
Stahler, Y. E. (M)
Stanford, R. W. (M)
Stanton, J. S. (M)
Stein, R. J. (A)
Stewart, J. R. (A)
Stewart, J. (M)
Stewart, W. E. (SM)
Stinson, R. G. (M)
Stolzenbach, R. W. (SM)
Stouch, D. H. (M)
Sutton, A. W., Jr. (M)
Sutton, W. K. (A)
Swanson, A. W. (A)
Swift, R. E. (M)
Tarmats, G. (SM)
Taylor, C. E. (M)
Temoyan, J. D. (M)
Temple, T. W. (A)
Teplitz, H. (M)
Thinnes, R. L. (A)
Thompson, J. P. (M)
Thome, E. D. (M)
Thresher, W. E. (M)
Tokarelf, P., Jr. (M)
Tomberg, S. (SM)
Toomey, P. J. (M)
Totten, J. E. (M)
Trenkle, R. A. (SM)
Trentman, D. J. (A)
Tucker, J. W. (A)
Turner, E. M. (SM)
Turner, R. P. (M)
Valentine, E. O. (SM)
Velesky, J. J. (M)
Vendely, B. (A)
Versic, C. (M)
Vetter, C. R. (A)
Veurink, W. J. (M)
Von Rohr, R. D. (A)
Wadsworth, N. L. (M)
Walczy, R. J. (M)
Wall, J. R. (M)
Walling, G. P. (SM)
Wamboldt, H. (M)
Warshawsky, L. M. (M)
Warwick, J. D. (M)
Watton, A., Jr. (SM)
Waugh, A. C. (SM)
Webb, D. E. (M)
Webb, W. C., Jr. (A)
Wehner, G. L. (M)
Weiser, R. V. (SM)
Westland, R. A. (M)
Whelan, R. E. (A)
Wiegert, P. G., Jr. (SM)
Wieland, E. S. (SM)
Wilde, A. J. (SM)
Wilkinson, J. E. (M)
Wilson, C. C. (M)
Winstead, D. D. (M)
Winters, W. D. (M)
Wooten, S. J. (A)
Worley, R. M. (M)
Writer, J. D. (M)
Wyse, D. S. (A)
Yoshida, H. (M)
Young, J. E. (M)
Young, L. McC. (SM)
Zabetakis, S. G. (M)
Zacharias, R. A. (A)
Zalusky, C. W. (A)
Zander, T. A. (M)
Zieman, C. M. (M)
Zimmerle, D. F. (M)
Zimmerman, R. F. (M)
Zingg, J. F. (M)
Zwissler, H. R. (A)

Deerfield (AKR-4)
Rogers, C. L., Jr. (M)

Defiance (TOL-4)
Hoeffel, J. D. (M)
Sherbno, J. C. (A)

Delaware (COL-4)
Kreis, R. J. (M)
Poast, L. M. (M)

Deshler (TOL-4)
Colwell, R. E. (SM)

Dover (PIT-4)
Petrella, J. L. (A)

Doylestown (AKR-4)
Nuss, R. J. (A)

Dublin (COL-4)
Tracy, R. C. (M)

East Cleveland (CLE-4)
Corrigan, M. J. (M)
Gardner, R. A. (M)
Hadzoglov, J. (M)
Kennedy, E. D. (SM)
Louis, J. R. (M)
Rodgers, R. C. (M)
Serota, R. M. (SM)
Tuttle, J. W. (M)
Viton, E. J. (M)
Ward, D. O. (M)
White, J. E. (M)

Eastlake (CLE-4)
Sawyer, B. (A)

East Liverpool (PIT-4)
Ryckman, G. E. (A)

Edon (TOL-4)
Winzenried, J. E. (A)

Elmore (TOL-4)
Bay, R. J. (A)

Elyria (CLE-4)
Finegold, I. (A)
Melli, E. J. (A)

Enon (DAY-4)
Garman, D. F. (M)
Short, W. K. (M)

Euclid (CLE-4)
Beaver, A. R. (M)
Businger, K. A. (M)
Calderhead, H. J. (M)
Elze, R. P. (A)
Mills, R. L. (A)
Murray, J. E. (M)
Nurmi, L. O. (M)
Powell, J. D., Jr. (M)
Puskarics, J. (M)
Schanfarber, R. C. (A)
Schunemann, C. F. (SM)
Stevko, P. J., Jr. (M)
Thompson, R. A. (M)
Wurster, D. E. (M)

Evendale (CIN-4)
Young, J. D., Jr. (M)

Fairborn (DAY-4)
Anderson, R. C. (M)
Archer, C. J. (SM)
Baker, M. W., Jr. (M)
Behane, D. (A)
Benson, M. C. (SM)
Bogrees, G. T. (M)
Bowker, I. H. (M)
Cheadle, H. R. (M)
Crosse, G. S. (A)
De Camp, P. W. (A)
Diavatis, N. D. (A)
Dickey, R. S. (M)
Emrick, B. S. (M)
Etheridge, L. R. (M)
Fahmey, R. L. (M)
Green, W. M. (M)
Greenfield, W. D. (M)
Hayes, O. E. (M)
Hines, C. A. (SM)
Hovan, T. (M)
Hybskmann, V. L. (A)
Ingram, D. B. (M)
Kaiser, G. B. (SM)
Kistner, R. L. (A)
Kohlmann, H. P. (M)
Lazur, E. (M)
Lynch, T. M. (M)
Marko, A. R. (M)
Matulka, D. D. (M)
Mayer, I. S. (SM)
McDowell, M. S. (A)
McElroy, G. A. (M)
McLaughlin, I. L. (M)
Menear, L. S. (M)
Milliron, J. R. (M)
Murrel, R. R. (M)
Parks, G. B. (M)
Peterson, L. S. (M)
Pflueger, W. W. (M)
Price, L. R. (M)
Rizos, J. G. (SM)
Schivley, G. W. (M)
Schloss, J. K. (SM)
Schulherr, R. M. (SM)
Sinnott, D. J. (M)
Skinner, E. E. (SM)
Sparks, R. S. (A)
Spengler, J. R. (A)
Stimson, J. S. (M)
Taylor, F. S., III (M)
Taylor, P. B. (SM)
Thatcher, F. F., II (M)
Vanderpool, H. D. (M)
Varga, M. J., Jr. (A)
Watren, P. J. (M)
Wilson, J. W. (M)

Fairview Park (CLE-4)
Atkisson, E. A. (M)
Gedeon, A. J. (M)
Griffin, T. A., Jr. (M)
Hart, C. E. (A)
Hlavin, J. M. (M)
Hoff, H. B. (M)
Nagy, L., Jr. (M)
Westbrook, R. D. (M)

Findlay (TOL-4)
Daymon, D. W. (M)
Lavender, J. S., Jr. (M)
Smith, E. C. (M)
Wells, D. H. (M)

Foster (DAY-4)
Clements, L. D. (M)
Porter, J. R. (M)

Fostoria (CLE-4)
Droll, T. F. (A)

Franklin (DAY-4)
Bryant, V. D. (M)

Fremont (TOL-4)
Leite, R. C. (M)
Swartzlander, G. W. (M)



Gahanna (COL-4)
De Myer, D. L. (M)
Hall, W. S. (M)
Mason, W. F. (M)
Mendenhall, W. S., Jr. (A)
Stropki, G. T. (A)

Galion (AKR-4)
Blashfield, W. H. (M)
Crissinger, W. W. (M)
Haferd, F. H. (M)
Halter, M. N. (A)
Jackson, R. G. (M)
Jacobson F. O. (A)
Jahnke, C. E. (M)
Leopert, D. V. (M)
Moore, C. R. (A)
Murphy, C. E. (M)
Stewart, W. H. (M)
Svala, C. G. (M)
Van Voorhees, A. J. (M)
Wentworth, H. B. (A)

Garfield Heights (CLE-4)
Gregory, R. L. (M)
Kurkul, W. (SM)
McGunigle, R. D. (M)
Penkowski, L. J. (M)
Schoeffler, J. D. (M)

Gates Mills (CLE-4)
Gardiner, R. A. (SM)

Genoa (TOL-4)
Spencer, N. K. (M)

Girard (AKR-4)
Kramer, R. E. (SM)

Glendale (CIN-4)
Browne, G. W. (M)
Schmittou, C. J. (M)

Granville (COL-4)
Clark, J. V. (M)
Knox, J. L. (M)

Grove City (COL-4)
Birk, E. V. (A)

Groveport (COL-4)
Pratt, R. E. (A)

Hamilton (CIN-4)
Davis, J. S., Jr. (M)
Deveney, J. D. (A)
Hanson, B. B. (M)
Marvin, I. E. (M)
Moore, W. H., IV (M)
Stein, J. L. (A)
Stump, A. M. (M)
Wear, J. (M)
Whittington, R. C. (M)
Winkeljohann, A. (M)

Hicksville (TOL-4)
Applegate, H. E. (SM)
Culler, D. M. (SM)

Hilliards (COL-4)
Burgener, R. C. (M)
Thompson, H. E. (A)

Hinckley (AKR-4)
Bidlack, C. S. (SM)
Simpson, P. A. (A)

Hubbard (AKR-4)
Bang, M. W. (SM)

Hudson (AKR-4)
Bachtell, R. S. (M)

Huron (CLE-4)
Wilber, B. E. (A)

Kent (AKR-4)
Bohar, J. (M)
Iarussi, R. D. (A)
Lewis, D. C. (M)
Mathis, H. F. (SM)
Rymer, R. W. (M)
Wills, R. H. (M)

Kettering (DAY-4)
Banta, F. D. (M)
Boone, G. R. (M)
Brothers, A. L., Jr. (M)
Call, S. W. (M)
Clute, D. G. (SM)
Desch, J. R. (M)
Gerhard, W. J. (M)
Getty, J. N. (M)
Godwin, R. G. (M)
Goff, N. G. (SM)
Grimm, F. W. (A)
Hogan, J. R. (A)
Jacoby, G. R. (M)
Kearns, J. H., III (M)
Kinne, R. C. (SM)
Kyle, T. A. (M)
Marshall, C. J. (F)
Morrison, C. L. (M)
Murray, P. R. (SM)
Myers, J. F. (M)
Nelson, N. A. (SM)
Stimmel, R. G. (SM)
Strasser, R. A. (M)
Thomas, E. R. (SM)
Walker, J. C. F., III (M)
Wallin, W. (M)

Kingston (CIN-4)
Leasure, R. B. (M)

Lakewood (CLE-4)
Benkelman, G. F. (SM)
Bremer, E. II (A)
Flack, S. G. (M)
Hamman, G. B. (M)
Keating, D. A. (M)
Mattern, R. M. (M)
Mealey, C. W., Jr. (M)
Phillips, W. E., Jr. (A)
Tasch, A. (M)
Torsch, C. E. (SM)
Wagener, J. S. (SM)
Wells, M. (M)

Lancaster (COL-4)
Christian, H. S. (M)
Daubenmire, R. L. (A)
Gamble, E. H. (SM)
Harshbarger, J. H., Jr. (M)
Heath, E. R. (M)
Hudson, R. S. (A)
Markwood, W. R. (A)
Newsome, R. K. (M)

Lemoyne (TOL-4)
Kohler, R. D. (M)

Lima (TOL-4)
Demecs, R. S. (A)
Gibbins, J. P. (M)
Heibel, J. H. (M)
McIlvaine, D. K. (M)
Schmieding, E. G. (M)
Smith, J. A., Jr. (M)
Swiderski, E. F. (A)

Lisbon (PIT-4)
Catanzarite, V. O. (M)

Lockbourne AFB (COL-4)
Longino, D. R., Jr. (A)
Thomas, O. D., Jr. (A)

Logan (COL-4)
Magle, R. (A)

London (COL-4)
Evans, E. C. (A)

Lorain (CLE-4)
Goodell, W. A. (M)
Herrick, R. H. (SM)
Huge, H. M. (M)
Kauffman, H. C. (M)
Koster, W. J. (M)
Mounce, C. O. (M)
Romoser, P. E. (M)
Thiery, T. E. (A)
Yarmack, J. E. (SM)

Louisville (AKR-4)
Boudler, A. G. (A)
Leslie, F. C., Jr. (A)
Rozlosnik, K. P. (M)

Loveland (CIN-4)
Gregg, T. (A)
Hancock, H. E. (SM)
Rabe, W. A. (A)

Lyndhurst (CLE-4)
Borland, R. P. (M)
Grasson, W., Jr. (M)
Kish, J. S. (M)
Koeblitz, W. E. (M)
O'Gara, J. J. (A)
Olson, B. (M)
Semenhuk, M. H. (A)
Stevens, H. E. (M)
Streater, J. W. (M)

Maderia (CIN-4)
Meuleman, R. (SM)

Mansfield (AKR-4)
Brain, T. M. (M)
Miller, K. W. (M)
Ryan, E. C. (M)
Stevens, W. C. (M)

Maple Heights (CLE-4)
Crail, A. C. (M)
Fahey, W. J. (M)
Flick, J. R. (M)
Pocta, J. W. (M)

Marietta (PIT-4)
Clark, C. E. (A)
Kraft, G. R. (A)

Marion (AKR-4)
Jenkins, D. B. (M)

Martins Ferry (PIT-4)
Daubenmeyer, H. L., Jr. (A)

Mason (DAY-4)
Lantzer, F. N. (M)
Owen, L. L. (M)
Raso, F. A. (M)

Massillon (AKR-4)
Burrier, W. O. (A)
Knouff, R. J. (M)

Maumee (TOL-4)
Chapman, L. B. (M)
Molloy, G. P. (SM)

Mayfield Heights (CLE-4)
Karbo, D. J. (M)
Reilly, E. J. (A)
Spiller, H. A. (M)
Toncich, S. V. (M)
Yeager, J. R. (M)

Medina (AKR-4)
Sharp, J. A. (M)

Medway (DAY-4)
Glancy, C. H. (M)
Ridenour, P. W. (M)
Waugh, R. E. (M)

Mentor (CLE-4)
Baker, R. G. (M)
Wermelskirchen, L. M. (M)

Miamisburg (DAY-4)
Bierley, D. A. (M)
Hood, W. L. (M)

Middletown (CIN-4)
Andres, R. J. (M)
Braden, P. F. (A)
Crist, L. S. (A)
Johnson, R. E. (M)
Morris, W. T. (A)

Milford (CIN-4)
Bissonette, A. J. (SM)
Davis, T. E. (M)
Marsh, J. H., Jr. (A)
Younginger, E. J. (M)

Milford Center (COL-4)
Reed, J. D. (M)

Minerva (AKR-4)
Dieringer, W. K. (M)

Mingo Junction (PIT-4)
Horvath, S. (A)

Mogadore (AKR-4)
Brown, D. L. (M)
Dunbar, S. D. (M)
Hann, D. D. (M)
Zeigler, E. S. (A)

Monroeville (CLE-4)
Cramer, R. F. (A)

Mount Healthy (CIN-4)
Feldman, R. F. (A)

Mount Vernon (COL-4)
Woodward, R. O. (M)

Munroe Falls (AKR-4)
Nickson, R. W. (A)

Napoleon (TOL-4)
Roessing, E. F. (M)

Newark (COL-4)
Rees, V. C. (A)
Stevens, T. R. (A)

New Bremen (TOL-4)
Koeper, J. T. (M)

Newbury (CLE-4)
Kragle, R. J. (M)

New Carlisle (DAY-4)
Croner, A. J. (M)
Jeffers, G. N. (M)
Lewis, L. F. (A)
Lower, R. (SM)
Maxim, W. A. (A)
Rogers, A. J. (M)

New Lebanon (DAY-4)
Mitchell, J. N., Jr. (A)

Newton Falls (AKR-4)
Force, E. (M)

North Canton (AKR-4)
Brown, D. L. (M)
Gray, D. W. (M)
Haas, D. L. (SM)
Lauby, J. W. (M)
Miller, B. M. (M)
Miller, J. H. (M)
Stahl, M. D. (M)
Zumiker, J. L. (A)
Zurcher, L. A. (SM)

Northfield (AKR-4)
Seib, W. D. (A)

North Olmsted (CLE-4)
Bieda, S. J. (A)
Bossard, G. L. (M)
Dailey, R. (A)
Downer, E. W. (M)
Raymond, R. G. (M)
Snyder, G. L. (M)

North Royelton (CLE-4)
Braschwitz, H. J. (M)
Hulme, W. P. (M)
Hutton, W. G. (SM)

Norwood (CIN-4)
Amberger, F. G. (A)
Carter, S. A. (M)
Sano, W. W. (M)

Novelty (CLE-4)
Barr, J. R. (M)
Lynch, T. E. (M)

Oak Harbor (TOL-4)
Wott, H. W. (A)

Oak Hill (CIN-4)
Loftis, H. J. (M)

Oberlin (CLE-4)
Gilford, S. R. (M)
Howe, C. E. (M)
Young, M. L. (A)

Olmsted Falls (CLE-4)
Conger, C. C. (M)
Irwin, D. E. (M)
Shirer, D. J. (M)
Wolfe, A. R. (M)

Oregon (TOL-4)
Reynolds, F. L. (A)

Ottawa (TOL-4)
Goodkin, S. S. (M)
Loman, J. A. (M)
Schoonover, D. J. (M)
Weideman, R. J. (M)

Oxford (CIN-4)
Teetzel, F. M. (M)

Parma (CLE-4)
Faler, P. E. (M)
George, W. C. (SM)
Guild, E. G. (A)
Hultzman, W. W. (M)
Levitsky, D. H. (M)
Manning, B. M. (A)
Meder, R. (M)
Sanderson, R. B. (A)
Schindler, R. W. (M)
Schultz, R. J. (M)
Scott, R. J. (A)
Sommer, R. A. (M)
Thayer, J. W. (M)
Tiedt, M. C. (A)
Yambor, E. P. (M)

Parma Heights (CLE-4)
Foster, F. A. (A)
Krawczonek, W. M. (A)
Mason, N. O. (A)

Pataskala (COL-4)
Cooper, L. K. (M)

Perrysburg (TOL-4)
Griss, C. H. (M)

Phillipsburg (DAY-4)
Share, G. E. (SM)

Piqua (DAY-4)
Driver, C. B. (M)

Poland (AKR-4)
Wallen, A. C. (A)

Port Clinton (TOL-4)
Morgan, W. O. (A)

Portsmouth (CIN-4)
Johnson, R. (A)

Powell (COL-4)
Wright, E. T., Jr. (M)

Ravenna (AKR-4)
Braden, W. V. (A)
Jennings, N. F. (A)
Montgomery, W. M. (M)

Reading (CIN-4)
Kamm, D. D. (A)

Reynoldsburg (COL-4)
McKinley, R. (M)
Telew, W. (M)
Tinkham, H. J. (M)

Ridgeway (TOL-4)
McQuown, R. E. (M)

Rocky River (CLE-4)
Byrd, H. F. (A)
Kelley, J. J. (M)
Stover, F. J., Jr. (M)

Rossford (TOL-4)
Perch, D. F. (M)

St. Bernard (CIN-4)
Wood, J. J. (M)

St. Clairsville (PIT-4)
Skoff, J., Jr. (A)

Sandusky (CLE-4)
Conlin, H. T. (A)
Derrick, W. A. (M)
Fraser, R. J. (A)
Freyberg, J. A. (A)
Hummer, E. W. (A)
Kenyon, H. S. (SM)
Shumaker, R. (M)
Wild, J. H. (SM)

Shaker Heights (CLE-4)
Costanzo, P. (M)
Dennis, H. (SM)
Fields, I. L. (A)
Jones, A. F. (A)
Keithley, J. F. (SM)
McCarty, C. J. (M)
Miller, H. J. (M)
Pfaff, R. W. (M)
Seidman, S. M. (M)
White, G. M. (M)

Sharonville (CIN-4)
Gorker, G. E. (A)

Shreve (AKR-4)
Mulligan, R. C. (A)

Sidney (TOL-4)
Ulman, W. H. (M)

Silverton (CIN-4)
Bertram, M. A. (A)

Solon (CLE-4)
Davison, B. (M)

South Euclid (CLE-4)
Basken, R. F. (M)
D. Julius, J. R., Jr. (A)
Glauberman, L. (M)
Louden, W. C. (M)
Monroe, R. T., Jr. (A)
Peterson, W. V. (M)
Soeder, E. F. (A)

Springfield (DAY-4)
Bier, C. E. (SM)
Beedy, R. M. (M)
Bell, A. L. (SM)
Carey, R. M. (M)
Cunningham, H. W. (A)
Davis, C. R. (SM)
Dieterle, M. W. (M)
Jones, T. G., Jr. (SM)
Marous, J. J. (M)
Parker, A. J. (SM)
Pingel, N. D. (M)
Rowe, N. L. (M)
Smith, L. A. (M)
Stevens, R. D. (A)

Spring Valley (DAY-4)
Horst, W. R. (M)

Steubenville (PIT-4)
McFeely, H. H. (SM)

Stow (AKR-4)
Andresen, G. J. C. (A)
Chappell, W. M. (M)
Fauss, G. C. (M)
Leach, H., Jr. (M)

Strongsville (CLE-4)
Mastrovitch, R. M. (M)

Struthers (AKR-4)
Bell, B. (A)

Sylvania (TOL-4)
Myers, O. J. (A)
Williams, R. B., Jr. (M)

Tallmadge (AKR-4)
Bargerman, G. L. (SM)
Folk, V. O. (A)
Stonerock, T. D. (M)

Terrace Park (CIN-4)
Hudnall, J. U. (A)
Jordan, J. F. (F)

Tiffin (TOL-4)
Hartman, R. E. (A)

Tipp City (DAY-4)
Bode, R. L. (SM)
Brown, D. E. (M)
Gambill, C. C. (M)
Garrett, A. F. (M)
Johns, M. W. (M)

Toledo (TOL-4)
Auffenheide, J. H. (M)
Beins, J. K. (M)
Bell, R. E. (M)
Bensman, R. W. (M)
Bitter, A. R. (SM)
Blomberg, P. E. (A)
Boudouris, A. (M)
Cameron, D. F. (M)
Childers, R. F. (M)
Chipman, R. A. (SM)
Comer, J. W. (M)
Cousino, R. E. (M)
Diehr, R. J. (A)
Doubett, W. W. (M)
Drescher, L. L. (M)
Eash, G. H. (A)
Ewing, D. J., Jr. (M)
Frewalt, E. W. (A)
Gage, J. F. (M)
Galambos, L. G. (M)
Gramlich, H. F. (A)
Grenier, G. H. (M)
Hanerman, L. (M)
Hanna, R. N. (M)
Hawley, F. S. (A)
Hedler, R. C. (M)
Hockenberger, F. R. (M)
Holmes, H. R. (A)
Kearney, J. P. (SM)
Keck, M. W. (M)
Ketcham, A. R. (M)

Kirchenbauer, C. C. (SM)
Laker, F. J., Jr. (M)
Larson, R. G. (M)
Leuck, D. D. (M)
Loehrke, H. F. (SM)
Loo, W. (M)
Marleau, R. S. (M)
Marsh, R. H. (A)
Martin, O. J. (M)
McCormick, J. M. (SM)
Meeker, J. G. (M)
Melcher, R. J. (A)
Morrison, E. (A)
Murley, E. M., Jr. (M)
Neuert, H. L. (M)
Nixon, W. A. (A)
Patay, J. J. (A)
Pierce, E. W. (M)
Richards, D. K. (M)
Rosencrantz, M. E. (M)
Rowe, H. N. (M)
Rynder, L. S. (M)
Sager, J. R. (M)
Schnell, W. S. (A)
Schoor, V. M. (M)
Seike, H. K. A. (M)
Seppeler, W. C. (M)
Shechler, L. D. (M)
Shook, W. H. (M)
Simonds, C. S. (M)
Stokes, H. W. (A)
Szymkowiak, E. (A)
Voigt, E. H. (A)
Wooster, W. H. (A)

Trotwood (DAY-4)
Atkind, I. (A)
Helbig, E. M. (A)
Sadow, R. M. (A)
Weissman, S. (SM)

Troy (DAY-4)
Benedict, D. E. (A)
Schmidt, H. J. (M)

Twinsburg (AKR-4)
Howard, W. R. (M)

Union (DAY-4)
Apple, R. C. (M)
Learish, H. B. (SM)

Uniontown (AKR-4)
Butler, J. W. (M)
Hansburg, M. (M)
Thompson, R. B. (M)

University Heights (CLE-4)
Goldfarb, J. (M)
Roth, M. S. (M)
Seidner, K. (M)
Williams, H. C. (M)

Urbana (DAY-4)
Alty, R. L. (M)

Vandalia (DAY-4)
Leffler, G. E. (A)
Mayer, J. M. (A)

Van Wert (FT-W-5)
Bates, E. L. (A)
Conley, W. H. (M)
Lindsay, J. T. (M)

Vermilion (CLE-4)
Heisner, D. A. (M)

Verona (DAY-4)
Hartman, M. L. (M)

Wadsworth (AKR-4)
Musser, D. A. (M)

Walbridge (TOL-4)
Corathers, C. N. (M)

Warren (AKR-4)
Atwood, W. L. (SM)
Biles, R. G. (M)
Marshall, E. L. (M)

Warrensville Heights (CLE-4)
Davis, S. (M)
Preschel, K. S. (M)
Sauerland, F. (M)

Washington (COL-4)
Hoffman, R. B. (M)

Waynesville (DAY-4)
Morin, R. W. (A)
Puterbaugh, W. H., Jr. (M)

West Alexandria (DAY-4)
French, R. W. (A)

West Carrollton (DAY-4)
Sonnanstine, E. H., Jr. (A)
Springer, L. D. (SM)

West Chester (CIN-4)
Rehmann, W. H., Jr. (M)

Westerville (COL-4)
Autery, R. M. (M)
Foulks, E. D. (M)
Harris, E. L. (M)
Huffman, D. L. (SM)
Kauffman, E. E., Jr. (M)
Pienkowski, E. C. (A)
Ponticello, J. A. (M)

Westlake (CLE-4)
Cowin, G. (M)
Fletcher, E. S. (SM)
Hayes, K. V. (A)
Odell, M. P. (SM)
Seybold, J. F. (A)

West Richfield (AKR-4)
Bear, N. (A)

West Union (CIN-4)
Malone, W. D. (M)

Wickliffe (CLE-4)
Knife, W. J. (M)
McMillin, A. L. (M)
McNeill, T. J. (A)

Willoughby (CLE-4)
Hodina, E. G. (M)
Sommer, R. J. (A)

Willoughby Hills (CLE-4)
Blauvelt, R. C. (SM)

Willowick (CLE-4)
Mason, R. F. (A)

Wilmington (CIN-4)
Hart, W. J. (A)

Woodville (TOL-4)
Loutzenhiser, C. F. (M)
Nitschke, N. C. (M)

Wooster (AKR-4)
Mullen, H. P., Jr. (A)

Worthington (COL-4)
Baeuhle, J. R. (M)
Cary, H. (M)
Clutter, E. C. (A)
Conlon, R. J. (M)
Davis, W. C. (SM)
De Vore, R. V. (M)
Kean, P. M., Sr. (A)
Orwig, E. O. (A)
Sisson, E. D. (M)
Taylor, R. C. (M)
Van Buskirk, R. C. (M)
Whitacre, R. E. (M)
Wyler, E. N. (M)

Wright-Patterson AFB (DAY-4)
Abbey, G. W. S. (M)
Bailey, T. W. (M)
Bolick, H. H., Jr. (M)
Brittain, J. F. (M)
Cherian, E. J. (M)
Corbin, M. W. (A)
Donovan, P. R. (M)
Drogosz, D. W. (M)
Dukes, E. F., Jr. (A)
Fenton, R. E. (M)
Fisher, J. E. (A)
Garrett, E. T. (M)
Gregory, J. W. (A)
Heavner, W. S. (SM)
Hitzenhammer, A. D. (SM)
Holden, J. B. (M)
Houpis, C. H. (M)
Jayson, R. M. (A)
Jones, E. D., Jr. (M)
Kennedy, J. V. (A)
King, J. D. (A)
Lubelfeld, J. (M)
Lucas, G. R. (M)
Metscher, W. (M)
Monahan, A. E., Jr. (M)
Morgan, B. S., Jr. (M)
Newsome, R., Jr. (M)
North, R. L. (M)
Oliveros, C. G., Jr. (M)
Politzer, L. M. (M)
Prohaska, C. R. (M)
Pulling, B. S. (M)
Regulinski, T. L. (M)
Rippere, J. B. (SM)
Roig, R. W. (M)
Schwartz, D. M. (M)
Scott, S. D. (M)
Staas, P. C. (M)
Sybenga, P. M. (M)
Thomas, C. P. (A)
Wisniewski, S. J. (M)
Young, R. W. (M)

Wyoming (CIN-4)
Bolenbaugh, R. K. (M)
Bruck, G. (SM)
Wahl, A. C. (M)
Zupansky, M. (A)

Xenia (DAY-4)
Anderson, C. W. (M)
Baker, W. W. (SM)
Barker, W. J. (M)
De Berry, D. R. (M)
Doran, R. J. (SM)
Doyle, C. E. (SM)
Holt, T. (M)
Horton, C. D. (M)
Kouri, F. G. (SM)
Kyle, F. W. (M)
Lisowski, E. M. (M)
Magee, T. H. (M)
Marshall, C. H. (M)
Michaelson, B. L. (A)
Myszko, R. (M)
Noble, H. V. (F)
Noll, L. J. (M)
Nordlund, R. J. (SM)

O'Brien, W. R. (M)
Russell, B. W., Jr. (M)
Russell, J. W. (A)
Schoonover, W. C. (M)
Sieenbergen, H. H. (A)
Walker, R. V. (M)
Williams, G. S. (A)

Yellow Springs (DAY-4)
Aschbacher, S. J. (M)
Bletzinger, P. (M)
Carr, D. L. (A)
Colbert, C. (SM)
Fritz, W. (A)
Greene, C. K. (SM)
Kimball, D. E. (SM)
Nosker, P. W. (SM)
Obermayer, R. W. (M)
Otten, K. W. (M)

Youngstown (AKR-4)
Cherpack, J., Jr. (M)
Conroy, M. J. (A)
Dieringer, F. A. (M)
Freisen, T. H. (M)
Housteau, C. M., Jr. (A)
Nyberg, W. C. (A)
Phillips, R. G. (A)
Pool, L. C. (M)
Resch, R. J. (M)
Small, J. P. (M)
Umbach, L., Jr. (M)
Williamson, W. P., III (M)
Wyman, J. C. (M)

Zanesfield (TOL-4)
Snyder, H. D. (A)

Zanesville (PIT-4)
Hatfield, F. A. (A)
Hunt, W. A. (M)
Iverson, F. A. (M)
Kirk, K. D. (M)
McGlashan, K. W. (M)
Thompson, C. O. D., Jr. (M)

OKLAHOMA

Altus (OC-6)
Baucum, E. L. (A)
Newsom, B. B. (M)

Bartlesville (TUL-6)
Bondurant, J. E. (M)
Brashear, R. T. (M)
Freeman, L. R. (M)
Greening, J. P. (M)
Hensley, W. A. (M)
Johnson, E. W. (M)
Kindred, R. L. (A)
Kline, M. E. (M)
Piety, R. G. (M)
Renfro, C. I. (A)
Walker, J. F. (M)

Bethany (OC-6)
Bailey, J. T. (M)
Daugherty, W. M. (M)
Hale, C. M. (M)
Hill, W. M. (M)
Kanen, G. M. (M)
Kuether, Q. W. (M)
O'Neal, R. K. (A)
Wells, F. D. (M)

Broken Arrow (TUL-6)
Smith, D. (A)
Tompkins, H. S. (A)

Catoosa (TUL-6)
Culver, J. F. (M)

Chickasha (OC-6)
Hamden, L. W. (M)

Choctaw (OC-6)
Kovar, P. (SM)

Clinton (OC-6)
Staley, J. D. (M)

Coweta (TUL-6)
Higgins, H., Jr. (A)

Coyle (OC-6)
Shellhammer, O. K. (M)

Duncan (OC-6)
Copland, G. V. (M)
Gray, C. R. (M)
Hulme, J. R. (M)

Earlsboro (OC-6)
Hines, J. W. (M)

Edmond (OC-6)
Daniel, D. B. (M)
Kearby, L. I. (M)

Enid (OC-6)
Poulsen, N. R. (M)

Fay (OC-6)
Conner, J. B. (M)

Fort Sill (OC-6)
Novak, R. J. (A)
Wood, P. W. (M)

Frederick (OC-6)
Jones, J. D., Jr. (SM)

Kinta (TUL-6)
Stowell, N. J. (M)

McAlester (TUL-6)
Nichols, C. D. (M)

Lawton (OC-6)
Averre, C. W. (A)
Shores, D. D. (A)
Theroux, G. L. (M)
Utterback, W. J. (M)
Wheaton, L. H. (A)

Medford (OC-6)
Scouten, D. C. (M)

Midwest City (OC-6)
Allen, D. P. (M)
Anderson, R. W. (M)
Boyd, W. L. (M)
Brooks, L. E. (M)
Brumley, C. C. (A)
Corgnati, E. S. (A)
Davis, A. C. (M)
Duff, J. B. (A)
Ferguson, J. W. (A)
Frey, W. A. (A)
Gish, D. F. (A)
Green, W. A. (M)
Hedson, H. D. (A)
Hilmes, E. F. (M)
Howell, W. R., Jr. (M)
Hutton, J. E. (M)
Karstetter, W. H. (M)
Kimmell, H. W. (A)
Kirchoff, K. J. (M)
Lewis, H. G. (M)
Lindley, R. A. (A)
Rauscher, A. I. (M)
Thompson, W. R. (M)
Villines, F. S. (M)
Weisiger, J. M. (M)
Wood, R. L. (M)

Moore (OC-6)
Gordon, J. B. (A)

Muskogee (TUL-6)
Bishop, R. D. (M)
Hardesty, R. D. (M)

Norman (OC-6)
Billings, S. M. (A)
Challenner, A. P. (SM)
Coubrough, J., Jr. (M)
Farrar, C. L. (SM)
Furlow, D. B. (M)
Gates, R. P. (M)
Green, B. B. (M)
Harp, C. E. (SM)
Krehbiel, K. O. (M)
Moore, R. E. (M)
Palmer, J. D. (M)
Peronard, O. L., Jr. (M)
Puckett, T. H. (M)
Sweeney, J. P. (M)
Taylor, D. A. (A)
Tuma, G. (SM)
Vlay, G. J. (SM)
Warren, J. D. (M)
Watson, J. K. (M)
Wilson, A. E. (M)

Oklahoma City (OC-6)
Adams, R. G. (M)
Allbright, B. D. (M)
Ashby, R. H. (M)
Ashworth, J. M. (M)
Barker, M. W. (M)
Barnett, J. E. (A)
Bastian, L. R. (M)
Battenburg, N. (M)
Berry, G. P. (M)
Black, E. (M)
Bower, H. H., Jr. (M)
Bradley, B. W. (M)
Brown, R. W., Jr. (M)
Bryan, R. K. (M)
Callihan, E. S. (M)
Cannon, W. P. (M)
Carson, R. G. (A)
Cherry, R. B. (A)
Clifton, J. L. (M)
Crippen, E. G. (M)
Cross, C. C. (M)
Daniels, C. L. (M)
Delbridge, J. D. (M)
Dick, C. W. (M)
Diggs, B. H. (M)
Dimick, C. V. (M)
Drumeller, C. C. (M)
Easum, C. M. (M)
Ebner, W. H. (M)
Ely, D. H. (M)
Fehrle, T. L. (M)
Fish, R. L. (M)
Fisher, D. L. (M)
Foster, E. W. (M)
Gibson, G. T. (M)
Gilmore, E. H. (M)
Glennon, R. E. (M)
Halliburton, J. V. (M)
Hammer, F. E. (M)
Hannan, C. V., III (A)
Hart, C. O. (M)
Haworth, R. E. (M)
Herriott, J. K., Jr. (M)
Hermann, F. (M)
Holaday, D. F. (SM)
Holt, G. W. (SM)
Hutchins, H. E. (M)
Jackson, F. L. (M)
Jackson, J. H., Jr. (M)
Jackson, M. H. (M)
Jones, B. H. (M)
Key, B. P. (M)
King, G. A., Jr. (A)
Kruger, K. W. (M)
Kuehne, A. (A)
Lagaly, G. B. (M)
Ledbetter, R. P. (M)
Le Fevre, F. W. (M)
Lindhorn, P. H., Jr. (M)
London, J. J. (*)
Luciani, V. J. (M)
Lyons, E. F. (M)
Marrinan, H. J. (M)
Mason, H. J., Jr. (A)
Maupin, C. E. (M)
McGowan, C. W. (A)
McKinley, H. W. (SM)
Michaels, G. (A)
Miller, C. L. (M)
Miller, I. S. (M)
Monkres, J. P. (A)
Moore, D. E. (M)
Morris, R. K. (M)
Mueller, C. W. (SM)
Murar, E. J. (M)
Murta, E. J., Jr. (M)
Nangle, W. O. (A)
Owen, B. J. (SM)
Park, R. K. (M)
Phillips, H. E. (M)
Pickett, R. N. (M)
Pulliam, J. G. (M)
Ramsey, O. B., Jr. (M)
Rea, R. W. (M)
Redding, P. B. (M)
Reynolds, J. (M)
Ricciotti, S. (M)
Roberts, B. J. (M)
Ross, B. L. (M)
Sala, K. E. (M)
Scally, P. J. (M)
Shaw, J. E. (M)
Sheaffer, C. F. (SM)
Snethen, J. A. (A)
Sober, V. (M)
Spence, R. E., Jr. (M)
Spooner, A. J. (M)
Sroufe, J. S., Jr. (A)
Steed, G. H. (M)
Swenson, H. T. (M)
Sypherd, R. S. (M)
Taylor, R. L. (SM)
Thomas, M. W. (SM)
Tyler, R. S. (M)
Walker, S. I. (M)
Welch, P. G. (M)
Welling, W. J. (M)
Wichels, J., Jr. (M)
Wilcox, P. M. (M)
Wilson, W. (A)
Wright, T. E. (M)
Zelinger, F. F. (M)

Owasso (TUL-6)
Hammond, J. (M)

Ponca City (TUL-6)
Brown, G. L. (M)
Doty, W. E. N. (M)
Fair, D. W. (M)
Forsberg, E. (A)
Karr, R. J. (A)
Lindsey, S. E. (M)
Rochelle, C. A. (A)
Stephenson, E. B. (A)
Sullivan, D. S. (M)
Wann, L. D. (M)
Wiik, E. (M)

Ringwood (OC-6)
Benton, H. B. (A)

Sand Springs (TUL-6)
Goatcher, H. Z. (A)
Stufken, R. D. (A)

Seminole (OC-6)
Smith, G. L. (M)
Spears, C. F. (M)

Shawnee (OC-6)
Johnson, L. W. (M)
Jones, M. E. (M)
Wells, E. W. (M)
Wood, G. J. (A)

Stillwater (TUL-6)
Buck, R. F. (M)
Cameron, C. F. (M)
Fristoe, H. T. (SM)
Hallett, P. C. (M)
Jones, H. L. (SM)
Kobos, F. (A)
Koepsel, W. W. (M)
Labarthe, L. C. (M)
Lingelbach, D. D. (M)
Mueller, D. C. (M)
Penn, R. M. (M)

Tinker AFB (OC-6)
Booth, J. E. (M)

Tulsa (TUL-6)
Alexander, W. A. (M)
Atchison, R. L. (M)
Austin, R. A. (M)
Barnes, E. M., Jr. (M)
Berner, R. R. (M)
Bey, V. L. (M)
Blackman, B. A. (M)



Born, W. T. (F)
Bowman, D. C. (M)
Broding, R. (SM)
Brooks, L. C. (M)
Buffum, C. E. (SM)
Burns, K. N. (M)
Burton, R. G. (M)
Bushnell, J. M., Jr. (A)
Care, W. C. (A)
Casey, J. L. (M)
Chapman, H. C. (M)
Cooley, J. A. (M)
Cooper, J. R. (SM)
Cordell, L. B. (M)
Cordell, R. L. (M)
Cox, J. R. (M)
Crom, C. L. (M)
David, W. O. (A)
Davis, D. R. (A)
Day, C. E. (M)
Deming, J. M. (A)
Dennis, J. R. (SM)
Dikmen, B. (M)
Donley, M. M. (A)
Draheim, L. H. (M)
Dunn, C. S. (M)
Durham, E. R. (A)
Earthman, J. C. (M)
Eisler, J. D. (SM)
Ellis, R. M. (SM)
Engle, A. W. (M)
Ferguson, H. B. (M)
Ferguson, P. M. (M)
Field, H. S. (M)
Finn, R. S. (M)
Fisher, J. L. (A)
Fisher, R. B. (M)
Flury, H. E. (A)
Freeman, F. R. (M)
Giles, C. S. (A)
Gladson, G. C. (M)
Graf, V. V. (M)
Green, G. C. (A)
Hadley, C. F. (SM)
Harper, F. N. (M)
Hart, R. N. (M)
Hawkins, J. E. (SM)
Hearn, D. P. (M)
Hibbard, H. C. (M)
Hill, J. K. H. (A)
Holmes, E. J. (A)
Hooker, L. H. (A)
Hopkinson, E. C. (A)
Hunsicker, W. R. (M)
Hussey, C. V., Jr. (M)
Hutchinson, H. M., Jr. (A)
Irvin, R. G. (M)
Jacobs, G. G. (A)
Kammerzell, C. E. (A)
Keene, L. C. (SM)
Keller, B. H. (A)
Kenton, J. K. (M)
Klemm, H. L. (M)
Koeppel, B. W. (M)
Lash, C. C. (SM)
Lynn, R. D. (M)
Mahoney, E. H. (M)
Marshall, B. R. (A)
Martin, H. H., Jr. (A)
McCoy, B. F. (A)
McKeel, W. J. (M)
Miller, J. W. (SM)
Mitchell, R. W., Jr. (M)
Moon, C. L. (A)
Newton, G. R. (SM)
Nichols, R. L. (A)
Nichols, W. R. (SM)
Norris, W. F. (M)
O'Reilly, G. A. (SM)
Orsak, A. J. (A)
Peterson, C. (SM)
Phillips, H. W. (SM)
Pittenger, R. D. (M)
Reid, A. C. (M)
Reinking, W. C. (M)
Roe, E. O. (M)
Rollans, J. C. (M)
Schad, C. A. (M)
Seaman, W. E. (M)
Shelton, H. C. (A)
Silverman, D. (F)
Smith, L. H. (A)
Sorge, W. A. (M)
Stinchcomb, B. G. (A)
Stinchcomb, R. T. (A)
Stovall, H. E. (M)
Stover, E. B., Jr. (M)
Sweeny, A. C., Jr. (A)
Swift, G. (M)
Vitali, J. D. (M)
Vogt, C. O. (M)
Voorheis, T. E. (A)
Walker, J. V. (M)
Watson, G. E. (A)
Watson, R. E. (A)
Wattenberger, W. W. (A)
Weldon, W. J. (A)
Westervelt, J. C. (M)
Wilcox, R. L. (M)
Willits, G. N. (A)
Wilson, B. F. (M)
Wood, G. A. (A)
Zongker, R. C. (M)

Village (OC-6)
Clinkenbeard, H. A. (M)

Wagoner (TUL-6)
Harris, C. D. (A)

Woodward (OC-6)
Williams, F. G. (M)

Yukon (OC-6)
Rice, P. G. (M)

OREGON

Albany (POR-7)
Churchill, T. L. (M)

Beaverton (POR-7)
Briesenick, C. R. (A)
Calnon, D. C., Jr. (M)
Gasser, C. D. (A)
Goard, R. W. (A)
Hinze, J. C. (A)
Jenkins, R. W. (M)
Kobbe, J. R. (M)
Macpherson, C. H. (M)
Passmore, F. X. (A)
Rullman, R. G. (M)
Tinker, F. B. (M)
Trump, W. E. (A)

Bums (POR-7)
Sorouse, R. T. (A)
Wendt, R. H. (A)

Columbia City (POR-7)
Choate, W. C. (M)

Condon (POR-7)
Van Wagoner, R. C. (M)

Corvallis (POR-7)
Albert, A. L. (F)
Amort, D. L. (M)
Ballard, B. J. (M)
Comes, R. G. (A)
Dunlap, C. R. (SM)
Fieket, G. S. (SM)
Huber, S. J. (M)
Hunnicutt, A. L. (M)
Jensby, W. G. (M)
Jensen, L. C. (A)
Looney, J. C. (M)
Magnusson, P. C. (SM)
Michael, R. R. (M)
Moore, E. G., Jr. (M)
Oorthuys, H. J. (SM)
Stone, L. N. (M)
Stone, S. A. (M)
Strayer, R. W. (M)
Stuart, C. J. (M)
Vincent, L. W. (M)
Weber, L. J. (M)
Yunker, E. A. (SM)

Eugene (POR-7)
Balint, J. E. (SM)
Hoppe, P. R. (A)
Surdam, E. L. (M)

Gresham (POR-7)
Nichols, J. S. (M)

Hillsboro (POR-7)
Kelsey, G. M. (A)
Myers, W. C. (M)
Parks, P. F. (M)

Klamath Falls (POR-7)
Chitwood, P. H. (M)
Cramer, K. J. H. (A)
Du Wayne, W. H. (A)
Fink, W. K. (A)
Grimes, W. P. (M)
Orrell, D. B. (M)

La Grande (POR-7)
Cannon, T. W. (M)

McMinnville (POR-7)
Bennett, S. D. (SM)
Charbonnier, F. M. (M)
Dyke, W. P. (M)
Hipperson, J. R. (M)
Simpson, L. R. (A)

Medford (POR-7)
Walker, V. G. (M)

Milton-Freewater (POR-7)
Tyrrell, R. L. (A)

Milwaukie (POR-7)
Garvin, W. E. (A)

Oswego (POR-7)
Edens, G. E. (M)
Smith, D. E. (SM)

Pendleton (POR-7)
Roden, M. E. (M)

Philomath (POR-7)
Plunkett, D. T. (A)

Portland (POR-7)
Abney, L. J. (A)
Allen, W. M. (SM)
Bailey, R. L. (M)
Bartch, H. (A)
Bay, F. H. (M)
Beck, R. M. (M)
Beeten, J. M. (M)
Be Lusko, J. V. (A)
Bishop, A. R. (M)
Bookwalter, L. S. (M)
Broms, B. H. (A)
Brown, F. M. (M)
Brown, W. C. (A)
Carpenter, C. B. (SM)
Cassidy, J. J., Jr. (M)
Colonias, J. S. (M)
Corbett, H. L., Jr. (M)
Corbett, T. (A)
Craycraft, H. T. (A)
Cutting, W. A. (M)
Dahnke, J. L. (M)
Dallas, W. K. (SM)
Davis, E. A. (A)
Davis, K. E. (SM)
Davis, R. J. (SM)
Day, J. E. (A)
Deardorff, R. W. (F)
Delord, J. F. (SM)
Doel, D. (M)
Donoghue, J. J. (M)
Downing, M. K. (A)
Dubinski, G. A. (M)
Eddas, R. (A)
Ellison, G. C., Jr. (M)
Elssner, E. H. (M)
Erwin, J. A. (M)
Fox, R. A. (M)
Franzel, D. E. (M)
Gard, J. J., Jr. (M)
Gibson, C. B., Jr. (M)
Glover, M. H. (M)
Gordon, D. D. (A)
Gotcher, A. W. (A)
Griffith, J. W. (M)
Groeger, E. R. (M)
Grossenbacher, A. C. (A)
Hashizume, G. K. (M)
Hazard, D. R. (M)
Heath, H. W. (M)
Hedrick, L. C. (SM)
Henderson, J. E. (A)
Herren, R. A. (M)
Hollinsworth, K. M. (A)
Holtzman, M. (M)
Homes, D. F. (M)
Hood, F. D. (M)
James, T. W. (M)
Johnson, D. E. (SM)
Johnson, J. A. (M)
Johnston, G. I. (M)
Keyser, K. E. (A)
Kilcoyne, M. K. (M)
Koroch, L. R. (M)
Krausse, J. B. (A)
Lee, W. L. (M)
Lee-h, E. R. (M)
Liedtke, J. A. (M)
Long, G. D. (M)
Lund, C. W. (SM)
Marlhart, D. J. (M)
Marsh, W. E. (SM)
McCann, F. H. (SM)
McCutcheon, S. R. (M)
McEdward, F. A. (M)
McFarland, B. N. (M)
Meissner, E. R. (SM)
Mendoza, D. C. (M)
Mepham, J. H. (M)
Miller, F. E. (SM)
Miller, V. F. (M)
Moak, A. R. (M)
Morey, A. M. (M)
Morgan, M. L. (A)
Morin, L. A. (M)
Morrison, H. L., (M)
Moulton, C. H. (M)
Mulvey, J. A. (A)
Murtagh, R. J. (M)
Nelson, C. W. (M)
Nelson, D. E. (A)
Newhouse, D. R. (M)
Nolan, C. A. (M)
Ofner, F. R., Jr. (A)
Olsen, R. M. (M)
Paul, B. R. (M)
Perletti, P. V. (M)
Peterson, R. M. (M)
Pittard, F. L. (M)
Polits, W. J. (A)
Pooley, R. R. (M)
Poulin, R. A. (M)
Quinn, A. C. (M)
Raupach, R. C. (M)
Reilly, J. A. (A)
Rhiger, R. R. (M)
Richardson, W. E. (M)
Riley, J. C. (SM)
Ritter, H. C. (A)
Roberts, M. L. (M)
Roots, W. K. (SM)
Ropiequet, R. L. (SM)
Rutherford, W. E. (M)
Scherzer, K. (M)
Schmitt, G. W. (A)
Schmitt, W. L. (M)
Scott, E. D. (SM)
Shantz, C. J. (A)
Shelley, A. L. (M)
Singleton, H. C. (SM)
Skinner, G. C. (M)
Stoll, J. L. (M)
Strain, D. C. (SM)
Svehaug, O. C. (A)
Tabshy, S. J. (M)
Terrill, F. Jr. (M)
Tompson, W. S. (M)
Tomson, A. (M)
Tunturi, A. R. (A)
Tyle, A. B. (SM)
Vassallo, W. H. (A)
Vollum, H. (F)
Wane, W. M. (A)
Weiss, L. S. (M)
White, L. C. (M)
Wilhoit, D. I. (M)
Winkler, L. R. (M)
Winningstad, C. N. (M)

Prairie City (POR-7)
Lynn, H. B. (M)

Salem (POR-7)
Purbrick, R. L. (M)
Stangland, D. E. (A)

Sherwood (POR-7)
Crawford, H. C. (A)
Long, L. A. (M)

The Dalles (POR-7)
Curtis, N. T. (M)
Epley, E. R. (A)

Tigard (POR-7)
Eliander, H. F., Jr. (M)
Kidd, D. E. (M)
Webber, W. B. (M)

Toledo (POR-7)
McClure, H. W. (A)

PENNSYLVANIA

Abington (PHI-3)
Adams, K. (M)
Batiuk, R. A. (M)
Beck, C. (A)
Bethke, H. B. (M)
Booker, R. W. (M)
Boyle, J. A. (M)
Chang, S. Y. (M)
Dittrich, W. A. (A)
Goff, K. W. (A)
Lounsberry, E. P. (M)
Remlich, J. E. (A)
Schellenberg, P. J. (A)
Schwartz, H. F. (M)
Schwarz, J. B. (M)
Tarzian, V. (A)
Van Horn, J. E. (M)
Vantine, H., Jr. (SM)
Young, C. P. (SM)

Aldan (PHI-3)
Gahagan, J. R. (M)
Heacock, R. J. (A)

Allentown (P-LV-3)
Anand, R. P. (M)
Bartholomew, C. Y., Jr. (M)
Bolez, E. C. (A)
Bradford, C. E. (M)
Buehler, P. R. (M)
Chaplin, N. J. (A)
Cordaro, C. F. (M)
Corgan, W. G. (M)
Cressman, R. N. (M)
Ford, G. T. (SM)
Hanfmann, A. M. (M)
Hansen, E. (M)
Hanson, F. E. (SM)
Hanson, G. H. (M)
Herbert, N. J. (SM)
Hittinger, W. C. (A)
Kortvely, Z. J. (M)
Landis, R. B. (M)
McGrath, J. W. (SM)
Morton, K. L. (M)
Murtaugh, J. L., Jr. (M)
Newhard, C. E. (M)
Parsons, T. W. (M)
Paulsen, J. F. (SM)
Purcell, R. H. (SM)
Ronci, V. L. (SM)
Rutter, V. E. (M)
Simpson, A. D. (SM)
Stubner, F. W. (M)
Sutter, D. M. (A)
Szabo, W. (M)
Taylor, E. W. (M)
Taylor, R. R. (M)
Tooker, H. A. (SM)
Waltz, M. C. (SM)
Watson, H. A. (M)
Whitner, R. A. (M)
Wiley, J. H., Jr. (M)
Young, C. S. (SM)
Ziegler, R. N. (M)
Zuk, P. (M)

Aliquippa (PIT-4)
Haluga, M. G. (A)
Ugoletti, L. S. (M)

Allison Park (PIT-4)
Joller, C. R. (A)
Mink, R. E. (M)
Sheppard, C. A. (M)
Sherwin, G. W. (A)

Altoona (PIT-4)
Erhard, J. L. (M)
Lunghofer, E. P. (M)
Rothrock, J. C. (M)
Schwartz, E. (M)

Ambler (PHI-3)
Anderson, E. A., Jr. (M)
Bielawa, H. W. (M)
Colussi, E. J. (M)
Conroy, J. F. (A)
Dosch, V. F. (M)
Gehman, P. A. (M)
Gruensfelder, K. (M)
Hunicke, R. L. (M)
Jensen, C. L. (M)
Kilson, H., Jr. (SM)
Kuberry, R. W. (M)
Kuzma, P., Jr. (A)
Leonard, J. F. (M)
Lex, R. G., Jr. (M)
Mauchly, J. W. (F)
McCarthy, C. S., Jr. (M)
Schoenberg, J. P. (M)
Simmons, C. D. (M)
Smith, F. P. (M)
Sommer, E. H., Jr. (M)
Swift, M. E. (SM)
Vidro, E. F. (M)
Voorhoeve, E. W. (A)
Wong, S. Y. (M)

Archbald (PHI-3)
Ling, R. F. (A)

Ardmore (PHI-3)
Coppa, P. L. (M)
Fuller, L. C., Jr. (M)
Gala, J. C. (M)
Gittelman, A. B. (A)
Mayer, R. (SM)
Meyer, C. B. (M)
O'Brien, G. F. (M)
Rauch, R. M. (A)
Rothenheber, N. (A)
Sowell, J. B. (M)
Weinberg, H. M. (M)

Ardsley (PHI-3)
Knierlem, H. W. (A)
Merrihew, H. W. (M)
Vasilevskis, H. S. (M)
Wheeler, E. B. (M)

Arnold (PIT-4)
Ceschini, E. S. (M)
Yingling, G. B. (M)

Ashley (PHI-3)
Grohowski, J. A. (A)

Audubon (PHI-3)
Hart, J. W. (M)

Bakerstown (PIT-4)
Mag, A. (M)

Bala-Cynwyd (PHI-3)
Bresson, J. (M)
Callender, E. M. (M)
Coleman, R. P. (M)
Connolly, J. J. (M)
Eachus, I., Jr. (SM)
Friedman, M. (A)
Friend, A. W. (F)
Jordan, A. K. (M)
Kushner, E. E. (M)
Messmer, W. J., Jr. (M)
Richards, J. R. (M)
Roop, R. W. (SM)
Schwarzlander, H. (M)
Sorkin, C. S. (M)
Spencer, R. W. (M)
Steinberg, B. D. (A)
Sunstein, D. E. (F)
Young, R. T. (A)

Bangor (P-LV-3)
Drury, H. J. (M)

Bartonsville (PHI-3)
Cyphers, R. F. (M)

Bath (P-LV-3)
Moyer, E. P. (M)

Beaver Brook (PHI-3)
Kunetz, G. J. (M)

Beaver Falls (PIT-4)
Pyle, R. E. (A)
Young, R. W. (A)

Bedminster (P-LV-3)
Moyer, L. K. (M)

Bellefonte (CP-4)
De Barber, J. P. (SM)
Harvey, H. B. (M)
Holter, D. H., Jr. (M)
Lyon, C. M. (A)
Maris, E. H., Jr. (M)

Belle Vernon (PIT-4)
Radock, C. (A)

Bellevue (PIT-4)
Myers, L. B. (M)

Bentleyville (PIT-4)
Vertar, J. A. (A)

Bernville (PHI-R-3)
Gantert, A. (A)

Berwyn (PHI-3)
Barnes, G. H. (A)
Brown, L. R. (SM)
Buck, J. H. (SM)
Hoberg, G. G. (SM)
Kenosian, H. (M)
Michaels, C. J., Jr. (M)
Murray, K. W. (M)
Oliver, G. A. (M)
Parsons, T. W. (M)
Phelan, L. T. (A)
Reid, C. R. (SM)
Schultz, M. A. (M)
Tate, H. J. (M)
Taylor, C. A. (SM)
Varallo, F. A. (M)
Williams, R. J., III (M)
Youtchieff, J. S. (M)

Bethayres (PHI-3)
Stone, J. E. (M)

Bethel Park (PIT-4)
Augenstene, M. G. (M)
Donahue, R. O. (A)
Grace, J. N. (M)
Sander, H. F. (M)

Bethlehem (P-LV-3)
Ajhar, R. M. (M)
Allen, R. M. (M)
Brosious, D. R. (M)
Downing, H. L. (M)
Elder, H. E. (M)
Fisher, R. E. (M)
Gobis, C. A., Jr. (A)
Karakash, J. J. (SM)
Kimura, F. S. (M)
Larky, A. I. (M)
Lisle, J. (M)
Long, T. P., Jr. (M)
McCracken, L. G., Jr. (SM)
Miller, S. G. (A)
Posivak, J. S., Jr. (M)
Stauffer, R. E. (M)
Trotta, J. (M)
Wagner, R. E. (M)
Wahl, A. (M)

Blairsville (PIT-4)
Bosted, N. P. (A)

Blue Bell (PHI-3)
Kieslich, W. G. (M)
Parnell, J. (M)
Simon, W. (M)
Straub, G. H., Jr. (M)

Blue Ridge Summit (PHI-3)
Engle, G. E. (M)

Boalsburg (CP-4)
Ayres, D. T. (A)
Harris, D. E. (SM)
Kaperocki, F. E. (M)
Niessner, A. F. (M)
Ritter, V. H. (M)
Sechrist, C. F., Jr. (M)
Slear, L. S., Jr. (M)
Smitley, C. R. (A)

Braddock (PIT-4)
Zygmunt, H. J. (M)

Bradford (EMP-4)
Bumsford, T. A. (M)
Capps, R. G. (M)
Cook, P. G. (M)
Craumer, H. S. (A)
Dawson, A. W. (M)
Di Marino, A. (M)
Eveleth, J. H. (M)
King, L. S. (M)
Lucy, C. J. (M)
Marafioti, J. J. (M)
McCann, R. W. (M)
McIntosh, K. S. (A)
McKnight, G. P. (SM)
Moshier, L. S., Jr. (M)
Murray, W. J. (A)
O'Brien, R. A. (M)
Sailer, E. (M)
Schermerhorn, F. G. (A)
Shaw, M. R. (M)

Bridgeport (PHI-3)
Berkowitz, M. (SM)
Busch, E. G. (M)
Kocher, W. J. H. (M)

Bridgeville (PIT-4)
Tury, S. F. (A)

Bristol (PHI-3)
Annett, M. E. (A)
Dolinski, J. W., Jr. (M)

Brookville (EMP-4)
Calvert, R. B. (M)
Emerick, L. C. (M)
Georgek, S. C., Jr. (M)
Porsch, A. W. (M)
Say, D. L. (M)

Broomall (PHI-3)
Benn, R. E. (M)
Boonin, N. B. (M)
Eells, W. A. (M)
Gray, R. L., Jr. (M)
Heopfner, K. B. (M)
Kessler, F. L. (M)
Marshall, D. E., Jr. (A)
Mason, E. A. (M)
Mercado, P. D. (A)
Picus, F. (M)
Stanley, J. N. (M)
Stanton, J. W. (M)
Streater, A. L. (M)
Thompson, G. H., Jr. (A)
Wylen, J. (M)
Zechter, S. (SM)

Bryn Athyn (PHI-3)
Lee, C. F. (A)
Simons, K. A. (M)

Bryn Mawr (PHI-3)
Anderson, R. F. (M)
Chow, C. K. (M)
Crouse, R. T. (M)
Dewey, C. P., Jr. (M)
Gardiner, F. J. (SM)
Hagen, D. L. (M)
Hertzberg, J. M. (M)
Hyde, H., Jr. (A)
Kimp, H. D. (SM)
Marshall, J. N. (M)
McTague, J. P. (M)
Minett, E. E. (SM)
Morgenson, E. O., Jr. (A)
Reich, A. L. (SM)
Sohmer, R. G. (M)

Bustleton (PHI-3)
Just, G. A. (A)

Butler (PIT-4)
Findley, R. W. (M)
Hitzel, J. M. (M)
Lewis, W. I. (M)
Olmsted, R. W. (M)
Wakeman, C. B. (M)

Baltzown (P-LV-3)
Simpson, R. H. (M)

Campbelltown (PHI-L-3)
Egan, S. H. (A)

Camp Hill (PHI-L-3)
Austin, R. C. (M)
Berry, J. D. (M)
Eisenhard, S. E., Jr. (M)
Morris, G. W. (M)
Peterson, R. K. (M)
Sponeybarger, J. O. (M)

Canonsburg (PIT-4)
Lybarger, S. F. (SM)
Sulkowski, E. L. (M)
Waldron, R. E. (M)

Carbondale (PHI-3)
Gumpert, D. F. (M)
Watson, R. R. (M)

Carlisle (PHI-L-3)
Gross, F. N. (M)
Hoffman, P. R. (SM)
Mann, C. W. (A)
Meyers, K. D. (M)
Ryesky, S. (M)
Van Gavree, R. L. (A)

Carlisle Barracks (PHI-L-3)
Goodrich, R. H. (M)

Carnegie (PIT-4)
La Sota, L. S. (M)
Maser, F. A. (A)

Cementon (P-LV-3)
Brown, R. P. (M)

Center Valley (P-LV-3)
Campbell, H. L., III (M)
Dum, L. R. (M)
Johnson, D. H. (A)

Central City (PIT-4)
Bloom, R. D. (A)

Centre Hall (CP-4)
Hackman, H. R. (M)
Reeser, F. H. (M)

Chalfont (P-LV-3)
Brenner, W. F. (A)
Doelp, W. L., Jr. (M)
Koos, E. E. (M)
Richter, F. A. (M)

Cheltenham (PHI-3)
Alter, A. R. (SM)
Eckert, J. F., Jr. (A)
Feigenbaum, I. A. (M)
Himmer, F., Jr. (SM)
Hoagland, C. C. (SM)
Sheldon, H. W. (SM)

Chester (PHI-3)
Desantis, Z. S. (M)
Hyypolainen, E. K. (A)
Lind, E. N. (M)
MacWilliams, J. E. (M)
Root, W. E. (M)
Spengos, A. (M)

Chester Springs (PHI-3)
Dodge, H. S. (M)
Ebert, H. K., Jr. (M)
Trumper, D. K. (A)

Cheswick (PIT-4)
Canter, E. L., Jr. (M)
Hollandbeck, R. F. (M)
Peters, J. E. (M)

Chinchilla (PHI-3)
Ringland, R. S. (SM)

Churchville (PHI-3)
Hunks, G. W. (M)
Kirk, D., Jr. (M)
Sysko, S. J. (M)
Uphoff, F. B. (A)

Clarendon (EMP-4)
Haines, H. M. (M)

St. Petersburg (PIT-4)
Kunkle, D. J. (M)

Clarks Green (PHI-3)
Blackford, W. (SM)
Moeller, K. F. W. (M)

Clarks Summit (PHI-3)
Cerva, C. H. (M)
Oschmann, R. G. (M)
Perkins, G. O. (M)
Thomas, J. E. (SM)
Winkler, R. H. (M)

Clearfield (EMP-4)
Bolton, S. W. (M)
Boyd, J. C. (SM)
Diehl, W. F. (F)
Little, D. R. (M)
Wallace, R. P. (SM)

Clifton Heights (PHI-3)
Allen, G. P. (A)
Bradley, W. E. (M)
Ellis, D. J. (M)
Lobel, D. J. (M)
Loebardini, P. P. (SM)
Werbickas, J. P. (A)
Wolle, J. E. (M)

Collegeville (PHI-3)
Burleigh, R. P. (M)
Smith, R. M. (A)
Strohmeyer, G. R. (M)

Collingdale (PHI-3)
Minahan, W. G. (M)

Columbia (PHI-L-3)
Horst, R. L. (M)

Colwyn (PHI-3)
Bradley, J. F. (M)

Conestoga (PHI-L-3)
Landis, C. G. (M)

Conshohocken (PHI-3)
Blumenthal, E. I. (M)
Milliken, E. N. (M)
Ruf, F. C. (M)
Wells, G. H. (M)

Coraopolis (PIT-4)
Cuccarese, E. A. (A)

Cornwells Heights (P-LV-3)
Douthwaite, W., Jr. (M)

Coudersport (EMP-4)
Du Bois, A. F. (M)

Crafton (PIT-4)
Sippach, F. W., Jr. (M)

Cynwyd (PHI-3)
Follensbee, W. R. (A)
Kilpatrick, D. G. (SM)
Laurent, G. J. (SM)
Prywes, N. S. (M)

Darby (PHI-3)
Ross, W. F., Jr. (M)

Delphi (PHI-3)
Richard, C. D., Jr. (M)

Devon (PHI-3)
Bell, P. F. (M)
Denk, W. E. (M)
Griffin, J. T. (M)
Pearson, W. H., III (A)
Zomber, G. L. (M)

Dickson City (PHI-3)
Grabowski, J. P. (M)
Srebro, F. P. (M)

Dillsburg (PHI-L-3)
Wolf, C. E. (A)

Donora (PIT-4)
Guyker, W. C., Jr. (M)

Downingtown (PHI-3)
Bittmann, E. E. (M)
Jensen, D. W. (M)

Doylestown (PHI-3)
Benecke, H. O. (SM)
Cogar, G. R. (M)
Cole, W. G. (M)
Davis, R. W., Jr. (SM)
Gerlach, G. G. (SM)
Mulherin, E. M. (M)
Schweitzer, R. W. (M)
Slocum, L. V. (M)
Smith, A. W. (A)
West, H. (M)

Dresher (PHI-3)
Davey, C. T. (M)
Spielman, H. (M)

Drexel Hill (PHI-3)
Adler, D. G. (M)
Boyajian, M. M. (A)
Brooks, F. C. (M)
Brown, L. J., III (M)
Buxton, P. T. (M)
Cleary, T. R. (M)
Dimmler, H. F., Jr. (M)
Dorsey, J. C. (M)
Finley, J. M. (M)
Free, A. L. (M)
Kley, R. C., Jr. (M)
Lewis, G. (M)
Ley, G. S. (SM)
Marcovitz, M. W. (M)
Marshall, F. H. B. (SM)
Morris, C. R. (M)
Mural, F. (M)
Powers, J. H., Jr. (M)
Rosenberg, H. (M)
Satin, N. J., Jr. (SM)
Schafer, W. W. (A)
Schinagel, M. (M)
Shattuck, C. J. (M)
Stobbart, A. J. (M)

Drifton (PHI-3)
Kistan, C. A. (M)

Dry Run (PHI-3)
Worthington, F. M. (M)

Du Bois (EMP-4)
Bley, L. H. (M)
Kunst, A. F. (M)
McGarvey, H. J. (M)
Winters, W. J. (M)

Dunmore (PHI-3)
Kinback, R. W. (M)
Reiner, C. (A)

Duquesne (PIT-4)
Laycak, J. F. (M)

Duryea (PHI-3)
Madera, A. J. (M)
Panick, R. J. (M)

East Lansdowne (PHI-3)
Ruggles, P. R. (M)

East McKeesport (PIT-4)
Colclaser, R. A. (M)
Queer, P. R. (A)

Easton (P-LV-3)
Berk, D. M. (M)
Carlson, R. F. (SM)
Conover, L. J. (SM)
Cosper, R. A. (M)
Duncan, J. R. (M)
Englehardt, W. K. (M)
Fallendorf, G. W. (M)
Gebhardt, F. L. (M)
Heller, L. J. (A)
Hollander, A. M. (M)
Kressman, J. H. (M)
Krohn, P. L. (SM)
Slavics, J. W. (A)
Smith, F. W. (SM)
Volk, J. H. (M)
Waer, R. R. (M)

East Petersburg (PHI-L-3)
Hammersand, F. G. (M)
Morrell, A. M. (M)

East Pittsburgh (PIT-4)
Blewitt, D. D. (M)
Buckler, P. F. (M)
Ferguson, R. W. (M)
Lee, C. H. (M)
McDonald, J. (A)
Steinbruegge, H. A. (M)

Edwardsville (PHI-3)
Belensky, M. J., Jr. (A)
Korlishin, L. (A)

Elizabethtown (PHI-L-3)
Alger, P. B. (M)
Custer, H. M. (M)
Lerch, D. P. (M)
Orr, R. W. (M)

Elkins Park (PHI-3)
Anton, A. (M)
Blembaum, J. W. (A)
Boreen, H. I. (M)
Brill, M. L. (M)
Caldwell, W. H. (SM)
Dahlin, E. B. (M)
Focht, L. R. (M)
Gruen, H. (M)
Kaufmann, H. L. (M)
Kirsch, A. L. (SM)
Kraus, M. H. (M)
Krutter, H. (F)
Lawson, B. V. (M)
McLaughlin, T. C. (M)
New, R. (M)
Porter, H. F. (SM)
Rath, H. B. (M)
Rojas, R. R. (M)
Rothschild, L. I., Jr. (SM)
Sink, J. A. (A)
Solegel, H. (A)
Suckle, B. W. (A)
Swartz, M. D. (A)
Valliere, E. G. (A)
Yaffe, M. (SM)
Zaslav, B. (A)

Ellwood City (PIT-4)
Powell, K. F. (A)

Emmaus (PHI-3)
Chittick, D. R. (M)
Gingrich, C. C., Jr. (M)
Ruth, H. L. (A)

Emporium (EMP-4)
Ackman, C. W. (M)
Ackman, H. E. (SM)
Allgaier, W. A. (SM)
Baldwin, A. V. (SM)
Beeney, D. W. (M)
Beergdahl, R. F. (A)
Bisso, R. J. (SM)
Boden, E. H. (SM)
Boots, W. K. (SM)
Bossers, C. (SM)
Brunner, G. V. (SM)
Buescher, W. E. (SM)
Burwell, A. C., Jr. (SM)
Campbell, V. H. (SM)
Carlstrom, T. H. (SM)
Clark, J. N. (M)
Clausen, R. P. (SM)
Conner, F. L. (A)
Cooley, R. M. (SM)
Curry, G. T. (SM)
Dander, D. A. (SM)
Detweiler, J. E. (A)
Dolnick, A. L. (SM)
Douglass, C. F. (SM)
Dresser, S. R., Jr. (M)
Erdle, P. J. (SM)
Fromelt, H. J. (SM)
Gausman, T. E. (SM)
Goodman, H. L. (M)
Gorman, V. R. (A)
Grubbe, V. P. (M)
Heitner, A. J. (M)
Hench, H. S., Jr. (M)
Hendrickson, C. C. (SM)
Herbert, H. W. (SM)
Himes, E. G. (A)
Kackauskas, J. J. (M)
Kanter, H. V., Jr. (M)
Klees, E. C. (M)
Klinestiver, G. H., Jr. (M)
Lambert, R. L. (SM)
Lantzy, W. E. (A)
Maguire, L. R. (SM)
McKain, J. L. (SM)
McNaughton, R. A. (M)
Metzler, F. A., Jr. (A)
Mueller, W. P. (SM)
Murphy, W. A. (M)
Neuber, R. E. (SM)
Northrup, R. M. (M)
Overmier, E. E. (SM)
Palen, H. A. (M)
Palmateer, R. E. (SM)
Peterson, A. W. (SM)
Petruna, J. G. (A)
Pope, L. A. (A)
Quini, G. L. (A)
Richardson, H. L. (M)
Rinehuls, N. F. (M)
Robbins, J. D. (SM)
Rolf, W. R. (SM)
Ross, V. C. (A)
Sassaman, P. H. (SM)
Schultz, A. J. (SM)
Schwender, L. D. (M)
Sember, W. J. (M)
Simon, P. R. (M)
Slinkman, R. W. (SM)
Snyder, V. D. (M)
Stengel, E. S. (SM)
Stumpff, H. G. (SM)
Summers, G. L. (M)
Vergason, D. L. (SM)
Walsh, R. J. (SM)

Ephrata (PHI-L-3)
Wiker, R. L. (M)

Erie (ERI-1)
Anderson, R. H. (M)
Blais, P. D. (A)
Blakeley, F. J. (M)
Bova, A. S. (A)
Davidson, A. R. (SM)
Ehman, P. B. (M)
Fisch, A. (M)
Gluck, F. (SM)
Gray, R. B. (SM)
Harding, G. D. (A)
Heibel, J. D. (M)
Herman, L. W. (M)
Herrick, H. S. (M)
Hestor, K. L. (M)
Hurst, A. H. (M)
Lodge, A. (A)
Michael, R. N. (M)
Minnium, B. B. (F)
Nedreski, R. J. (A)
Onsager, R. W. (M)
Ozechoski, A. T. (A)
Page, R. S. (M)
Presutti, B. D. (A)
Rochin, D. W. (A)
Shafer, W. A. (A)
Smith, D. H. (M)
Sterner, P. E. (M)
Thomas, P. R. (A)
Vieira, J. E. (A)
Werner, G. L. (M)
Windsor, R. T. (M)
Wolfskill, J. M. (M)
Young, F. R. (M)

Exeter (PHI-3)
Morris, W. P. (A)

Export (PIT-4)
Bennett, A. I., Jr. (A)
Gywn, C. B., Jr. (SM)
Putkovich, R. P. (A)

Exton (PHI-3)
Reisener, W. C., Jr. (M)



Fairless Hills (PHI-3)
Gallagher, J. E. (A)

Fallsington (PHI-3)
Maddox, J. A. (M)

Fleetwood (PHI-R-3)
Miller, R. C. (M)

Flourtown (PHI-3)
Bartels, H. C., Jr. (M)
Bruno, A. (M)
Chase, B. G. (A)
Kellett, H. G. (M)
Kishpaugh, A. W. (M)
Lynch, C. V., Jr. (M)
Marcus, H. M. (A)
O'Brien, J. F., Jr. (M)
Perkins, H. A., Jr. (M)
Spindler, C. W., Jr. (SM)

Folcroft (PHI-3)
Cunningham, W. G. (M)
Miesse, C. E. (A)
Will, H. C. (M)

Folsom (PHI-3)
Donnelly, E. J. (M)
Kozlkowski, J. L. (M)

Ford City (PIT-4)
Tihanovich, W. P. (A)

Forest City (PHI-3)
O'Peka, F. J. (M)

Freedom (PIT-4)
Swartz, F. E. (A)

Ft. Washington (PHI-3)
Dawson, W. C. (A)
Jacoby, M. (M)
Mosher, R. M. (A)
Price, R. (SM)
Schantz, J. S. (M)
Schubert, E. J. (SM)

Fullerton (P-LV-3)
Moyer, R. H. (M)
Scheirer, R. D. (M)

Furlong (PHI-3)
Horn, R. W. (A)

Gallitzin (PIT-4)
Fels, F. E. (A)

Gardenville (PHI-3)
Biggs, J. A. (M)

Gardners (PHI-L-3)
Tate, R. G. (A)

Gettysburg (PHI-L-3)
Cain, M. F. (M)
Wentz, G. W. (M)

Gladwyne (PHI-3)
Dever, J. A. (M)
Eckert, J. P., Jr. (F)
Owings, J. L. (M)

Glassport (PIT-4)
Pudlak, A. (A)

Glen Mills (PHI-3)
De Prisco, C. F. (A)

Glen Moore (PHI-3)
Kelly, J. B. (M)

Glenolden (PHI-3)
Olson, H. H. (M)
Stott, H. B. (SM)

Glen Rock (PHI-L-3)
Gladfelter, A. E. (M)

Glenshaw (PIT-4)
Horlbeck, W. E. (M)
Komar, J. C. (M)
Springer, C. J. (A)
Suter, S. G. (M)
Van Nice, R. I. (M)

Glenside (PHI-3)
Beardwood, J. T., III (M)
Bobb, L. J. (M)
Brown, D. G. (A)
Butt, S. P., Jr. (M)
Chedaker, J. (A)
Hall, R. W. (A)
Irwin, R. R. (A)
Mayher, R. J. (M)
Montgomery, A. P. (SM)
Paup, R. E. (M)
Plotkin, I. (M)
Stapp, I. P. (M)
Stein, H. B. (SM)
Taylor, J. R. (M)
Van Basselaere, L. J. (M)
Wilson, H. R. (M)
Wood, H. O. (SM)

Greencastle (PHI-3)
Elliott, B. L. (M)

Green Lane (PHI-3)
Robertson, G. C. (M)

Greensburg (PIT-4)
Baldwin, C. H. (SM)
Courty, C. H. (M)
Hutchinson, G. W. (M)
Lynch, R. D. (M)
Motto, J. W. (A)
New, T. C. T. (M)
Stickler, M. G. (M)

Greenville (PIT-4)
Greene, R. L. (M)
Schomburg, W. K. (M)

Gwynedd (PHI-3)
Guzewicz, J. F. (A)

Gwynedd Valley (PHI-3)
Robinson, R. R. (A)

Hanover (PHI-L-3)
Rohrbaugh, P. A. (A)
Zinn, R. H. (A)

Harborcreek (ERI-1)
Challstrom, K. I. (M)

Harleysville (PHI-3)
Rizzetto, D. J. (M)

Harrisburg (PHI-L-3)
Helst, H. E., Jr. (A)
Holcombe, M. M. (SM)
Kelley, O. G. (A)
Moretz, L. A. (M)
Peffer, R. M. (M)
Shuey, D. R., Jr. (M)
Stock, K. A. (M)
Strickland, J. L. (M)
Wachtman, G. S. (SM)
Whitley, J. H. (A)

Hartsville (PHI-3)
Dymecki, J. W. (M)
Granger, B. W. (M)
Herrmann, D. C. (M)
Snook, J. E. (M)
Wullert, J. R. (SM)

Harveys Lake (PHI-3)
Baloga, J. J. (M)

Hatboro (PHI-3)
Aleo, J. (M)
Baxter, K. W. (M)
Brooks, C. E. (M)
Bryan, J. S. (M)
Bucks, R. M. (A)
Cramton, F. N. (A)
Dietz, W. J. (M)
Doerfel, H. V. (M)
Drake, J. C. (SM)
Ettenhoffer, K. L. (M)
Fedde, G. A. (M)
Foley, T. J. (M)
Fortini, M. M. (M)
Gleiter, W. C. (M)
Godley, W. P. (A)
Harrison, R. K. (M)
Johnson, E. C. (SM)
Knouse, R. H. (A)
Landsman, B. (M)
Long, M. L., Jr. (SM)
Machuta, A. J. (SM)
Martin, H. B. (M)
McWilliams, C. R. (M)
Miles, T. J. (SM)
Miller, R. L. (M)
Richter, H. K. (A)
Roschen, J. (M)
Saboe, J. (M)
Sokol, S. (A)
Steele, C. R. (M)
Suter, H. (SM)
Sutphen, K. A. (M)
Swanson, C. I. (A)
Tiley, J. W. (SM)
Williams, G. C. (M)
Ziebell, D. H. (M)

Hatfield (PHI-3)
Barclay, F. T. (M)
Insinger, R. H., Jr. (M)
Smith, D. J. (M)

Haverford (PHI-3)
Benham, T. A. (SM)
Crawford, A. L., Jr. (SM)
Freeman, M. F. (M)
Mayer, H. C. (M)
Schwennesen, D. (M)

Havertown (PHI-3)
Andes, J. H. (A)
Apolito, P. L. (M)
Beck, J. J. (SM)
Consalvi, A. L. (SM)
Crockett, J. G. (SM)
Deacon, W. E. (M)
Devenny, C. F., Jr. (M)
Dougherty, J. W. (M)
Dytt, L. F. (M)
Eschner, A. N. (M)
Ferri, J. F. (M)
Fulmer, J. W. (M)
Gildea, R. J. (M)
Gilligan, T. E., Jr. (M)
Hastings, J. A. (M)
Henry, A. T. (A)
Kauders, R. W. (M)
Koch, J. F., Jr. (SM)
Liston, J. (A)
Lund, G. E. (M)
Meyer, S. (M)
Miehle, W. (M)
Moore, J. H. (M)
Mustico, J. (A)
Napolitano, P. (M)
Paskman, M. (M)
Patchell, T. A. (M)
Reid, J. M. (M)
Robinson, C. W. (M)
Ryskamp, J. H. (M)
Sachs, A. F. (M)
Satterthwaite, W. F. (M)
Sohon, H. (SM)
Wilson, R. C. (M)
Wise, B. (A)
Woestman, J. W. (M)
Woll, C. F. (SM)
Wynne, J. J. (A)
Zappacosta, A. D. (M)

Hazleton (PHI-3)
Bugalski, C. A. (M)
Butterwick, G. H. (A)
Gans, J. S. (A)
Lindermuth, G. (A)
Steckert, J. W. (M)
Walker, M. J. (M)

Hellam (PHI-L-3)
Megargel, L. R., Jr. (M)
Swengel, R. C. (A)

Hershey (PHI-L-3)
Smith, E. C. (M)

Holland (PHI-3)
Lambert, C. R. (M)
Schwartzberg, H. L. (M)

Hollidaysburg (PIT-4)
Kilgore, W. (M)

Holmes (PHI-3)
Warner, H. (M)

Homestead Park (PIT-4)
Cauley, T. K. (M)

Honesdale (PHI-3)
Driesse, W. H. (M)

Horsham (PHI-3)
Monteith, W. W. (A)
Tremblay, H. G. (A)

Houston (PIT-4)
Wagner, F., Jr. (A)

Huntingdon Valley (PHI-3)
Angell, J. B. (SM)
Boothroyd, W. P. (F)
Borden, C. C. (A)
Brady, P. B. (SM)
Erle, S. D. (M)
Forell, H. K. (A)
Freeland, E. C. (SM)
Gumas, G. (A)
Gyllenhaal, P. R. (M)
Ham, D. L. (M)
Hayward, J. W. (M)
Jones, A. G. (M)
Klein, M. J. H. (A)
Kolodner, M. (M)
Lorant, L. (SM)
Matthews, A. C. (SM)
Merklinger, J. J. (M)
Moore, R. C. (F)
Munster, A. C. (SM)
Ostroff, A. (A)
Rietman, L. (SM)
Riester, H. A, Jr. (M)
Ruehlemann, H. E. (SM)
Schulze, H. E. (M)
Spieler, A. (A)
Thompson, M. L. (SM)
Vallette, C. N. (M)
Vaughan, T. J. (M)
Weinberg, I. (M)
Welsh, W. J. (M)

Indiana (PIT-4)
Hitchcock, R. C. (SM)
Muldoon, R. P. (M)
Weber, G. E. (M)

Irwin (PIT-4)
Brook, A. (A)
Jud, H. G. (M)
Kinder, H. R. (M)
Mucci, C. (M)
Nowalk, T. P. (M)
Place, W. P. (M)
Rice, L. (A)
Riemersma, H. (M)
Rowe, I. (M)
Shaw, G. D. (M)
White, C. W. (A)
Wissman, A. J. (M)
Wright, E. B. (M)

Ivyland (PHI-3)
Erickson, M. L. (A)
Gonzalez, C. P. (M)
Lee, W. S. (M)
Rogers, D. H. (M)

Jeanette (PIT-4)
Chick, R. F. (M)
Hope, J. L. (M)
Kilchel, O. D. (M)

Jeffersonville (PIT-4)
Maguire, M. F. (M)

Jenkintown (PHI-3)
Caplan, N. (SM)
Clark, W. R. (SM)
Frear, W. (SM)
Hill, J. E. (M)
Husband, R. E. (M)
Koehler, J. F. (SM)
Lanagan, J. G. (A)
Liebscher, A. (SM)
McClarren, R. H. (SM)
Myers, A. S., Jr. (SM)
Namaroff, J. H. (SM)
Overdeer, R. H. (M)
Peltz, W. J. (SM)
Scharf, S. W. (M)
Sepahban, A. H. (A)
Stewart, G. H., III (M)

Jersey Shore (WIL-4)
Johnson, C. E. (M)

Jessup (PHI-3)
Potash, A. G. (M)

Johnstown (PIT-4)
Campbell, T. E. (A)
Friedman, M. I. (A)
Froehlich, J. P. (M)
Grumling, J. R. (M)
Kocsan, E. S. (M)
Shostek, R. E. (M)
Smith, R. F. (M)
Sodano, R. D. (A)
Treimer, J. A. (M)
Vrooman, A. L. (A)

Johnsville (PHI-3)
Even-tov, O. (M)
Fenton, F. H., Jr. (M)
Jesse, H. W. (M)
Kemp, J. C., Jr. (M)
McCarty, W. F. (A)
Nupp, W. D. (A)
Pickett, H. D. (A)
Polhemus, G. C. (M)
Sander, R. E. (M)
Smithey, L. D. (M)
Stobie, E. F. (M)
Vasaka, C. S. (SM)
White, G. T. (M)
Yowell, G. M., Jr. (M)

Karthaus (EMP-4)
McMillan, R. E. (SM)

Kennerdell (PIT-4)
Smith, S. A. (A)

King of Prussia (PHI-3)
Cohen, K. J. (M)
Coles, R. V. (SM)
Connaught, P. M. (M)
Dix, T. S., Jr. (SM)
Galbraith, J. R. (M)
Gregory, T. R. (M)
Hamill, R. V. (M)
Hand, G. C., Jr. (M)
Hochman, S. (M)
Holeczy, A. A. (M)
Joos, J. W. (M)
Klein, R. J. (SM)
Kutner, N. H. (M)
Lally, V. E. (M)
Lannutti, A. P. (M)
Levy, L. G. (M)
Longo, J. F. (M)
Marchetta, P. (M)
O'Hara, J. J. (SM)
Osbahr, B. F. (SM)
Ottaviano, A. V. (M)
Regan, J. V., Jr. (M)
Rosen, H. H. (SM)
Schneider, R. P. (M)
Schumer, H. A. (M)
Selinsky, J. J. (M)
Smith, V. Z. (M)
Sweigart, A. S. (A)
Wearer, R. L. (M)
Webster, D. J. (M)
Wolfe, W. R. (M)
Wright, J. A. (M)

Kingston (PHI-3)
Sakoski, C. (A)

Kittanning (PIT-4)
Golla, E. F. (SM)
Rupp, J. A. (M)

Kutztown (PHI-R-3)
Tawney, G. L. (SM)

Kylertown (EMP-4)
Bird, F. W. (A)

Lafayette Hill (PHI-3)
Bloomsburgh, R. A., Jr. (M)
Clark, W. A. (M)
Crawford, C. S., Jr. (A)
Kinney, R. V. (A)
McKee, G. R., Jr. (M)
Ruff, J. A. (M)
Scott, C. H., Jr. (M)
Zuck, R. A. (M)

Lahaska (PHI-3)
Phillips, C. M. (M)

Lake Ariel (PHI-3)
Grimditch, W. H. (SM)
Harris, W. C. (M)

Lakeville (PHI-3)
Greenfield, J. C. (M)

Lampeter (PHI-L-3)
Damon, P. P. (SM)

Lancaster (PHI-L-3)
Almond, W. R. (M)
Ayer, R. B. (SM)
Bedrosian, P. G. (A)
Beidler, R. T. (M)
Bennett, W. P. (SM)
Bixler, R. T. (SM)
Block, F. G. (M)
Brackbill, C. R. (SM)
Brown, B. B. (M)
Burnett, C. E. (SM)
Comins, A. W. (SM)
De Metl, J. (SM)
Des Rochers, R. D. (M)
Doner, C. E. (M)
Dreyer, K. (SM)
Duckworth, G. W. (M)
Dyall, W. T. (SM)
E'Dei, R. R. (M)
Enck, F. D. (SM)
Epstein, D. W. (F)
Evans, J. (M)
Fendley, J. R., Jr. (A)
Forman, J. M. (M)
Fournier, R. V. (SM)
Free, J. J. (M)
Freund, W. H. (M)
Gadbois, G. S. (A)
Gaylord, J. W. (M)
Grimm, A. C. (SM)
Handel, R. R. (SM)
Harsh, M. D. (M)
Heagy, J. F. (M)
Herman, L. C. (SM)
Hershenson, L. H. (M)
Hillegass, H. N. (M)
Hoover, M. V. (M)
Johnson, J. K. (SM)
Kaseman, P. W. (M)
Kitchen, R. F. (M)
Krallinger, R. E. (M)
Kuwabara, T. (M)
Mandell, G. E. (A)
Mark, J. T. (A)
Matheson, R. M. (M)
Mathiot, J. E. (M)
Mattern, P. E. (M)
McNees, S. G. (M)
McNickle, R. E. (M)
Mengle, L. I. (M)
Miller, L. D. (M)
Moodey, H. C. (SM)
Nekut, A. G. (SM)
Parker, W. N. (SM)
Perry, H. E. (M)
Pickard, J. B. (M)
Reed, R. E. (M)
Rogers, H. L. (M)
Rotow, A. A. (SM)
Rueggeberg, W. (M)
Scott, G. W., Jr. (SM)
Siegler, H. B. (A)
Sinclair, R. R. (A)
Smith, C. P. (SM)
Spangler, R. G. (A)
Spitzer, E. E. (F)
Stem, S. (M)
Stone, R. P. (SM)
Stoudenheimer, R. G. (SM)
Sweet, A. P., Jr. (M)
Uyeda, Y. (M)
Van Asselt, R. L. (SM)
Van Ormer, D. D. (M)
Velth, F. S. (SM)
Vine, B. H. (SM)
Walton, R. S. (M)
Warshaw, J. (M)
Wenger, R. S. (SM)
Wood, W. H. (SM)
Yingst, T. E. (M)
Zarbarlason, R. H. (SM)

Langhorne (PHI-3)
Bayliss, B. F. (M)
Brown, J. N. (M)
Cooley, C. C., Jr. (A)
Ryan, T. J. (SM)

Lansdale (PHI-3)
Bachman, C. S. (M)
Bonk, P. J. (M)
Carney, R. W. (M)
Clarke, C. E. (M)
Conley, J. W. (M)
Davis, H., III (M)
Doherty, W. E., Jr. (M)
Dougherty, F. J. (M)
Ekiss, J. A. (M)
Gable, W. P. (M)
Gray, C. R. (M)
Halmowitz, B. (M)
Halligan, J. W. (M)
Hirshon, J. M. (M)
Houpt, G. K. (M)
Ishler, H. K. (SM)
Jha, A. R. (M)
Kaden, G. (M)
Levy, S. L. (SM)
Lyle, A. E. (SM)
Martin, R. B. (M)
McCotter, J. D., Jr. (M)
Moll, W. H. (M)
Pratt, G. W. (M)
Sanders, J. G. (M)
Schlegel, E. S. (M)
Schnable, G. L. (A)

Sluss, J. A., Jr. (SM)
Smith, W. E. (M)
Tague, C. B., Jr. (M)
Thornton, C. G. (SM)
Waite, G. C. (M)

Lansdowne (PHI-3)
Amborgi, J. N., Jr. (M)
Brumbaugh, J. M. (SM)
Holdsworth, R. M., Jr. (A)
Klemas, V. (M)
Odenweiler, C. (M)
Pappas, C. (M)

Lansford (PHI-3)
Pispeky, S. (M)

Latrobe (PIT-4)
Albert, D. E. (M)
Anlinger, P. R. (M)
Guidos, B. W. (A)
Kuehn, T. J. (M)
Shaw, V. G. (SM)

Laureldale (PHI-R-3)
Amron, I. (A)
Embree, M. L. (A)
Miller, L. E. (SM)
Westberg, R. W. (A)

Lebanon (PHI-L-3)
Kiscadden, G. G. (M)

Lemoyne (PHI-L-3)
Smiley, W. A. (M)

Leola (PHI-L-3)
Bowers, W. A. (M)

Levittown (PHI-3)
Aires, R. H. (M)
Amodei, J. J. (M)
Auerbach, S. S. (A)
Azaren, D. (M)
Barnes, W. L. (M)
Barnette, W. E. (A)
Bell, C. V. (M)
Berenbaum, L. M. (M)
Bernstein, F. (A)
Bloss, R. C. (M)
Boardman, H. B. (M)
Boerschig, B. A. (M)
Bradshaw, G. V., Jr. (M)
Brautigam, E. H. (A)
Brechling, G. E. (M)
Bressler, J. (M)
Brittin, C. R. (M)
Brown, W. K. (M)
Busby, J. W. (M)
Charton, S. (M)
Cohen, I. (M)
Coleman, A. H. (M)
Colodny, S. H. (SM)
Darling, D. C. (M)
Dixon, G. P. (M)
Dunalef, C. (SM)
Dunn, T. E. (M)
Durham, A. F. (M)
Eigner, H. (SM)
Elion, H. A. (M)
Etkin, H. A. (SM)
Ewald, W. J. (A)
Faust, E. J. (M)
Fink, E. A. (SM)
Finn, M. M. (SM)
Foster, L. E. (M)
Fox, E. C. (M)
Furstein, R. A. (M)
Garber, H. N. (M)
Given, W. H., III (M)
Gleason, H. H. (SM)
Goldstone, B. J. (M)
Greenberg, D. (M)
Greenfield, J. D. (M)
Hacking, C. (SM)
Halprin, J. (A)
Haneman, W. J. (M)
Heinaman, H. B., Jr. (M)
Hollander, M. (M)
House, H. J. (M)
Hsueh, C. Y. (M)
Insalaco, P. J. (A)
Jackson, W. K. (M)
Jamison, R. P. (M)
Jessen, F. A., Jr. (M)
Jurkevich, I. (M)
Kaskey, G. (SM)
Kaye, M. G. (M)
Krieg, S. (M)
Lamnin, M. (M)
Lathrop, P. A. (SM)
Levine, S. A. (A)
Li, K. (M)
Liddy, J. E. (M)
Lieberman, E. (M)
Loudin, W. D. (M)
McDevitt, J. T. (A)
McGee, A. K. (M)
Miller, E. (M)
Miller, W. A. (M)
Mondress, M. (M)
Murr, R. H. (M)
Nachman, M. W. (M)
Nichols, R. R. (A)
Ogawa, H. F. (A)
Pierce, W. B. (M)
Pitts, W. L. (SM)
Podolski, G. A. (M)
Potosky, M. (M)
Prensky, W. C. (M)
Pulgdollers, E., Jr. (M)
Raciti, S. A. (A)
Riley, P. J. (SM)
Rivitz, H. R. (M)
Robinson, L. R. (A)
Rosen, B. H. (M)
Sakaguchi, T. Y. (M)
Schlichting, D. N. (M)
Shucker, S. (SM)
Shultz, R. S. (M)
Silverman, M. (SM)
Slobins, M. (A)
Solomon, H. (A)
Spiro, G. H. (M)
Sullivan, F. J. (M)
Susskind, I. N. (M)
Szumila, A. D. (A)
Terrell, R. L. (M)
Titelsky, E. J. (M)
Trilling, T. R. (M)
Turner, R. J. (M)
Turtil, J. F. (M)
Tuszynski, A. A. (M)
Urban, S. J., Jr. (M)
Uslin, L. T. (M)
Walberg, A. G. (M)
Weinberg, A. D. (A)
Weinheimer, F. E. (A)
Weisman, S. M. (M)
Wilcox, J. E. (M)
Wilker, M. D. (M)
Winter, L. (M)
Wood, R. F., Jr. (SM)
Wydro, W. S. (A)
Yang, T. (M)
Zeiger, K. K. (M)

Lewisburg (WIL-4)
Irland, G. A. (M)
Mathias, J. P. (A)
Webb, H. E. (SM)
Walker, R. C. (M)

Lewistown (WIL-4)
Gardner, G. F. (M)

Liberty (ELM-C-1)
Frutiger, W. A. (M)

Line Lexington (PHI-3)
Schramm, J. A. (M)

Linglestown (PHI-L-3)
Fritz, W. B. (A)

Lionville (PHI-3)
Lynch, J. T. (M)

Lititz (PHI-L-3)
Grosh, J. B., III (M)
Sheffy, H. J. (M)

Lock Haven (WIL-4)
Cooney, T. D. (M)
Young, G. D. (A)

Lynnport (P-LV-3)
Klingaman, G. W. (M)

Macungie (P-LV-3)
Nelson, M. F. (A)

Malvern (PHI-3)
Balakian, G. (A)
Bedrosian, S. D. (SM)
Bikle, A. S. (A)
Bingham, H. W. (M)
Briggs, T. H. (SM)
Dowds, T. A. (M)
Durfee, G. H. (M)
Grafinger, A. B. (SM)
Hood, C. E. (SM)
Kensinger, G. L. (M)
Kozak, W. S. (M)
Parris, S. R. (M)
Pedersen, J. H. (A)
Perkins, C. C. (M)
Reiss, H. R. (M)
Skinner, N. W. (A)
Smith, J. T. (A)
Ten Broeck, C. A. (M)
Wachter, W. J. (M)
Weisenberger, A. J. (M)
Witherspoon, J. M. (SM)

Manor (PIT-4)
Anderson, J. W. (A)

Maple Glen (PHI-3)
Currie, A. H. (M)
Wood, W. M. (A)

Marcus Hook (PHI-3)
Alexander, F. C., Jr. (SM)
Imbodon, H. B. (SM)
Smith, O. J., III (M)

Marietta (PHI-L-3)
Oboryshko, H. (M)

Mars (PIT-4)
Beninger, J. W. (A)

Martins Creek (P-LV-3)
Mahalick, S. V. (M)

McIntyre (PIT-4)
Tomei, J. B. (M)

McKeesport (PIT-4)
Andrews, F. J. (M)
Douglass, H. H. (M)
Farkas, B. (M)
Levine, M. (M)
Morabito, R. A. (M)
Vogt, W. G. (M)

McKees Rocks (PIT-4)
Zeltner, F. L., Jr. (M)

Meadowbrook (PHI-3)
Bingley, F. J. (F)
Dolberg, C. E. (SM)
Etz, W. O. (M)
Fink, D. G. (F)
Forsyth, W. A., Jr. (M)
Greenwood, R. W. (M)
Lukens, R., Jr. (SM)
Reynolds, V. F. (M)
Rogers, T. E. (M)
Sheppard, C. B. (M)
Walker, H. (M)

Meadville (PIT-4)
Brown, R. L. (M)

Mechanicsburg (PHI-L-3)
Hill, B. C., Jr. (SM)
Malone, R. H. (M)
Miller, H. E. (A)
Sechrist, W. S. (A)

Media (PHI-3)
Bargellini, P. L. (SM)
Bigelow, R. P. (A)
Coccoli, J. C. (M)
Gray, H. J., Jr. (M)
Harman, G. F., Jr. (A)
Hathcock, D. S., Jr. (M)
Kinkead, W. K. (M)
Miller, A. F. (M)
Rhea, H. E. (M)
Salati, O. M. (SM)
Schlop, J. W. (M)
Van Dam, A. (M)
Ware, A. R. (M)

Mendenhall (PHI-3)
Stinger, H. J. (M)

Mercersburg (PHI-3)
Clutz, D. A. (M)

Merion (PHI-3)
Adamson, R. G. (M)
Colehower, C. H., Jr. (M)
Emurian, A. D. (SM)
Merriam, A. S. (M)

Merion Station (PHI-3)
Bonn, T. H. (SM)
Rubinoff, M. (M)
Shapp, M. J. (SM)

Meyersdale (PIT-4)
Baer, W. E. (A)

Middletown (PHI-L-3)
Jankowski, J. A. (M)
Miller, J. C. (M)
Steve, W. T. (M)

Millersville (PHI-L-3)
Smith, E. M. (M)
Weaver, J. E. (A)

Mill Hall (WIL-4)
Schnering, C. J. (M)

Milmont Park (PHI-3)
Ida, E. S. (M)

Mohnton (PHI-R-3)
Fister, T. J. (A)
Olson, H. M. (M)

Monessen (PIT-4)
Bodola, M. J. (M)
Pansino, S. R. (M)

Monongahela (PIT-4)
Rockwell, R. R. (A)

Monroeville (PIT-4)
Allen, S. D. (M)
Boyd, J. J. (M)
Cilyo, F. F., Jr. (M)
Coleman, W. E. (M)
Decker, R. W. (M)
Diamond, H. (M)
Eastman, R. (M)
Gillott, D. H. (M)
Hester, W. A. (M)
Hooge, C. R., Jr. (M)
Kardos, L. F. (M)
Kikta, E. J. (M)
Lester, R. A. (M)
Locante, J. (M)
Lyman, R. C. (M)
Murray, R., Jr. (A)
Revay, A. W., Jr. (M)
Shaw, J. B. (M)
Uti, O. L. (M)
Wright, W. L. (M)

Mont Clare (PHI-3)
Kaufmann, H. W. (M)

Montoursville (WIL-4)
Bennett, A. J. (A)
Daley, C. J. (A)
Dowden, W. M. (M)

Montrose (PHI-3)
Flore, W. V. (M)

Morrisville (PHI-3)
Featherstone, F. B. (A)
Griesbach, R. J. (M)
Mislan, J. D. (M)
Riegel, R. B. (M)
Wieger, J. J. (A)

Morton (PHI-3)
Gaschnig, G. R. (M)

Moscow (PHI-3)
Kaplan, M. (SM)

Mount Holly Springs (PHI-L-3)
Samuelson, W. H.E.(M)
Snyder, J. R. (M)

Mount Joy (PHI-L-3)
Dock, S. J., Jr. (A)

Mount Pleasant (PIT-4)
Hartley, W. A. (M)

Mount Carmel (WIL-4)
Schneider, C. P. (A)

Muncy (WIL-4)
Amey, G. B. (A)

Murrysville (PIT-4)
Baker, W. H. (M)
Caywood, W. P., Jr. (SM)
Decker, R. O. (M)
Jones, C. H. (SM)
Klotzbaugh, G. A. (SM)
Leone, H. A. (A)

Myerstown (PHI-L-3)
Sando, G. G. (M)

Nanticoke (PHI-3)
Cancellari, N. J. (M)
Kotulak, J. (M)

Narberth (PHI-3)
Brustman, J. A. (F)
Clapp, R. G. (SM)
Forstall, F. L. (SM)
Jeffries, S. A. (M)
Tabor, L. P. (SM)
Williamson, J. F. (M)

Nazareth (P-LV-3)
Kilpatrick, W. M. (M)

New Cumberland (PHI-L-3)
Berg, Q. (M)
Brucktacher, J. E., Jr. (M)
Hanemann, H. A., Jr. (M)
Houck, G. R. (A)
Keat, J. E. (M)

Newfoundland (PHI-3)
Wohlfart, E. (A)

New Holland (PHI-L-3)
Fizz, R. A. (A)

New Hope (PHI-3)
Ansley, A. C. (M)
Benjamin, J. M., Jr. (SM)
Chadwick, P. S. (A)
Goodwin, W. N., Jr. (F)
Halpern, W. (M)
Karaczan, W. W. (M)
Vonderschmitt, B. V. (M)

New Kensington (PIT-4)
Brouwer, N. L. (M)
Hoch, F. R. (M)
Miller, R. B. (A)
Panian, F. C. (M)
Robl, R. F., Jr. (SM)
Zubek, J. (M)

New Stanton (PIT-4)
Forbes, N. A. (M)
Standart, C. S. (M)

Newton Square (P-LV-3)
Grant, R. W. (M)

Newtown (PHI-3)
Adezio, L. S. (M)
Beck, K. H., Jr. (M)
Cushman, R. W. (M)
Ghebeles, G. C. (A)
Gould, D. F., II (M)
Small, H. E. (M)
Yerkes, H. W. (A)

Newtown Square (PHI-3)
Bachofer, H. L. (A)
Bernheisel, E. R. (A)
Fussell, R. L. (M)
Garlano, W. F. (SM)
Horwitz, J. D. (A)
Johnson, F. L. (M)
Livesay, R. (A)
Post, M. D. (SM)
Schneider, S. (M)
Shawhan, E. N. (M)
Snyder, C. M., (A)
Thomason, J. F. (M)
Titus, C. H. (M)

Newville (PHI-L-3)
McElwain, J. L. (M)

Nicholson (PHI-3)
Hricko, R. M. (A)

Nicktown (PIT-4)
Hoppel, T. O. (M)

Noble (PHI-3)
Hilliard, D. M. (M)

Norristown (PHI-3)
Aichelmann, F. J. (M)
Anderson, D. C. (M)
Avellino, W. R. (M)
Barber, E. (A)
Bingham, W. R., Jr. (M)
Bokros, P. (M)
Boscia, S. J. (M)
Cassel, L. E. (M)
Chudleigh, W. H., Jr. (SM)
Dubuc, G. J. (M)
Eisenmann, J. F. (M)
Flannery, W. E. (M)
Graham, E. C. (M)
Heitemes, R. B. (M)
Innes, F. T. (M)
Ivins, W. A. (A)
Jacoby, N. (M)
Kirkaldy, A. J., Jr. (A)
Lee, F. F. (SM)
Loeper, C. J. (M)
McCallister, J. P. (M)
Merritt, J. E. (A)
Middleton, R. J., Jr. (M)
Nurnberg, R. K. (M)
Oerter, G. W. (M)
Osisek, C. P., Jr. (M)
Paxson, R. F. (M)
Peszka, S. F. (M)
Pezely, S. J. (M)
Place, S. W. (M)
Roberts, F. R. (M)
Rogers, R. F. (M)
Sandoval, J. (A)
Schmidt, E. J. (M)
Smock, W. W. (M)
Snyder, F. B., Jr. (A)
Starr, J. E. (M)
Stauffer, R. F. (M)
Thomas, J. K., II (M)
Webb, D. T. (SM)
West, W. H. (M)
White, J. P. (M)
Williamson, J. V. (A)
Wykstra, E. A. (M)
Yeaton, R. B. (M)
Zelby, L. W. (M)
Zern, R. T. (M)

Northampton (P-LV-3)
Hvazda, M. C. (M)

North Hills (PHI-3)
Deemer, R. W. (M)
Stahl, R. W. (M)
Vick, A. J. (M)

Northumberland (WIL-4)
Phillips, M. A. (M)

North Wales (PHI-3)
Bergstrom, C. J. (A)
Booher, R. W. (M)
Burkart, D. P. (M)
Cockrell, J. L. (SM)
Eynon, J. U. (M)
Foley, G. M. (SM)
Fraunfelder, J. A. (M)
Harple, K. G. (SM)
Henderson, F. C. (M)
Hitt, J. J. (M)
Jakacki, W. B. (M)
Killmeyer, F. P. (M)
Knipe, W. T. (M)
Machler, R. C. (SM)
Oplinger, E. J. (M)
Packer, W. H. (A)
Stanwood, R. H. (A)
Tarpley, R. E. (SM)

Norwood (PHI-3)
Biscardi, J. J. (M)
Nelson, L. (M)
Sagan, E. R. (A)

Oakford (PHI-3)
Hoffman, N. N. (M)

Oakmont (PIT-4)
Dimasi, L. A. (M)
Muffly, G. (SM)

Oil City (PIT-4)
Moore, K. A. (M)
Swanson, W. A. (M)

Oley (PHI-R-3)
Franke, R. B. (A)
Noll, E. M. (A)

Olmsted AFB (PHI-3)
Bartley, J. P. (M)

Olyphant (PHI-3)
Naglak, L. A. (M)

Orefield (PHI-3)
Allerton, G. L. (SM)

Oreland (PHI-3)
Altemus, W. C. (M)
Bonanni, O. A. (M)
Churchill, R. F. (M)
Comeau, C. P. (M)
Garden, M. (M)
Halsted, C. P. (A)
Jacobs, E. (M)
Keener, C. E. (SM)
Kelber, F. P., Jr. (M)
Lawrence, J. D., Jr. (M)
Lockhart, J. C. (M)
Maher, W. F. (A)
Mehr, E. J. (M)



Nelson, F. H. (M)
Preston, G. W. (SM)
Straehley, E. H. (M)
Zebrowitz, S. (SM)
Zwart, C. (M)

Oxford (PHI-3)
Mallalieu, F. R. (SM)

Palmerton (PHI-3)
Swanson, H. E. (M)

Palmyra (PHI-3)
Phillippy, C. R. (A)

Paoli (PHI-3)
Brenner, M. M. (M)
Caldwell, R. P. (M)
Carlson, P. N. (M)
Clark, E. G. (SM)
Collier, D. M. (SM)
Dahlberg, R. S., Jr. (SM)
Dixson, S. B. (SM)
Eble, B. B. (M)
Engelman, J. H. (M)
Fasko, E. A. (M)
Faulls, D. R. (M)
Fegley, K. A. (M)
Fissell, C., Jr. (A)
Foster, W. P. (M)
Gluck, S. E. (M)
Gottschalk, J. M. (M)
Howard, J. H. (SM)
Hurst, S. R. (M)
Jones, R. E. (M)
Juro, E. (A)
Landrey, L. R. (SM)
Lauser, C. T. (M)
Lawson, A. C. (M)
Lohse, E. (SM)
Lussier, R. R. (M)
McIlwain, K. (F)
Miksit, G. L. (M)
Nordling, K. I. (A)
Overmiller, C. M. (M)
Porter, J. R. (M)
Pugh, A. L., Jr. (SM)
Reese, H. E., Jr. (M)
Starr, D. A., Jr. (M)
Stevens, A. W. (A)
Taylor, H. W. (SM)
Zimmer, K. J. (M)

Paxinos (WIL-4)
Farr, K. E. (SM)

Pen Argyl (P-LV-3)
Palmer, J. E. (M)

Penn Valley (PHI-3)
Washburne, B. P. (M)

Perkasie (P-LV-3)
Bossard, C. L. (M)
Goltau, R. H. (M)

Perkiomenville (PHI-3)
Okada, R. H. (M)

Philadelphia (PHI-3)
Abel, R. L. (M)
Abend, K. (M)
Aberth, O. (A)
Adamson, P. R. (M)
Albright, R. B. (SM)
Alpert, D. (M)
Altemose, W. M. (M)
Altmann, W. T. (M)
Amatneek, K. V. (M)
Ames, M. E., Jr. (SM)
Anderson, J. C. (M)
Andress, P. M. (M)
Antharvedi, A. (A)
Aptaker, I. M. (M)
Archer, G. R. (M)
Arthur, G. R. (SM)
Asenlero, W. L. (M)
Auerbach, I. L. (F)
Azoff, I. (M)
Bachman, B. E. (M)
Bacon, J. R. (M)
Banks, J. (M)
Barney, L. W. (M)
Barofsky, M. (M)
Bartfeld, R. A. (M)
Barth, R. A. (M)
Bartik, W. J. (M)
Barton, R. (M)
Barton, R. H. (M)
Bash, I. F. (M)
Batey, R. W. (A)
Baumann, J. A. (A)
Beane, T. E. (M)
Beaver, M. W. (M)
Beckman, C. (M)
Beggs, G. E., Jr. (SM)
Bein, H. F. (M)
Beltramo, J. R. (A)
Belz, R. L. (M)
Benson, M. (M)
Benollel, I. (SM)
Benson, S. E. (M)
Berger, D. (M)
Berger, H. (M)
Berger, J. (M)
Berkowitz, R. S. (M)
Bess, T. J., Jr. (M)
Beter, R. H. (SM)
Biberman, D. M. (M)
Binz, D. L. (M)
Bixler, D. A. (M)
Blair, B. H. (M)
Block, I. E. (M)
Blumberg, D. F. (M)
Boghosian, W. H. (M)
Bogusz, J. F. (M)
Bohn, J. L. (SM)
Boonin, L. I. (A)
Bortman, J. S. (M)
Bossi, E. W. (M)
Brachman, R. J. (M)
Brainerd, J. G. (F)
Breslow, A. J. (A)
Brett, G. F. (M)
Brisk, M. L. (A)
Brothers, J. T. (F)
Bruchlos, H. O. (A)
Brunner, D. H. (M)
Buchsbaum, L. (M)
Buco, P. A. (A)
Buggy, R. V. (SM)
Burger, A. F. (M)
Burgett, M. I., Jr. (SM)
Buzby, J. A. (M)
Byczer, B. B. (SM)
Byerly, H. W. (M)
Byers, A. C. (SM)
Campbell, E. R., Jr. (A)
Campbell, J. K. (A)
Carapellotti, L. T. (SM)
Carlson, E. G. (M)
Camuccio, J. N. (M)
Cathers, H. W. (A)
Cattafesta, W. M. (M)
Cawley, A. (A)
Chamberlin, N. K. (M)
Chamberlin, W. A. (M)
Chambers, C. C. (F)
Chance, B. (F)
Chapline, J. D., Jr. (M)
Chase, C. T. (SM)
Chatten, J. B. (M)
Cheney, E. A. (M)
Chong, C. F. (M)
Chressanthis, A. G. (M)
Chu, J. C. (M)
Ciarlela, D. J. (M)
Ciletti, V. J. (M)
Clair, F. F. (M)
Clark, F. R. (M)
Clark, L. B. (A)
Clasen, C. P. (M)
Closson, L. E. (SM)
Coburn, J. M. (M)
Cogan, S. (M)
Cohen, B. H. (M)
Cohen, D. Z. (M)
Cola, T. F. (M)
Cole, P. J. (M)
Comer, A. J. (A)
Conrad, M. (SM)
Cooperstein, B. D. (M)
Copestakes, J. E. (M)
Cottingham, J. H. (M)
Cotton, R. V. (M)
Cramer, B. G. (M)
Craven, E. S. (M)
Creamer, E. M., Jr. (M)
Crist, L. W. (M)
Cross, C. (M)
Cummings, E. J. (M)
Daigle, E. J., Jr. (M)
Dale, J. D. (M)
D'Ambrisi, A. S. (M)
D'Amico, J. R. (M)
Daniels, J. H. (M)
Davidson, W. N. (M)
Davis, J. A. (M)
Davis, R. P. (M)
Davis, S. (M)
Day, R. W. (M)
De Coatsworth, C. G. (M)
Dectrow, T. X. (M)
De Florio, R. A. (M)
Deutermann, A. R. (M)
Dever, F. J. (A)
Devlin, M. (M)
Deysher, J. B. (M)
Dibrell, J. W. (M)
Diem, G. W. (M)
Dietz, J. H. (M)
Di Giacomo, J. J. (M)
Dinter, E. (M)
Di Polvere, E. J. (M)
Di Sabato, C. A. (M)
Divor, C. (M)
Dobkin, R. C. (A)
Domboski, R. F. (M)
Dorfman, J. C. (M)
Doto, N. J. (M)
Dove, J. B. (A)
Dovlak, R. J. (M)
Drazdauskas, C. J. (M)
Dubin, F. (M)
Dunbar, R. C. (M)
Dunn, E. B. (M)
Durgin, T. R. (A)
Dyal, J. O., Jr. (M)
Earnshaw, D. P. (SM)
Eckersley, A. (SM)
Edelman, F. H. (SM)
Edelman, R. D. (M)
Edelman, S. Z. (M)
Edwards, R. Q. (A)
Eichert, E. S. (SM)
Eisenberg, M. (M)
Elfand, S. (M)
Elliott, L. D. (M)
Ellis, J. A. (A)
Emerson, K. H. (SM)
Emery, E. J. (A)
Endres, R. D. (SM)
Engle, J. L. (M)
Epstein, H. (M)
Estersohn, H. (A)
Ett, A. H. (SM)
Evalds, E. H. (A)
Evans, W. R., Jr. (M)
Everett, F. C. (M)
Ewing, C. E. (M)
Falk, G. E. (M)
Fante, R. L. (M)
Fariello, N. A. (M)
Farmar, F. E. (M)
Faunce, N. P. (M)
Feldman, F. S. (A)
Feller, M. S. (A)
Fenster, S. C. (M)
Fernbach, M. (M)
Fey, C. (A)
Fidler, R. D. (A)
Flen, I. L. (A)
Fierstein, J. H. (M)
Fink, L., III (M)
Fisher, E. J. (M)
Fisher, F. (M)
Fisher, S. T. (M)
Fistal, M. S. (M)
Fitch, J. A. (M)
Fleming, R. E. (M)
Flomenhoft, M. (M)
Flood, F. T. (M)
Flood, J. J., Jr. (M)
Fogarty, J. D. (M)
Foley, J. J. (M)
Follmer, W. C. (M)
Ford, R. (M)
Forrest, L. A., Jr. (A)
Forster, W. H. (SM)
Fow, B. F. (M)
Fowler, C. J. (SM)
Francisco, R. L. (M)
Frank, A. I. (M)
Friedman, M. (M)
Fuchs, A. M. (M)
Fujimoto, A. (M)
Gaither, L. E. (SM)
Galbraith, F. D., Jr. (M)
Gardner, W. H. (A)
Garfield, E. E. (A)
Geer, D. A. (A)
Gelb, H. A. (A)
Gelfand, R. (M)
Geller, R. H. (M)
Gelles, A. J. (A)
Gellhaus, K. M. (M)
Gerber, E. L. (M)
Geswelitz, D. B. (A)
Gilbert, W. E. (SM)
Gillies, J. H. (SM)
Giordano, M. J. (M)
Glace, K. (M)
Glaser, E. R. (M)
Glassman, I. (M)
Glazer, H. I. (M)
Goldich, N. (A)
Goldman, A. (M)
Goldman, R. L. (M)
Goldstein, I. E. (SM)
Goldstein, P. (A)
Golestaneh, S. (M)
Golub, R. (M)
Goodman, R. M. (SM)
Goodman, J. H. (M)
Goodwin, D. P. (M)
Gottlieb, M. (A)
Grande, F. M. (M)
Gravel, A. J. (M)
Greenberg, S. N. (M)
Grieco, L. (M)
Griffin, E. H. (M)
Griffin, G. C. (A)
Gross, A. M. (A)
Grossman, S. (A)
Grummt, W. E. (M)
Gudis, R. S. (A)
Guttroff, G. H. (M)
Haas, N. V. (M)
Hadley, A. M. (SM)
Hafler, D. (A)
Hahn, P. M. (M)
Haines, B. P. (SM)
Halushynsky, G. D. (M)
Hamilton, B. S. (M)
Hamilton, S. (SM)
Hardiman, E. R. (M)
Harewood, C. P. (M)
Hargens, C. W., III (SM)
Harley, T. J., Jr. (M)
Harold, P. H. (M)
Harris, H. H. (SM)
Hart, D. J. (SM)
Hatton, R. W. (M)
Hattori, Y. (A)
Haviland, R. P. (SM)
Hazeltine, A. V. (M)
Heck, J. C. (M)
Heckelman, T. J. (M)
Helfen, E. (M)
Hembree, W. A. (M)
Hendrixson, L. H. (M)
Hennessy, E. T. (M)
Henninger, J. H. (M)
Hermann, J. E. (M)
Herscher, M. B. (A)
Hershfield, L. L. (M)
Heskett, H. (M)
Hewitt, E. C. (M)
Hill, W. C. (A)
Hillier, G. (M)
Hinden, A. (M)
Hirsch, M. (M)
Hobson, W. (A)
Hock, R. E. (M)
Hoffman, A. (M)
Hoffman, E. (A)
Hollinger, R. A. (M)
Holm, R. M. (A)
Honert, G. B. (A)
Hopper, G. M. (M)
Horn, C. H. (M)
Hradsky, A. (M)
Hule, D. L. (M)
Hunter, R. D. (M)
Hurst, J. F. (M)
Hyams, I. (M)
Inacker, H. F. (M)
Isaacson, J. J. (A)
Isken, J. R. (M)
Ivory, J. F. A. (M)
Jacobowitz, H. (M)
Jacobson, L. J. (M)
Jednacz, J. E. (M)
Johnson, N. (SM)
Johnston, W. R., Jr. (A)
Joshi, A. K. (A)
Jung, J. P. (M)
Jurskis, A. (M)
Kall, A. R. (M)
Kalos, S. (A)
Kanal, L. N. (M)
Kansas, R. (SM)
Kappeler, W. H. (A)
Karish, J. A. (M)
Karr, C. H. (M)
Kashtan, S. (A)
Katz, A. S. (M)
Katz, S. (SM)
Kauffmann, R. A. (M)
Kell, O. C., Jr. (M)
Kenny, H. W. (A)
Kemus, A. (M)
Keroes, H. I. (M)
Kimel, H. (M)
King, W. C. (SM)
Kirk, D. B. (M)
Klein, S. (M)
Klein, W. (A)
Knaff, P. R. (A)
Knoll, J. W. (SM)
Koenen, M. (M)
Koslch, R. J. (M)
Kovach, J. F. (A)
Koval, J. F. (M)
Kozak, M. J. (M)
Kraft, M. A. (M)
Kranton, J. (M)
Kraus, C. R. (SM)
Kraus, F. A. (M)
Krembs, G. M. (M)
Kreidel, E. S. (SM)
Kritikos, H. N. (M)
Kritzstein, S. G. (M)
Kropp, C. W. (M)
Ku, Y. H. (SM)
Kugler, F. (M)
Kurtzo, L. E. (M)
Kusner, D. B. (M)
Kuzman, E. J. (M)
Kwiatkowski, J. M. (A)
Kyne, T. (M)
Lachocki, E. (A)
Lancaster, W. W. (M)
Landauer, W. I. (M)
Lane, A. L. (M)
Lannan, K. E. (A)
Latham, H. L., Jr. (SM)
La Verghetta, F. E. (M)
Lawrence, D. H. (A)
Lawson, R. A. (M)
Layton, H. J. (M)
Lazinski, R. H. (M)
Leader, R. (A)
Le Croissette, D. H. (M)
Lehman, J. J. (A)
Leibovitz, P. T. (M)
Leitch, J. G. (SM)
Leonard, W. D. (M)
Lerpold, B. A. (A)
Leshner, E. (M)
Levenqood, L. J. (M)
Lewis, E. M., III (M)
Lieb, A. B. (M)
Lieberman, F. (M)
Liggans, C. L. (A)
Lindinger, J. L. (SM)
Ling, D. A. (M)
Linsky, E. F. (M)
Lisanti, A. G. (A)
Liss, D. M. (M)
Livezey, F. M. (M)
Lock, F. J., Jr. (M)
Locker, R. J. (M)
Loebe, L. V. (M)
Loftus, E. V. (M)
Loftus, J. A. (M)
Loginow, S. (SM)
Londner, R. T. (M)
Longley, H. N., Jr. (M)
Lorber, H. (M)
Lowe, T. C. (M)
Lubow, B. P. (M)
Lukoff, H. (SM)
MacDonald R. D. (A)
MacFadden, W. C. (M)
Maddox, J. L., Jr. (M)
Magasiny, I. P. (SM)
Magee, J. J. (M)
Maguire, H. T. (A)
Mah, L. (M)
Malcolm, R. W. (M)
Malczynski, J. R. (M)
Malkin, T. A. (M)
Malta, S. V. (M)
Manser, J. E. (A)
Mapp, H. S. (M)
Marcus, S. M. (M)
Markowitz, R. S. (M)
Marks, E. I. (M)
Marple, M. O. (A)
Marsele, I. (A)
Marsten, J. (F)
Martin, M. A. (M)
Martire, J. A. (M)
Masurat, G. (M)
Matthews, E. I., Jr. (M)
Mauger, R. S. (A)
May, K. S. (M)
McBride, J. M. (M)
McCarron, F. J. (A)
McDade, J. J. (M)
McDermody, R. A. (M)
McDevitt, B. J. (M)
McDowell, A. P., Jr. (M)
McEnroe, J. M., Jr. (A)
McFall, T. J. (M)
McKnight, C. F. (A)
McNally, F. C., Jr. (M)
McNames, L. D. (M)
Meehan, F. J. (M)
Meinken, K. C., Sr. (A)
Melis, J. T. (M)
Meloff, M. (M)
Meyer, W. T. (M)
Michel, C. (M)
Miedzius, C. A. (M)
Mikolajczyk, W. J. (M)
Milewski, E. P. (A)
Miller, L. K. (A)
Miller, W. G., Jr. (M)
Milowitz, P. (M)
Mode, D. E. (SM)
Moavero, C. (M)
Mooney, J., Jr. (M)
Mooney, W. J., Jr. (A)
Moore, T. W. (M)
Morris, L. C. (M)
Mosenkis, R. (M)
Moskowitz, N. (M)
Moulton, S. W. (SM)
Mozenter, M. J. (M)
Mroz, C. J. (SM)
Muckel, F. H. (M)
Muller, P. E. (SM)
Murphy, E. G. (M)
Murphy, J. V. (M)
Murray, R. E. (M)
Myers, E. F. (M)
Naiman, M. L. (SM)
Namblar, K. K. (A)
Natkin, H. B. (M)
Neddenriep, D. D. (M)
Nelson, C. R. (SM)
Neuber, H. K. (M)
Newman, E. L. (M)
Newmeyer, D. R. (M)
Nichol, A. V. (SM)
Nicholson, V. (A)
Nicol, S. F. (A)
Nolan, J. J. (A)
Norman, D. A. (M)
Nussbaum, M. (M)
Olevsky, B. (A)
O'Malley, M. (A)
O'Neill, M. J. (M)
Osborne, M. H. (A)
Palfas, E. D. (A)
Panas, J. F. (M)
Partin, M. E. (M)
Patterson, G. W. (F)
Paz, H. J. (M)
Pearce, C. T. (SM)
Pearson, E. E. (M)
Pehlert, W. K., Jr. (M)
Perles, A. H. (M)
Peterson, E. F., Jr. (M)
Pierce, O. B. (A)
Platt, B. E. (A)
Plizak, B. T. (M)
Pober, J. (M)
Podell, E. J. (M)
Polin, B. (M)
Polin, B. H. (M)
Porter, T. J. (M)
Powers, E. N. (M)
Pressman, A. (M)
Price, B. L. (M)
Procopio, L. W., Jr. (M)
Profera, C. E., Jr. (M)
Raburn, L. E. (SM)
Raffa, P. E. (M)
Rambo, L. W. (M)
Randall, N. C. (M)
Rapp, A. K. (M)
Ratner, A. (M)
Read, M. E. (A)
Ree, J. (M)
Reese, E. H. (M)
Revesz, G. (M)
Richardson, W. W. (M)
Richman, R. R. (M)
Richter, F. (M)
Riethof, T. R. (M)
Rivelli, P. A. (M)
Riviere, H. W. (M)
Robinson, G. W. (A)
Roede, J. B. (M)
Rogers, D. A. (M)
Rogers, R. S. (M)
Rohr, J. G. (M)
Rohrich, J. F. (A)
Rollins, M. M. (M)
Rolnick, M. A. (M)
Roman, A. F. (M)
Romanofsky, N. R. (M)
Rooney, J. D. (M)
Roseman, H. M. (M)
Rosenberg, N. A. (M)
Rosenstein, G. M. (A)
Rosenthal, D. (M)
Ross, I. L. (M)
Rostrom, R. W. (M)
Roth, H. H. (M)
Roth, R. L. (M)
Rothwarf, F. (M)

Rovins, J. J. (M)
Ruben, H. (SM)
Rudin, B. (M)
Rudnick, J. J. (A)
Rudofsky, S. (A)
Rufe, E. F. (A)
Sapinosa, R. J. (M)
Saponaro, A. J. (M)
Sarkisian, J. (A)
Saunders, J. (M)
Scarpello, M. J. (M)
Schaefer, H. W. (A)
Schaffer, H. H. (M)
Schlerff, F. O. (M)
Schlfreen, C. S. (A)
Schleifer, M. N. (M)
Schmechel, D. M. (M)
Schmitt, P. T. (A)
Schock, H. E., Jr. (M)
Scholes, W. R. (A)
Scholtes, P. W. (M)
Schrader, R. H. (M)
Schuder, J. C. (M)
Schumacher, F. A. (M)
Schumann, G. H. (M)
Schwan, H. P. (F)
Schwartz, L. (M)
Schwartz, P. (M)
Scolnik, W. L. (M)
Scott, H. M. (M)
Seawell, W. N. (M)
Segal, B. (M)
Segal, R. J. (SM)
Seif, E. (M)
Serafin, J. F. (M)
Sheffler, W. J. (M)
Shen, D. W. C. (SM)
Sherman, A. (A)
Sherman, E. H. (A)
Sherr, S. I. (A)
Shienbloom, H. M. (A)
Shih, W. M. (M)
Showers, R. M. (SM)
Shrager, J. S. (M)
Shulman, M. B. (M)
Shwop, J. E. (M)
Sichel, A. T. (M)
Sickles, L., II (M)
Silverstein, E. R. (M)
Simendinger, R. A. (M)
Sims, R. L. (M)
Slomko, G. (M)
Sipler, H. (M)
Sklaroff, M. (M)
Slampyak, S., Jr. (M)
Slavin, H. (M)
Slawek, J. E. (M)
Smith, B. J. (A)
Smith, D. B. (F)
Smith, J. F. (M)
Smith, L. E. (M)
Smith, R. C. (M)
Soltoff, B. M. (M)
Sonnster, G. F. (M)
Soorenko, T. (M)
Sorius, A. (M)
Sos, J. (M)
Spadaro, P. C. (M)
Spady, R. J. (M)
Spandorfer, L. M. (M)
Spector, E. N. (A)
Spencer, G. R. (M)
Spiegel, P. (M)
Spielman, S. C. (SM)
Stachejko, V. (M)
Stanton, L. (M)
Starks, W. H. (SM)
Steele, R. W. (M)
Steelman, A. T., Jr. (M)
Stein, M. (A)
Stein, S. J. (SM)
Steinberg, M. (M)
Steinruck, C. F., Jr. (A)
Stella, A. J. (M)
Stern, F. (M)
Stiles, C. J. (M)
Stone, J. (A)
Stoughton, A. M. (M)
Stovall, J. R., Jr. (M)
Stranix, R. G. (M)
Streleckis, J. A. (M)
Stubbs, G. S. (M)
Stufflebeam, C. E. (A)
Sugalski, A. C. (A)
Sullivan, H. B. (A)
Sun, H-H. (M)
Sunshine, B. M. (M)
Sutcliff, C. H. (SM)
Sweeney, J. A. (A)
Szczepkowski, T. G. (M)
Szczyrbak, J. (M)
Szukalski, E. A. (M)
Talbot, G. S. (M)
Teacher, C. F. (M)
Tenny, R. M. (M)
Thornton, J. W. (M)
Throckmorton, C. L. (M)
Tillman, A. F. (M)
Tom, J. (M)
Tomar, R. M. (A)
Tonooka, S. (M)
Torrese, A. A. (SM)
Torrey, R. D. (M)
Trachtenberg, B. M. (M)
Trachtman, J. (M)
Tribolet, F. H. (M)
Trocky, E. V. (A)
Trost, J. C. (M)
Turczyn, A. (A)
Turchi, D. J. (A)
Tweedie, T. C., Jr. (M)
Urkowitz, H. (SM)
Ussler, W., Jr. (M)
Valesky, C. S. (M)
Van Aller, W. H. (M)
Van Horn, J. C. (SM)
Varricchio, A. L. (M)
Veit, O. F. (M)
Volpe, J. M. (M)
Wagooner, G. F. (SM)
Wagner, M. (A)
Waitkeneus, J. (SM)
Walunas, J. S. (M)
Warchaizer, S. E. (M)
Warner, E. H. (M)
Warren, S. R., Jr. (SM)
Warwick, R. E. (A)
Watson, B. (A)
Weber, H. C. (M)
Weigert, F. M. (A)
Weilerstein, I. M. (M)
Weiner, M. (M)
Weinger, R. (A)
Weinstock, W. W. (SM)
Weiss, D. H. (M)
Weiss, S. (M)
Weiss, S. (A)
Welsh, J. J. (SM)
West, W. P. (SM)
Whitby, L. S. (M)
White, A. A. (M)
White, F. J. (M)
Wiefer, K. E. (M)
Wightman, R. R. (M)
Willenborg, E. J. (A)
Williams, A. J., Jr. (F)
Williams, R. M. (M)
Williams, W. H. (M)
Wilsker, O. (M)
Wilson, L. D. (SM)
Winsor, P., III (SM)
Wisler, F. W. (M)
Witkin, E. (SM)
Woessner, W. J., Jr. (M)
Wojcik, J. J. (SM)
Wojciehowski, E. T. (M)
Wolin, L. (SM)
Wolstoncroft, J. C. (M)
Wood, R. F. (A)
Woodcock, V. E. (M)
Woodrow, G. V., Jr. (SM)
Woods, L. J. (SM)
Wos, J. (A)
Wyeth, F. H. (M)
Yacyk, J. (M)
Yamada, H. (A)
Yanishevsky, G. (M)
Yonan, H. B. (A)
Zacher, D. (M)
Zappacosta, J. A. (M)
Zimmerman, B. L. (A)
Zimmerman, M. S. (SM)
Zwirn, H. L. (A)
Zygmont, A. J. (M)

Phoenixville (PHI-3)
Carter, W. S., Jr. (M)
Harlin, W. R. (M)
Hayes, H. J. (M)
Menges, W. R. (M)
Tanguy, L. L., Jr. (M)

Pine Grove Mills (CP-4)
Durrwachter, H. W., II (M)
Griffin, W. D. (M)
Miller, N. B. (M)
Pharo, L. C., Jr. (M)

Pineville (PHI-3)
Schreiner, W. A. (M)

Pitcairn (PIT-4)
Gannon, G. F., Jr. (A)
Hedges, C. D., Jr. (M)
Heess, E. L. (M)
Jones, C. I. (M)
Keener, E. L. (SM)
Kuegler, G. K. (M)
Mulica, A. R. (M)
Phelps, G. H. (SM)
Raney, R. A. (F)
Raymond, C. G. (A)
Steinback, R. T. (M)
Taylor, M. E. (M)

Pittock (PIT-4)
Shyhalla, N. (M)

Pittsburgh (PIT-4)
Anderson, A. E. (M)
Angello, S. J. (F)
Antonopios, P. A. (A)
Aronson, M. H. (M)
Balerbach, R. I. (M)
Barron, F. E. (SM)
Basista, J., Jr. (M)
Bauer, B. F. (M)
Baughman, G. W. (SM)
Bean, W. C. (M)
Benjamin, C. E. (M)
Bhavnani, K. H. (M)
Biel, D. T. (M)
Billetdeaux, A. C. (M)
Binstock, M. H. (M)
Bizon, A. M. (M)
Blackmon, H. (SM)
Blair, H. A., Jr. (M)
Boardman, E. (A)
Boerio, A. H. (M)
Booker, C. A., Jr. (M)
Bossart, P. N. (F)
Boyer, J. L. (M)
Brashear, J. E. (A)
Brath, P. W. (M)
Bright, H. S. (SM)
Bright, R. L. (M)
Brinda, J., Jr. (M)
Browder, F. E. (M)
Brown, B. K., Jr. (A)
Busby, W. R. (M)
Bush, N. E. (M)
Caplan, H. M. (A)
Carlan, A. J. (M)
Carothers, W. D., Jr. (M)
Castner, R. J. (A)
Chackan, H. G. (M)
Chandler, A. M. (A)
Chang, H. (SM)
Cheek, R. C. (M)
Chen, K. (A)
Church, C. H. (M)
Clark, R. G. (M)
Coates, R. S. (M)
Colker, J. (M)
Coltman, J. W. (F)
Conry, W. T. (M)
Cox, H. L., Jr. (M)
Crawford, E. M. (A)
Cunningham, R. C. (SM)
Davis, R. E. (SM)
Dean, W. C. (M)
Delgado, R. H. (M)
Dodd, A. E. (M)
Dolby, L. W., III (A)
Donohue, E. P. (M)
Duckett, E. J. (SM)
Dugan, J. F. (M)
Durst, E. A. (M)
Eash, J. J. (M)
Eggers, C. W. (M)
Engel, F. A., Jr. (SM)
England, T. R. (M)
Evans, R. (M)
Fairman, J. F., Jr. (M)
Fekete, J. M. (A)
Ferber, R. R. (M)
Feucht, D. L. (M)
Fischer, M. M. (M)
Fischer, R. L. (A)
Florino, J. A. (M)
Ford, D. J. (M)
Franz, J. P., Jr. (M)
Friedman, A. B. (A)
Fryling, C. V. (M)
Garrett, S. J. (M)
Geil, F. G. (M)
Germann, J. D. (A)
Gibson, F. C. (M)
Gilbert, C. W. (M)
Gogniat, T. (M)
Goldstein, R. P. (A)
Graul, T. A. (M)
Greenwood, J. H. (SM)
Hager, R. E. (M)
Hall, J. C. (M)
Hamilton, W. H. (SM)
Hanna, C. R. (SM)
Hansen, J. R. (SM)
Haun, R. D., Jr. (M)
Hayes, J. A. (M)
Herwald, S.W. (F)
Hildebrand, D. A. (M)
Hooper, E. H. (M)
Hovey, B. K. (SM)
Huggler, L. R. (M)
Hutcheson, J. A. (F)
Jackson, A. H. (A)
Jarvis, P. H. (A)
Jones, D. H. (M)
Jordan, A. G. (M)
Kadak, E. (M)
Kaiser, H. R. (SM)
Kaufman, W., II (M)
Keay, F. W. (M)
Kenney, T. C. (SM)
Ketterer, R. L. (M)
Kleshauer, F. W. (M)
King, N. P. (M)
Klingler, E. H. (M)
Knox, W. G. (A)
Konnerth, K. L., Jr. (M)
Krasik, S. (SM)
Kuehn, R. T. (M)
Larson, C. O. (SM)
Lavi, A. (M)
Lawson, T. R., Jr. (M)
Leahy, E. F. (M)
Leeds, J. V., Jr. (M)
Le May, C. Z. (SM)
Lempert, J. (SM)
Li, C. C. (M)
Libenschek, R. S. (A)
Lin, H. C. (M)
Lipchak, J. B. (M)
Logsdon, G. R. (A)
Lublch, J. W. (M)
Luther, J. M. (M)
Mack, M. C. (SM)
Macklewicz, T. J. (A)
Madsen, C. J. (SM)
Magee, C. H. (A)
Maher, J. I. (M)
Malmberg, P. R. (M)
Marcus, T. J. (M)
Margolis, S. G. (M)
Marsh, J. M. (M)
Marshall, S. C. (M)
Mathias, R. A. (SM)
McConaughy, D. L. (M)
McConnell, R. A. (SM)
McCreanor, R. A. (M)
McCreary, H. S., Jr. (A)
McIntosh, R. D. (SM)
McKinley, J. G., Jr. (A)
McNamara, J. E. (M)
McShane, J. L. (M)
Melngailis, I. (M)
Menes, M. (M)
Merritts, T. D. (M)
Metcalf, G. L. (A)
Miller, W. M. (M)
Milnes, A. G. (SM)
Mitchell, J. B. (M)
Mocharko, G. L., Jr. (M)
Mokrytzki, B. (M)
Moore, G. E. (M)
Morrison, C. O. (M)
Moss, A. I. (M)
Nagel, G. W. (SM)
Nathanson, H. C. (M)
Newell, W. E. (M)
Noggle, L. H. (M)
O'Donnell, J. J. (M)
O'Donnell, T. J. (SM)
Olson, T. H. (M)
Ong, C. J. (M)
Osbon, W. O. (M)
O'Shea, J. P. (A)
Oslai, T. A. (SM)
Ott, R. R. (M)
Pack, J. L. (M)
Painter, W. C. (M)
Pakala, W. E. (SM)
Peters, H. D. F. (M)
Peters, L. J. (SM)
Philips, J. (M)
Pickholtz, L. (M)
Pittman, P. F. (M)
Platt, J. A., Jr. (M)
Porterfield, C. P. (M)
Povejsil, D. J. (SM)
Ramage, W. W. (SM)
Rathbone, D. E. (M)
Rau, F. J. (M)
Reihing, J. V., Jr. (M)
Reinhard, E. A. (M)
Reynolds, M. T. (M)
Rhoads, D. O. (A)
Roberts, R. W. (M)
Rodgers, R. W. (SM)
Roelike, D. A. (M)
Ross, E. J. (M)
Rude, P. A. (M)
Ruth, D. K. (A)
Rydin, R. A. (M)
Sack, E. A., Jr. (M)
Saucedo, R. (M)
Schaeperkoetter, L. C. (A)
Schatz, E. R. (SM)
Schindler, D. G. (M)
Schiring, E. E. (M)
Schneeberger, R. J. (SM)
Schneider, H. L. (SM)
Schultz, J. J. (M)
Schultz, M. A. (SM)
Schwindt, A. J. (M)
Seidel, R. A. (M)
Shafer, W. L. (A)
Shanks, W. C. (M)
Sheker, E. B. (M)
Sherman, A. G. (M)
Shoupp, W. E. (F)
Sines, W. U., Jr. (M)
Slepian, J. (F)
Smith, L. E. (M)
Smith, P. W. (M)
Snefsky, E. A. (M)
Sparrow, R. F. (M)
Swint, L. A., Jr. (M)
Stapelfeldt, R. (M)
Staubitz, E. J. (M)
Stavrolakis, J. A. (A)
Stern, J. (M)
Stolt, W. R. (A)
Strasser, A. (M)
Stuart, R. A. (A)
Sverdrup, E. F. (M)
Sze, T. W. (A)
Szikiai, G. C. (F)
Taylor, W. (M)
Teare, B. R., Jr. (F)
Thompson, J. H. (SM)
Tunell, R. H. (A)
Twaska, V. M. (A)
Uleman, T. (SM)
Umbel, F. K. (M)
Unger, E. J. (M)
Vargo, M. S. (M)
Vogeley, C. E., Jr. (SM)
Voshall, R. E. (M)
Wagner, H. A. (SM)
Wagner, R. J. (A)
Walchl, H. E. (SM)
Wexler, C. H. (M)
Wieczorkowski, E. A. (M)
Williams, E. M. (F)
Wolfe, P. N. (M)
Wolpert, M. L. (M)
Wood, J. E. (M)
Wood, M. H. (SM)
Woodford, J. B., Jr. (SM)
Wyckoff, R. D. (F)
Yarussi, F. P. (A)
Young, F. J. (M)
Zoffel, G. I. (M)

Pittston (PHI-3)
Chesavage, A. J. (M)
Loughney, T. M. (M)
Miller, A. N. (M)

Plymouth Meeting (PHI-3)
Applegarth, A. R., Jr. (SM)
Best, D. T. (M)
Broomall, J. M. (SM)
Chamow, M. F. (A)
Ginsberg, A. (M)
Ginsberg, E. M. (M)
Hauer, C. A. (M)
Hoffman, A. N. (M)
Judd, J. E. (A)
Koller, W. B. (M)
Krantz, F. H. (M)
Lifsey, J. A. (M)
Loev, D. (M)
Luscombe, C. F. (M)
Nead, B. G. (M)
Roush, J. E. (M)
Ryesky, A. (M)
Smith, R. C. (M)
Warshaw, C. H. (M)

Portage (PIT-4)
Dorsch, F. E. (M)

Port Matilda (CP-4)
Seeley, R. M., Jr. (M)

Pottstown (PHI-3)
Binelli, W. D. (M)
Hafner, H. F. (M)
Helmsness, O. D. (A)
Nace, C. E. (M)
Trout, H. J., Jr. (A)

Prospect Park (PHI-3)
Groves, J. R. (M)

Prospectville (PHI-3)
Wall, D. J. (M)

Punxsutawney (EMP-4)
Cameratta, P. J. (M)

Quakertown (P-LV-3)
Anderson, A. E. (F)
Cole, W. P. (SM)
Hendricks, P. S. (M)
Moose, L. F. (M)
Porter, V. J. (M)
Shand, J. R. (M)
Webster, G. R. (M)

Radnor (PHI-3)
Bolgiano, D. R. (M)
Engels, R. O. (M)
Garrison, P. A. (M)
Heckman, H. T. (SM)
Lachenbruch, D. (A)
Noyer, R. O. (SM)
Roberts, R. E. (SM)
Sumerlin, W. T. (SM)

Reading (PHI-R-3)
Ake, N. E. (M)
Bennett, W. F. (M)
Blakely, R. E. (M)
Catchmark, J. (M)
Coldren, S. D. (A)
Daburlos, K. E. (A)
Emery, L. L., Jr. (M)
Farrell, R. B. (SM)
Gable, J. R. (A)
Greely, D. K. (A)
Hauck, H. S. (M)
Henrich, G. R. (A)
Hill, A. R. (A)
Hill, K. J. (M)
Holzinger, C. S. (M)
Kons, J. B. (A)
Krufka, E. F. (M)
Lipscomb, R. F. (M)
Lundberg, R. H. (M)
Mill, A. F. (A)
Mystinski, S. A. (M)
Noll, W. S. (M)
Odenweller, R. L. (A)
Peterson, K. E. (A)
Pomeroy, R. C. (SM)
Rose, F. L. (M)
Schilling, R. G. (A)
Scull, E. W. (A)
Shockley, O. B. (A)
Von Ohlsen, L. H., Jr. (M)
Wentzel, L. S. (A)
Wolfe, E. M. (A)
Zechman, W. N. (A)

Richboro (PHI-3)
Del Mar, D. (M)

Ridgway (EMP-4)
Cowles, R. J. (M)
Gausman, G. G. (M)
Kirkpatrick, D. N. (SM)

Ridley Park (PHI-3)
Blumberg, M. (A)
Dietze, H. O. (A)
Fritz, C. H. (M)
Jamison, J. S. (M)
McCarty, C. E. (M)
McWilliams, G. R. (M)
Rowe, L. R. (A)

Rockwood (PIT-4)
Henkels, H. W. (SM)

Rosemont (PHI-3)
Abernethy, H., III (M)
Heid, J. P. (M)
Karmiol, E. D. (M)
Speakman, E. A. (F)
Stuart, R. M. (M)

Roslyn (PHI-3)
Bameti, G. F. (M)
Bauer, J. E. (M)
Beaver, J. A., Jr. (M)
Burrows, J. W. (M)
Dietz, J. R. (M)
Douglass, F. W. (SM)
Fasano, M. D. (M)
Fey, R. C. (M)
Grove, L. R. (M)



Kuter, J. J. (M)
Lamonte, R. J. (M)
Lannamann, R. J. (A)
Moore, J. L. (M)
Sayer, T. C. (M)
Silverman, J. B. (M)
Stahl, R. A. (M)
Todd, C. R. (M)
Yutz, R. W. (M)

Royersford (PHI-3)
Grime, R. (M)

Rushville (PHI-3)
Galetto, L. V. (M)

Rydal (PHI-3)
Clarke, I. A. (M)
Ferrill, T. M., Jr. (SM)
Hoffman, M. (M)
Lagore, J. A. (SM)

St. Davids (PHI-3)
Gabriel, E. Z. (M)
Karcher, R. W. (M)
Prednis, L. J. (M)

St. Mary's (EMP-4)
Bickmire, R. L. (SM)
Breindel, L. A. (A)
Butler, E. W. (SM)
Dressel, H. (A)
Fritz, C. F. (A)
Fritz, H. U. (M)
Garner, W. J. (A)
Hoffman, R. R. (SM)
Inge, E. F. (M)
Neff, A. K. (A)
Pierson, I. S. (M)
Simbeck, R. H. (M)
Snowdon, T. L. (SM)
Sorg, F. X. (M)
Speer, J. S., II (M)
Young, R. W. (M)

Salfordville (PHI-3)
McKenney, J. E. (M)

Saxonburg (PIT-4)
Cooper, R. W. (A)
Stuebgen, W. F. (A)

Sayre (ELM-C-1)
Ball, M. (A)
Franklin, B. A. (A)

Schwenksville (PHI-3)
De Berardis, A. J. (M)

Scottdale (PIT-4)
Buzzard, G. K. (A)

Scranton (PHI-3)
Cooke, K. R. (A)
Corwin, N. J. (M)
Hartnett, J. D. (M)
Kelly, J. F. (M)
Lahey, P. J. (M)
Leskauskas, F. C., Jr. (M)
Miller, W. A. (A)
Murnock, J. P. (M)
Quinn, J. M. (M)
Risse, J. A. (M)
Schiller, J. (M)
Schmidt, H. L. (M)
Smith, G. (SM)
Steler, H. P. (SM)
Thomas, W. F. (M)

Sharon (PIT-4)
Barley, C. D. (M)
Bowers, P. R. (M)
Zahniser, R. M. (A)

Shenandoah (PHI-3)
Kulak, A. J. (M)

Shillington (PHI-R-3)
Gillette, M. M. (M)
Lundberg, W. R. (M)
Radomski, J. J. (M)
Swavely, R. S. (A)

Shirleysburg (PIT-4)
Fogle, E. L. (M)

Shoemakersville (PHI-R-3)
Barry, D. E. (A)
Yoder, L. R. (A)

Simpson (PHI-3)
Tarris, P. D. (M)

Sinking Spring (PHI-L-3)
Nester, A. L. (M)
Zechman, R. W. (A)

Smethport (EMP-4)
Francisco, S. G. (M)
Greenlaw, A. F. (M)

Solebury (PHI-3)
Algeo, B. C., Jr. (SM)

Somerton (PHI-3)
Donald, E. N. (M)
Pharo, E. W., Jr. (M)

Souderton (PHI-3)
Smith, H. B. (M)

Southampton (PHI-3)
Barsky, H. S. (SM)
Dempster, B. W. (M)
Grzywacz, W. (M)
Lichtenfels, J. L. (M)
O'Connor, W. B. (M)
Oliver, W. G. (M)
Schroeder, A. C. (F)
Thompson, R. L. (M)

South Williamsport (WIL-4)
Lavo, H. J. (M)

Spring City (PHI-3)
Clevenstine, W. M. (A)

Springdale (PIT-4)
Duris, M. W. (M)
Gayhart, M. F. (A)
Shearer, D. L. (M)

Springfield (PHI-3)
Brinton, J. H., Jr. (M)
Ebling, W. F., Jr. (M)
Fallon, C. (A)
Hahn, A. J. (M)
Hudgins, W. D. (SM)
King, G. W. K. (M)
Laiming, H. J. (SM)
Marcott, C. M. (M)
Miller, M. N. (M)
Mitchell, W. J., Jr. (A)
O'Neill, J. F. (M)
Russo, L. J. (M)
Schwartz, R. F. (SM)
Sylvester, R. A. (M)
Wagenseller, J. E. (A)
Ware, W. E. (M)
Weiss, E. A. (M)

State College (CP-4)
Ammerman, C. R. (SM)
Baker, W. L. (SM)
Barber, K. F. (A)
Bastuscheck, C. P. (SM)
Baxter, F. C., Jr. (M)
Bender, R. M. (M)
Bloomquist, W. B. (M)
Bogar, J. E. (M)
Bringman, J. M. (M)
Brownlee, R. R. (M)
Burkey, J. R. (M)
Byers, H. K. (M)
Caldine, H. G. (M)
Callaghan, J. W. (M)
Cannon, J. B., Jr. (M)
Carey, D. E. (M)
Chemesa, J. (M)
Chubb, W. R., Jr. (M)
Clark, D. G. (M)
Crain, H. M. (SM)
Crossley, G. L. (SM)
Davies, J. E., Jr. (M)
Davis, M. G. (M)
Dean, J. C. (M)
Diamant, H. B. (M)
Dickey, C. W. (M)
Diehl, W. L. (M)
Eck, R. C. (M)
Elliot, W. A. (SM)
Erdley, R. F. (M)
Ewing, R. W. (M)
Fasnacht, M. B. (A)
Fleni, D. O. (M)
Files, W. D. (SM)
Finlon, F. P. (M)
Gaudinsky, J. R. (M)
Gawryla, R. E. (M)
Geronimo, M. B. (M)
Hall, F. T., Jr. (M)
Harbolis, S. S. (M)
Harris, V. E. (M)
Hastert, D. D. (M)
Henman, R. J. E. (M)
Herlt, B. G., Jr. (M)
Herman, E. B. (SM)
Hild, D. R. (M)
Houser, W. G. (M)
Howard, W. A. (M)
Hunter, R. P. (SM)
Huntington, W. J., Jr. (M)
Kenly, T. F. (M)
Key, C. L., Jr. (SM)
Key, J. T., Jr. (M)
Krueger, D. (M)
Kulp, K. H. (M)
Kush, L. J. (M)
Lawther, J. M. (M)
Lee, H. S. (M)
Leiss, W. J. (SM)
Lemley, L. W. (M)
Lewis, J. C. (M)
Lopez, A. F. (SM)
Love, G. P. (M)
Marcus, R. B. (M)
McCallum, R. G. (M)
McGinley, J. H. (M)
McKinney, D. W. (M)
McLucas, J. L. (SM)
Mertzer, J. R. (SM)
Miller, R. F. (M)
Milliken, M. P. (M)
Minor, L. C. (M)
Moore, F. B. (SM)
Moore, R. C. (M)
Musser, G. L. (SM)
Nearhoff, H. J. (SM)
Norris, R. S. (M)
Oolinger, J. T. (M)
O'Connor, H. C., Jr. (M)
Oelbermann, E. J. (SM)
Palmer, J. R. (SM)
Passow, R. L. (SM)
Pelick, T. J. (A)
Perks, N. W. (M)
Quinn, T. P. (M)
Rexroat, L. D. (M)
Richardson, E. (M)
Ripple, J. R. (A)
Rix, H. D. (SM)
Roeshot, L. (M)
Rowlands, R. O. (SM)
Ruff, G. A. (M)
Santalucia, A. J. (M)
Scheihing, F. A. (M)
Shaffer, J. D. (M)
Sharp, A. C. (SM)
Siewers, D. C. (M)
Skagerberg, W. A. (M)
Skipper, R. E. (SM)
Skudrzyk, E. J. (M)
Smith, J. P. (M)
Spackman, R. M. (M)
Taylor, J. G. (M)
Thompson, F. C. (SM)
Thornton, M. Z. (A)
Tidwell, A. O. (M)
Traugott, R. D. (M)
Vetter, A. R. (M)
Walker, J. P., Jr. (M)
Watkeys, D. E. (M)
Wellington, T. C. (M)
Wolfe, R. E. (M)
Wurst, J. W. (M)

Stratford (PHI-3)
Huber, R. D. (A)
Mathes, R. E. (F)

Sunbury (WIL-4)
Weber, J. O. (M)
Young, R. H. (M)

Swarthmore (PHI-3)
Barus, C. (SM)
Bowler, D. L. (M)
Burtis, S. F., Jr. (M)
Heald, M. A. (M)
Jablonski, E. R. (M)
Johnson, F. M. (M)
Roberts, G. A. (M)
Tompkins, H. E. (SM)

Tamaqua (PHI-3)
Dignazio, L. A. (M)

Tarentum (PIT-4)
Chantler, G. D. (M)

Telford (PHI-3)
Hinds, J. L., Jr. (M)
Lawson, T. C. (M)
Robinson, S. A. (SM)

Throop (PHI-3)
Goodman, J. (M)

Tobyhanna (PHI-3)
Fuqua, H. G. (SM)
Jarecki, S. J. (A)
Piscatello, D. J. (M)

Towanda (ELM-C-1)
Englsch, R. A. (M)

Trafford (PIT-4)
Breakey, G. A. (M)
Upham, S. W. (M)

Trevose (PHI-3)
Fahi, J. P. (A)
Gorny, D. S. (M)

Trout Run (WIL-4)
Warne, T. P., Jr. (SM)

Turtle Creek (PIT-4)
Skinner, D. D. (M)

Tyrone (PIT-4)
Kearney, H. B., Jr. (M)

University Park (CP-4)
Atwater, H. A. (SM)
Bowhill, S. A. (SM)
Brown, J. L., Jr. (M)
Butman, G. R. P. (M)
Ebaugh, P. (M)
McLane, S. B., Jr. (M)
Ross, W. J. (SM)
Schmerling, E. R. (SM)
Smith, R. M. (M)
Somayajulu, Y. V. (SM)
Walker, E. A. (F)
Waynick, A. H. (F)
Wilson, G. L. (SM)

Upper Darby (PHI-3)
Altopiedi, A. T. (M)
Beane, J. M. (SM)
Bush, B. A., Jr. (M)
Charp, S. (SM)
Chernish, G. (SM)
De Carlo, A. P. (M)
Dement, D. K. (M)
Dinackus, H. G. (M)
Dzwonczyk, J. G. (M)
Garkav, E. (M)
Gumacos, C. (M)
Hopkins, V. A. (SM)
McCoy, C. T. (SM)
McGowan, R. F. (M)
Mehan, A. J. (M)
Pope, R. A. (M)
Santaguida, C. (A)

Valley Forge (PHI-3)
Register, C. L. (SM)

Verona (PIT-4)
Bartholomew, R. R. (M)
Thompson, F. T. (M)
Viener, A. H. (M)

Villanova (PHI-3)
Cecal, J. A. (A)
Chen, T. C. (SM)
Dilks, U. C. S. (SM)
Klekotka, J. A. (M)
Lockwood, F. P., Jr. (A)
Mullen, A. J. (M)
Silneman, J. W., Jr. (A)
Tate, R. V. (M)

Wallingford (PHI-3)
Baugh, C. W., Jr. (M)
Jayne, F. B. (A)
Martin, J. L. (M)
Robinson, I. E. (M)
Shallcross, D. H. (A)

Warminster (PHI-3)
Aurelius, K. P. (A)
Bachinsky, R. D. (M)
Bearscove, K. O. (M)
Bicking, H. P. (M)
Buscher, D. G. (M)
Butterfoss, E. J. (A)
Espig, M. A. (M)
Fitzpatrick, J. F. (M)
Francis, W. A. (M)
Hollich, S. E. (M)
Jackamonis, G. (A)
Karew, J. J. (M)
Kuhnle, R. C. (A)
Massey, T. J., Jr. (M)
Senulis, R. E. (M)
Twist, G. A. (M)

Warren (EMP-4)
Barre, W. E. (M)
Loranger, J. A. (SM)
Loucks, W. J. (A)
Myers, S. J. (A)
Thelin, D. H. (A)
Wanner, L. R. (M)

Warrington (PHI-3)
Clarance, A. L. (M)
Curtis, C. T. (M)
Michener, R. E. (M)

Washington (PIT-4)
Loffredi, A. J. (A)
Paul, D. R. (M)
Tarsia, J. S. (A)
Young, C. E., Jr. (M)

Waverly (PHI-3)
Mundell, K. C. (M)

Wayne (PHI-3)
Anderson, F. W. (SM)
Bartlett, F. F. (M)
Blakely, R. T. (SM)
Bowman, D. F. (SM)
Collins, H. B., Jr. (SM)
D'Andrea, L. L. (SM)
Davis, H. U. (M)
De Wolf, J. B. (M)
Donecker, R. R. (A)
Ellis, D. M. (M)
Graeter, R. J. (M)
Guyer, R. S. (A)
Jansheon, S. W. (M)
Leiserving, J. G. (M)
Lenfest, G. C. (M)
Libby, E. C. (M)
Lolli, L. M. (M)
McCauley, C., Jr. (M)
Medkeff, R. J. (M)
Neumann, L. R. (M)
Niemann, E., Jr. (M)
Palmer, G., Jr. (SM)
Reagan, W. E. (M)
Schneider, W. M., Jr. (M)
Stern, D. M. (M)
Vincent, D. G. (M)
Wellard, C. L. (M)

Weatherly (PHI-3)
Kiser, N. L. (SM)

Wellsboro (ELM-C-1)
Weaver, C. H. (A)

Westeyville (ERI-1)
Brown, P. A. (M)

West Chester (PHI-3)
Craig, R. C. (M)
Fuller, J. B., Jr. (M)
Green, R. E., Jr. (M)
Haner, L. P. (SM)
Hickey, J. E., Jr. (M)
Kieselbach, R. (M)
Loring, R. A. (M)
Lynch, F. T. (M)
McGrogan, E. P., Jr. (M)
Selin, W. L. (M)
Tracy, R. A. (M)

West Conshohocken (PHI-3)
Eckert, E. R. (M)

West Hazleton (PIT-4)
Yesenofski, J. S. (M)

West Lawn (PHI-R-3)
Ellenberger, C. E. (M)
Helm, K. P. (M)
Homberger, R. F. (M)
Rexon, L. (M)
Schenck, H. P. (A)

West Middlesex (PIT-4)
Herr, C. E. (A)

West Pittston (PHI-3)
Bruno, A. R. (M)

West Reading (PHI-R-3)
Pietruszynski, L. J. (M)

Wilcox (EMP-4)
Wantuck, W. T. (M)

Wilkes-Barre (PHI-3)
Bates, G. P. (M)
Foley, W. M. (M)
Graytock, R. A. (M)
Groff, H. A. (M)
Katyl, R. H. (A)
Middleton, W. W. (M)
Parise, J. D. (A)
Reid, J. F. (A)
Wojtowicz, J. T. (M)

Williamsport (WIL-4)
Anderson, L. F. (M)
Bresee, W. H. (M)
De Gan, J. J. (M)
Deming, G. W. (M)
Gehrke, F. E. (SM)
Gregor, T. P. (A)
Jewart, D. M. (SM)
Kouglas, G. C. (A)
McCarthy, F. J. (M)
Pennington, E. T. (M)
Peterson, N. C. (M)
Petts, R. G. (M)
Pouy, R. H. (M)
Richart, D. H. (M)
Sibley, R. C. (M)
Simmons, W. J., Jr. (A)
Teno, E. (A)
Watson, W. H. (M)

Willow Grove (PHI-3)
Affel, H. A., Jr. (SM)
Beatty, P. H. (M)
Bell, R. R. (M)
Bradshaw, J. L. (M)
Colocousis, J. (SM)
Curtis, E. I. (M)
Dry, D. N. (M)
Feidelman, L. A. (M)
Fishbeck, R. A. (M)
Florence, V. H. (M)
Franke, A. E. (M)
Fraser, R. S. (M)
Gatter, H. H. (M)
Herbert, E. J., Jr. (M)
Hirschman, H. (M)
Hockelmer, H. E. (M)
Koop, W. S., Jr. (A)
Kornfeld, M. (M)
Kornfield, N. R. (M)
Lewis, J. R. (M)
Lucke, W. N. (M)
Pacl, R. A. (M)
Rude, R. T. (M)
Schreyer, F. J. (M)
Shulman, L. (M)
Sikina, T. V. (M)
Speights, M. T. (M)
Thomson, D. N. (M)
Tillman, R. M. (M)
Tobe, S. S. (SM)
Weldknect, C. J., Jr. (M)
Zohn, R. L. (M)

Windsor (PHI-L-3)
Arnold, P. H. (M)

Woodlyn (PHI-3)
Kashmar, E. J. (M)

Worcester (PHI-3)
Aricson, L. H. (M)

Wrightstown (PHI-L-3)
Fisher, M. K. (M)

Wrightsville (PHI-L-3)
Young, C. R. (A)

Wyncote (PHI-3)
Alexy, M. R. (SM)
Bembaum, B. (M)
Cooper, D. T. (M)
Craig, P. M. (F)
Dorris, R. C. (M)
Fox, B. (M)
Gonzalez-Correa, E. (M)
Handy, N. (M)
Kinnier, D. (M)
Kusma, D. (SM)
Moore, W., Jr. (M)
Sher, N. (M)
Smith, R. V. (SM)

Wynnewood (PHI-3)
Aitken, T. B. (M)
Appel, W. N. (A)
Blum, C. M. (M)
Cheng, T. (M)
Dohan, W. R. (M)
Fisher, J. F. (SM)
Fulton, L. H. (A)
Leas, J. W. (SM)
Meyerhoff, A. J. (SM)

Wyomissing (PHI-R-3)
Bang, R. L. (M)
Boynton, W. D. (M)
Davis, W. J. (M)
Feicht, R. B. (M)

## PENNSYLVANIA

Gehris, J. P. (M)
Huyett, W. I. (M)
Le Lacheur, R. M. (M)
McLaughlin, J. F. (M)
Savadelis, I. C. (M)
Prudhon, G. L. (SM)

Yardley (PHI-3)
Cook, E. G. (M)
Cook, G. W. (SM)
Emslie, N. M. (A)
Frank, U. A. (M)
MacDonald, H. E. (M)
Schwartz, N. J. (M)

Yeadon (PHI-3)
Bordogna, J. (M)
Dillon, T. P. (A)
Haber, F. (M)
McBlain, W. L. (M)
Mekel, R. (M)
Mollieri, J. T. (A)
Norpel, J. W. (M)

York (PHI-L-3)
Beck, M. R. (M)
Boyer, R. M. (A)
Boyer, W. H. (A)
Chronister, W. M. (M)
Dangl, J. R. (M)
De Frees, H. F. (M)
Evans, C. R. (M)
Feder, J. H., Jr. (A)
Frost, E. L. (M)
Gerber, W. E., Jr. (M)
Gleeson, E. J. (M)
Goodling, G. G., Jr. (M)
Haas, W. I. (M)
Haskins, G. E., Jr. (A)
Jensen, H. S. (M)
Kiser, L. L. (M)
Knouse, G. H. (M)
Kudlich, K. H. (M)
Lease, D. A. (A)
Love, R. M. (M)
Lowe, F. B. (M)
Muscella, D. J. (M)
Parker, J. C., Jr. (M)
Pueschner, H. (M)
Raymond, R. E. (M)
Schmidt, E. W. (M)
Schutt, R. O., Jr. (M)
Sims, W. H., Jr. (M)
Staub, J. R. (A)
Stees, R. L. (M)
Sterner, F. L. (M)
Stover, N. K. (A)
Stulac, R. J. (M)
Tassia, J. P. (M)
Walker, H. (SM)
Wanbaugh, W. C. (M)
Weiner, E. G. (A)
White, D. L. (M)
Wildermuth, J. R. (M)

Youngwood (PIT-4)
Borneman, E. H. (SM)
Christian, A. M. (M)
Hamet, L. N. (M)
Hugle, W. B. (SM)
Martin, W. A. (M)
Stelmak, J. P. (SM)

### RHODE ISLAND

Barrington (BOS-1)
Perry, F. G. (A)
Prior, T. K. (A)

Bristol (BOS-1)
Tingley, F. M. (M)

Coventry (BOS-1)
Dunham, P. N. (M)

Cranston (BOS-1)
Abbenante, N. (M)
Amoroso, F. (M)
Cauchon, F. B. (M)
Monopoli, R. V. (M)
Pagliarini, J. A., Jr. (M)
Salk, D. (A)
Sherman, A. (M)
Sosola, B. L. (M)

Cumberland (BOS-1)
Bailey, L. E. (M)
Perry, M. F. (A)
Woodward, J. E. (A)

East Greenwich (BOS-1)
Bingham, R. C. (A)
Dunkel, A. M. (A)
Wong, G. J. (M)

East Providence (BOS-1)
Henry, F. J. (M)

Esmond (BOS-1)
Fox, G. F. (A)

Greene (BOS-1)
Hunsicker, R. K. (M)

Greenville (BOS-1)
Weaver, C. E. (A)

Hoxsie (BOS-1)
Kunz, G. A. (M)

Kingston (BOS-1)
Haas, R. S. (M)
Hill, R. F. (M)
Middleton, F. H. (M)
Polk, C. (SM)
Prince, M. J. (M)

Manville (BOS-1)
Lavallee, M. L. (A)
Pennucci, N. (M)

Narragansett (BOS-1)
Farrell, C. L., Jr. (A)

Newport (BOS-1)
Baer, E. W., III (M)
Bath, J. P. (M)
Bowerman, R. H. (M)
Brown, C. K. (M)
Bryan, W. L. (M)
Delgado, R. (M)
Fortin, R. J. (M)
Gabriel, L. J. (M)
Gretchen, J. J. (A)
Hale, H. D., Jr. (M)
Mahoney, T. R. (M)
Mathison, W. W. (M)
Murphy, E. J. (M)
Phillips, L. D. (M)
Ripple, E. G. (M)
Sollozy, C. S. (M)

North Kingstown (BOS-1)
Smith, P. W. (A)

North Providence (BOS-1)
Lancia, T. (M)

Pawtucket (BOS-1)
Beckett, H. F. (M)
Joyal, F. G. (A)
Nichols, A. J. (A)

Peace Dale (BOS-1)
Birch, W. B. (A)

Point Judith (BOS-1)
Merriam, R. W. (M)

Portsmouth (BOS-1)
McCarty, F. H. (M)

Providence (BOS-1)
Anderson, G. P. (M)
Angulo, C. M. (SM)
Barlow, H. B., Jr. (M)
Blanchard, W. E. (M)
Blender, M. I. (A)
Bliss, Z. R. (A)
Coppell, F. K. (A)
Cretella, J. P. (M)
Dandreta, W. (M)
Dutile, B. C. (M)
Famsworth, H. E. (SM)
Farrell, F. X. (M)
Feehan, J. E. (M)
Fine, S. (M)
Gerta, N. (SM)
Halton, E. B. (M)
Hazeltine, B. (M)
Horava, A. P. (A)
Kodis, R. D. (SM)
Kornhauser, E. T. (SM)
Mann, H. F. (A)
Markey, J. T. (M)
Murtaugh, W. A. (M)
Myrow, A. J. (A)
Streifer, W. (M)
Testa, E. (M)
Truell, R. (SM)
Verrecchia, T. A. (M)
Wagner, R. R. (M)

Riverside (BOS-1)
Bushnell, R. R. (A)
Gulorgulev, M. (A)

Rumford (BOS-1)
Chick, B. B. (M)

Tiverton (BOS-1)
Lizotte, O. A. (M)
Patenaude, N. H. (A)
Swinburn, A. H. (M)

Wakefield (BOS-1)
Mowbray, W. H. (A)

Warren (BOS-1)
Bowen, H. C. (M)

Warwick (BOS-1)
Fiddes, G. B. (M)
Gordon, R. S. (M)
Jacobs, B. S. (M)
Klemer, B. H. (M)
Thoresen, J. C. (A)
Tully, P. P. (A)

West Barrington (BOS-1)
Coppolino, L. S. (M)
Prior, T. C. J. (M)

Westerly (BOS-1)
Finocchiaro, E. C. (M)
Manfredi, C. C. (M)

West Warwick (BOS-1)
Blais, L. D. (M)

Woonsocket (BOS-1)
Dube, J. J. A. (A)
Garbis, F. (M)
Urico, F. X. (M)

### SOUTH CAROLINA

Aiken (S-CAR-3)
Everett, W. W., Jr. (M)
Hoover, R. E. (A)
Kirkland, D. (M)
Ross, J. D. (SM)
Studley, R. V. (M)

Anderson (S-CAR-3)
Glaser, H. I. (M)

Beaufort (S-CAR-3)
Johns, J. H. (M)

Cameron (S-CAR-3)
Haigler, J. L. (M)

Cayce (S-CAR-3)
Hafely, C. H. (A)

Charleston (S-CAR-3)
Alderman, E. L. (M)
Allman, D. P. (A)
Bailey, J. H. (M)
Birchfield, W. P. (A)
Boehm, W. R. (SM)
Brooks, M. J. (M)
Brust, N. T. (M)
Cook, J. E. (M)
Cory, I. W. (M)
Dutton, I. L. (M)
Feath, W. R. (M)
Fechter, G. B. (M)
Goldberg, H. S. (M)
Hart, R. N., III (M)
Herring, O. L., Jr. (M)
Jefferies, D. W. (M)
Kahn, A. I. (A)
Knickel, E. R. (M)
Lackey, H. B. (M)
La Jole, Z. A. (M)
McGihon, R. S. (M)
Miller, A. H. (M)
Morrissey, J. N. (M)
Peters, D. H. (M)
Risher, R. G. (M)
Schachte, W. L. (SM)
Schleppegrell, J. R. (A)
Slopach, R. W. (M)
Sterrett, D. S. (SM)
Waldo, W. A., Jr. (M)
Wilcox, E. J. (M)

Charleston Heights (S-CAR-3)
Flynn, L. A. (A)
Isaac, G. F. (A)
McCarthy, M. F. (A)
Pope, J. W., Jr. (M)
Shimandle, J. G. (M)

Cheraw (S-CAR-3)
Akerman, B. (SM)
Evans, A. C. (A)

Clemson (S-CAR-3)
Brittain, J. E. (A)
Hind, A. T., Jr. (M)
Hughey, J. J., Jr. (M)
Martin, J. C. (M)
Thurston, J. N. (SM)

Columbia (S-CAR-3)
Fellers, R. G. (SM)
Ferris, W. R. (F)
Foster, L. W. (SM)
Henson, J. A. (A)
Lambert, R. D., Jr. (SM)
Lowman, B. L. (M)
Moseley, S. T. (SM)
Noland, J. H., Jr. (SM)
Parsons, J. H., Jr. (A)
Queen, W. E. (M)
Reese, M. T. (M)
Roberts, W. H. (M)
Romanyszyn, M. T. (A)
Scott, A. L. (A)
Smith, E. H., Jr. (M)
Snyder, R. J. (A)
Taylor, J. (SM)
Warr, G. H. (M)

Florence (S-CAR-3)
Bonner, J. T. (M)
Moore, B. E. (M)
Sellars, E. A. (SM)
Zeigler, A. L. (A)

Folly Beach (S-CAR-3)
Howell, J. E. (M)
Smith, F. A. (M)

Greenville (S-CAR-3)
Cox, T. L. (M)
Garrison, W. E. (M)
Greer, P. A. (SM)
Mills, C. W. (M)
Pace, M. W. (A)
Wearn, W. C. (M)

Greenwood (S-CAR-3)
Duffie, J. E. (M)
Hawthorne, D. (A)
McCombs, J. W. (M)

Irmo (S-CAR-3)
Flood, F. R. (M)
Warner, D. F. (M)
Yeamans, W. H. (M)

Lancaster (S-CAR-3)
Elliott, R. J. (M)

Moncks Corner (S-CAR-3)
Volf, L. F. (A)

Mount Pleasant (S-CAR-3)
Gay, R. E. (M)
Schneider, A. P. (M)

Myrtle Beach (S-CAR-3)
Howard, J. E. (M)
Rau, D. R. (M)
Romiti, V. L. (M)
Syverson, C. N. (M)
Williams, B. A. (M)

Newberry (S-CAR-3)
Terry, J. A. (M)
Young, D. W. (A)

North Augusta (S-CAR-3)
Felder, A. A. (M)
Gill, J. P., Jr. (M)

North Charleston (S-CAR-3)
Carnes, F. W. (M)
Gatch, C. E. (A)
Germann, F. G., Sr. (A)
Hunter, H. L. (M)
Kiedinger, J. W. (M)
Mathis, W. H. (M)
McMasters, P. A. (SM)
Mitton, D. V. (A)
Rogers, C. L. (M)
Thomason, J. G. (M)

Orangeburg (S-CAR-3)
O'Cain, W. L. (A)

Shaw AFB (S-CAR-3)
Benedict, D. F. (M)
Hanson, G. B. (M)

Spartanburg (S-CAR-3)
Pippin, R. F., Jr. (M)

Sumter (S-CAR-3)
Coleman, D. T., Jr. (M)
King, M. B. (M)

West Columbia (S-CAR-3)
Bowers, C. W. (M)

### SOUTH DAKOTA

Alpena (TC-5)
Brammer, R. G. (M)

Arlington (TC-5)
Dill, E. C. (M)

Belle Fourche (TC-5)
Wilson, R. L. (M)

Brookings (TC-5)
Cheadle, J. N. (SM)
Olson, R. C. (M)

Canning (TC-5)
Graf, E. A. (M)

Ellsworth AFB (TC-5)
Burke, J. F. (M)
Swisher, L. W. (A)

Freeman (TC-5)
Delssler, K. L. (A)

Pierre (TC-5)
Brancel, O. R. (M)
Jones, M. G. (A)

Rapid City (TC-5)
Green, F. M. (M)
Mayer, F. N. (M)
McNeil, R. D. (M)
Nelson, E. A. (M)
Schultz, D. G. (M)

Roslyn (TC-5)
Storley, C. L. (M)

Sioux Falls (TC-5)
Bunday, G. F. (A)
Froke, L. C. (A)
McKenna, W. E. (M)
Nelson, V. R. (M)
Pierce, M. E. (M)
Sikorski, J. W. (A)
Warren, L. C. (A)

Vermillion (TC-5)
Bedwell, T. H. (M)
Graf, S. J. (M)

### TENNESSEE

Adams (HUN-N-3)
Wilson, C. L. (M)

Alcoa (ATL-3)
Warren, M., Jr. (M)

Altamont (HUN-3)
Morgan, C. C., Jr. (M)

Bristol (ATL-3)
Bernot, T. (M)
Bradfute, G. A., Jr. (M)
Chambers, W. M. (A)
King, L. A. (SM)
Robinson, M. P., Jr. (M)
Schell, J. H. (M)
Shackelford, H. L. (M)
Wirfel, W. M. (M)

Chattanooga (ATL-3)
Barnes, B. B. (A)
Bohr, E. T. (M)
Briscoe, H. R., Jr. (A)
Crozier, H. W. (M)
Gasell, J. A., Jr. (M)
Hoffstetter, G. E. (M)
Jones, H. B. (A)
King, T. R. (A)
Meagher, A. W. (A)
Smith, R. T. (A)
Terrell, J. M., Jr. (M)
Young, B. A. (M)

Cleveland (ATL-3)
Ledford, W. L. (M)

Clinton (ATL-3)
McMurray, C. S. (M)

Concord (ATL-3)
Devine, J. M. (A)

Cordova (HUN-M-3)
Downs, H. I. (M)

Dayton (ATL-3)
Warner, C. J. (A)

Erwin (ATL-3)
Reeves, H. L., Jr. (A)

Fayetteville (HUN-3)
Kulberg, L. E. (M)
Thompson, A. W. (M)
Thompson, R. D. (A)

Fort Campbell (HUN-N-3)
O'Keefe, R. W. (M)

Fountain City (ATL-3)
Harter, J. A. (SM)
Oakes, L. C. (M)

Franklin (HUN-N-3)
Clarkson, T. (M)
Montgomery, W. C. (M)
Ragsdale, S. P. (M)

Gatlinburg (ATL-3)
Stanbery, J. F. (SM)

Greeneville (ATL-3)
Furman, O. G. (M)
Jimenez, G. L. (M)
Story, M. L. (A)
Turski, S. (M)

Jackson (HUN-M-3)
Altenpohl, D. (M)
Hight, H. H. (M)

Jefferson City (ATL-3)
Brown, J. H. (A)

Johnson City (ATL-3)
Gentry, R. O. (A)
Hunter, W. C. (A)

Kingsport (ATL-3)
Devaney, R. G. (M)
Henry, J. W. (SM)
Lingar, W. E. (M)

Kingston (ATL-3)
Behr, B. C. (SM)
Hanauer, S. H. (M)
Hirsch, C. B., Jr. (M)

Knoxville (ATL-3)
Affel, R. G. (M)
Bodenheimer, B. E. (M)
Bradshaw, R. L. (M)
Craig, L. W. (M)
Eckel, J. R., Jr. (M)
Evans, R. C. (A)
Horton, J. R. (M)
Hulley, W. P. (M)
Neff, H. P., Jr. (M)
Pierce, J. F. (SM)
Schede, R. W. (M)
Sundeen, O. H. (M)
Tillman, J. D., Jr. (M)
Watkins, G. C., Jr. (M)
Williams, A. B. (A)

Lake City (ATL-3)
Byerly, J. W. (A)

Lebanon (HUN-N-3)
Rucks, A. J. (M)

Lawrenceburg (HUN-3)
Beckham, R. H. (M)

Lenoir City (ATL-3)
Todd, J. H. (M)

Madison (HUN-N-3)
Burton, R. B. (A)

Manchester (HUN-3)
Kingery, M. K. (M)
Norman, C. F. (M)

Martin (HUN-N-3)
Gregg, R. W. (M)

Maryville (ATL-3)
Artis, P. T. (M)

Memphis (HUN-M-3)
Babb, E. L. (A)





Bovaird, C. F. (A)
Boyd, I. H. (M)
Bradshaw, J. C. (M)
Bray, J. W. (M)
Browning, J. W. (M)
Buster, L. F., Jr. (A)
Carney, G. (M)
Ecoff, F. A., Jr. (A)
Fitzgerald, G. M., Jr. (A)
Frazier, M. B., Jr. (A)
Freeman, A. L., Jr. (A)
Freymuth, J. J., Jr. (M)
Haas, I. J. (M)
Harbison, R. T. (A)
Holbrook, T. C., Jr. (A)
Horton, H. C. (M)
Kizer, D. F. (A)
Logan, E. W., Jr. (A)
Maice, L., Jr. (M)
McLin, J. T. (A)
Ray, C. D. (M)
Rieker, J. P. (A)
Stewart, E. B. (A)
Walker, J. A. (M)

Nashville (HUN-N-3)
Allen, R. B. (M)
Arnold, T. G., Jr. (M)
Binns, F. D. (M)
Bright, F. W. (M)
Burch, C. E. (M)
Campbell, J. S. (M)
Cherry, K. G. (M)
Compton, R. E., Jr. (M)
Daddario, A. S. (M)
Dewitt, J. H., Jr. (F)
Dicker, P. E. (SM)
Dorris, C. G. (M)
Duke, C. R. (M)
Esslinger, G. H. (M)
Ewing, A., Jr. (M)
Gerung, N. W. (M)
Haynes, W. M., Jr. (M)
Hobbs, R. V. (M)
Holladay, A. M. (M)
Huckaby, R. L. (M)
Johnson, L. E., Jr. (M)
Kincaid, W. B., Jr. (M)
Madden, K. W. (M)
Maddox, W. V. (M)
McAdams, E. E. (M)
McAllister, G. P. (M)
Montgomery, L. H., Jr. (F)
Pearsall, S. H. (SM)
Reynolds, G. A. (M)
Satterfield, R., Jr. (A)
Schumann, F. (SM)
Shelton, A. C. (SM)
Stiller, W. W., Jr. (SM)
Sutton, A. T. (M)
Williams, H. R. (M)
Wolfson, R. P. (M)
Zeigler, R. H. (M)

Oak Ridge (ATL-3)
Anderson, J. L. (M)
Banta, H. E. (SM)
Dahl, A. H. (M)
Dale, J. A. (SM)
De Hart, S. B. (M)
Dunlap, J. L. (M)
Edwards, R. S. (M)
Emmer, T. L. (M)
Fairstein, E. (SM)
Fort, W. G. S. (M)
Groothuis, S. E. (M)
Henry, J. J. (M)
Henry, K. M., Jr. (A)
Henson, F. W. (M)
Holt, G. A. (M)
Judish, J. P. (M)
Knowles, D. J. (SM)
Manning, F. W. (M)
Marks, J. E. (M)
Miller, P. D. (M)
Mosko, S. W. (M)
Pigg, J. C. (M)
Porter, F. M. (M)
Redford, J. L. (A)
Ritter, R. C. (M)
Shipley, E. D. (M)
Smith, H. F., Jr. (A)
Southern, A. L. (M)
Walker, C. S. (M)
Wilson, H. N. (M)
Worsham, R. E. (A)
Zachry, D. S., Jr. (M)
Ziegler, N. F. (M)

Old Hickory (HUN-N-3)
Hurt, A. B., Jr. (M)

Sparta (ATL-3)
Haston, C. W. (M)

Tullahoma (HUN-3)
Brewer, J. H. (M)
Choate, R. H. (M)
Cortner, A. H. (M)
Giltinan, T. L. (M)
Holt, D. C. (M)
Humphrey, R. L. (M)
Johnson, M. D. (M)
Kaisner, R. W. (SM)
McKee, M. L. (M)
Miller, W. A. (A)
Pope, R. H. (M)

### TEXAS

Abilene (FW-6)
Bottom, V. E. (SM)
Henley, R. D. (A)
Kumm, A. L. (M)

Alice (SA-A-6)
Smith, J. S. (A)

Alpine (SA-A-6)
Bowden, A. J. (A)

Amarillo (LUB-6)
Boatwright, F. V. (M)
Farmer, P. E. (M)
Harris, H. W. (M)
Martin, J. L. (M)
Patterson, J. M. (M)
Spitzer, C. R. (M)
Torrey, W. H. (A)

Arlington (FW-6)
Baker, M. F. (M)
Bentley, R. L., Jr. (M)
Billingsley, J. D. (M)
Buehrle, C. D. (M)
Bushart, G. J., Jr. (M)
Calvin, C. C., Jr. (M)
Cash, F. L. (SM)
Cashat, S. D. (M)
Crosby, R. H. (SM)
Davis, J. A., Jr. (M)
Ditto, J. C. (M)
Drennan, J. B. (M)
Fischer, J. N. (M)
Forester, J. R. (M)
Gegon, P. H. (M)
Hale, R. A. (M)
Hankinson, F. K. (SM)
Hegl, J. G. (M)
Hodge, R. B., Jr. (M)
Hoelke, W. D. (M)
Howard, J. E. (M)
Hutcheson, G. C. (SM)
Jordan, C. F., Jr. (M)
Koogle, J. F. (M)
Lanier, R. E. (SM)
Lassiter, E. M. (M)
Linehan, R. J. (M)
Lowry, L. W. (M)
Lundberg, C. F. (M)
Muery, R. W. (M)
Oster, R. E. (M)
Pollmerou, L. G. (M)
Prior, R. R. (M)
Raymond, W. D. (M)
Reynolds, G. N. (M)
Tardiff, R. J. (M)

Austin (SA-A-6)
Adams, R. M. (M)
Anderson, C. D. (M)
Baltzer, O. J. (SM)
Barber, L. M. (M)
Barclay, J. N. (SM)
Block, E. H. (M)
Bostick, F. X. (M)
Britt, C. O. (SM)
Broman, W. N. (A)
Clardy, D. E. (M)
Clark, D. G. (A)
Coale, C. R., Jr. (M)
Darmento, J. (M)
Davis, A. (SM)
Deam, A. P. (M)
Duesterhoeft, W. C., Jr. (SM)
Duff, B. M. (M)
Fannin, B. M. (SM)
Gantt, J. D. (M)
Garner, W., Jr. (M)
Gribble, R. F. (M)
Hackett, R. E. (M)
Hartwig, W. H. (SM)
Helmer, R. J. (M)
Hixson, E. L. (SM)
Hopkins, G. H., Jr. (M)
Kreuz, L. B. (SM)
La Coste, L. J. B. (M)
Lagrone, A. H. (SM)
Lane, R. N. (SM)
Lauderdale, D. M. (M)
Law, P. F. (M)
Lowenberg, E. C. (M)
Lueg, R. E. (M)
Martin, P. E. (M)
McKinney, C. M. (SM)
McQuown, A. N., Jr. (SM)
Meharg, L. S. (M)
Mollenhauer, H. H. (A)
Morrow, R. E. (M)
Opiela, A. D., Jr. (M)
Phillips, J. P. (M)
Ripperger, E. A. (A)
Robertson, W. (A)
Rountree, J. G. (SM)
Simpson, W. D. (M)
Smith, H. W. (SM)
Smith, R. T. (M)
Smith, S. E. (M)
Stone, C. S. (M)
Stratton, A. W. (F)
Tolbert, C. W. (SM)
Trochta, R. (M)
Tucker, E. A. (SM)
Tucker, W. E. (M)
Wallace, R. H. (M)
Wallis, W. R. (A)
Werner, C. T. (M)
White, G. E. (SM)
Whitener, A. S. (M)
Willett, N. W. (SM)
Wright, J. R. (M)
Wukasch, E. D. (M)
Youngblood, W. A. (M)

Ballinger (FW-6)
Kelley, W. C. (M)

Baytown (HOU-6)
Harding, J. H. (M)
Jordan, R. W. (A)
Newton, C. J. V. (A)
Suttle, A. D., Jr. (SM)

Beaumont (B-PA-6)
Bartlett, H. W. (M)
Burgess, C. H. (M)
Bush, C. R. (M)
Cherry, L. B. (SM)
Cram, F. M. (SM)
Cryer, J. E. (M)
Cunningham, R. E. (M)
Davis, V. E. (A)
Eckles, W. W., Jr. (M)
Ferguson, J. D. (M)
Haack, W., Jr. (A)
Hughes, B. F. (M)
Keenon, D. L. (M)
Kolak, C. S. (A)
Laughlin, C. E. (M)
Lawrence, T. B. (M)
Mazzagatti, R. D. (M)
Miller, P. M. (A)
Montague, L. E. (A)
Morgan, J. G. (M)
Musick, A. L., Jr. (M)
Normand, A. J. (A)
Oliver, J. L. (M)
Ott, L. G. (A)
Otto, G. (A)
Pearson, E. A. (A)
Petkovsek, J., Jr. (SM)
Powell, J. W. (A)
Scroggs, J. R. (M)
Shane, Z. G. (A)
Smith, H. K. (M)
Stockard, L. C. (M)
Straughn, W. L., Sr. (M)
Turk, G. L., Jr. (A)
Welch, H. E. (A)
Whitmeyer, L. J., Jr. (A)
Wilder, E. H. (M)
Wood, M. A. (A)

Beeville (SA-A-6)
Godfrey, B. L., Jr. (A)

Bellaire (HOU-6)
Barnette, L. A. M. (SM)
Bedcar, E. D. (M)
Borcten, R. R. (M)
Brock, A. H. (M)
Causey, C. N. (M)
Cowles, L. G. (SM)
Crawford, D. (M)
Cunningham, A. B. (M)
Hearne, S. M. (M)
Herzog, G. (F)
Hicks, F. M. (A)
Keyes, R. (M)
Lee, B. D. (SM)
Loofbourrow, R. J. (SM)
Mazzagatti, R. P. (SM)
Moore, S. D. (SM)
Peetz, G. E., Jr. (M)
Pitts, R. W. (M)
Reeves, D. S. (M)
Schafer, E. L. (A)
Stafford, J. A. (M)
Stelzer, R. B. (SM)

Bergstram AFB (SA-A-6)
Pipino, L. L. (M)

Big Lake (SA-A-6)
Segars, L. K. (M)

Big Spring (LUB-6)
Hagen, H. H. (M)
Light, J. E., Jr. (M)

Blooming Grove (DAL-6)
Crocker, J. A. (M)

Borger (LUB-6)
Smith, J. P. (M)

Breckenridge (FW-6)
McBeath, H. M., Jr. (A)

Brownfield (LUB-6)
Spear, R. B. (M)

Brownsville (SA-A-6)
Austin, T. D. (A)
Martin, G. H., Jr. (A)

Brownwood (FW-6)
Inman, F. W. (M)

Bryan (HOU-6)
Cox, W. B. (M)
Druce, A. J. (M)
Fridel, G. E. (M)
Kilmer, R. E. (M)
Sosolik, F. J. (A)

Canyon (LUB-6)
Maddux, J. T. (M)
Thompson, C. E. (M)

Carswell AFB (FW-6)
Reierson, V. L. (M)
Young, W. E. (M)

Castroville (SA-A-6)
Burges, E. G. (M)

Center (B-PA-6)
Riley, H. E. (A)

Channelview (HOU-6)
Bice, H. J. (A)
China (B-PA-6)
Seaberg, I. (M)

Cibolo (SA-A-6)
Seibel, H. (M)

Cleburne (FW-6)
Gardner, A. H. (SM)
Graham, H. L. (A)
McClanahan, M. E. (M)
Ryter, R. L. (SM)

College Station (HOU-6)
Ball, B. J. (M)
Bhosale, S. G. (M)
Dillingham, H. C. (SM)
German, J. P. (SM)
Hallmark, G. D. (SM)
Hebert, J. O., Jr. (M)
Johnson, M. R., Jr. (SM)
Jonas, L. K. (M)
Rekoff, M. G., Jr. (M)
Roots, E. N., Jr. (M)
Taack, G. B., Jr. (M)

Columbus (HOU-6)
Laurents, V. T. (A)

Commerce (DAL-6)
Farell, C. L. (M)
Sparkman, W. A., Jr. (M)

Corpus Christi (SA-A-6)
Kettlewell, J. (M)
Le Blanc, L. F. (A)
Lockhart, H. B. (A)
Roberts, J. D. (A)
Taylor, P. (M)
Zarvoska, J., Jr. (SM)

Dallas (DAL-6)
Abraham, R. P. (M)
Ackley, D. A. (M)
Adams, L. P. (SM)
Adcock, W. A. (SM)
Albano, J. (SM)
Allan, R. E. (M)
Alley, P. D. (M)
Alley, R. E., Jr. (M)
Allison, G. D. (M)
Anderson, J. (SM)
Ankele, E. T., Jr. (M)
Armistead, H. G., Jr. (M)
Arnold, D. C. (SM)
Ashley, C. E. (M)
Atchley, J. Q. (M)
Aymond, E. F., Jr. (A)
Bailey, R. W. (M)
Bailey, W. R. (M)
Baker, H. C. (M)
Bandy, C. C. (M)
Banks, B. M. (M)
Barnett, M. L. (M)
Barney, G. M. (M)
Barr, W. W. (A)
Barry, D. T. (M)
Barton, J. R. (A)
Bass, J. E. (M)
Batts, B. F. (M)
Bechtel, B. (A)
Becklund, O. A. (SM)
Bennett, G. T. (SM)
Bentley, E. M. (M)
Berglund, J. F. (M)
Blocper, W. H. (SM)
Blackwell, L. A. (M)
Blatt, J. D. (SM)
Boller, R., Jr. (M)
Bonin, E. L. (M)
Bonner, J. H. (M)
Bose, K. W. (M)
Bowling, W. P. (M)
Bowman, W. W. (M)
Bowne, J. C. (M)
Boyd, R. S. (M)
Boyles, A. E. (M)
Brachman, M. K. (SM)
Branham, D. W. (M)
Branum, M. C. (A)
Brawner, C. A., Jr. (SM)
Broodo, A. (M)
Brower, W. C. (M)
Brown, B. G. (M)
Brown, K. C. (M)
Brown, L. E. (M)
Brown, P. L. (A)
Brown, R. A., Jr. (A)
Brown, R. L. (SM)
Brown, V. L. (M)
Brumley, A. R. (M)
Brusie, N. C. (M)
Buchanan, D. L. (M)
Buchanan, R. A. (M)
Buchmeyer, H. W. (SM)
Buckner, R. P. (M)
Bullock, M. W. (SM)
Burdine, B. R. (M)
Burg, K. E. (M)
Burpen, J. G., Jr. (M)
Buzard, R. S. (M)
Byrn, R. L. (M)
Call, P. D. (M)
Calvert, D. T. (A)
Camp, H. E. (M)
Campbell, J. R. (M)
Campion, R. M., Jr. (A)
Cantwell, W. C. (M)
Carey, D. R. (A)
Carland, J. F. (SM)
Carleton, G. W. (M)
Carlton, A., Jr. (M)
Carney, P. E. (M)
Carpenter, J. R. (A)
Carr, W. B. (A)
Carter, A. W. (M)
Carter, T. F. (M)
Case, H. B. (M)
Chandler, J., Jr. (M)
Chang, C. M. (M)
Chapin, R. C. (M)
Chapman, A. B. (M)
Chenault, H. P. (A)
Childress, C. B. (M)
Chun, M. E. (SM)
Cipher, J. A. (M)
Clark, L. D. (M)
Clark, W. E. (M)
Cleaver, B. L. (A)
Clinger, A. H. (M)
Coats, R. P. (A)
Collier, G. A. (M)
Congdon, R. L. (SM)
Constant, [illegible] (M)
Cooper, J. W. (SM)
Corwin, T. L. (A)
Couch, V. Y. (M)
Coursey, J. R. (M)
Couvillion, A. J., Jr. (M)
Crabtree, W. A. (M)
Crandell, C. F. (M)
Crank, J. B. (M)
Crawford, J. D. (M)
Cuesta, N., Jr. (SM)
Cullum, A. E., Jr. (F)
Cunningham, R. W. (M)
Currie, H. A., Jr. (M)
Dannemiller, J. R. (M)
Daniell, C. M. (SM)
Da Silva, T. M. (M)
Davis, C. F., Jr. (M)
Day, W. J. (M)
Deaderick, G. E. (M)
Dean, J. T. (M)
Delashaw, J. W. (M)
Dew, W. M., Jr. (M)
De Weese, C. R. (M)
Dill, C. T. (A)
Dobbins, T. K. (M)
Dodd, C. L. (SM)
Doherty, J. E. (M)
Douglas, J. H. (M)
Dowell, K. P. (M)
Dreke, D. W. (M)
Dunaway, R. M. (M)
Dunlap, J. T., Jr. (M)
Dunlap, R. H. (M)
Durham, K. M., Jr. (A)
Dyer, F. C. (M)
Earhart, C. E. (SM)
Ebensberger, A. C. (SM)
Edwards, T. S. (M)
Elird, M. A. (M)
Elkenburg, R. B. (M)
Elkins, C. C. B., Jr. (M)
Ellis, B. E. (M)
Elmore, C. M., Jr. (M)
Emery, F. E. (M)
Evans, A. D. (SM)
Everts, S. G. (SM)
Eyres, W. G. (SM)
Farmer, C. R., Jr. (A)
Farrell, T. A., Jr. (M)
Faullin, R. R. (M)
Fennel, C. K. (M)
Fernandez, M. (SM)
Fewer, D. R. (SM)
Finlayson, J. K. (M)
Finley, C. G. (M)
Fischer, D. G. (M)
Fisher, L. M. (M)
Flath, E. H., Jr. (M)
Flynn, J. G., Jr. (SM)
Fontenot, W. J. (M)
Ford, J. W. (M)
Fox, C. H. (M)
Fox, J. B. (M)
Fox, K. R. (M)
Francis, T. L. (M)
Frauman, C. I. (M)
Friedrichs, C. C., Jr. (M)
Frost, E. S. (M)
Gaertner, R. F. (M)
Garrett, C. L. (M)
Geia, A. J. (M)
Geisel, F. J. (SM)
Geissinger, E. L. (M)
George, R. A. (M)
Germain, J. M. (M)
Gerrard, J. A. F. (SM)
Gibbs, T. E. (SM)
Gilder, E. E. (A)
Gillam, J. R. (A)
Gluck, L. D. (M)
Godbey, J. K. (SM)
Goodman, W. D. (A)
Gragert, W. J. (M)
Granberry, D. S. (SM)
Gray, C. T. (M)
Green, G. F., Jr. (M)
Green, J. A. (SM)
Greenberg, L. H. (M)
Griffin, E. H. (M)
Griffin, R. C. (M)
Grover, L. L. (M)
Gudzin, M. G. (M)
Haefele, D. M. (M)
Haggerty, P. E. (F)
Hall, D. B. (M)
Hall, J. R. (SM)
Hallford, B. R. (M)
Hammack, G. W. (M)
Hankinson, O. N. (M)
Hansen, M. O., Jr. (M)
Harmon, F. I. (M)
Harmon, R. E. (M)
Harrison, F. (SM)

Hass, N. W. (M)
Hasty, J. D. E. (SM)
Hatcher, J. L. (M)
Hayes, B. M. (A)
Head, C. D., III (M)
Headington, N. L. (M)
Hedeman, W. R., Jr. (SM)
Heizer, K. W. (M)
Henderson, R. P. (M)
Hendricks, J. B. (M)
Henrici, C. R. (SM)
Herbst, A. O. (M)
Hewlett, T. N. (M)
Hill, P. W. (M)
Himmel, R. N. (M)
Hodges, A. J. (M)
Hoehn, G. L., Jr. (M)
Holle, E. G. (M)
Holt, I. D. (M)
Hooker, B. C. (A)
Horne, K. M., Jr. (A)
Howard, G. M. (SM)
Howard, L. L. (M)
Howes, R. B., Jr. (A)
Humke, F. O., Jr. (M)
Hunt, J. T. (A)
Hurley, J. H., Jr. (A)
Hutchinson, N. D. (M)
Hutson, R. N. (M)
Hyltin, T. M. (A)
Ince, N. S. (M)
Ingram, J. H. (M)
Irwin, B. B. (M)
Irwin, C. B., Jr. (M)
Jackson, R. W. (SM)
Jaeger, W. S. (A)
Jenkins, E. A. (A)
Joel, H. C. (M)
Johnson, D. L. (M)
Johnson, G. D. (M)
Johnson, W. M. (M)
Johnson, W. S. (A)
Jones, D. W. (M)
Jones, J. B. (M)
Jones, R. L., Jr. (A)
Jones, R. W. (M)
Jostrand, B. D. (A)
Joyce, W. F. (SM)
Jurek, W. M. (SM)
Kaiser, R. L. (M)
Kamena, J. G. (M)
Kantenberger, R. F. (A)
Kearley, R. I., Jr. (M)
Keener, R. F. (M)
Keilfer, E. G. (M)
Kelly, J. J. (A)
Kelsay, W. D. (M)
Kennedy, F. H., Jr. (SM)
Kenton, W. L. (A)
Kettler, C. L. (M)
Kettler, E. W., Jr. (M)
Keyser, A. R., Jr. (M)
Kilby, J. S. (M)
Kirksey, T. W. (M)
Kitchens, L. G. (M)
Koelmans, G. D. (M)
Kost, C. R. (M)
Kuehne, W. (SM)
Kuhn, T. G. (M)
Lambert, C. C. (M)
Land, D. W. (M)
La Taste, C. D. (A)
Lawler, C. E. (A)
Lawrence, L. J. (A)
Lawson, R. T. (A)
Ledford, R. E., Jr. (A)
Ledlow, K. L. (M)
Lee, C. (M)
Leedom, J. N. (M)
Leinfelder, E. J. (A)
Lempner, J. S. (M)
Lentini, J. J. (M)
Lewis, M. T. (M)
Lincoln, C. F., Jr. (M)
Lineback, J. T. (M)
Linker, C. L. (M)
Lipscomb, E. W. (SM)
List, B. H. (M)
Little, W. A. (M)
Long, K. G. (A)
Long, W. G., Jr. (M)
Loper, G. B. (M)
Loposer, T. L. (SM)
Loras, J. (SM)
Lowe, H. N. (A)
Lowry, J. H., Jr. (SM)
Lucas, G. H. (M)
Lupfer, W. C. (A)
Lynne, S. (M)
Macdonald, J. R. (F)
Mace, J. W. (M)
Macurak, A. (M)
Magnuson, K. W. (M)
Mansur, G. F., Jr. (M)
Marcus, S. B. (M)
Marshall, C. H. (M)
Martin, D. O. (SM)
Martin, D. W. (M)
Martin, E. D., Jr. (M)
Martin, E. E. (M)
Martin, J. W. (A)
Martin, W. L. (M)
Martin-Vegue, C. A. (M)
Mason, A. E., Jr. (M)
Matlack, N. C. (SM)
Matzen, W. T. (M)
Maxwell, J. W. (M)
Maxwell, K. D. (SM)
McAnally, D. G. (M)
McClellan, J. C., Jr. (M)
McClure, R. M. (M)
McConnell, D. K. (M)
McConoughey, S. R. (M)
McCord, A. R. (M)
McDermott, E. (M)
McDonald, J. E. (M)
McDuffie, G. L. (SM)
McGahen, P. W. (M)
McGarrah, J. E. (M)
McIntyre, R. L. (M)
McKenna, R. G. (M)
McKinney, R. C. (M)
McMillin, J. M., Jr. (M)
McMullin, T. J. (M)
McNeely, J. S. (SM)
Meador, M. E. (M)
Meads, P. H. (M)
Meinholdt, D. W. (A)
Meinstein, A. (M)
Melancon, N. J. (A)
Meredith, M. K. (M)
Meyer, C. J. (M)
Meyer, R. B. (M)
Michaelis, L. P. (M)
Miedke, R. C. (M)
Milam, W. C. (M)
Miller, H. M. (M)
Miller, N. D. (SM)
Millican, G. L. (M)
Mills, R. L. (M)
Mitchell, E. E. (M)
Mitchell, H. L. (M)
Mitchell, W. R. (M)
Moffitt, J. F. (M)
Monroe, T. C., Jr. (M)
Moore, J. E., Jr. (M)
Moore, J. G. (A)
Morgan, R. E. (M)
Morris, K. L. (M)
Morris, R. B. (M)
Morrison, E. J. (M)
Morrison, J. A., Jr. (M)
Morton, H. W. (M)
Moseley, T. B. (SM)
Moss, H. (SM)
Moxley, W. C., Jr. (A)
Mundell, D. P. (A)
Mut, S. C. (M)
Naab, P. J. (M)
Nastasiak, J. J. (SM)
Neal, C. M. (M)
Neathery, J. L., Jr. (M)
Neitzel, E. B. (M)
Nelson, J. E. (M)
Nelson, R. M. (M)
Newell, B. J. (A)
Nichols, R. H., Jr. (M)
Niemann, G. W. (M)
Niemeyer, J. M. (A)
Nilson, O. J. (A)
Nipper, J. T. (M)
North, M. E. (M)
Norvell, E. W. (A)
Norvell, K. A. (M)
Nunley, W. (M)
Oakley, J. H. (M)
O'Connor, C. G. (M)
Ohlen, G. M. (M)
Ohlrich, J. H. (A)
Olson, R. W. (F)
Orand, C. E. (A)
Orris, E. C. (M)
Orsinger, A. R. (M)
Osborn, W. F. (M)
Owen, J. G. (M)
Owens, H. L. (SM)
Owens, T. E., Jr. (SM)
Pacini, E. J. (M)
Packard, D. C. (A)
Palmer, W. D. (M)
Papoulias, V. P. (M)
Parsons, R. L. (A)
Patrick, L. B. (M)
Patterson, J. W. (M)
Pelt, T. E. (M)
Penisten, D. E. (M)
Penn, W. D. (SM)
Peterson, D. A. (SM)
Petritz, R. L. (A)
Phillips, J. B. (A)
Phillips, J. L., Jr. (M)
Phillips, W. M. (M)
Pittman, P. D., Jr. (M)
Poole, F. M. (M)
Potter, W. D. (M)
Pritchard, R. L. (F)
Puckett, R. D. (A)
Quimby, K. S., Jr. (A)
Rapp, R. N. (A)
Ratti, J. N. (M)
Ray, R. E. (M)
Redmond, W. G., Jr. (SM)
Reed, B. S. (M)
Reese, J. R. (M)
Reese, J. R. (M)
Renner, D. S. (M)
Retzlaff, D. (M)
Reynolds, B. C. (M)
Rice, J. A. (M)
Rice, L. W., Jr. (M)
Rich, E. A. (M)
Riley, E. C. (A)
Riser, H. N. (M)
Ritchie, C. A. (M)
Robel, R. B. (SM)
Roberts, E. L. (M)
Roberts, J. O. (A)
Robinson, D. A. (A)
Robinson, G. C. (M)
Robinson, R. C. (M)
Rodden, W. H. (M)
Romans, W. E. (M)
Rosentreter, E. W. (SM)
Ross, C. C. (M)
Ruhberg, D. L. (A)
Runyan, W. R. (M)
Russum, P. E. (M)
Rutherford, C. R. (M)
Sample, G. A. (M)
Sapo, A. E., Jr. (M)
Sarraflan, G. P. (M)
Sartor, J. O., Jr. (M)
Satterwhite, G. D. (M)
Saunders, R., Jr. (SM)
Scammel, B. C. (M)
Scanlon, P. J. (M)
Schleicher, R. R. (M)
Schminke, R. E. (A)
Schultz, R. H. (M)
Schwalm, C. M. (M)
Seay, C. F., Jr. (SM)
Service, C. W. (M)
Sessel, R. (M)
Severin, J. A. (M)
Sharp, F. B., Jr. (M)
Sheffield, R. D. (M)
Shepherd, M., Jr. (SM)
Sherman, M. R. (M)
Shoemaker, C. E. (M)
Shook, E. M. (M)
Shuffler, R. M. (SM)
Simmons, A. C., Jr. (M)
Simonds, F. W. (M)
Simpson, J. D. (M)
Sims, C. R. (M)
Slack, D. G. (M)
Smallwood, J. L. (M)
Smith, A. B. (A)
Smith, D. L. (M)
Smith, F. G. (A)
Smith, F. G., Jr. (SM)
Smith, G. A., Jr. (M)
Smith, H. J. (SM)
Smith, J. E. (A)
Smith, J. H. (M)
Smith, L. R. (M)
Smith, M. W. (M)
Smith, P. J. (M)
Smith, R. T. (M)
Smoot, R. L., Jr. (A)
Smylie, J. W. (M)
Snipes, R. W. (A)
Sobey, A. E., Jr. (SM)
Songayllo, A., Jr. (M)
Sorkin, S. A. (M)
Sorrows, H. E. (A)
Spaulding, G. B. (SM)
Spencer, L. P. (A)
Spieker, L. J. (M)
Stanford, J. A. (M)
Stein, A. J., Jr. (M)
Stevens, B. A. (M)
Stewart, W. E. (M)
Stiedle, P. P. (M)
Storey, B. (M)
Stover, J. S. (M)
Strom, L. D. (M)
Stroup, R. M., Jr. (M)
Sullivan, O. J. (M)
Sullivent, E. E., Jr. (M)
Summers, G. C. (M)
Sumners, H. S. (M)
Sustare, B. A. (M)
Tatom, W. C. (M)
Tatum, F. W. (SM)
Taylor, J. H. (M)
Teal, G. K. (F)
Teasdale, A. R., Jr. (SM)
Teddlie, E. A. (A)
Thiede, H. T. (M)
Thomas, C. T. (SM)
Thomas, O. E. (M)
Thompson, J. H., Jr. (SM)
Thompson, W. J. (M)
Thompson, W. L. (M)
Thomson, J. R. (M)
Thomson, J. T., Jr. (M)
Thurmond, F. S., Jr. (M)
Tipple, K. R. (M)
Tittle, C. W. (SM)
Titus, G. W. (M)
Tooley, J. R. (M)
Travis, J. B., Jr. (M)
Trent, R. L. (SM)
Trewitt, M. B. (M)
Tschudi, D. E. (M)
Tubb, G. E. (M)
Tucker, C. W. (M)
Tucker, D. J. (SM)
Tullius, A. B. (M)
Tullius, R. F. (M)
Vanderpool, C. L. (A)
Vandigriff, J. E. (M)
Van Voorhis, J. B. (M)
Varga, J. E. (M)
Vargez, J. P., Jr. (M)
Villalg, J. L., Jr. (SM)
Vincent, B. T., Jr. (M)
Volcansek, M., Jr. (M)
Wadel, L. B. (SM)
Waite, H. M. (A)
Walker, D. E. (M)
Wall, M. J. (M)
Wallace, P. P. (M)
Wallace, R. M. (M)
Wallis, T. F., Jr. (A)
Walston, J. A. (A)
Walters, C. C. (M)
Walters, R. K. (M)
Waters, W. F. (M)
Watson, C. D., Jr. (M)
Watson, J. T. (M)
Watson, L. C. (M)
Waugh, J. H., Jr. (M)
Weaver, S. M. (M)
Weaver, T. H. (M)
Webberman, B. M. (M)
Weber, R. L. (M)
Webster, R. R. (SM)
Wedel, E. L. (A)
Weed, K. F. (M)
Weedfall, R. W. (M)
Weeks, R. M. (M)
Weeks, R. R. (SM)
Weinreich, G. F., Jr. (A)
Welch, A. B. (M)
Welch, C. (M)
Weldon, J. F. (M)
Weldon, J. O. (F)
Wells, E. R. (M)
Wendelbo, C. A. (M)
Westerberg, G. E. (M)
Wetterau, L. C., Jr. (M)
White, C. A., Jr. (M)
White, F. J. (M)
White, G. W., Jr. (SM)
Whitehurst, J. D. (M)
Whitson, D. R. (M)
Wilhelm, E. S. (SM)
Wilkinson, J. D. (M)
Wilkinson, M. M. (M)
Willard, R. S., Jr. (M)
Williams, C. S. (SM)
Williams, E. R., Jr. (M)
Williamson, V. R. (M)
Willis, G. D. (M)
Wills, R. V., Jr. (M)
Wilson, R. (M)
Winslow, C. (A)
Wissemann, H. J. (SM)
Witty, W. M. (SM)
Wolk, I. F. (A)
Wolny, W. T. (M)
Wood, H. A. (M)
Woods, R. B. (SM)
Woolfolk, R. L. (SM)
Worth, W. G., Jr. (SM)
Wortham, A. W. (SM)
Wright, J. A. (M)
Wulle, R. F. (M)
Wunsch, D. E. (M)
Wyatt, A. E. (M)
Yaggi, L. A., Jr. (M)
Yancey, J. D., Jr. (M)
Yarbrough, A. D. (M)
Yeagley, F. W. (SM)
Zapp, K. A. (A)
Ziemer, D. R. (M)
Zimmerman, C. W. (M)
Zimmerman, J. D. (M)
Zimmerman, M. (M)

De Kalb (SHR-6)
Harkey, T. J. (A)

Del Rio (SA-A-6)
Bosquez, R. D., Jr. (M)
Chemack, S. (A)

Denison (DAL-6)
Patti, V. C. (A)

Denton (FW-6)
Haisler, J. B., Jr. (M)

Devine (SA-A-6)
Anderson, W. L. (M)
Burkholder, C. C. (M)
Martin, C. F. (M)

Dickinson (HOU-6)
Thomason, E. M. (A)

El Paso (EP-6)
Alexander, W. R. (A)
Anderson, K. E. (A)
Atherton, T. A. (M)
Back, M. B., Jr. (M)
Baird, J. K. (M)
Barnes, T. G. (SM)
Barto, R. C. (M)
Bayer, J. A. (A)
Beck, C. L. (A)
Beymer, E. H. (M)
Bigelow, G. F. (M)
Bringelson, A. L. (M)
Brown, C. W., Jr. (A)
Brown, J. S. (M)
Bryant, A. D. (M)
Bulger, T. J. (A)
Carr, R. T. (A)
Cates, J. D. (M)
Cavanna, A. R., Jr. (M)
Cito, A. V. (M)
Clatfelter, A. C. (SM)
Clelland, L. M. (M)
Crosson, J. W. (M)
Davis, W. B. (M)
Dean, E. A. (M)
De Busk, W. H. (M)
Dickson, J. C. (M)
Dryden, E. R., Jr. (A)
Ebert, R. H. (A)
Enloe, H. L. (M)
Fernstrom, C. H. (M)
Fischer, D. W., Jr. (A)
Flottman, E. R. (M)
Francis, L. G. (M)
French, C. E. (M)
Fulkerson, T. E. (M)
Gavaldon, A. L. (A)
Geller, M. (A)
Goodwin, H. C. (A)
Hardison, J. M. (M)
Hauffe, G. S. (M)
Howe, W. M. (M)
Hurd, C. D. (M)
Ingram, B. A. (M)
Itsines, N. J. (A)
Jabor, T. (M)
Jensen, H., Jr. (M)
Johnson, D. L. (M)
Jones, R. T. (A)
Jones, T. R., Jr. (M)
Keith, R. E. (M)
Kelch, J. E. (A)
Kleman, D. L. (M)
Kitchen, F. J. (M)
Kotorsky, S. K. (M)
Kryvanich, M. A. (M)
Krutilek, G. A. (A)
Kuberski, O. C. (M)
Kuntz, H. A., Jr. (M)
Lentz, W. H. (M)
Littlefield, D. F. (M)
Lovitt, S. A. (A)
Lutener, O. C. (M)
Manglapane, R. (M)
Manguiles, I. (M)
Marshall, S. V. (M)
Maury, J. H. (M)
Mayes, R. A. (A)
McCalla, T. M., Jr. (M)
McCollum, A. J. (A)
McCreary, J. T. (A)
McGee, J. F. (SM)
McGill, W. T. (M)
McGraw, J. E. (SM)
McKennon, L. W. (A)
McKenzie, J. (A)
McNicol, D. C. (A)
Meredith, G. L. (M)
Messina, J. (M)
Miles, J. R., Jr. (M)
Miller, W. E., Jr. (SM)
Morgan, W. R. (A)
Morgan, Z. K., Jr. (A)
Nagel, R. (M)
Napper, H. B. (M)
Polking, U. H. (M)
Rhoden, V. C., Jr. (M)
Rice, T. B. (M)
Richards, H. E. (M)
Rieger, R. W. (M)
Robey, E. E. (A)
Rojas, A. M. H. (M)
Santa Ana, L. T. (A)
Sarge, A. E. (A)
Schroeder, K. G. (M)
Sharp, R. L. (M)
Shiplett, K. E. (M)
Slater, B. M. (M)
Smith, K. W. (M)
Stephens, J. L. (A)
Stuart, J. F. (SM)
Swan, R. L. (M)
Talbott, E. P. (SM)
Thomson, O. A. (A)
Thorne, H. W. (A)
Timmons, W. L. (A)
Toland, W. A. (M)
Trullinger, L. L. (A)
Turke, R. C. (M)
Van Gorder, M. (M)
Waite, A. C., Jr. (M)
Walker, P. G., III (M)
Walton, K. J. (M)
Wasser, N. (M)
Watkins, R. I. (M)
Webb, L. G. (M)
Whaley, W. W. (M)
Wilder, G. E. (M)
Wilson, D. J. (A)

Fayetteville (HOU-6)
James, D. B. (M)

Fort Bliss (EP-6)
Cardenas, H. A. (M)
Chin, Q. (M)
De La Torre, V. R. (A)
Rush, R. I. (M)
Tomlin, E. W., III (A)
Vass, J. L., Jr. (A)
Warner, L. L. (A)
Yuill, S. J. (M)

Fort Davis (EP-6)
Thompson, A. R. (M)

Fort Worth (FW-6)
Absolom, R. H. (A)
Adams, W. A. (M)
Alexander, B. W. (M)
Allen, C. A., Jr. (M)
Allen, R., Jr. (M)
Allensworth, J. L. (M)
Athans, M. (A)
Atkins, T. T. (SM)
Babb, D. D. (M)
Baglione, D. F. (A)
Baker, B. R. (M)
Ball, J. H. (M)
Barr, E. W. (A)
Bateman, J. W. (M)
Baxley, W. E. (A)
Bean, R. C. (M)
Beasley, B. (M)
Bednash, J. D. (M)
Bingham, C. R., Jr. (M)
Blackwell, W. A. (M)
Blum, S. (SM)
Boatright, A. W. (M)
Boileau, V. C. (M)
Bourland, H. M. (M)
Brandt, L. C. (M)
Brock, W. P. (M)
Bronson, R. D. (M)
Brooker, E. G., Jr. (M)
Brooks, J. L. (M)
Brothers, J. E. (A)
Bruce, B. D. (A)
Brunette, E. L. (M)
Brust, M. F. (M)
Bryan, K. W. (M)



Bunch, B. D. (A)
Burkhalter, W. R. M. (M)
Cantrell, W. E. (SM)
Carr, P. G. (M)
Case, E. E. (A)
Caudle, R. L. (A)
Chandler, S. B. (A)
Charvoz, P. L. (M)
Christian, H. C. (M)
Clark, J. E., Jr. (M)
Clark, L. T. (A)
Clements, C. W. (SM)
Colfax, D. E. (SM)
Condron, W. F. (A)
Conrad, R., Jr. (M)
Cook, A. B. (M)
Cotnam, J. L. (M)
Cox, E. R. (M)
Crittenden, L., Jr. (M)
Crotty, J. V. (SM)
Crumb, S. F. (SM)
Cyr, R. P. (M)
Daggett, D. H. (M)
Danner, O. G. (M)
Deering, C. S. (M)
Dickenson, R. M. (M)
Diffin, K. S. (M)
Dilworth, G. H. (M)
Dinsmore, J. T. (A)
Dodd, J. M. (M)
Drewett, J. D. (M)
Dunlap, K. H. (A)
Du Teil, J. P. (M)
Eberhard, R. C. (M)
Ecklund, T. W. (M)
Egan, D. G. (SM)
Ellett, J. D. (M)
Elliott, J. E. (M)
Ellis, H. G. (M)
Emery, L. T. (M)
Errante, J. J. (M)
Falk, B. (M)
Felice, J. J. (M)
Fink, W. L. (M)
Finkbonner, W. E. (M)
Fisher, M. C. (A)
Fleming, D. R. (M)
Fletcher, C. H. (M)
Ford, B. H., Jr. (M)
Foreman, D. E. (M)
Fowler, J. (M)
Frank, A. (A)
Fuhrman, W. J. (M)
Funderburk, H. E. (SM)
Gandy, W. (SM)
Gaston, C. W. (M)
Gentry, B. F. (M)
Gilmartin, T. (SM)
Goggin, J. C. (M)
Gordon, M. J. (M)
Green, P. C. (SM)
Greene, C. E. (M)
Greenlee, D. R. (M)
Grubbs, C. L. (M)
Hair, U. R. (A)
Hall, C. D. (M)
Hann, G. W. (M)
Hardin, B. A. (M)
Hargrove, J. L. (M)
Harman, D. G. (SM)
Haury, F. W., Jr. (M)
Hawkins, W. K. (A)
Hawks, R. B. (M)
Hawthorne, M. M. (M)
Hay, G. W. (SM)
Hayes, R. R. (M)
Hayes, T. J. (A)
Heizer, L. E. (M)
Hicks, R. D. (M)
Hill, H. H., Jr. (M)
Hines, R. L. (M)
Hites, W. H. (M)
Hodges, T. R. (A)
Hogue, W. T. (M)
Holliday, C. E. (A)
Holt, J. M. (M)
Holtkamp, L. A. (A)
Hudgens, L. L. (M)
Jackson, G. L. (M)
Jiles, C. W. (SM)
Johns, S. E., Jr. (A)
Johnson, C. E., Jr. (A)
Jones, D. M. (M)
Kearse, G. P. (SM)
Keck, J. F. (A)
Kelly, B. A. (SM)
Keppler, C., III (M)
Kidd, L. H. (SM)
Kimbell, E. C. (M)
Kinyon, W. E. (M)
Knight, D. G. (M)
Koshi, D. M. (M)
Koski, J. I. (SM)
Kunselman, J. S. (A)
Lairmore, W. J. (SM)
Lanham, S. T., Sr. (M)
Lanier, J. (M)
Lattler, E. E., Jr. (M)
Logsdon, H. E. (M)
Looney, G. R. (M)
Lott, J. C. (M)
Macune, C. W. (M)
Maes, W. J. (SM)
Mallory, Y. L. (SM)
Manchbanks, N. B., Jr. (M)
Martin, W. E. (M)
Mathis, B. G. (M)
Mayfield, S. A. (M)
McCully, W. L. (M)
McCutcheon, T. L. (M)
McDonnell, J. E. (M)
McDuff, B. G. (M)
McKenzie, J. R., Jr. (M)
McMary, R. C. (A)
McWhorter, L. C. (M)
Mehrwm, R. L. (M)
Mercer, A. A. (M)
Migliaco, P. S. (M)
Miller, E. W. (M)
Mitchell, D. B. (M)
Moore, J. W. (M)
Moore, N. E. (M)
Moore, W. F. (A)
Morgan, R. L. (M)
Morgenthaler, H. L. (A)
Mowery, D. K. (M)
Mundy, M. E. (A)
Musil, V. P. (M)
Neher, H. T. (SM)
Neshyba, S. J. (M)
Nunley, L. J. (M)
Pace, R. L. (M)
Palmer, E. B. (M)
Palmer, J. E. (M)
Peck, R. D. (M)
Perry, E. R. (M)
Peterson, W. E. (M)
Pickens, F. T., III (M)
Piel, S. A. (M)
Powell, S. C. (M)
Pryor, L. C. (A)
Quirino, F. (SM)
Randal, J. M. (M)
Rankin, L. T. (A)
Rasmussen, J. M. (M)
Redman, J. (A)
Reeves, R. R. (M)
Roberts, P. L. (A)
Robertson, D. R. (M)
Robertson, G. H. (M)
Robinson, D. A. (M)
Robinson, J. H. (M)
Robinson, T. P. (M)
Roderick, R. (SM)
Rodgers, V. P., Jr. (M)
Romaker, P. F. (A)
Ross, D. R. (M)
Roy, F. J. (M)
Rushing, G. F. (M)
Rutman, S. M. (A)
Salis, A. E. (SM)
Schappert, P. J. (M)
Seale, I. A. (M)
Serfass, B. R. (A)
Sewell, C. R. (M)
Seymour, D. E. (M)
Shafer, L. (M)
Shaver, J. W. (M)
Shepherd, M. F. (M)
Shoptaugh, J. R., Jr. (M)
Sissom, A. W. (SM)
Sivernell, R. B. (A)
Slack, J. R. (M)
Slagle, G. M., Jr. (M)
Smith, H. L. (A)
Smith, J. R. (M)
Smith, L. B. (M)
Smith, R. O. (A)
Snead, J. L., Jr. (M)
Sneed, C. O. (M)
Soniat, A. E. (M)
Spears, M. F. (M)
Spencer, J. L. (M)
Spradlin, J. O. (M)
Standridge, H. H. (M)
Stanford, E. G. (M)
Stanley, J. D. (A)
Stewart, G. W. (M)
Stimpfl, E. J. (A)
Stoker, C. J. (M)
Strack, L. W., Jr. (M)
Straiton, J. W. (SM)
Stribling, J. L., Jr. (M)
Strother, J. J. (M)
Sumner, G. C. (SM)
Theriot, I. J. (SM)
Thomas, J. E. (A)
Thomasson, W. D. (M)
Tinkler, D. M. (M)
Travis, C. M. (SM)
Trimm, J. H. (M)
Tucker, B. J. (M)
Turner, A. G., Jr. (M)
Van Hoozer, C. H. (M)
Watkins, O. E. (M)
Watson, D. C. (M)
Watson, P. G. (M)
Watson, R. D. (M)
Watts, J. D. (M)
Webb, E. E. (SM)
Webb, V. C. (M)
Webber, E. O. (M)
Weidler, C. R. (M)
Welter, N. E. (M)
Wentworth, G. E. (M)
Williams, C. E. (M)
Williman, J. F. (M)
Wilson, C. T. (M)
Wolanski, H. S. (A)
Wood, G. K. (M)
Woodard, K. R. (M)
Woodrun, H. C. (A)
Worley, E. B., Jr. (M)
Wren, B. W. (A)
Yandell, D. (M)
Young, E. D. (M)
Young, F. W. (M)

Freeport (HOU-6)
Coker, S. G. (M)

Galveston (HOU-6)
Lee, J. L. (M)
Matthews, J. A. (A)

Garland (DAL-6)
Albertine, H., Jr. (SM)
Allen, E. (M)
Andreassen, H. N. (M)
Bickel, R. L. (M)
Bondy, M. A. (SM)
Buie, J. G. (A)
Burden, H. O., Jr. (M)
Cawood, J. L. (A)
Coleman, H. R. (M)
Cox, K. J. (M)
Davis, P. D., Jr. (SM)
Dubose, G. P. (M)
Eichenseer, R. J. (M)
Faith, W. O. (SM)
Fumell, W. W., Jr. (SM)
Garrett, F. W. (M)
Gill, R. M. (M)
Gillett, J. D. (M)
Granger, F. P., Jr. (M)
Griffith, B. W., Jr. (SM)
Grubbs, C. E. (M)
Grubbs, W. C., Jr. (SM)
Haper, C. K. (M)
Hand, R. L. (M)
Harton, P. L. (M)
Henneke, H. L. (M)
Hoelle, H. J. (A)
Hom, C. E. (M)
Houston, R. H. (A)
Jackson, H. J. (A)
Kattawar, A. (M)
Keeth, J. K. (M)
Kelly, W. T. (M)
Lamb, E. D. (M)
Langston, J. W. (M)
Logan, F. (M)
Lynn, J. C. (M)
MacKenzie, D. G. (M)
Marcucci, R. L. (M)
Marshall, L. C. (SM)
McCrum, K. W. (M)
McMurtrey, A. W., Jr. (SM)
Mitchell, W. D. (SM)
Morey, G. C. (M)
Parish, H. G. (M)
Parrish, O. C. (M)
Patterson, W. E. (M)
Riley, J. H. (A)
Salisbury, W. W. (F)
Sandefer, S. R. (A)
Sanford, A. L. (A)
Shaw, J. D. (M)
Sneed, J. D. (M)
Sohrer, H. K., Jr. (M)
Spillman, J. C. (M)
Stanton, A. N. (SM)
Tackett, H. A. (SM)
Thomas, T. C. (M)
Tipton, C. D. (SM)
Turvey, E. J. (M)
Underbrink, G. P. (M)
Whiteside, D. L. (M)
Williams, B. M. (SM)
Williams, C. E. (M)
Yeager, D. L. (M)

Genoa (HOU-6)
Johnson, O. F. (M)

Georgetown (SA-A-6)
Brown, B. M. (M)

Grand Prairie (DAL-6)
Albertson, H. D. (M)
Anderson, R. P. (M)
Blanning, R. B. (M)
Chadbourne, J. D. (M)
Davis, J. T., Jr. (M)
Glenn, R. D. (M)
Harris, B. A. (M)
Howell, J. S., Jr. (A)
Morris, B. V. (M)
Romary, D. L. (M)
Tharp, C. U. (A)
Young, D. C. (M)

Grapevine (FW-6)
Blackshear, J. W. (A)
Donaldson, C. A. (M)
Donovan, J. J. (M)
McMurray, R. F. (M)

Greenville (DAL-6)
Cain, R. E. (M)
Johnson, D. M. (M)
Myers, W. D. (M)
Shuler, J. L. (M)

Hamilton (FW-6)
Sparks, E. C., Jr. (A)

Harlingen AFB (SA-A-6)
Harrill, J. W. (M)
Murdock, A. E. (A)
Summers, R. R. (M)

Henderson (SHR-6)
Daniels, T. E. (SM)

Hitchcock (HOU-6)
Hullett, V. T. (A)

Houston (HOU-6)
Adkins, E. E., III (A)
Albertson, J. N. (A)
Anderson, W. L. (SM)
Anker-Goll, K. (M)
Armand, H. A. (SM)
Arnett, R. A. (SM)
Arthur, M. A. (SM)
Asbury, R. T. (M)
Atkinson, C., Jr. (M)
Atmar, R. L., Jr. (M)
Attali, G. (M)
Austin, F. M. (SM)
Badger, A. S. (SM)
Bailey, E. H. (A)
Baker, B. M. (SM)
Baker, J. H. (M)
Baker, L. E. (M)
Baker, R. L. (A)
Ball, D. F. (SM)
Ball, J. D. (M)
Beeman, K. R. (M)
Belk, J. H. (A)
Bender, J. C. (SM)
Benner, R. G. (A)
Beyer, A. R. (A)
Beyer, F. (A)
Beyer, J. A. (M)
Biggs, M. A. (A)
Blanchard, A. (SM)
Bodden, A. L., Jr. (A)
Boys, C. W. (A)
Booker, J. L. (A)
Bowen, L. C., Jr. (A)
Bowers, W. E. (M)
Boyd, C. S. (A)
Braidwood, D. W. (M)
Bravenec, F. R. (M)
Brezik, F. J., Jr. (A)
Brock, F. A. (M)
Brougher, R. M. (M)
Brown, C. R. (M)
Browne, J. H. (M)
Bryan, R. G. (M)
Buck, H. M. (SM)
Buckner, G. O., Jr. (SM)
Bucy, J. F. Jr. (SM)
Buechner, R. H. (SM)
Bulhon, J. J. M. (M)
Burnett, D. (M)
Burrows, R. C., Jr. (M)
Burton, J. R. (M)
Busacker, J. W. (A)
Butemeyer, D. K. (M)
Byers, E. G. (SM)
Byrnes, R. W. (A)
Cammack, A. R. (A)
Campbell, J. R. (M)
Canup, R. E. (SM)
Capers, J. L. (A)
Caplan, R. S. (SM)
Capote, L. C. (A)
Carter, J. H. (A)
Carter, W. H., Jr. (SM)
Chapman, C. W. (M)
Childers, H. E. (SM)
Chinski, G. R. (SM)
Chung, W. J. Y. (M)
Clerc, M. C. (M)
Cohn, D. (A)
Cook, G. R. (SM)
Cormier, R. E. (M)
Coulter, T. W. (M)
Craig, G. H. (M)
Crews, I. B. (M)
Crook, T. N. (M)
Crossland, O. C. (A)
Cummings, L. C., Jr. (M)
Curry, C. P. (M)
Dady, W. E. (M)
Davis, A. Q., Jr. (M)
Davis, S. B. (A)
Davison, B. D. (A)
Dewan, J. T. (M)
Dixon, T. K., Jr. (M)
Donohoe, L. J. (A)
Dosher, R. T., Jr. (SM)
Douglas, J. E. (A)
Dowling, D. J. (M)
Drennan, H. J. (M)
Drisdale, T. B. (A)
Dunkel, J. R. (M)
Dupree, E. M. (SM)
Du Rapau, J. J. (A)
Eaton, F. M. (M)
Edwards, W. H. (A)
Ehrlich, B. F. (M)
Ekeroot, S. (A)
Elliott, L. E., Jr. (A)
England, L. T. (A)
Erath, L. L. (M)
Ellinger, S. D., Jr. (A)
Feagin, F. J. (SM)
Forcier, N. E. (A)
Fossler, K. L. (M)
Francis, C. A. (M)
Franklin, P. E. (M)
Frazier, L. J. (M)
Frobese, C. W. (M)
Frosch, A. (M)
Gardner, D. H. (M)
Gass, F. G. (A)
Geddes, L. A. (SM)
Geery, P. W. (A)
Gillespie, T. F. (A)
Girala, A. S. (M)
Goff, W. H. (M)
Goltwitzer, L. H. (A)
Graham, M. (SM)
Green, J. W. (M)
Greer, W. J. (SM)
Gundlach, E. E. (M)
Hackbarth, E. (M)
Hagen, H. B. (M)
Hall, H. K. (M)
Halbert, J. L. (M)
Hale, E. M. (SM)
Hall, M. L. (M)
Hallenburg, J. K. (SM)
Halliday, O. T. (SM)
Hanlon, E. G. (M)
Hanus, F. J. (A)
Hargett, J. T. (M)
Harris, R. A. (M)
Hauschild, R. L. (M)
Hawkins, D. W. (M)
Hegar, D. T. (M)
Heins, A. E. (M)
Heintz, K. O. (SM)
Helken, E. W. (M)
Herrod, R. A., Jr. (M)
Hickman, D. M. (M)
Hill, H. B. (A)
Hilton, R. C. (M)
Hinds, M. H. (A)
Hiner, T. L. (A)
Holloway, M. R. (A)
Hougen, H. C. (M)
Houston, J. T., Jr. (A)
Hubbard, C. L. (M)
Huck, L. A. (A)
Huddleston, R. H., Jr. (A)
Hudgins, W. T., Jr. (M)
Huffman, C. H. (M)
Hunwooff, E. P. (M)
Hunt, C. J. (A)
Hurlbert, L. L. (M)
Huston, O. H. (M)
Irwin, H. R. (M)
Jameson, J. P. (M)
Jasper, L. L. (A)
Jeanes, P. M. (A)
Johnson, R. M. (M)
Johnstone, C. W. (SM)
Jones, H. J. (SM)
Jones, T. L. (SM)
Josephson, B., Jr. (M)
Joss, J. (A)
Kahnenstein, F. M. (M)
Kaufman, S. (SM)
Keating, L. M. (A)
Keefer, D. E. (M)
Keeling, R. W. (M)
Keep, H. A. (A)
Kelly, R. W. (SM)
Kilcrease, M. F. (A)
Kovesh, F. P. (M)
Kolb, R. H. (M)
Kriegel, H. C. (SM)
Lathrop, W. A. (A)
Le Moine, W. R. (M)
Leonardon, G. E. (M)
Limb, L. K. (M)
Lord, A. H. (A)
Luce, E. S. (M)
MacDonald, C. O. (M)
Mack, C. R. (A)
Madeley, P. E. (M)
Maness, J. H. (M)
Mann, R. W. (SM)
Marquess, R. L. (A)
Marsh, G. E. (M)
Martin, S. A., Jr. (M)
Masterson, H. T. (M)
Mathis, J. D. (SM)
Matteson, L. W., Jr. (A)
Matthews, C. R. (A)
Matthews, T. S. (M)
McArthur, H. K. (M)
McCabe, L. L. (SM)
McConnell, H. E. (SM)
McCormick, K. C. (M)
McDonald, M. (M)
McGrath, H. E. (A)
McKay, G. C., Jr. (M)
McKee, F. E. (M)
McLendon, C. R. (M)
McLin, W. R. (A)
McManis, L. B. (SM)
McMorris, A. H. (M)
McNatt, W. E. (M)
Medlin, R. D., Jr. (M)
Melton, D. P. (M)
Menelaides, K. L. (M)
Menger, W. M. (M)
Meyer, J. L. (M)
Miles, H. L. (A)
Millar, H. D. (M)
Millis, E. G. (M)
Milton, D. F. (A)
Minton, W. C. (A)
Mitchell, J. L. (A)
Mitchell, J. L. (M)
Mitchell, M. B., Jr. (M)
Monkhouse, J. R. (M)
Moore, A. M. (M)
Moore, R. D., Jr. (A)
Moss, K. S., Jr. (M)
Mullan, L. A. (M)
Nachlas, S. (A)
Nelsen, H. H. (M)
Neuenschwander, E. F. (M)
Nicolau, N. G. (M)
Noles, M. H. (M)
O'Brien, D. D. (A)

Richardson, J. G. (A)
Robinson, J. C. (A)
Roby, J. W., Jr. (M)
Rodd, F. R. (M)
Rogers, H. H., Jr. (M)
Roiko, R. M. (M)
Rust, W. M., Jr. (F)
Ryon, R. M. (SM)
Sadofsky, M. D. (M)
Salter, R. E. (M)
Sasseen, J. H. (SM)
Savage, K. D. (SM)
Sawyer, W. G. (M)
Saxer, N. K. (M)
Schmidt, F. P. (A)
Schmidt, H. (A)
Schmuck, R. H. (M)
Schneider, W. P. (M)
Schuster, N. A. (SM)
Schutz, T. C. (M)
Sears, H. A. (M)
Seixas, A. D. (A)
Sembera, F. J. (M)
Sharpe, M. O. (SM)
Shawver, E. F. (M)
Sherrill, B. (M)
Siems, L. E. (M)
Silvus, H. S., Jr. (M)
Skellie, A. C. (M)
Sloughter, W. J. (SM)
Smith, F. C., Jr. (SM)
Smith, O. R. (SM)
Spann, M. M. (M)
Sparks, D. J. (A)
Spence, D. W. (SM)
Spencer, R. W. (A)
Spoor, W. A. (M)
Stanley, R. S. (M)
Stanphill, J. R. (M)
Stapleton, J. W. (M)
Steward, W. B. (SM)
Stickley, D. F. (A)
Stone, O. L. (M)
Stotler, D. E. (A)
Stroman, L. J. (M)
Tanguy, D. R. (M)
Tate, J. B. (M)
Taylor, A. D. (A)
Taylor, L. A. (SM)
Teal, E. E. (M)
Thomas, C. W., Jr. (A)
Thompson, R. R. (SM)
Thornton, L. C. (A)
Trimmier, W. W. (M)
Tullos, F. N. (M)
Turner, C. G. (SM)
Ulmer, J. G. (A)
Unger, J. H. (SM)
Van Wambeck, S. H. (SM)
Vaughan, R. I. (A)
Venker, D. P. (A)
Vogel, C. B. (M)
Walker, H. O., Jr. (M)
Walters, W. T. (M)
Waters, J. S. (M)
Watson, A. L. (M)
Watson, J. S. (A)
Watt, J. S. (SM)
Weidner, C. P. (A)
Welz, W. C. (M)
Wenzel, G. E. (A)
Westmoreland, P. E. (M)
Wheeler, H. T. (M)
Whitaker, T. N. (SM)
White, G. (SM)
Widerstrom, F. W. (A)
Wilkinson, S. L. (M)
Williams, A. P. (M)
Wischmeyer, C. R. (SM)
Witt, W. W. (M)
Woehst, K. H. (A)
Wofford, J. H. (M)
Wofford, W. D., Jr. (A)
Wright, F. E. (A)
Wright, J. L. (A)
Wrye, W. C., Jr. (M)
Zill, F. W. (M)

Hurst (FW-6)
Keplinger, M. (M)

Irving (DAL-6)
Atchley, B. K. (M)
Baker, T. J. (M)
Breithaupt, J. J. (M)
Brewer, H. D. (A)
Butler, D. M. (M)
Chancey, W. L. (M)
Cleveland, A. R. (SM)
Curling, R. L. (M)
Dillon, P. (M)
Flowers, B. R. (M)
Harris, H. F. (M)
Haskins, D. E. (M)
Heithecker, L. F. (M)
Holly, L. C. (M)
Jones, J. F. (SM)
Jones, W. B. (M)
Jones, W. T. (M)
Kramer, C. V. (SM)
Lewis, R. E. (M)
Mac Donald, F. H. (M)
Mayberry, K. L. (M)
Merington, R. N. (A)
Nichols, L. A. (A)
Norman, T. J., Jr. (SM)
Parker, F. D. (M)
Penn, T. C. (SM)
Petrasek, A. C. (SM)
Rambie, G. S., Jr. (SM)
Ridgway, R. H. (M)
Seals, R. B. (SM)
Sheppard, D. E. (A)
Skelton, C. W. (SM)
Smith, C. H. (M)
Stone, R. M. (SM)
Thomas, C. R. (M)
Wood, J. H., Jr. (A)

Kelly AFB (SA-A-6)
Cooper, J. H. (M)
Hirsch, C. O. (A)
Moreland, H. H. (M)
Robertson, J. T. (M)

Kermit (EP-6)
Hopper, W. L. (M)

Kerrville (SA-A-6)
Mason, A. F., Jr. (M)

Kingsville (SA-A-6)
Balkanli, H. (M)
Eckart, J. H. (M)
Guinn, J. R., Jr. (M)
Korges, E. (M)
Rawls, H. F. (A)

Lake Jackson (HOU-6)
Williams, W. E. (M)

La Marque (HOU-6)
Johanson, K. A., Jr. (M)

La Porte (HOU-6)
Harrison, R. H. (M)

Laredo (SA-A-6)
Steele, E. M. (A)
Szczepanski, J. J. (A)

Lewisville (FW-6)
Chick, D. R. (M)

Lubbock (LUB-6)
Bland, E. W. (A)
Breeland, G. L. (M)
Bryant, R. S. (A)
Cardwell, H. A. (M)
Carver, D. H. (M)
Charlesworth, L. M. (M)
Craig, J. P. (A)
Criswell, J. J. (M)
Easter, B. H. (M)
Edwards, D. J. (M)
Fagan, J. R. (M)
Griffith, P. G. (M)
Grigsby, L. L. (M)
Halbrooks, J. O. (A)
Hollingsworth, R. B. (A)
Houston, C. E. (SM)
Hutton, C. D. (A)
Johnson, J. B. (M)
Joiner, J. B. (M)
Jones, L. B., Jr. (A)
Kilcrease, E. F. (M)
Lankford, I. C., Jr. (A)
Lee, R. F. (SM)
Meeks, R. D. (M)
Paul, C. A. (A)
Pease, L. A. (M)
Sandlin, B. J. (M)
Smith, C. D. (M)
Smith, G. H. (A)

Lufkin (B-PA-6)
Hill, F. C. (M)
Saxon, M. (SM)

Marble Falls (SA-A-6)
McDonald, C. J. (M)

McAllen (SA-A-6)
Bishop, R. L. (A)
Smithgall, D. C. (A)

McDade (SA-A-6)
Graham, O. D. (M)

McQueeney (SA-A-6)
King, C. B. (A)

Mesquite (DAL-6)
Busch, W. M. (M)
Faulkner, H. E. (M)
Felch, J. L. (M)
Gray, T., Jr. (A)
Helmer, A. R. (M)
Nieswiadomy, B. L. (M)
Puett, J. W. F. (M)
Wright, R. G. (M)

Midland (LUB-6)
Coleman, M. V., Jr. (M)
Dickey, B. B. (A)
Giles, J. R. (A)
King, V. G. (M)
Lowery, R. O. (M)
Markwardt, A. J. (M)
Maunder, E. R. (M)
Murphy, M. L. (M)
Nance, B. J. (M)
Yates, T. (A)

Mineral Wells (FW-6)
Buzbee, J. M. (M)
Dunlavy, J. H., Jr. (A)
Mitchell, D. H. (SM)
Smith, T. D. (M)

Mission (EP-6)
Parsons, J. R. (M)

Nederland (B-PA-6)
Franke, R. E. (M)
Hammons, E. G. (A)
Lewis, F. R. (M)

Odessa (LUB-6)
Blake, R. C. (A)
Schock, W. R. (A)

Orange (B-PA-6)
Jones, R. L. (M)

Pampa (LUB-6)
McQuigg, H. E. (M)

Pasadena (HOU-6)
Butts, T. M. (A)
Gulihur, D. L. (M)
Smith, C. W. (M)
Stivers, R. B. (M)

Petersburg (LUB-6)
Nelson, D. R. (M)

Plano (DAL-6)
Lowder, C. M. (M)
Patterson, J. A. (A)

Point Comfort (SA-A-6)
Covant, R. D. (M)

Ponder (FW-6)
Swafford, T. W., Jr. (M)

Port Arthur (B-PA-6)
Dolson, R. M. (A)
Hamilton, C. J., Jr. (M)
Knute, E. H. (A)
Monroe, W. M. (A)
Swanson, E. C. (M)

Port Isabel (SA-A-6)
Brand, J. (M)

Port O'Connor (SA-A-6)
Caldwell, J. L., Jr. (M)

Prairie View (HOU-6)
Kelly, G. E., Jr. (M)

Quanah (FW-6)
Todd, D. E. (M)

Randolph AFB (SA-A-6)
Houghton, E. G. (SM)

Richardson (DAL-6)
Adams, J. E. (M)
Adkins, A. W., Jr. (SM)
Aichholz, C. (M)
Allen, M. B. (M)
Antrim, G. H. (A)
Ariail, H. E., Jr. (M)
Athans, M. (A)
Baker, G. T. (M)
Bark, D. A. (M)
Bates, L. D. (M)
Baum, F. L., Jr. (M)
Bebee, M. G. (M)
Berg, C. H. (A)
Blard, J. R. (M)
Biggs, J. A. (SM)
Bistrup, J. H. (M)
Blackwell, W. C. (M)
Blount, J. F. (M)
Bradford, J. R., Jr. (M)
Braginton, P. R. (SM)
Braun, C. (A)
Brooks, F. E., Jr. (F)
Brown, J. M. (M)
Bryan, W. D. (M)
Burson, J. D. (M)
Byrd, D. M., Jr. (M)
Carter, R. C. (M)
Cate, G. M. (M)
Cheney, J. O. (M)
Church, G. C. (M)
Clabaugh, C. E. (M)
Cleaver, N. E. (M)
Cook, C. R., Jr. (M)
Cook, L. (M)
Cooke, H. F. (M)
Corbin, C. D. (M)
Cox, R. H. (M)
Crandell, E. L. (M)
Cunningham, J. E. (M)
Cuthbert, T. R., Jr. (M)
Darroch, R. D. (M)
Davidson, K. W. (M)
Davis, D. K. (M)
Davis, M. E. (M)
Day, J. C. (M)
Delaney, J. S. (M)
Devoll, C. W. (M)
Dill, F. J. (M)
Donnell, W. F. (M)
Eddleston, J. H. (M)
Entsminger, P. W. (M)
Evans, L. L. (M)
Fellhauer, H. E. (M)
Fenner, R. G. (M)
Foos, R. (A)
Forney, F. E. (A)
Fowler, W. L. (M)
Gage, R. G. (M)
Garon, A. J. (SM)
Gilbreath, B. F. (M)
Godbey, J. J. (M)
Green, A. W., Jr. (M)
Hadley, C. E. (M)
Haerle, J. M. (M)
Hall, J. E. (M)
Halvorson, R. L. (M)
Hanna, G. W. (A)
Hem, H. D. (M)
Herndon, R. A. (M)
Hertel, P., Jr. (M)
Hiatt, E. V. (M)
Higginbotham, H. L. (M)
Hill, J. D., III (M)
Hinkle, V. O., Jr. (M)
Holmes, D. W. (M)
Hughes, L. E. (M)
Hull, J. E. (M)
Ivy, A. W. (M)
Jones, D. B. (M)
Jones, J. W. (M)
Kaff, L. E. (M)
Keen, H. E. (M)
Kennedy, C. L., Jr. (M)
Kisner, H. L. (M)
Kosaris, S. (M)
Lavergne, A. J., Jr. (M)
Lee, R. E. (SM)
Leming, T. L. (M)
Love, K. A. (A)
Lovelace, H. D. (M)
Lovelady, B. W. (M)
Luecke, G. N. (M)
Luthans, R. L. (A)
Mallett, A. J. (M)
Mann, R. M. (M)
Manning, V. R. (M)
Marshall, K. R. (M)
Mason, J. S. (M)
McElroy, J. E. (M)
McKinley, G. D. (M)
McKinney, E. G. (M)
Meadows, R. A. (M)
Mickey, L. W. (M)
Mitchell, A. T. (A)
Mitchell, R. M. (SM)
Morris, B. W. (A)
Morrow, C. D. (M)
Muhm, R. E. (M)
Murdock, B. J. (SM)
Nall, A. E., Jr. (M)
Nichols, R. A. (M)
Nickel, W. L. (M)
Obenhaus, R. E. (M)
O'Bryant, R. (M)
Ocnaschek, F. J. (SM)
Penn, E. J. (M)
Perkins, A. D. (M)
Perkins, W. C. (M)
Perry, R. A. (M)
Peterson, M. E. (M)
Pierce, C. H. (M)
Pippenger, D. E. (A)
Polaski, C. A. (M)
Powers, J. D. (M)
Price, J. F. (M)
Prickett, T., Jr. (SM)
Prier, H. W. (M)
Randolph, C. E. (M)
Reisch, F. E. (M)
Reynolds, R. B. (M)
Sawyer, F. L. (M)
Scroggins, E. B. (M)
Sebesta, D. H. (A)
Sebesta, J. R. (M)
Severin, E. O. (M)
Sharpe, T. W. (M)
Sherwood, J. R. (SM)
Shockley, W. L. (SM)
Slay, L. G. (M)
Smith, C. E. (A)
Smith, K. F. (M)
Spieker, M. (M)
Stansbury, R. H. (M)
Stewart, R. F. (M)
Stillwell, H. F. (SM)
Sullivan, W. A., Jr. (M)
Syptak, D. M. (M)
Tinch, C. S., Jr. (A)
Turner, J. S. (SM)
Van Der Wal, E. A. (M)
Veerman, W. H. (M)
Volder, J. E. (SM)
Wagner, R. J. (M)
Ware, P. M., Jr. (M)
Warriner, B. (SM)
Wendlandt, C. W. (M)
White, R. T. (SM)
Whitfield, O. E. (M)
Wiechmann, E. H. (M)
Wilson, E. C. (M)
Wilson, F. L. (M)
Winget, W. A. (M)
Wolff, E. A., Jr. (M)
Wollan, R. W. (SM)
Wright, W. W., Jr. (M)
Yaple, T. L. (M)

Saginaw (FW-6)
Knote, W. E. (A)

San Angelo (SA-A-6)
Stanley, B. B. (M)
Vancil, B. I. (M)

San Antonio (SA-A-6)
Adams, R. M. (A)
Andrews, F. E. (A)
Arnold, J. B. (SM)
Balusek, A. J. (M)
Beckwith, J. E. (M)
Behrendt, H. B. (M)
Bergquist, A. O. (M)
Birdsong, L. F. (M)
Brann, W. (M)
Bristow, G. P., Jr. (M)
Brogan, F. A. (SM)
Buchanan, H. (M)
Cadena, D. G. (M)
Campbell, H. G. (A)
Canfield, R. D. (M)
Carmack, W. J. (A)
Case, B. (A)
Chamberlain, P. E. (M)
Clee, L. W. (A)
Cooper, R. E. (M)
Cory, W. E. (SM)
Crites, C. R. (M)
Crockett, A. E. (M)
Cuccia, J. W. (A)
Cunningham, J. B. (A)
Dean, J. L. (A)
Donaldson, W. L. (SM)
Dubois, V. G., Jr. (A)
Dupener, F. (M)
Edgerton, R. D. (M)
Edmonson, J. W. E. (M)
Egerton, W. G. (SM)
Egger, S. L. (M)
Enderle, T. L. (SM)
Fitzsimon, D. E. J. (A)
Fountain, L. S. (M)
Fretz, D. G. (SM)
Gallagher, J. D. (M)
Gardiner, B. E. (A)
Gosch, V. E. (M)
Gower, S. G. (M)
Graf, C. R. (M)
Gunkel, W. A. (M)
Hallam, J. T. (M)
Hamm, W. J. (F)
Harrell, R. D. (A)
Hasbrook, A. F. (SM)
Hicks, B. (A)
Hixon, S. M. (A)
Hornbrook, F. W. (M)
Ing, G. W. (SM)
Jackson, T. R. (M)
Jackson, W. J. (SM)
Jeffers, C. L. (SM)
King, J. D. (M)
Laenger, C. J., Sr. (M)
Lamb, H. O. (M)
Laster, C. C., Jr. (M)
Lincoln, J. P. (M)
Lovely, H. E. (M)
Lusk, E. C. (A)
Matheson, P. E. (M)
Matthews, K. B. (M)
Mayne, W. H. (SM)
McConnell, J. W. (M)
Meiners, W. H. (A)
Meskill, W. D. (M)
Miller, G. M. (M)
Miller, W. J. (A)
Moore, J. D. (M)
Morris, C. R. (M)
Norton, W. M., Jr. (M)
Owen, T. E. (M)
Parr, J. O., Jr. (SM)
Pomy, H. J. (M)
Pool, E. B. (M)
Porter, J. B. (M)
Rhodes, M. H. (A)
Richey, E. O. (SM)
Rives, J. B. (SM)
Roland, F. M. (M)
Samford, H. L. (A)
Savino, L. J. (A)
Sears, D. (M)
Semmes, D. R. (M)
Sherrill, W. M. (M)
Siegel, H. A. (A)
Sikes, R. E. (SM)
Simpson, S. H., Jr. (SM)
Smith, R. J., Jr. (M)
Stenshoel, C. R. (M)
Sullivan, M. C. (M)
Taucer, C. W. (M)
Travers, D. N. (M)
Turner, H. C. (M)
Turner, R. A. (A)
Wangler, R. B. (M)
Wardwell, H. W. (M)
Watson, R. J. (M)
White, D. D. (A)
Wiggins, E. D. (M)
Wilkes, C. P. (M)
Wippermann, D. R. (M)
Zimmerman, L. O. (M)
Zumwalt, B. C. (M)

Sheppard AFB (FW-6)
Gunther, W. J. (A)

Sinton (SA-A-6)
Mayer, E. G. (M)

Sour Lake (B-PA-6)
Collins, J. P. (M)

Sulphur Springs (DAL-6)
Pippin, T. M., Jr. (M)

Tarleton Station (FW-6)
Baker, L. T. (M)

Temple (FW-6)
Martin, B. A. (M)

Texarkana (SHR-6)
Dickinson, M. A. (A)

Texas City (HOU-6)
Chaloupka, M. J. (A)

Timpson (B-PA-6)
Cantrell, D. A. (M)

Tyler (DAL-6)
Godfrey, R. M. (M)
Grice, C. F. (M)

Victoria (SA-A-6)
Loborise, C. J. (M)
Murray, J. W. (M)
Scroggins, C. M. (M)



Waco (DAL-6)
Craig, J. C. (M)
Fuhriler, R. J. (A)
Peterson, F. H. (M)
Schwetman, H. D. (SM)
Trevillian, R. A. (A)

Waxahachie (DAL-6)
Pitts, W. C., Jr. (M)

West Columbia (HOU-6)
Blair, R. S. (M)

Wharton (HOU-6)
Prazak, M. A. (M)

Wichita Falls (FW-6)
Adams, J. (A)
Beckman, D. A. (M)
Black, H. L. (M)
Civello, J. R. (M)
Dickensheets, L. (A)
Dillinger, B. L. (M)
Fenner, W. E. (M)
Redmond, J. P. (M)
Sigler, G. A., Jr. (M)
Wiley, H. T. (M)

Wylie (DAL-6)
Cooper, R. B. (A)

Ysleta (EP-6)
Lane, J. F. (A)

Zapata (SA-A-6)
Garcia, G. (A)

UTAH

Bountiful (SLC-7)
Anderson, I. E. (M)
Anderton, C. W. (M)
Barneck, C. A. (A)
Bingham, J. B. (A)
Bowen, M. J. (M)
Brown, J. E. (M)
Cox, D. D. (M)
Douglas, S. B. (M)
Guilford, J. R. (M)
Hansen, C. F. (M)
Hoffman, R. L. (M)
Moss, S. D. (M)
Nielsen, L. M. (M)
Ogden, K. L. (M)
Prisbrey, D. (A)
Reidel, R. L. (M)
Richardson, F. L. (M)
Strosnider, J. W. (M)
Whipple, A. J. (M)
Willhard, W. J. (M)
Wilson, D. E. (M)
Yancey, L. D. (M)

Brigham City (SLC-7)
Butler, B. L. (A)
Chiaretta, F. L. (M)
Gardner, T. W. (M)
Gillen, T. W. (M)
Jensen, S. D. (M)
Wick, M. R. (M)

Centerville (SLC-7)
Folsom, J. B. (M)

Clearfield (SLC-7)
Brewer, L. R. (M)
Kartchner, K. A. (M)
Krajcovic, C. (A)

Granger (SLC-7)
Graham, J. H. (M)

Hill AFB (SLC-7)
Hager, D. N. (A)

Hyde Park (SLC-7)
Hancey, H. L. (M)

Hyrum (SLC-7)
Atkinson, A. L. D. (M)
Brown, F. R. (M)

Kaysville (SLC-7)
Kishimoto, T. H. (M)

Kearns (SLC-7)
Glover, K. H. (M)
Wertz, C. C. (M)

Layton (SLC-7)
Loomis, F. E. (A)

Lehi (SLC-7)
Wing, G. J. (M)

Logan (SLC-7)
Brownell, F. P., Jr. (M)
Budge, E. C. (M)
Chadwick, D. G. (M)
Clark, C. (SM)
Cole, L. S. (SM)
Jones, W. L. (SM)

Magna (SLC-7)
Nuttall, W. D. (M)

Moab (SLC-7)
Widows, C. H. (A)

Murray (SLC-7)
Black, F. B. (M)
Burgess, E. W. (M)
Judkins, C. D. (M)
Patterson, C. L., III (M)
Reid, D. W. (M)
Tew, D. E. (M)

North Salt Lake (SLC-7)
Davidson, B. G. (M)

Ogden (SLC-7)
Bean, R. C. (M)
Heiser, R. K. (M)
Hixson, R. L. (M)
Lee, G. F. (M)
Mitchell, J. W. (M)
Rudd, F. S. (M)
Shortt, W. A., Jr. (M)
Swientoniewski, E. J. (M)
Urie, H. G. (M)
Wardleigh, G. R. (M)

Provo (SLC-7)
Bartholomew, D. (M)
Jonsson, J. J. (SM)
Monson, D. J. (M)
Woodbury, R. C. (M)

Roy (SLC-7)
Arrington, A. C. (M)
Billings, R. G. (M)
Hansen, Q. P. (M)

Salem (SLC-7)
Nybo, R. C. (M)

Salt Lake City (SLC-7)
Ahearn, J. M. (M)
Alley, C. L. (SM)
Anderson, D. W. (M)
Anderson, J. E. (A)
Arbaney, V. A. (M)
Ballard, F. (M)
Balls, D. (M)
Bell, W. D. (M)
Bray, G. L. (M)
Card, J. B. (M)
Carman, F. C. (M)
Carpenter, B. R. (M)
Christiansen, R. J. (M)
Clayton, V. E. (SM)
Cochran, G. R. (M)
Conway, J. F., Jr. (M)
Cox, R. T. (M)
Cozzens, W. D. (M)
Dalley, J. E. (M)
Davis, T. D. (M)
Diehl, C. E. (M)
Fehr, H. (M)
Ferre, R. G. (M)
Fisher, C. E. (M)
Fisher, I. N. (M)
Folland, D. F. (SM)
Gates, F. Y. (M)
Gehmlich, D. K. (M)
Geller, W. (M)
Glantz, R. H. (A)
Gray, C. S. (SM)
Green, D. J. (M)
Grover, R. C. (M)
Grow, R. W. (SM)
Gunderson, A. L. (M)
Haegele, R. W. (SM)
Hales, D. B. (M)
Hall, J. E. (A)
Hammond, S. B. (SM)
Hanking, J. R. (M)
Hansen, L. L. (M)
Harper, R. B. (M)
Harris, L. D. (SM)
Haycock, O. C. (SM)
Heine, W. (M)
Hemsley, A. L. (M)
Hilleary, H. W. (M)
Hing, K. M. L. (A)
Hing, K. T. L. (M)
Hoggan, M. J. (A)
Hooper, J. S. (M)
Holmann, R. H. (M)
Howell, N. E. (M)
Hubbard, J. J. (A)
Hunt, M. J. (M)
Hutton, L. G. (M)
Johnson, D. K. (M)
Johnson, W. L. (M)
Jones, A. S. (M)
Krajewski, E. Z. (M)
Kumpfer, B. D. (SM)
Larsen, R. R. (A)
Longson, F. W. (M)
McLaughlin, J. W. (M)
Meyer, H. E., Jr. (M)
Meyer, K. G. (M)
Murphy, L. C. (M)
Myrberg, J. E. (M)
Newman, P. (M)
Newman, W. E. (M)
Nicholes, G. H. (M)
Nielsen, R. D. (M)
Orr, M. W. (M)
Palmgren, C. F. (M)
Pedersen, K. A. (M)
Piele, G. H. (M)
Pound, E. F. (A)
Powers, J. T. (M)
Proehl, A. B. (M)
Quayle, R. J. (M)
Rathke, J. E. (M)
Redd, H. J. (M)
Robinson, W. H. (A)
Rose, R. G. (M)
Shaffer, M. R., Jr. (M)
Skousen, O. K. (M)
Smart, M. J. (M)
Stimpson, E. C., Jr. (M)
Teets, R. M. (M)
Tesser, W. D. (M)
Thorpe, J. N. (M)
Thurber, L. R. (M)
Trinnaman, R. R. (A)
Vincent, G. J. (M)
Vodak, A. W. (M)
Wagner, L. W. (M)
Warner, H. R. (A)
Watson, D. R. (M)
Wells, K. R. (SM)
Williams, K. L. (M)
Wright, J. W. (F)

Sandy (SLC-7)
Armstrong, D. R. (M)
Atwood, K. W. (M)
Mitchell, L. K. (M)
Noffsinger, D. T. (A)
Skinner, R. L. (M)

Spanish Fork (SLC-7)
Hone, S. J. (M)

Tremonton (SLC-7)
Bjorn, D. E. (A)

West Jordan (SLC-7)
Bingham, F. G. (M)

Woods Cross (SLC-7)
Urry, L. W. (M)

VERMONT

Bennington (BOS-1)
Osgood, D. W. (M)

Brandon (BOS-1)
Scoskie, A. T. (A)

Burlington (B-NV-1)
Bender, D. R. (M)
Cloutier, M. P. (A)
Eckels, A. R. (SM)
Frisby, W. L. (M)
Irwin, R. W., Jr. (A)
Landry, A. E. (M)
Leonard, C. E. (M)
Martin, S. T. (SM)
Sicsel, F. J. M. (SM)
Tierney, J. W. (M)

Charlotte (B-NV-1)
Parlas, J. L. (SM)

Chester (BOS-1)
Rowe, A. H. (A)

Essex Junction (B-NV-1)
Beauregard, L. P. (A)
Faunce, N. J. (M)
Hogel, A. (M)
La Porte, G. L. (M)
Marcotte, R. A. (M)
Wyckoff, S. H. (M)

Jericho (B-NV-1)
Snowman, L. R. (M)

Northfield (B-NV-1)
Marsh, R. F. (SM)
Seal, P. M. (SM)
Webb, M. L. (M)

Richmond (B-NV-1)
Quinn, P. A. (A)

Rutland (BOS-1)
Church, H. V. (M)
O'Brien, J. A. (M)

St. Albans (B-NV-1)
Wright, H. E. (M)

Saxtons River (B-NV-1)
Robinson, D. (M)

Shelburne (B-NV-1)
Bundy, L. M. (M)

South Burlington (B-NV-1)
Dudevoir, W. G. (M)
Wheatley, D. M. (M)

South Woodstock (BOS-1)
Garceau, L. (M)

Springfield (B-NV-1)
Churchill, D. W. (A)
Gallup, G. B. (A)
Lohan, F. J. (M)
Power, D. W. (M)
Running, A. F. (A)

Stowe (B-NV-1)
Prouty, G. S., Jr. (M)

Waterbury (B-NV-1)
Chase, W. C. (M)

Weston (BOS-1)
Boothby, L. W. (M)

VIRGINIA

Abingdon (VIR-3)
Krusberg, R. J. (M)

Alexandria (W-DC-3)
Afex, D. G. (M)
Andrus, A. M. (M)
Ashenden, G. K., Jr. (M)
Ashley, D. S. (M)
Barchfeld, R. D. (M)
Balsamo, W. W. (SM)
Bates, J. F. (SM)
Bauer, R. E. (M)
Bawer, R. (A)
Beresford, H. E. (M)
Besancon, M. (SM)
Bickford, F. H., Jr. (A)
Blackburn, E. E. (M)
Boland, A. F. (SM)
Bosse, W. H. (SM)
Bowman, W. B. (A)
Brashman, R. D. (M)
Busby, E. S., Jr. (M)
Carroll, L. O. (A)
Carson, J. O., Jr. (M)
Carterette, A. A., Jr. (M)
Chadwick, G. G. (M)
Chatfield, N. V. (A)
Coleman, H. P. (M)
Coleman, R. H., Jr. (A)
Collins, W. H. (M)
Colton, R. B. (F)
Compton, M. E., Jr. (M)
Coven, A. W. (SM)
Danos, L. A., Jr. (M)
Darcey, R. J. (M)
Davis, H. (F)
Dawson, H. E. (A)
Disenhaus, N. (SM)
Dresson, S. A. (M)
Dudley, D. D. (M)
Ellsworth, R. T., Jr. (A)
Evans, J. P. (M)
Favret, A. G. (SM)
Firth, E. E. (SM)
Foyer, D. R. (A)
Fraedrich, D. K. (M)
Fry, L. T. (A)
Garafola, J. R. (M)
Gephart, C. L. (M)
Gerlach, E. K. (M)
Gills, L. C. (M)
Glass, R. (A)
Godfrey, R. B. (A)
Goeser, J. N. (SM)
Graves, C. J. (M)
Guinard, N. W. (SM)
Hancock, R. L. (A)
Harmon, W. R. (SM)
Heister, C. F. (SM)
Hendershot, L. R. (A)
Hewitt, G. J. (M)
Hill, M. E. (M)
Hopkins, A. F., Jr. (SM)
Howard, E. G. (M)
Huck, W. J., Jr. (M)
Humphrey, J. S. (A)
Hurlburt, R. W., Jr. (A)
Iddings, H. G., Jr. (SM)
Ide, J. M. (SM)
Jewell, H. H., Jr. (M)
Johannes, J. M. (SM)
Johnson, C. O. (M)
Johnson, H. B., Jr. (A)
Johnson, S. F. (M)
Kaufman, J. W. (A)
Keith, R. M. (M)
Kelleher, K. S. (SM)
Kiebach, O. D. (A)
King, W. M. (M)
Klenk, J. L. (M)
Kochendarfer, D. C. (M)
Koll, A. J., Jr. (M)
Kondracki, E. J. (M)
Kozak, A. S. (A)
Kransdorf, R. J. (M)
Kubilius, A. A. (M)
Lacy, E. A. (M)
Link, B. G. (M)
Littlejohn, H. S. (M)
Littlepage, C. M. (A)
Livingston, J. L. (M)
Longfellow, B. S. (M)
Lorenz, R. J. (M)
Love, F. B. (M)
Mallinson, F. C. (SM)
Malone, D. M. (M)
Mancebo, T. W. (M)
Marlbugh, W. (M)
Marsh, D. H. (M)
Marsolan, V. C. (SM)
Martino, J. P. (M)
McCall, C. P. (M)
McCann, B. J. (M)
McElroy, E. J. (M)
McLeod, J. A. (M)
Melton, B. S. (SM)
Messer, A. M. (M)
Miles, P. D. (SM)
Miller, A. T. (A)
Milo, P. (A)
Mittelman, L., Jr. (M)
Montague, H., III (M)
Montgomery, M. D. (M)
Moore, H. S. (M)
Moore, R. T. (SM)
Morrow, C. M. (M)
Myers, J. C. (SM)
Nabell, E. G. (A)
Nelson, M. W. (A)
Neuman, R. H. (A)
Noble, H. L. (A)
Park, K. L. (M)
Parker, C. V. (SM)
Partello, P. E. (A)
Pavell, P. J. (M)
Peake, H. J. (SM)
Peavey, B. (M)
Percy, R. W. (M)
Perrino, S. R. (A)
Phillips, R. M. (M)
Phillips, A. P. (M)
Pichetto, P. B. (M)
Platt, R. T., Jr. (M)
Polder, J. M. (M)
Price, H. W., Jr. (M)
Raudenbush, J. E. (M)
Rayborn, H. C. (M)
Raybuck, C. B. (SM)
Ream, S. W. (M)
Rector, C. (M)
Reiser, D. (M)
Robinson, R. F. (M)
Rochelle, R. W. (M)
Romer, W. J. (M)
Rowe, H. E. (SM)
Royce, R. K. (M)
Sabel, A. J. (SM)
Salmond, D. S. (SM)
Salsgiver, J. P. (A)
Sams, T. G. (M)
Sargent, R. S. (SM)
Schneider, R. J. (SM)
Scholl, G. S. (M)
Schumann, A. W. (M)
Seddon, J. C. (F)
Shepard, D. H. (SM)
Smith, C. (A)
Smith, W. R., III (M)
Smolensky, S. M. (SM)
Stewart, C. (SM)
Stinson, I. F. (SM)
Stroble, R. R. (M)
Stuhrenberg, M. B. (A)
Tasaka, T. (M)
Taylor, W. B. (M)
Thompson, L., Jr. (SM)
Thomson, W. E. (M)
Tidball, F. E. (SM)
Trout, C. C. (M)
Tucker, J. W. (M)
Tucker, W. K., Jr. (A)
Underwood, R. W. (M)
Van Allen, R. L. (M)
Varela, A. A. (SM)
Vaughn, J. E. (M)
Vogel, J. P. (M)
Von Dohlen, H. W. (M)
Wallace, W. H. (M)
Watts, C. B., Jr. (M)
Weihe, W. K. (SM)
Weinstein, A. (M)
Wenzinger, E. C. (M)
West, J. S. (M)
Wise, J. P. (M)
Wunderley, R. H. (M)
Young, M. P. (SM)

Annandale (W-DC-3)
Black, L. (M)
Bouvy, J. W. (M)
Bradley, E. H. (SM)
Casey, C. J. (M)
Cervenka, F. J. (SM)
Corbin, H. S. (M)
Croy, J. R. (M)
Curtis, C. V. (M)
Deaton, I. V. (M)
Dixon, J. T. (SM)
Feild, S. C., Jr. (M)
Forss, J. W. (A)
Garlan, H. (M)
Germain, E. G., Jr. (A)
Glass, B. W., Jr. (M)
Hershberger, W. O., Jr. (M)
Jahr, E. F. (M)
James, F. B. (M)
Johnson, F. (SM)
Jones, J. P. (M)
Kerr, J. M., Jr. (M)
Lasskell, L. R. (A)
Miller, J. W. (M)
Olds, M. L. (M)
Pyle, S. H. (M)
Ray, J. (A)
Richman, H. R. (M)
Rogers, C. J. (A)
Sherman, W. R. (SM)
Sinex, C. H. (SM)
Stillwell, D., Jr. (M)
Tallant, W. T. (M)
Teachman, A. E. (SM)
Thompson, R. A. (A)
Williams, R. T. (M)
Willis, H. W. (SM)
Zushin, A. R. (M)

Arlington (W-DC-3)
Adams, T. M. (M)
Addams, C. S. (A)
Albee, C. (SM)
Atkinson, E. E. (M)
Aymar, E. (M)
Babcock, J. H. (M)
Backus, W. A. (M)
Bailey, D. C. (M)
Baker, H. L. (A)
Banks, C. R. (SM)
Bankson, H. D. (M)
Batch, W. J. (M)
Batista, W. C. (A)
Becker, D. E. (M)
Bennett, R. (F)
Bernard, J. T. (M)
Bernstein, H. E. (SM)
Bettis, W. E. (M)
Beyer, C. M. (SM)
Black, H. (M)
Boggs, G. E. (M)
Boros, G. (A)
Boswell, R. A. (A)
Bowen, C. H. (M)
Boyd, R. W. (A)

Bradley, M. R. (M)
Breen, M. T. (A)
Bridges, J. M. (F)
Brown, R. F., Jr. (M)
Brunk, H. L., Jr. (M)
Buchanan, O. R. (A)
Bull, W. I. (SM)
Bullington, E. W. (M)
Burleson, M. M. (A)
Burns-Meyer, H. (SM)
Busch, C. R. (M)
Butts, R. S. (M)
Cahan, P. J. (M)
Calohan, W. C. (M)
Campbell, J. S. (A)
Cerwin, S. S. (SM)
Chasnov, B. (SM)
Childers, A. A. (SM)
Clark, R. L. (F)
Clarke, W. H. B. (M)
Cobb, C. A. (SM)
Cobb, M. W. (A)
Cochran, J. L. (SM)
Cohen, I. (SM)
Coleman, T. W. (M)
Connaway, J. E. (M)
Cook, D. C. (A)
Cook, E. F. (SM)
Crawley, A. O. (M)
Crigler, T. B. (A)
Crutchfield, A. E. (A)
Dale, R. J. (M)
D'Antonio, R. G. (M)
Davidson, W. P. (M)
Davis, C. H. (A)
Davis, T. R. (A)
De Maar, J. D. (M)
Dennison, B. H., Jr. (SM)
De Vore, C. (SM)
Disney, J. G., Jr. (A)
Dixon, G. C. (SM)
Dodge, J. E. (M)
Dolle, W. C. (SM)
Donald, B. L. (M)
Dreyfus, J. (SM)
Dutton, W. P. (M)
Eiwen, C. J. (SM)
Elder, B. M. (M)
Elliott, G. H. (M)
Enos, R. M. (M)
Fagan, B. B. (M)
Farrell, C. (M)
Fennessy, P. Q. (M)
Fiedelman, C. (SM)
Fletcher, R. (M)
Flint, R. B. (M)
Flores, R. A. (M)
Fortna, J. D. E. (M)
Freeman, J. T. (M)
Gall, R. G. (M)
Garcia, O. M. (M)
Garrett, L. F. (A)
Garrett, W. O. (SM)
Gauss, H. (M)
Getman, G. A., Jr. (M)
Gibson, G. B. (SM)
Giles, R. C. (M)
Gillenwater, T. M. (SM)
Gland, E. J. (SM)
Gleason, D. H. (A)
Glover, L. L. (M)
Goetsch, E. A. (M)
Good, C. A., Jr. (M)
Grant, H. W. (SM)
Gregory, C. A. (SM)
Griffin, L. L. (M)
Groves, W. E. (SM)
Gumina, L. V. (A)
Hale, R. J. (A)
Hall, O. E. (M)
Harkins, P. B. (SM)
Harrison, G. T., Jr. (M)
Harvey, D. T., Jr. (M)
Hedrick, C. E. (M)
Hens, R. J. (A)
Hepler, W. R. S. (M)
Hice, L. C. (A)
Higgins, D. P. (A)
Hilgedick, W. C. (SM)
Hinman, W. S., Jr. (F)
Hochhalter, L. D. (A)
Hodge, J. D. (A)
Hogarth, K. G. (A)
Hollinger, W. P. (M)
Husted, J. M. (M)
Hutton, D. B. (A)
Israel, F. (M)
Iwanovsky, A. (M)
Jacks, S. T. (M)
Johansen, G. N. (SM)
Jolkovski, J. (M)
Jones, E. L. (M)
Kahwaty, F. T., Jr. (M)
Karp, A. L. (M)
Kawal, W. T. (M)
Keenan, R. J. (A)
Kefalas, G. P. (M)
Keller, A. J. (M)
Kempf, R. F. (M)
Kersey, J. A. (SM)
King, L. H. (M)
Koditek, G. W. (A)
Kosar, W. S., Jr. (M)
Krcek, J. A. (SM)
Kroger, M. G. (SM)
Kulesha, K. J. (M)
Kuun, A. (A)
Lancioni, P. (M)
Lawson, A. A. (SM)
Lee, J. M. (SM)
Loda, C. J. (SM)
Logan, B. A., Jr. (M)
Londis, J. J. (A)
Louer, P. E. (M)
Manning, J. R. (M)
Martin, De L. K. (SM)
Martin, E. T. (SM)
Martin, O. L. (M)
Martin, R. D. (SM)
Martin, T. J. (M)
McAdon, C. B. (M)
McCachren, W. S. (SM)
McClurg, G. H. (SM)
McConnell, I. R. (M)
McKechnie, R. M., III (M)
McMichael, R. D. (M)
Mendus, W. M. (A)
Merchant, C. C. (M)
Messick, V. D. (A)
Metzger, E.E. (M)
Miller, J. L. (M)
Millies, F. G. (M)
Moffet, J. A. (M)
Montgomery, J. N., III (M)
Morris, A. A. (M)
Morrisey, J. A. (A)
Morscher, L. N., Jr. (SM)
Musson, W. D. (M)
Myers, R. F. (M)
Nelson, C. W., Jr. (M)
Newhouse, A. R. (M)
Noble, J. S. (A)
Nyhen, E. M. (M)
Older, H. (A)
Olsen, P. F. (M)
Oscanyan, P. C. (M)
Parker, M. L., Jr. (M)
Parris, D. S. (A)
Penland, C. E. (M)
Penniman, I. B. (M)
Penniwell, A. F. (M)
Perrott, T. A. (M)
Petit, A. F. (M)
Podrasky, R. W. (M)
Poling, A. C. (M)
Post, T. B. (A)
Pressnall, J. R. (A)
Price, M. A. (SM)
Prins, D. W. S. (A)
Puro, W. O. (SM)
Quinn, F. S., Jr. (M)
Ragsdale, M. M. (A)
Raker, S. K. (M)
Rawicz, L. (M)
Rice, J. E. (SM)
Rigdon, C. A. (M)
Rogers, A. L. (M)
Rosenthal, S. (A)
Roy, L. B. (M)
Saline, L. E. (SM)
Sargent, C. J. (M)
Schaal, R. H. (SM)
Schmid, O., Jr. (A)
Schmidt, W. J. (M)
Scholetzky, J., Jr. (A)
Scofield, H. L. (SM)
Scull, R. C. (A)
Selfert, F. F. (M)
Selby, H. A. (A)
Seligson, I. (A)
Sergeant, R. C. (SM)
Sherer, L. M. (SM)
Sherwood, R. M. (SM)
Sisco, H. W. (SM)
Skewis, W. H. (A)
Smith, D. L. (SM)
Smith, P. O., Jr. (A)
Smith, R. O. (SM)
Smith, T. F. (M)
Snyder, M. L. (A)
Sokolove, F. L. (A)
Spies, M. C. (M)
Stec, C. L. (SM)
Stephan, H. W. (M)
Stewart, J. M. (SM)
Stiman, J. P. (M)
Strothers, H. (M)
Stuart-Donathan, W. E. (A)
Suminski, H. (A)
Sutton, B. L. (M)
Swanson, M. W. (SM)
Tate, J. P., Jr. (A)
Teschner, D. (M)
Thames, W. M. (SM)
Thomasson, H. B. (M)
Tralnum, D. A. (M)
Trantham, W. E. (M)
Tregub, B. G. (M)
Turkiewicz, J. M. (M)
Vance, R. T. (M)
Van Valkenburgh, R. A. (M)
Veatch, J. P. (SM)
Von Alven, W. H. (SM)
Waller, S. L. (SM)
Ware, M. (M)
Weihe, V. I. (F)
Weiss, R. A. (SM)
White, C. E. (SM)
Wiener, G. (A)
Williams, E. A. (M)
Williams, L. L., III (M)
Wilson, J. B. (A)
Wilson, L. M. (A)
Wilson, W. F. (M)
Wilson, W. H. (M)
Witting, E. G. (SM)
Wulff, J. J. (A)
Yatman, T. (A)
Yoon, P. (M)

Ashland (VIR-3)
Ryscuck, J. (M)

Bayside (VIR-3)
Bradbury, J. T. (M)
Enright, R. E. (M)
Lee, R. H. (SM)

Bedford (VIR-3)
Shawl, W. C. (M)

Bena (VIR-3)
Hogge, E.C . (A)

Blacksburg (VIR-3)
Baker, V. H. (M)
Dennison, B. L. (M)
Gannett, D. K. (F)
Holt, C. A. (M)
Lee, C. (SM)
Skutt, H. R. (M)
Stewart, A. W. (M)
Wright, R. R. (SM)

Bowling Green (VIR-3)
Hall, T. G. (A)

Bristol (VIR-3)
Boggs, W. G. (M)

Buckroe Beach (W-DC-3)
Moore, T. E. (M)

Cape Charles (VIR-3)
Brehm, C. M. (M)

Charlottesville (VIR-3)
Albee, R. B. (M)
Ankney, S. M. (M)
Ballard, L. L. (M)
Blankenship, H. T. (M)
Bossleux, E.V., Jr. (M)
Brown, B. T., Jr. (M)
Burford, A. J. (M)
Bursey, R. E. (M)
Butcher, R. B. (M)
Butler, A. A., Jr. (M)
Carpentier, R. A. (M)
Clevenger, J. E. (M)
Coburn, W. L. (M)
Deaner, H. W. (M)
Denman, E. D. (M)
Elmore, W. A. (M)
Evans, W. V., Jr. (M)
Fleming, R. F., Jr. (M)
Fosque, H. S. (M)
Fuller, H. P., Jr. (M)
Gehrke, W. C. (M)
Given, R. A. (M)
Grymes, J. R., Jr. (M)
Harris, O. R. (SM)
Harvey, G. L. (M)
Haynes, K. L. (M)
Hedrick, R. L. (M)
Hermansdorfer, J. E. (M)
Hughes, J. E. (M)
Humphris, R. R. (M)
Johnson, R. E. (M)
Jones, G. D., Jr. (M)
Landes, H. S. (M)
Lassetter, W. L. (M)
Lee, K. D. (M)
Manning, J. D. (M)
Metcalf, W. C. (M)
Miller, L. S. (M)
Moss, F. E. (M)
Overstreet, R. L., Jr. (M)
Pumell, L. S. (SM)
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Raney, R. L. (M)
Redfield, D. D. (SM)
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Roberts, W. W., Jr. (SM)
Rockett, F. H., Jr. (A)
Siegel, C. M. (M)
Smith, A. G. (M)
Stansell, T. A., Jr. (M)
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Turf, L. (A)
Van Sickler, E. P. (A)
Vogt, G. A. (M)
Walker, W. P. (M)
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Welch, A. A. (M)
Westbury, T. J., Jr. (M)
White, E. J. (M)
Wright, P. W. (A)

Christiansburg (VIR-3)
Gordon, J. P. (M)

Clifton (W-DC-3)
Bowie, D. M. (M)
Clark, V. C. (SM)

Cradock (VIR-3)
Shepherd, J. F. (M)

Culpeper (VIR-3)
Yowell, J. M., Jr. (M)

Dahlgren (VIR-3)
Barnes, W. C. (M)
Gros, J. R. (M)
Lewis, R. L. (M)
Lewis, T. S. (M)
Maxwell, M. S., G. (M)
Middlebrook, C. G. (M)
Potter, R. R. (M)
Pruitt, J. A., Jr. (M)
Ryland, R. T., Jr. (M)
Tharp, T. H. (M)

Danville (VIR-3)
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Lea, R. H. (A)
Molley, L. C. (M)

Denbigh (VIR-3)
Gustafson, A. J., Jr. (M)
Mason, C. D. (M)
Morton, R. W. (M)
Stubblefield, R. L. (A)

Dunn Loring (W-DC-3)
Griffin, P. W. (M)

Ellerson (VIR-3)
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Andrews, M. D. (M)
Barnhill, J. H. (M)
Bergen, S. (SM)
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Cave, E. L. (M)
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Fischer, R. L. (SM)
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Goldwag, H. (M)
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Irby, R. F. (M)
Irving, R. (M)
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James, J. E. (M)
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Colby, P. R. (SM)
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Knight, C. L. (SM)
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Mahood, W. L. (M)
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McDowell, R. B. (SM)
McIntyre, R. T. (M)
McKenney, M. S. (M)
McLean, J. W. (SM)
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Merchant, R. S. (M)
Mileson, D. F. (M)
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Montague, N. C. (M)
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Myers, W. D. (A)
Nickell, R. S. (M)
North, W. L. (SM)
Parker, C. F., Jr. (SM)
Plank, P. E. (M)
Proferes, N. J. (A)
Pullara, J. C. (M)
Randall, H. (SM)
Ranucci, J., Jr. (M)
Ratliff, T. D. (M)
Renton, R. J. (M)
Rogers, W. H., Jr. (M)
Rowland, E. T. (M)
Royal, D. C. (M)
Rumble, A. R. (SM)
Safford, L. F. (SM)
Sanders, N. D. (A)
Saunders, C. H., Jr. (M)
Savarese, R. T. (A)
Schanzenbach, G. P. (M)
Scott, R. M. (M)
Scott, S. R. (SM)
Seccombe, W. T. (SM)
Shaffer, L. R., Jr. (M)
Shearer, H. W. (M)
Shimei, N. K. (A)
Sjoholm, E. M. (A)
Skrivseth, A. G. (SM)
Slobodin, R. J. (M)
Smith, B. D., Jr. (M)



Smith, L. G. (M)
Sobol, E. J. (A)
Sotak, J. W. (A)
Stevens, C. L. (A)
Stevens, R. L. (A)
Stites, R. G. (SM)
Stuemer, E. H. (SM)
Svedlow, J. D. (M)
Swafford, J. H. (A)
Taylor, P. E. (M)
Taylor, P. G. (M)
Teare, E. H., Jr. (M)
Thompson, H. H. (A)
Thrasher, P. M., Jr. (M)
Ubelhor, J. A. (M)
Uffelman, M. R. (M)
Vandivere, E. F., Jr. (M)
Vernon, A. W. (A)
Vignali, J. A. (M)
Von Clemm, E. C. (M)
Walker, F. T. (M)
Walker, L. F. (SM)
Webb, B. S. (M)
Weld, A. C. (M)
Whiting, W. K. (M)
Wickenkamp, F. W. (M)
Wilcox, H. E. (M)
Williams, J. H., Jr. (A)
Winter, R. E. (M)
Young, A. H. (M)
Young, R. C. (SM)

Fort Lee (VIR-3)
Haaker, L. (M)

Fredericksburg (VIR-3)
Brooks, F. E. (M)

Gainesville (W-DC-3)
Sedman, T. M. (A)

Great Falls (VIR-3)
Bugg, J. E. (SM)

Hampton (VIR-3)
Babcock, R. A., III (M)
Boyer, W. J. (M)
Burton, W. G., Jr. (M)
Chicoine, L. L. (M)
Creighton, H. C. (M)
Croswell, W. F. (M)
Dial, E. W. (M)
Duncan, L. E. (M)
Faust, R. P. (M)
Frankenberg, A. J. (M)
Hardesty, C. A. (M)
Hastings, C. E. (SM)
Holup, A. C. (M)
Howell, W. E. (M)
Kessler, L. (M)
King, W. C., Jr. (A)
Lee, C. Q. (M)
McDonough, J. J. (M)
Ohnesorge, T. E. (M)
Russell, J. A., Jr. (M)
Seaford, R. P. (M)
Vavra, P. H. (M)
Webb, D. D., Jr. (M)
Wells, W. B. (M)
Wolfe, L. I., Jr. (M)

Harrisonburg (VIR-3)
Braun, W. L. (SM)
Foley, J. M. (M)
Jackson, R. C. (M)
Jones, T. B., Jr. (M)

Herndon (W-DC-3)
Horn, H. J. (M)
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Leesburg (W-DC-3)
Alberts, W. S. (SM)
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Lexington (VIR-3)
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Korb, A. (SM)

Lynchburg (VIR-3)
Andrus, O. F. N. (M)
Ball, R. M. (M)
Barnes, J. M. (M)
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Brown, M. A. (M)
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Clark, B. H. (M)
Corbell, I. T., Jr. (SM)
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Downes, C. L. (A)
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Garcia, J. R. (A)
Georgiev, P. V. (M)
Giesselman, A. C. (SM)
Gifford, R. P. (M)
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Hannel, F. D. (M)
Hassel, E. W. (M)
Hopkins, F. L. (SM)
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Kenelake, E. W. (SM)
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Morris, W. J. (A)
Murray, C. B., Jr. (A)
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Pitman, J. E. (M)
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Portz, H. G. (M)
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Smyrnos, G. J. (M)
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Martin, W. P. (M)
McCastlin, L. B., Jr. (M)
Medley, R. C. (A)
Moore, J. B., Jr. (A)
Ochsltree, S. L. (M)
Paterson, R. C. (A)
Peck, P. V. (M)
Peffer, J. C. (SM)
Pegues, J. K. (SM)
Price, C. F. (M)
Pyle, H. D. (M)
Reiher, E. J. (M)
Reisner, G. H. (M)
Roman, R. (A)
Selby, S. L. (A)
Slaughter, W. R. (A)
Sutherland, W. R. (M)
Swab, C. S. (M)
Tacke, W. N. (M)
Thompson, L. H. (A)
Thumm, H. L., Jr. (A)
Trahadias, P. N. (A)
Uhlfelder, L. P. (M)
Vann, I. M., Jr. (M)
Varn, S. P., Jr. (A)
Waters, T. F. (A)
Weiland, E. H. (M)
Williams, B. D., Jr. (M)
Wilson, R. V., Jr. (M)
North Arlington (W-DC-3)
Moss, D. G. (M)

North Springfield (W-DC-3)
Baxter, W. D. (M)
Fine, F. (M)
Forbes, D. F. (M)
Harding, N. D., Jr. (M)
Hill, R. B. (A)
Ocel, R. P. (M)
Sheldon, R. E. (M)
Shelton, J. P., Jr. (M)
Stell, J. P. (A)

Petersburg (VIR-3)
Clemente, J. R. (A)

Phoebus (VIR-3)
Cooper, W. N. (A)

Poquoson (VIR-3)
Burlock, J. (M)

Portsmouth (VIR-3)
Bell, J. S., Jr. (SM)
Butler, W. J. (M)
Cox, J. C. (M)
Crowson, R. D. (M)
Hoffman, G. R. (M)
Howell, J. E., Jr. (M)
Howerton, D. J. (M)
Jenkins, R. G. (M)
Norcom, G. J. (M)
Sperry, G. T. (SM)
Williamson, D. E. (M)
Williamson, S. R. (M)

Quantico (W-DC-3)
Johnson, D. W. (M)
Kyle, D. N. (M)

Quinton (VIR-3)
Black, J. H. (A)

Remington (W-DC-3)
Saunders, E. R., Jr. (M)

Richmond (VIR-3)
Bailey, R. C. (SM)
Batte, R. B. (M)
Conte, T. M. (SM)
Golding, R. M. (A)
Gregory, C. A., Jr. (M)
Hobbs, W. E. (M)
Kyle, J. W. (M)
Lee, W. M. (M)
Martin, E. L. (A)
McArthur, C. S. (SM)
Miller, A. G. (M)
Mingia, S. L. (M)
Nine, J. A. (M)
Petrus, W. W., IV (M)
Richter, A. R. (M)
Slough, C. M. (A)
Steele, C. P. (A)
Szczebak, E. J. (M)
Thorpe, R. A. (M)
Tiller, J. L., Jr. (M)
Toms, E. C. (M)
Vellines, W. E., Jr. (M)
Wilson, R. C., Jr. (M)
Wolfe, I. P. (A)
Woods, D. C. (M)

Riverton (VIR-3)
Spencer, D. K. (M)

Roanoke (VIR-3)
Bailey, F. M. (SM)
Branscom, G. A. (M)
Briggs, J. P. (A)
Everleigh, C. A. (M)
Gillock, G. M. (M)
Guill, G. M., Jr. (A)
Legendre, V. (M)
Malloy, J. J. (M)
Manoly, A. E. (M)
McCants, D. G. (M)
Thomas, J. E. D. (M)

Salem (VIR-3)
Clower, W. D. (M)
Hansen, J. A. (M)
Weber, W. N. (SM)

Sandston (VIR-3)
Rowand, G. E. (A)

Scottsville (VIR-3)
Whiteside, F. S. (A)

South Arlington (W-DC-3)
Thompson, F. J. (M)

South Norfolk (VIR-3)
Yates, Z. (A)

Springfield (W-DC-3)
Adkisson, G. O. (M)
Alderman, J. M. (M)
Alderson, W. S. (SM)
Anderson, R. V. (M)
Ayers, J. G., Jr. (M)
Baird, L. I. (A)
Bargh, P. F. (M)
Barreto, J. M. (SM)
Behrens, F. A. (M)
Bell, W. E. (M)
Burkhardt, R. H. (M)
Bush, J. E. (M)
Camonaella, S. J. (M)
Castle, R. A. (M)
Chapman, J. N. (M)
Chatfield, G. F. (A)
Coffee, J. M. (M)
Comport, J. J. (M)
Conant, W. W. (A)
Conlon, J. R. (M)
Connelly, E. M. (M)
Coulter, D. C. (M)
Coville, D. (M)
Devereaux, W. J. (M)
Facchine, F. B. (M)
Foster, L. E. (M)
Fredrick, W. C. (M)
Gale, M. (M)
Garner, W. G. (M)
Guy, L. S. (M)
Hocking, L. J. (A)
Jaynes, F. H. (A)
Jennette, J. E., Jr. (M)
Johnson, W. C. (M)
Johnston, E. C. (A)
Jones, R. C. (SM)
Keys, C. A. (A)
Klotz, J. W. (M)
Lindsay, J. C. (M)
Lipsey, E. M. (M)
Loynd, H. T., Jr. (M)
Lynch, D. W. (M)
Mathews, W. C. (M)
Mayman, J. J. (A)
McAndrews, F. C. (SM)
McCown, J. R. (M)
Miller, J. H. (M)
Peake, F. E., Jr. (M)
Peratino, G. S. (M)
Phillips, J. T. (A)
Probert, L. J. (A)
Reese, M. R., Jr. (M)
Rose, J. (M)
Rudolph, L. R. (M)
Shinn, L. A. (M)
Smith, A. W. (M)
Smith, S. T. (SM)
Smith, T. H. (A)
Spencer, C. L. (M)
Spencer, D. F. (SM)
Spitz, D. C. (M)
Spooner, W. A. (M)
Stelter, L. R. (M)
Stewart, J. P. (A)
Thompson, K. B. (A)
Tucker, W. J., Jr. (M)
Walter, W. P. (A)
Wardrop, S. C. (M)
Wigington, R. L. (M)
Wisniewski, L. R. (A)
Witherow, J. A. (M)
Woo, W. G. (SM)
Wright, C. S. (SM)

Stanardsville (VIR-3)
Whitehurst, C. H., Jr. (A)

Sterling (W-DC-3)
Burlingame, C. W. (M)
Richardson, R. M. (SM)

Suffolk (VIR-3)
Bangley, J. H., Jr. (A)

Vienna (W-DC-3)
Aceto, L. J. (A)
Bird, C. T. (SM)
Brantly, R. S., Jr. (M)
Carrick, R. L. (M)
Coddington, D. L. (M)
Cole, B. M. (SM)
Cooke, N. M. (SM)
Csiszar, A. (M)
Cuthbertson, R. D. (M)
Daugherty, C. T. (M)
Daugend, J. P. (M)
Dupree, W. F. (A)
Eskinzes, J. G. (A)
Fairchild, I. J., Jr. (M)
Falcone, J. (M)
Feinman, G. (M)
Gibbs, D. R. (M)
Gray, W. A. (SM)
Groff, W. M. (M)
Hall, J. R. (M)
Kaneski, V. J. (M)
Karalow, G. T. (A)
La Rue, C. E. (M)
Llen, D. A. (A)
Macklin, H. W., Jr. (M)
McDonald, K. D. (M)
Meisinger, H. P. (SM)
Minor, R. E. (A)
Nye, J. W. (M)
O'Connor, M. A., Jr. (M)
Poulter, H. M. (M)
Ravinsky, J. (A)
Schmid, P. E., Jr. (A)
Shanahan, J. C. (M)
Shumaker, J. L. (SM)
Toler, B. L. (A)
Tumage, H. C. (M)
Tuttle, L. P., Jr. (M)
Webb, P. L. (A)
Wimmer, P. L. (M)
Wolfe, J. J. (A)

Triangle (W-DC-3)
Parrish, L. J. (M)
Smith, C. M. (A)

Virginia Beach (VIR-3)
Coile, R. C. (M)
Conway, B. B. (M)
Corkran, R. L., Jr. (M)
Du Val, C. N. (A)

, L. G. (M)
, E. J. (A)
, W. (A)
ns, C. (A)
ns, R. (A)
, F. (SM)
ner, E. H. (SM)
ow, J. D. (M)
ord, W. H. (A)
r, P. (M)
r, P. (M)
, G. H., Jr. (M)
sson, W. H. (A)
ner, P. M., Jr. (M)
r, J. (M)
man, M. R. (M)
vere, L. F., Jr. (M)
n, A. (A)
, J. (M)
leman, E. C. (M)
r, F. (M)
r, L. (SM)
, B. S. (M)
, A. C. (M)
ng, W. K. (M)
enkamp, F. W. (M)
r, H. (M)
ms, J. H., Jr. (A)
, R. (M)
, A. (M)
g, R. L. (SM)

(VIR-3)
er, L. (M)

sbury (VIR-3)
es, F. S. (M)

le (W-DC-3)
man, W. M. (A)

ls (VIR-3)
, J. E. (SM)

(VIR-3)
cock, R. A., III (M)
r, W. (M)
en, W. G., Jr. (M)
ome, L. L. (M)
ghton, W. C. (M)
well, W. F. (M)
, E. W. (M)
can, L. E. (M)
st, R. P. (M)
kenberg, A. J. (M)
desty, C. A. (M)
timore, C. E. (SM)
p, J. C. (M)
rell, W. E. (M)
sler, L. (M)
, W. H., Jr. (A)
, C. S. (M)
Donnell, J. A. (M)
esamore, T. T. (M)
sell, J. A., Jr. (M)
ford, R. P. (M)
rra, J. W. (M)
bb, D. D., Jr. (M)
ls, W. B. (M)
fe, L. L., Jr. (M)

burg (VIR-3)
un, W. L. (SM)
ley, W. M. (M)
kson, H. C. (M)
es, T. B., Jr. (M)

(W-DC-3)
n, H. L. (M)
ne, W. A. (M)

rg (W-DC-3)
ve, P. S. (M)

ell (VIR-3)
mer, G. H. (A)

VIR-3)
nnicutt, W. A. (M)

sburg (VIR-3)
archer, J. W. (M)
ont, H. N. (M)

y (VIR-3)
me, D. H. (A)

y Afb (VIR-3)
erill, B. P. (M)
wley, R. P. (M)
rman, E. F., Jr. (M)
yce, R. E. (A)
pitt, M. W., Jr. (M)
ungbluth, O., Jr. (M)

urg (W-DC-3)
liberty, W. S. (SM)
ar, L. H. (M)
y, L. (M)
artin, W. H. (M)
cClelland, F. H. (M)
ands, L. E. (M)
ington, T. L. (M)
turnell, L. (M)
hillmire, W. C., Jr. (A)

gton (VIR-3)
well, M. W. (M)

n (W-DC-3)
lorb, A. (SM)

nburn (VIR-3)
Andrus, J. F. H. (M)

Ball, R. M. (M)
Barnes, J. W. (M)
Brauner, E. J. (M)
Breazeale, W. M. (SM)
Brown, M. K. (M)
Buesing, R. T. (SM)
Bunday, D. L. (SM)
Bunger, J. W. (M)
Cardwell, B. B., Jr. (M)
Ceelen, P. A. J. (M)
Christian, E. (M)
Cisler, M. C. (SM)
Clark, B. H. (M)
Corbell, I. T., Jr. (SM)
Cox, J. L. (M)
Dalton, W. D. (M)
Davids, H. W. (SM)
Dewire, G. M. (M)
Downes, C. (A)
Erlandsen, C. F. (M)
Farmer, R. A. (A)
Fincher, J. C. (M)
Gallion, W. L. (M)
Garcia, J. R. (A)
Georgiev, P. V. (M)
Gieseleman, A. C. (SM)
Gifford, M. P. (M)
Guth, R. D. (A)
Hannell, F. D. (M)
Hassel, E. W. (M)
Hopkins, F. L. (SM)
Hudson, A. G. (M)
Jenkins, D. C. (M)
Kenefake, E. W. (SM)
Kerker, R. (M)
Klous, L. A. (M)
Kluender, E. C. (SM)
Laitinen, W. R. (M)
Lather, A. C. (M)
Linker, J. B., Jr. (SM)
Lippard, J. H., Jr. (M)
McCormick, J. A. (M)
McGee, A. A., Jr. (M)
McKee, T. A. (M)
McNeil, H. N. (A)
Miller, H. J. (M)
Morris, W. J. (A)
Murray, C. B., Jr. (A)
Murphy, W. T., Jr. (A)
Myers, P. T. (M)
Orth, J. F. (M)
Peifer, W. A. (A)
Peoplatt, H. J. (M)
Phillips, J. H., Jr. (M)
Pickett, R. T., III (M)
Pinkerton, J. C. (SM)
Pitman, J. E. (M)
Pitzer, H. B., Jr. (M)
Poppe, J. R. (M)
Portz, H. G. (M)
Powell, R. A. (A)
Pree, W. G. (SM)
Ray, K. P. (M)
Roberts, D. M. (M)
Rose, G. D., Jr. (M)
Sain, W. C. (M)
Sanger, R. B. (A)
Seamon, W. R. (M)
Shepherd, N. H. (SM)
Sherman, J. H., Jr. (M)
Smee, P. G. (SM)
Smith, L. (M)
Smith, J. S., Jr. (M)
Smith, J. S. (SM)
Smyrnios, G. J. (M)
Stone, P. F. (M)
Street, D. S. (M)
Strong, N. E. (A)
Sutton, R. B. (A)
Sviter, S. A. (M)
Thomas, H. P. (F)
Tucker, A. A., Jr. (M)
Vadasz, A. J. (SM)
Van Aken, H., Jr. (A)
Vander Does, A. S. (M)
Vimont, B. D. (A)
Williams, J. A., Jr. (A)
Williamson, R. H. (F)
Willson, K. R. (SM)
Worthen, K. J. (M)

Lynchburg (VIR-3)
Kane, R. P. (M)
Stoddart, T. M. (M)

Manassas (W-DC-3)
Becker, W. J. (A)

Manassas Park (VIR-3)
Baxter, D. D. (M)

Marion (VIR-3)
Crispin, H. L. (A)
Meek, J. S. (M)

McLean (W-DC-3)
Bateman, R. (F)
Behme, R. E. (M)
Bell, W. S. (A)
Boucher, S. H. (M)
Brown, D. H. (M)
Butler, J. E. (M)
Carne, E. B. (A)
Child, A. A. (A)
Collins, M. F. (SM)
Covell, W. G. (M)
Creutz, J. (M)
Davis, E. D. (A)
Dee, H. E. (A)
De Hart, R. N. (M)
Dyke, E. (SM)
Ferry, R. M. (M)
Gumb, D. F. (A)

Hall, R. W. (A)
Hallman, A. B. (M)
Harding, X. C. (SM)
Heckel, R. D. (M)
Hopkins, C. (SM)
Martin, M. M. (M)
Noble, L. V. (M)
Rogers, A. W. (F)
Rogers, C. J. (M)
Schuette, W. H. (M)
Seely, E. E. (M)
Seewald, E. C. (M)
Shoemaker, R. F. (A)
Smith, A. E. (SM)
Smith, J. M. (M)
Smoot, W. S., III (M)
Stokes, H. S. (SM)
Stonesifer, R. A. (M)
Stotler, H. J. (M)
Sunde, D. H. (A)
Trenaman, J. I. (SM)
Tucker, G. L. (M)
Turnbomed, T. E. (M)
Vest, C. R. (M)
West, J. P. (M)

Mount Solon (VIR-3)
Wilson, W. P. (M)

Mount Vernon (W-DC-3)
Phillips, M. L. (SM)

New Alexandria (W-DC-3)
Myers, E. G. (M)

Newport News (VIR-3)
Akenhead, B. A. (M)
Andrews, R. E. (M)
Bjerke, J. O. (M)
Cooper, M. J. (M)
Cootes, J. G. (M)
Davies, R. A. (M)
Harkavy, V. M. (SM)
Hunter, W. W., Jr. (M)
Jackson, J. C. (M)
Jones, R. F. (M)
Krasnican, M. J. (M)
Leopold, L. (M)
O'Connell, J. V. (A)
Shultz, L. R. (A)
Silverstein, W. E., Jr. (M)

Norfolk (VIR-3)
Bacon, F. W., Jr. (M)
Beck, F. E., Jr. (M)
Bein, G. E. (M)
Blagg, R. L. (M)
Bull, W. J. (M)
Burchard, J. (A)
Butler, K. L. (M)
Christian, O. R. (M)
Clarke, W. E. (M)
Cole, P. P. (M)
Colgan, P. V. (SM)
Councill, J. W. (M)
Cowie, D. G. (M)
Crabtree, B. W. (M)
Crawford, J. K. (M)
Crowley, H. R. (M)
Davis, E. E. (M)
Dean, K. B. (M)
De Jarnette, H. M. (M)
De Witt, D. D. (M)
Dryer, H. M. (M)
Eller, J. E., Jr. (SM)
Evernham, J. L. (M)
Fabianic, W. S. (M)
Forehand, R. R. (A)
Fox, D. A. (M)
Geary, J. T. (M)
Graham, D. A. (M)
Hamilton, G. H. (A)
Herrmann, W. E. (A)
Jennings, J. L. (A)
Jones, C. M. (M)
Judson, J. F. (M)
Justice, R. J. (M)
Kaseman, F. S. (M)
Kazist, P. M. (M)
Kinn, R. H. (M)
King, S. O. (A)
Koontz, C. E. (M)
Lapless, J. H. (M)
Lindell, R. L. (M)
Martin, W. P. (M)
McCaslin, L. B., Jr. (M)
Medley, R. C. (A)
Moore, J. B., Jr. (A)
Ochsnitree, S. L. (M)
Paterson, R. C. (A)
Peck, P. V. (M)
Peffer, J. C. (SM)
Peques, J. K. (SM)
Price, C. F. (M)
Pyle, H. D. (M)
Reiher, E. J. (M)
Reisner, G. H. (M)
Rosen, R. (A)
Selby, S. L. (A)
Straughter, W. R. (A)
Sutherland, W. R. (M)
Swab, C. S. (M)
Tache, W. N. (M)
Thompson, L. H. (A)
Thorn, H. L., Jr. (A)
Trahadias, P. N. (A)
Uhlfelder, L. P. (M)
Vann, I. M., Jr. (M)
Vann, S. P., Jr. (A)
Waters, T. F. (A)
Weiland, E. H. (M)
Williams, B. D., Jr. (M)
Wilson, R. V., Jr. (M)

North Arlington (W-DC-3)
Moss, D. G. (M)

North Springfield (W-DC-3)
Baxter, W. D. (M)
Fine, F. (M)
Forbes, D. F. (M)
Harding, N. D., Jr. (M)
Hill, R. B. (A)
Ocel, R. P. (M)
Sheldon, R. E. (M)
Shelton, J. P., Jr. (M)
Stell, J. P. (A)

Petersburg (VIR-3)
Clemente, J. R. (A)

Phoebus (VIR-3)
Cooper, W. N. (A)

Poquoson (VIR-3)
Burlock, J. (M)

Portsmouth (VIR-3)
Bell, J. S., Jr. (SM)
Butler, W. J. (M)
Cox, J. C. (M)
Crowson, R. D. (M)
Hoffman, G. R. (M)
Howell, J. E., Jr. (M)
Howerton, D. J. (M)
Jenkins, R. G. (M)
Norcom, G. J. (M)
Sperry, G. T. (SM)
Williamson, D. E. (M)
Williamson, S. R. (M)

Quantico (W-DC-3)
Johnson, D. W. (M)
Kyle, D. N. (M)

Quinton (VIR-3)
Black, J. H. (A)

Remington (W-DC-3)
Saunders, E. R., Jr. (M)

Richmond (VIR-3)
Bailey, R. C. (SM)
Batte, R. B. (M)
Conte, T. M. (SM)
Golding, R. M. (A)
Gregory, C. A., Jr. (M)
Hobbs, W. E. (M)
Kyle, J. W. (M)
Lee, W. M. (M)
Martin, E. L. (A)
McArthur, C. S. (SM)
Miller, A. G. (M)
Minyia, S. L. (M)
Nine, J. A. (M)
Pettus, W. W., IV (M)
Richter, A. R. (M)
Slough, C. M. (A)
Steele, C. P. (A)
Szczebak, E. J. (M)
Thorpe, R. A. (M)
Tiller, J. L., Jr. (M)
Toms, E. C. (M)
Vellines, W. E., Jr. (M)
Wilson, R. C., Jr. (M)
Wolfe, I. P. (A)
Woods, D. C. (M)

Riverton (VIR-3)
Spencer, D. K. (M)

Roanoke (VIR-3)
Bailey, F. M. (SM)
Branscom, G. A. (M)
Briggs, J. P. (A)
Everleigh, C. A. (M)
Gillock, G. M. (M)
Guill, G. M., Jr. (A)
Legendre, V. (M)
Malloy, J. J. (M)
Mahoney, A. E. (M)
McCants, D. G. (M)
Thomas, J. E. D. (M)

Salem (VIR-3)
Glower, W. D. (M)
Hansen, J. A. (M)
Weber, W. N. (SM)

Sandston (VIR-3)
Rowand, G. E. (A)

Scottsville (VIR-3)
Whiteside, F. S. (A)

South Arlington (W-DC-3)
Thompson, F. J. (M)

South Norfolk (VIR-3)
Yates, Z. (A)

Springfield (W-DC-3)
Adkisson, G. O. (M)
Alderman, J. M. (M)
Alderson, W. S. (SM)
Anderson, R. V. (M)
Ayers, J. G., Jr. (M)
Baird, L. I. (M)
Bargh, P. F. (M)
Barreto, J. M. (SM)
Behrens, F. A. (M)
Bell, W. E. (M)
Burkhardt, R. H. (M)
Bush, J. E. (M)
Campanella, S. J. (M)
Castle, R. A. (M)

Chapman, J. N. (M)
Chatfield, G. F. (A)
Coffee, J. M. (M)
Comport, J. J. (M)
Conant, W. W. (A)
Conlon, J. R. (M)
Connelly, E. M. (M)
Coulter, D. C. (M)
Coville, D. (M)
Devereaux, W. J. (M)
Facchine, F. B. (M)
Foster, L. E. (M)
Fredrick, W. C. (M)
Gale, M. (M)
Garner, W. G. (M)
Gary, L. S. (M)
Hocking, L. J. (A)
Jaynes, F. H. (A)
Jennette, J. E., Jr. (M)
Johnson, W. C. (M)
Johnston, E. C. (A)
Jones, R. C. (SM)
Keys, C. A. (A)
Klotz, J. W. (M)
Lindsay, J. C. (M)
Lipsey, E. M. (M)
Loynd, H. T., Jr. (M)
Lynch, D. W. (M)
Mathews, W. C. (M)
Mayman, J. J. (A)
McAndrews, F. C. (SM)
McCown, J. R. (M)
Miller, J. H. (M)
Peake, F. E., Jr. (M)
Peratino, G. S. (M)
Phillips, J. T. (A)
Probert, L. J. (A)
Reese, M. R., Jr. (M)
Rose, J. (M)
Rudolph, L. R. (M)
Shinn, L. A. (M)
Smith, A. W. (M)
Smith, S. T. (SM)
Smith, T. H. (A)
Spencer, C. L. (M)
Spencer, D. F. (SM)
Spitz, D. C. (M)
Spooner, W. A. (M)
Stelter, L. R. (M)
Stewart, J. P. (A)
Thompson, K. B. (A)
Tucker, W. J., Jr. (M)
Walter, W. P. (A)
Wardrip, S. C. (M)
Wigington, R. L. (M)
Wisniewski, L. R. (A)
Witherow, J. A. (M)
Woo, W. G. (SM)
Wright, C. S. (SM)

Stanardsville (VIR-3)
Whitehurst, C. H., Jr. (A)

Sterling (W-DC-3)
Burlingame, C. W. (M)
Richardson, R. M. (SM)

Suffolk (VIR-3)
Bansley, J. H., Jr. (A)

Vienna (W-DC-3)
Aceto, L. J. (A)
Bird, G. T. (SM)
Brantly, R. S., Jr. (M)
Carrick, R. L. (M)
Coddington, D. L. (M)
Cole, B. M. (SM)
Cooke, N. M. (SM)
Csiszer, A. (M)
Cuthbertson, R. D. (M)
Daugherty, L. C. (M)
Dausend, J. P. (M)
Dupree, W. F. (A)
Eskinzes, J. G. (A)
Fairchild, I. J., Jr. (M)
Falcone, J. (M)
Feineman, G. (M)
Gibbs, D. R. (M)
Gray, W. A. (SM)
Groff, W. M. (M)
Hall, J. R. (M)
Kaneski, V. J. (M)
Karalow, G. T. (A)
La Rue, C. E. (M)
Lien, D. A. (A)
Mauldin, H. W., Jr. (M)
McDonald, K. D. (M)
Meisinger, H. P. (SM)
Minor, R. E. (A)
Nye, J. W. (M)
O'Connor, M. A., Jr. (M)
Poulter, H. M. (M)
Ravinsky, J. (A)
Scivold, P. E., Jr. (M)
Shanahan, J. C. (M)
Shumaker, J. L. (SM)
Tofte, B. L. (A)
Tumage, H. C. (M)
Tuttle, L. P., Jr. (M)
Webb, P. L. (A)
Wimmer, P. L. (M)
Wolfe, J. J. (A)

Triangle (W-DC-3)
Parrish, L. J. (M)
Smith, C. M. (A)

Virginia Beach (VIR-3)
Colle, R. C. (M)
Conway, B. B. (M)
Corkran, R. L., Jr. (M)
Du Val, C. N. (A)

## VIRGINIA

Fadeley, J. H. (A)
Hickey, H. V. (M)
Humphries, J. H. (A)
Mikulski, S. S. (M)

Ware Neck (VIR-3)
Lawrence, H. M. (SM)

Warrenton (W-DC-3)
Gundy, G. L. (A)
Kowalewski, H. S. (A)
Maloney, J. P. (M)
Williams, J. S. (M)
Woodside, C. S. (SM)
York, J. A. (M)
Young, T. M. (M)
Zura, E. A. (M)

Warwick (VIR-3)
Brummer, E. A. (M)
Comstock, A. L. (M)
McFall, C. H., Jr. (M)
Sawyer, R. S. (M)

Waynesboro (VIR-3)
Bukoskey, R. M. (A)
Campbell, R. C. (M)
Clark, D. B. (M)
Cockrell, W. D. (SM)
Cooper, B. (M)
Curtis, D. D. (A)
Duncan, W. L. (A)
Hansen, W. O. (M)
Langley, L. W. (M)
Lyda, G. S. (M)
Meyer, L. L. (M)
Swann, C. H. (M)
Thuresson, R. G. (A)
Wilson, T. M. (M)
Young, H. S. W. (M)
Zaluski, J. P. (M)

Williamsburg (VIR-3)
Dickinson, J. O. (M)
Dutton, A. A. (A)
Harrell, E. E. (A)
Kyle, H. C. (M)

Winchester (VIR-3)
Baughman, D. L. (M)
Grace, G. M. (M)
Lockhart, W. J. (A)
Whitney, P. B. (SM)

Woodbridge (W-DC-3)
De Rosa, G. D. (A)
Shipley, G. H., Jr. (M)
Sudduth, J. F. (M)

Yorktown (VIR-3)
Duran, A. E. (M)

## WASHINGTON

Alderwood Manor (SEA-7)
Fitzsimmons, G. W. (M)

Auburn (SEA-7)
Hirenbaugh, A. F. (M)
Huber, W. (SM)
Lidovitch, S. B. (M)
Rasmussen, F. A. (M)
Thrush, T. W. (M)
Westbo, L. A., Jr. (M)

Bainbridge Island (SEA-7)
McCarty, E. W. (M)

Belfair (SEA-7)
Osborn, N., III (M)

Bellevue (SEA-7)
Albright, D. L. (M)
Ambrose, J. (M)
Anderson, C. F. W. (SM)
Asoholm, L. R. (M)
Ausec, R. C. (A)
Banks, R. B. (M)
Beckenstein, M. (M)
Bennett, J. R. (A)
Bethel, H. W. (M)
Birch, J. S. (M)
Black, J. C. (M)
Boys, J. A. (SM)
Boytz, J. R. (M)
Bridgland, T. F., Jr. (M)
Burge, D. L. (M)
Burgh, A. J. (M)
Burnett, W. A. (M)
Bush, B. E., Jr. (A)
Charters, R. L. (M)
Cockrill, M. S. (M)
Crane, W. K. (SM)
Crawford, W. N. (M)
Dalby, T. G. (M)
Delk, E. T. (M)
Downing, G. (M)
Dye, D. L. (M)
Fairfield, H. R. (M)
Ferguson, R. C. (A)
Fonda, K. A. (M)
Foster, J. H. (M)
Furst, U. R. (SM)
Gellert, M. E. (M)
Gerry, M. E. (SM)
Gibson, G. A. (M)
Goss, W. (M)
Hamilton, W. R. (M)
Herr, M. D. (M)
Hisamoto, R. M. (M)
Hodgson, D. J. (M)
Huie, W. (M)
Iversen, A. J. (M)
Janken, S. (A)
Jessup, D. G. (M)
Johnson, K. L. (M)
Johnson, R. E. (M)
Jones, L. E. (SM)
Kearl, J. A. (A)
Kendall, E. L. (M)
King, B. G. (M)
Kuzeja, C. (M)
Lane, R. G. (M)
Lange, T. J. (M)
Lerchenmueller, W. (M)
Letwin, A. (M)
Lewis, R. O., Jr. (M)
Lins, E. G. (A)
Little, F. A. (SM)
Lundberg, R. M. (M)
Matthews, A. R. (SM)
McCarley, H. H. (SM)
McElhoe, B. A. (M)
Metter, R. E. (M)
Montgomery, R. A. (M)
Noland, L. J. (M)
Olsson, E. A. (M)
Osgood, E. P. (M)
Pigott, W. H. (M)
Piltz, F. (A)
Prindle, R. H. (M)
Robinson, R. B. (M)
Schiller, A. E. (A)
Shomer, J. E. (M)
Short, L. E. (M)
Smith, C. R. (SM)
Spencer, K. J. (M)
Stapleton, E. R. (M)
Sullivan, J. K. (M)
Summerhays, M. S. (M)
Taylor, C. K. (M)
Thompson, A. G. (M)
Turko, D. A. (M)
Unwin, A. M. (M)
Weimer, J. W. (A)
Westburg, V. B. (M)
Wright, W. E. (M)

Bellingham (SEA-7)
Christensen, D. M. (M)
Harper, E. E. (M)
Price, J. W. (M)

Bothell (SEA-7)
Curtis, W. L. (M)
Rama, L. C. (M)
Vermillion, E. E. (M)

Bremerton (SEA-7)
Cruwell, F. N. (M)
Helmark, H. A. (A)
Levin, R. J. (A)
Lyngstad, E. O. (M)
Mason, J. E. (M)
Milden, C. W. (M)
Pascual, R. A. (M)
Pitts, H. L. (SM)
Thorne, C. M. (M)
Tufts, W. F. (M)

Centralia (SEA-7)
Lipsincott, E. W. (M)

College Place (SEA-R-7)
Brown, R. H. (M)

Colville (SEA-7)
Ruskin, D. A. (M)

Dash Point (SEA-7)
Boze, J. L. (A)

Deer Harbor (SEA-7)
Tippery, M. W. (M)

Des Moines (SEA-7)
Berntsen, D. G. (M)
Perkins, L. C. (M)

East Wenatchee (SEA-7)
Frese, G. M. (SM)

Edmonds (SEA-7)
Asper, R. L. (M)
Bassett, D. M. (M)
Baxter, J. R. (M)
Christie, L. F., Jr. (M)
Hauge, P. S. (M)
Jones, W. L. (M)
May, R. L. (M)
Ohlen, C. E. (M)
Renwick, R. L. (M)
Staab, C. S. (M)
Timm, W. E. (M)
Zevenbergen, J. W. (M)

Electric City (SEA-7)
Alps, R. B. (M)

Enumclaw (SEA-7)
Stedman, C. K. (SM)

Everett (SEA-7)
Powers, C. R. (M)
Tryqstad, G. P. (M)

Fairchild AFB (SEA-R-7)
Paige, D. R. (M)
Wehlander, E. O. (M)

Federal Way (SEA-7)
Hartwell, S. A. (M)
Smith, E. L. (M)

Friday Harbor (SEA-7)
Taylor, C. C. (M)

Gig Harbor (SEA-7)
Berkheimer, R. H. (M)
Bice, M. H. (M)
Roberts, M. E. (A)

Hoquiam (SEA-7)
Smading, R. E. (A)

Ilwaco (SEA-7)
Ganifas, G. (A)

Issaquah (SEA-7)
Harms, R. G. (M)
Hulford, M. R. (M)
Janes, H. P., Jr. (M)
Paschal, S. L. (M)

Kennewick (SEA-R-7)
Guyer, F. R. (M)
Hinshaw, R. M. (A)
Lambert, T. G. (M)
Rastovich, M. (A)
Ratcliffe, C. A. (M)
Skaugset, R. L. (A)
Taylor, G. R. (A)
Thomas, J. P. (M)

Kent (SEA-7)
Duboff, R. (M)
Erlandsen, E. K. (M)
Froeschle, E. J., Jr. (M)
Haff, D. H. (M)
Hokenson, H. S. (M)
Jensen, W. R. (A)
Kirkpatrick, R. L. (M)
Miller, G. E. (M)
Nunner, R. J. (M)
Rice, R. G. (M)
Rona, T. P. (SM)
Smith, J. K. (M)
Swain, C. W. (M)
Tyras, G. (M)
Vassilakos, D. A. (M)

Keyport (SEA-7)
Anderson, R. J. (M)

Kirkland (SEA-7)
Austin, J. D. (M)
Bohn, A. L. (M)
Caldwell, J. J., Jr. (SM)
Coughlan, G. B. (M)
Flint, D. C. (M)
Glaser, R. A. (M)
Layman, R. S. (M)
Sheldon, J. K. (A)
Smith, M. R. (M)
Wall, R. E., Jr. (M)
Whipple, M. M. (M)

Longview (POR-7)
Collins, E. H. (M)

Lynnwood (SEA-7)
Grinnell, C. W. (M)
Killitz, R. M. (M)
Presender, R. E. (M)
Pribbenow, F. C. (M)
Swinney, S. I. (A)

McChord AFB (SEA-7)
Lord, W. P. (M)
Nygaard, G. M. (M)

Mercer Island (SEA-7)
Caldwell, R. R. (M)
Carman, D. M. (M)
Chen, P. F. (M)
Cowdrey, H. R. (A)
Fang, F. F. (M)
Franzel, R. T. (M)
Fu, K. S. (M)
Harris, R. E. (M)
Koch, G. E. (M)
May, E. L. (M)
Maynard, J. E. (SM)
Moore, W. H. (SM)
Nelson, H. (M)
Newell, J. S., Jr. (M)
O'Hara, R. N. (M)
Perdue, R. E. (M)
Porad, B. L. (M)
Pyle, H. S. (SM)
Thompson, M. E. (M)
Winder, D. E. (M)

Mineral (SEA-7)
Rowe, V. G. (M)

Moses Lake (SEA-7)
Bramel, E. F. (M)
Hall, R. P. (M)
Harrison, J. C. (A)
Kaack, C. H. (M)
Scheele, W. H. (M)

Mountlake Terrace (SEA-7)
Andersen, J. H. (M)
Engstrom, W. C. (M)
Gallwey, K. L. (M)
Sackman, D. J. (A)

North Bonneville (SEA-7)
Dillis, M. M. (M)

Oakesdale (SEA-R-7)
Russell, J. S. (A)

Oak Harbor (SEA-7)
Baker, N. C. (M)
Reiff, G. A. (M)

Olympia (SEA-7)
Christensen, A. B. (M)
Guiberson, M. D. (M)

Othello (SEA-7)
Beus, S. W. (M)

Pacific Beach (SEA-7)
Van Cott, J. M. (M)

Pasco (SEA-R-7)
Driver, G. E. (M)

Port Angeles (SEA-7)
Niemi, R. I. (A)
Oakes, G. K. (A)

Port Orchard (SEA-7)
Drew, D. H., Jr. (M)
Finke, W. H. (M)

Pullman (SEA-R-7)
Betts, A. L. (SM)
Craine, L. B. (M)
Dayot, V. D. (M)
Harbour, R. D. (M)
Ikstrums, J. (M)

Redmond (SEA-R-7)
Elliott, R. E. (A)

Renton (SEA-7)
Anderson, F. C. (M)
Ashland, R. F. (M)
Beairsto, R. J. (M)
Carlson, B. L., Jr. (M)
Cockrill, W. C. (A)
Connell, J. L. (M)
Fitch, J. L. (A)
Harley, T. P. (M)
Hulse, B. T., Jr. (M)
Melkonian, H. A. (M)
Nelson, J. K. (M)
Nicolino, T. A. (M)
Rigg, K. W. (M)
Savage, T. R. (M)
Siopach, H. G. (M)
Taylor, D. E. (M)

Richland (SEA-R-7)
Althoff, P. C. (M)
Barcroft, J. R. (M)
Brown, D. P. (M)
Cartmell, T. R. (M)
Connally, R. E. (M)
Crosetti, P. A. (M)
Dionne, P. J. (M)
Erickson, G. L. (M)
Forsberg, J. L. (A)
Frederick, C. L. (M)
Glass, C. E. (M)
Harvey, R. A. (SM)
Hunter, D. O. (M)
Iverson, N. A. (M)
Kelly, P. R. (M)
Libby, H. L. (M)
McClung, W. E. (A)
Metelmann, C. (M)
Pleasance, C. L. (M)
Rising, F. L. (M)
Ruiz, A. L. (SM)
Sheen, E. M. (M)
Simsen, C. A. (M)
Spanner, J. C. (M)
Spear, W. G. (SM)
Stiede, W. L. (M)
Upson, U. L. (M)
Waldkoetter, G. L. (A)
Wood, E. C. (M)
Wood, M. R., Jr. (M)
Worlton, D. C. (M)

Ritzville (SEA-7)
Thiel, P. A. (M)

Seattle (SEA-7)
Abe, I. (M)
Aburano, P. F. (M)
Adamson, A. A. (SM)
Afker, M. J. (M)
Alcock, A. C. (A)
Alexander, W. L. (M)
Andermann, A. (M)
Anderson, E. R. (M)
Anstett, F. D. (SM)
Aoyama, H. T. (M)
Applefond, L. R. (M)
Arlowe, H. H. (SM)
Armstrong, C. W. (M)
Asato, Y. (A)
Ashbaugh, F. E. (M)
Austin, C. N. (A)
Bach, R. O. (SM)
Bailey, M., Jr. (M)
Baker, C. A. (M)
Baker, R. G. (M)
Ballata, R. J. (M)
Banack, N. F. (M)
Barbee, G. S., Jr. (M)
Barger, S. D. (A)
Bark, R. S. (M)
Barstad, S. (M)
Bartholomew, C. S. (M)
Bartlemay, J. M. (M)
Bartlett, J. E. (A)
Bastow, J. G., Jr. (M)
Bateman, C. D. (M)
Battis, L. R. (M)
Battles, W. T., Jr. (M)
Baumgartner, D. L. (M)
Beals, E. L. (A)
Beauchamp, F. A. (A)
Beene, H. (M)
Belch, F. R. (M)
Belenski, J. D. (M)
Bergseth, F. R. (M)
Berzin, J. G. (M)
Betts, D. C. (M)
Biella, R., P. (SM)
Biggs, A. W. (M)
Biggs, J. D., Jr. (SM)
Bishop, D. J. (M)
Bjorkman, F. D. (M)
Bjorkstam, J. L. (A)
Bloomfield, J. A. (M)
Boehme, F. J. (M)
Boettcher, G. J. (M)
Boileau, D. C., Jr. (M)
Bonham, E. P. (M)
Bonstrom, D. B. (M)
Botzong, W. B. (M)
Bradburn, W. C. (M)
Brady, T. L. (A)
Breakey, E. P. (M)
Brill, R. W. (M)
Brock, R. L. (M)
Brown, T. S. (M)
Brune, F. A. (M)
Buldhaupt, L. F. (A)
Bull, W. A. (SM)
Burleson, C. T. (M)
Bushman, F. W. (M)
Bystrom, A., Jr. (M)
Callahan, L. R. (M)
Camobell, S. S. (M)
Chaffey, D. K. (M)
Chang, C-Y. (M)
Chase, L. I. (M)
Chase, R. F. (M)
Chen, H. C. (M)
Choop, J. A. (A)
Christensen, V. E. (A)
Christoff, N. A. (M)
Churchill, J. N. (M)
Clark, L. G. (A)
Clark, R. N. (M)
Cochran, L. B. (SM)
Coe, R. J. (M)
Colasurdo, J. (M)
Consego, B. J. (M)
Cooley, W. W. (A)
Corey, P. J. (M)
Corpus, A. R. (M)
Craig, D. I. (A)
Crowhurst, D. E. (M)
Currie, W. E. (M)
Damey, R. A. (M)
Daniel, R. A. (M)
Darnell, G. L. (M)
Davidson, T. K. (M)
Dayles, W. R. (M)
Decker, D. A. (M)
De Faye, P. J. (M)
De Groot, E. B. (M)
De Groot, F. M. (M)
Dempsey, J. P. (M)
Dennis, D. L. (M)
Determan, J. H. (M)
Dettmann, J. R. (A)
Dhar, R. L. (A)
Dietz, W. R. (M)
Dittman, P. E. (M)
Dorband, A. E. (M)
Dorratcague, P. E. (M)
Dorwart, R. J. (M)
Drake, R. S. (M)
Duggan, G. S. (M)
Duncan, J. A. (M)
Duryee, P. A. (A)
Early, E. W. (M)
Eastman, A. V. (F)
Elgin, D. L. (M)
Elliott, H. R. (A)
Ebken, A. F., Jr. (M)
Eck, H. J. (M)
Eckton, W. H., Jr. (M)
Elde, M. O. (M)
Elsenbach, M. E. (M)
Ellerbeck, K. H. (M)
Embree, R. R. (A)
Engstrom, D. E. (A)
Ercolini, J. E. (M)
Erdmann, P. R. (M)
Erskine, R. G. (M)
Erwin, E. V. (M)
Erwood, R. G. (M)
Esson, R. C. (A)
Evenson, H. J. (M)
Fancher, V. M. (M)
Fantin, P. J. (M)
Fargo, R. J. (M)
Farrens, D. G. (M)
Felgel, E. W. (M)
Ferguson, R. E. (M)
Fisher, R. C. (SM)
Fluke, J. M. (M)
Folkestad, G. T. (M)
Folsom, J. A. (A)
Foster, J. H. (M)
Foss, R. N. (M)
Foster, N. H. (SM)
Frederickson, A. A., Jr. (M)
Friedland, R. J. (M)
Frye, H. E. (M)
Gage, B. P. (M)
Galloway, W. C. (SM)
Geam, G. R. (M)
Gedaugas, J. (M)
Gee, H. P. S. (M)
Geisert, F. W. (M)
Geiger, R. G. (M)
Gelbach, H. R. (M)
Gerchow, C. A. (M)
Giarola, A. J. (M)
Gilbert, D. M., (A)
Gilbert, R. E. (M)
Gill, C. C. (M)
Godo, E. (M)





Golde, H. (M)
Goldhaber, J. C. (M)
Goodwin, J. M. (M)
Graybeal, J. (A)
Grechny, N., Jr. (M)
Griffin, W. C., Jr. (A)
Guilford, E. C. (M)
Gulden, D. C. (M)
Gunby, G. C. (M)
Guy, A. W. (M)
Guyette, R. J. (M)
Haaland, G. A. (M)
Halstead, F. H., Jr. (M)
Hammer, E. D. (M)
Hansen, W. P., Jr. (A)
Harris, D. H. (M)
Harrison, A. E. (F)
Harrold, W. T. (SM)
Hasserdjian, G. K. (M)
Hatfield, J. B. (M)
Haugen, E. L. (M)
Havens, J. D. (M)
Hayashi, M. (M)
Heindsmann, T. E. (SM)
Held, G. (M)
Helfer, J. L. (SM)
Herbert, E. C. (M)
Hermanson, K. P. (A)
Hill, R. V. (M)
Hill, W. R., Jr. (SM)
Hill, W. S. (M)
Hoard, G. L. (SM)
Hoard, R. F. (M)
Hoglund, R. H. (SM)
Holman, F. S. (M)
Horn, H. T. (M)
Hove, R. G. (M)
Howard, J. R. (M)
Hsu, C. C. (M)
Hu, A. Y. (M)
Hu, W. (A)
Hufford, G. (M)
Hughes, V. C. (M)
Iga, A. T. (A)
Ikstrums, I. (M)
Illman, R. W. (M)
Ingman, J. F. (M)
Isbell, D. E. (A)
Ishimaru, A. (M)
Jacks, H. G. (M)
Jauch, K. E. (M)
Johnson, J. F. (SM)
Johnson, L. F., Jr. (M)
Johnson, O. E. (M)
Johnson, R. R. (M)
Jones, A. W. (M)
Jones, E. A. (A)
Judd, C. W. (M)
Judd, L. R. (M)
Judson, H. H., Jr. (M)
Kalviste, A. (M)
Kaminoff, M. (M)
Keith, J. L., Jr. (M)
Kellar, J. B. (A)
Kessler, K. L. (A)
Kleburtz, R. B. (M)
Kilroy, J. (M)
Kimbark, E. W. (M)
Kindall, E. W. (M)
Kindred, J. C. (M)
Kiskaddon, W. V. (M)
Kohl, P. H. (M)
Koshman, R. (A)
Kostrey, M. J. (M)
Kraemer, B. J. (M)
Kramer, L. V. (M)
Kubik, P. (A)
Kudish, H. (M)
Laande, W. O. (M)
Lahn, F. C. (M)
Lai, M. C. (M)
Lansinger, J. M. (M)
Lantor, I. (M)
Larson, G. L. (M)
Larson, L. A. (A)
Lavering, F. B. (M)
Laxdall, D. W. (M)
Ledray, W. (M)
Lee, D. E. (M)
Lehtone, L. L. (A)
Lennstrom, C. O. (M)
Leonard, P. W. (A)
Leone, M. (M)
Lepoer, J. M., Jr. (M)
Leuthold, D. H. (M)
Le Von, M., Jr. (M)
Lewis, L. J. (SM)
Libby, T. M. (F)
Lillie, W. A. (A)
Lind, P. C. (A)
Lind, R. P. (M)
Linder, W. J. (M)
Lindsey, R. J., Jr. (M)
Loule, C. H. (M)
Low, F. J. (A)
Lucey, W. E. (M)
Luna, A. H. (M)
Lund, W. W., Jr. (SM)
Lytle, D. W. (M)
Madle, E. J. (M)
Magness, F. M. (M)
Major, M. D. (M)
Maloleszyc, V. (M)
Manetsch, T. J. (M)
Martin, G. H. (M)
Martin, J. L. (M)
Maxwell, R. L. (M)
McCaffrey, B. I. (M)
McClure, K. M. (M)
McGuire, C. B. (A)
McIlroy, F. W. (M)
McInelly, R. M. (M)
McIvor, B. H. (M)
McKay, W. M. (M)
McKenna, B. D. (A)
McKinley, W. R., Jr. (M)
McKitrick, W. (M)
McPherson, E. L. (M)
McRae, J. C. (M)
Mead, H. W. (M)
Mears, R. J. (M)
Meerdink, K. J. (M)
Merriam, D. P. (M)
Metz, P. R. (M)
Michelsen, P. W. (M)
Miller, C. E. (A)
Miller, D. J. (M)
Miller, K. E. (M)
Mitchell, G. W. (A)
Mitchell, W. T. (M)
Moelter, A. (M)
Mollen, G. J. (A)
Momenthy, A. M. (M)
Morris, C. R. (M)
Mossman, F. B. (SM)
Mount, R. C. (M)
Munday, W. A. (M)
Murray, W. A. (A)
Nagle, J. I. (M)
Nagyoszy-Wolf, L. M. (M)
Nation, A. W. C. (M)
Neal, E. T. (A)
Neal, T. (M)
Nelson, N. P. (M)
Nesbitt, W. E. (SM)
Newell, J. A. (M)
Newman, S. M. (M)
Niehaus, U. K. (A)
Niemi, L. T. (M)
Noges, E. (M)
Nordmann, F. M. (M)
Norin, T. L. (M)
Nutting, D. C. (M)
Ogasawara, T. B. (M)
Olson, B. V. (M)
Olson, D. S. (M)
Omoth, M. J. (M)
Oncley, P. B. (M)
Opell, J. W. (M)
Ordonia, J. M. (A)
Orth, J. W. (A)
Osness, R. H. (M)
Ostrom, C. W. (M)
Page, R. (M)
Paisley, M. R. (M)
Papich, M. G. (M)
Parks, H. F. (SM)
Parr, E. D. (M)
Parris, J. A. (M)
Parrott, J. E. (M)
Parsons, L. W. (M)
Paterson, J. M. (M)
Payne, R. S. (M)
Peabody, H. L. (M)
Pearce, G. E. (A)
Pearson, R. E. (M)
Pedersen, R. E. (M)
Peedo, E. (M)
Perry, F. E. (M)
Peterson, J. H. (M)
Petrich, R. O. (M)
Peyton, E. E. (M)
Pfalzer, J. L. (M)
Pitre, J. A. (M)
Polcuch, A. F. G. (M)
Poppe, R. F., Jr. (M)
Porter, B. C. (A)
Porterfield, H. D. (M)
Post, M. O. (A)
Post, R. (A)
Poumelle, J. E. (A)
Pratt, L. M. (M)
Prentiss, G. K., Jr. (M)
Pyper, T. L. (A)
Quantz, R. G. (A)
Ramsey, N. K. (M)
Randall, H. L. (M)
Rao, N. N. (A)
Reh, J. J. (M)
Renfro, H. E. (M)
Retka, J. A. (M)
Reynolds, D. K. (SM)
Rice, R. W. (M)
Richards, G. O. (M)
Ritchey, W. (M)
Robbins, F. D. (M)
Roberts, B. J. (M)
Roberts, H. O. (M)
Rogers, W. E. (SM)
Ross, D. L. (M)
Ruck, G. T. (A)
Rudzitis, A. (M)
Rumoza, W. R. (M)
Rupp, A. (M)
St. John, I. S. (M)
Sander, C. M. R. (A)
Saran, G. S. (M)
Sastry, P. V. V. S. (M)
Schaper, E. (M)
Schomer, J. W. (A)
Schweizer, E. G. (M)
Scidmore, D. L. (M)
Scott, T. G. (M)
Scovill, J. M. (M)
Scratchley, E. W. (M)
Seilstad, N. D. (M)
Seto, Y. J. (M)
Shallbetter, C. E. (M)
Sharp, B. M. (M)
Shaw, D. G. (A)
Shaw, W. C. (A)
Sheppard, J. J., Jr. (M)
Shimada, K. (M)
Shimono, Y. (M)
Shipek, R. H. (M)
Shirrod, R. L. (M)
Shook, W. A. (A)
Shoub, B. (M)
Siddons, W. J. (M)
Sigelmann, R. A. (A)
Simons, D. D. (M)
Simons, R. J. (M)
Siverts, R. D. (A)
Skahill, B. J., Jr. (A)
Sleeth, J. D. (M)
Small, R. E. (M)
Smith, K., Jr. (M)
Smith, K. C. (M)
Snyder, P. D. (M)
Sowa, C. P. (M)
Stachurski, S. (M)
Stampalla, I. J., Jr. (M)
Starks, J. C. (SM)
Stebbins, J. A. (M)
Stefanowicz, M. R. (A)
Stine, H. A. (M)
Stockman, R. R. (M)
Strandrud, H. T. (M)
Strange, R. T. (M)
Strauss, B. (M)
Strohecker, J. P. (M)
Suinn, H. (M)
Sutherland, L. C. (M)
Swanson, M. J., Jr. (M)
Swarm, H. M. (SM)
Swetman, E. D. (M)
Swisher, B. F. (M)
Talcott, M. S. (M)
Tanaka, S. (M)
Tang, H. K. (M)
Tashiro, S. (M)
Tate, J. A. (SM)
Tenning, C. B. (M)
Thomas, A. O. (M)
Thomas, H. C. (M)
Thomas, P. S. (M)
Thomasson, L. T. (M)
Thompson, K. J. (M)
Tighe, R. F. (A)
Todaro, C. N. (M)
Todd, H. C. (A)
Tolmie, J. R. (F)
Traub, L. A. (M)
Tsao, C. (M)
Tsukamato, C. (M)
Tuni, J. K. (M)
Turner, R. L., Jr. (A)
Uhlman, D. D. (M)
Urban, R. A. (M)
Vahrenkamp, R. H., Jr. (M)
Van Deventer, A. J. (M)
Van Over, W. E. (M)
Van Sickle, T. T. (M)
Vanskyock, J. A. (M)
Visser, A., Jr. (A)
Voss, J. M. (A)
Wagner, W. J. (SM)
Walker, R. T. (M)
Warshawsky, J. (M)
Wei, L. Y. (M)
Weiland, W. A. (M)
Weinstein, G. (M)
Weiss, R. R. (M)
West, E. A., Jr. (M)
Wetli, R. C. (M)
Whalen, J. E. (M)
Willard, H. R. (M)
Williams, C. E. (F)
Willson, A. R. (SM)
Wisner, R. M. (SM)
Woo, J. (M)
Wood, F. P. (M)
Woodbury, J. W. (M)
Woodhouse, G. H. (M)
Wright, C. P. (M)
Wright, J. M. (M)
Yamauchi, T. T. (M)
Yee, J. S. (M)
Yeslin, A. R. (M)
Zieseniss, F. H. (A)

Snohomish (SEA-7)
Sterley, R. R. (M)

Spokane (SEA-7)
Burnette, W. D. C. (A)
Caruana, P. A. (A)
Cassidy, B. F. (M)
Coates, F. M. (M)
Felkins, T. N. (M)
Gorman, D. P. (M)
Green, D. I. (M)
Green, W. L. (M)
MacLean, T. W. (M)
Rue, K. M. (A)
Storms, H. H. (M)
Suden, J. E. (M)
Switzer, W. H. (A)
Trebby, F. J. (M)

Sumner (SEA-7)
Mendel, F. S. (M)

Sunnyside (SEA-7)
Haney, W. E. (M)

Tacoma (SEA-7)
Backman, J. A. (A)
Barrows, J. H. (A)
Brostrom, K. E. (M)
Corbridge, L. R. (M)
Erwin, R. L., Jr. (M)
Hamlin, D. R. (M)
Hill, A. P. (M)
Kukowski, J. F. (M)
Leader, R. E. (M)
Linnet, C. (A)
Mann, J. W. (A)
McClamrock, J. M. (M)
McDonough, D. M. (SM)
Morrill, D. W. (A)
Olson, D. L. (A)
Perkins, M. G. (M)
Self, G. L. (M)
Sorgenfrei, G. H. (M)
Spencer, K. E. (M)
Unkefer, R. C. (M)
Wagar, J. L. (M)
Williams, K., Jr. (M)
Wittenberg, E. C. (M)

Tumwater (SEA-7)
Nielsen, R. G. (M)

Vancouver (POR-7)
Curtis, A. F. (M)
Murdock, M. J. (M)
Roesler, R. W. (M)
Rogers, E. J. (M)
Wohlgemuth, D. G. (A)

Vashon (SEA-7)
Patience, D. L. (M)

Vashon Island (SEA-7)
Caproni, G. A. (A)

Walla Walla (SEA-R-7)
Barclay, W. F. (A)
Parmelee, W. G. (M)
Wilken, B. W. (A)

Waukon (SEA-7)
Stark, J. A. (A)

Wenatchee (SEA-7)
Wallace, J. (SM)

Winslow (SEA-7)
Waterman, H. B. (M)

Yakima (SEA-7)
Forgey, J. A. (A)
Munger, R. E. (A)
Root, M. W. (M)
Spelman, F. A. (M)

Zenith (SEA-7)
Friddell, H. G. (M)

## WEST VIRGINIA

Beckley (W-DC-3)
Guerino, M. (M)

Bluefield (PIT-4)
Hammer, A. C. (A)

Buckhannon (PIT-4)
Jones, E. W. (M)

Charleston (PIT-4)
Brick, G. R. (A)
Dixon, W. E. (SM)
Drury, G. R. (A)
Johnson, E. M. (SM)
Sinsel, P. W. (M)
Wolford, J. E. (A)
York, D. E. (A)

Clarksburg (PIT-4)
Hough, R. D. (M)

Dunbar (PIT-4)
Mitchell, S. E. (A)

Fort Seybert (PIT-4)
Youmans, A. B. (M)

Green Bank (PIT-4)
Drake, F. D. (M)
Findlay, J. W. (SM)
Hvatum, H. (M)

Huntington (PIT-4)
Bromley, R. A. (A)
Clay, J. P. (M)
Hawes, J. G. (M)
Kilpatrick, L. E. (SM)
Miller, R. M. (A)
Roberts, V. B. (A)
Shaw, J. L. (SM)
Tanner, J. E. (M)

Martinsburg (W-DC-3)
Boland, E. J. (SM)
Reynolds, T. G., Jr. (A)
Ricketts, J. C. (M)
Samsky, B. S. (SM)

Mc Mechen (PIT-4)
Pyle, G. D. (M)

Middlebourne (PIT-4)
Nichols, G. C. (A)

Montgomery (PIT-4)
Proops, J. M. (A)

Morgantown (PIT-4)
Barbe, E. C. (M)
Colwell, R. C. (SM)
Kreer, J. B. (M)
Seibert, C. B. (M)
Smith, N. S., Jr. (M)

Moundsville (PIT-4)
Jones, J. W. (M)
Rulong, C. P. (M)

New Martinsville (PIT-4)
Shepherd, W. P. (M)

Nitro (PIT-4)
Aliff, J. R. (M)
Rogers, L. J. (M)

Oak Hill (PIT-4)
Phillips, T. (M)
Thomas, R. R., Jr. (M)

Ona (PIT-4)
Pitts, M. J. (A)

Parkersburg (PIT-4)
Andreassen, L. A. (A)
Spence, R. C. (A)

Princeton (PIT-4)
Bailey, W. F. (M)

Ravenswood (PIT-4)
Ellison, B. P. (M)

St. Albans (PIT-4)
Fertig, R. B. (M)

South Charleston (PIT-4)
Johnson, H. L. (A)
Thompson, W. R. (M)

Weirton (PIT-4)
Mellis, J. G. (A)
Mellis, J. G. (A)

West Union (PIT-4)
Elefritz, J. F. (M)

Wheeling (PIT-4)
Ackermann, M. E. (A)
Hayes, T. P. (M)
Levenson, D. W. (M)
Rollins, E. A. (M)
Snead, W. K. (A)
Sorsby, C. R. (A)
Winslow, R. B. (A)

## WISCONSIN

Amery (TC-5)
Haselhorst, D. (M)

Antigo (TC-5)
Parfitt, R. J. (M)

Appleton (MIL-5)
Hansen, J. C. (M)
Schlafke, D. A. (A)
Stein, F. H. (M)

Beloit (MIL-5)
Leeson, J. L. (M)

Bristol (CHI-5)
Schaefer, K. E. (M)

Brookfield, (MIL-5)
Eisele, E. J. (A)
Graham, J. D. (M)
Kasdorf, G. R. (M)
Kirschner, J. G. (M)
Lindemann, A. W. (M)
Mereen, D. E. (M)
Ribbens, W. F. (M)
Woods, K. C. (A)

Burlington (MIL-5)
Holmbeck, J. D. (SM)

Butler (MIL-5)
Budy, J. J. (A)
Hemday, R. H. (M)
Kaetel, H. C. (M)
Kuckuck, C. L. (A)

Caledonia (MIL-5)
Arrington, J. R. (M)

Carrollville (MIL-5)
Colgan, A. R. (A)

Cedarburg (MIL-5)
Pollock, J. J. (A)

Chilton (MIL-5)
Poppy, D. J. (M)

Chippewa Falls (TC-5)
Peloquin, P. T. (A)

Cudahy (MIL-5)
Follen, R. J. (M)
Patrick, P. J. (A)
Strandt, E. R. (M)

Delafield (MIL-5)
Farber, E. R. (M)

Eau Claire (TC-5)
Jorgenson, T. O. (M)

Egg Harbor (MIL-5)
Lemere, J. P. (M)

Elm Grove (MIL-5)
Bailey, T. J. (A)
Evans, J. A. (M)
Horgan, J. D. (M)

Fort Atkinson (MIL-5)
Anthes, J. (A)
Bloxham, R. L. (M)

Grafton (MIL-5)
Konig, V. A. Y. (A)
Rubinstein, H. W. (M)

## WISCONSIN

Greendale (MIL-5)
Bovich, E. J. (A)
Dahlmann, V. R. (A)
De Witt, C. M., III (M)
Fisher, R. D. (M)
Jomeruck, J. H. (M)
Raucher, W. L. (M)

Greenfield (MIL-5)
Mc Carter, O. T. (M)

Green Lake (MIL-5)
Helple, R. B. (M)

Hales Corners (MIL-5)
Des Lauriers, E. D. (A)
McGillem, C. D. (M)
Podlewski, R. S. (A)
Tyson, H. B. (A)
Wantaja, G. E. (M)
Whiteman, J. R. (M)

Hartland (MIL-5)
Harry, W. R. (M)
Keast, D. E. (A)

Janesville (MIL-5)
Brandt, R. W. (SM)
Glander, H. H. (M)
Keppert, G. D. (M)
Weckwerth, H. A. (M)
Williams, C. R. (M)
Ziehlke, R. J. (A)

Kenosha (CHI-5)
Bart, S. (M)
Harris, O. D. (A)
Klein, F. N. (M)
Kovachik, E. (A)
Krause, R. E. (M)
Osterlund, S. G. S. (M)
Reich, E. A. (M)
Turkish, M. C. (M)

La Crosse (TC-5)
Leeman, A. (M)

Lake Mills (MIL-5)
Darsch, A. P. (M)

Lake Nebagamon (TC-5)
Caspers, G. E., Jr. (M)

Lannon (MIL-5)
Gauthier, R. L. (M)

Madison (MIL-5)
Ackerman, W. J. (M)
Asmuth, J. L. (M)
Bell, R. D. (M)
Boehme, A. W. (M)
Bushnell, R. H. (M)
Clarkson, H. E., Jr. (M)
Davidson, C. H. (M)
Dietmeyer, D. L. (M)
Donohoo, D. J. (M)
Donohoo, J. A. (M)
Duffendack, O. S. (F)
Edgerton, J. F. (M)
Emerson, R. E. (M)
Fontaine, A. B. (A)
Gehl, J. A. (M)
Gilson, W. E. (SM)
Greenbaum, L. A. (M)
Greer, W. M. (A)
Greiner, R. A. (M)
Gritzmacher, D. E. (M)
Hahn, N. G. (M)
Hariu, W. R. (M)
Haxby, R. O. (SM)
Herrick, J. F. (M)
Kelley, W. V. (M)
Klinge, H. F. (M)
Koehler, G. (F)
Levy, D. M. (M)
Mack, H. A. (A)
Nag, B. (A)
Olson, K. H. (M)
Parent, R. J. (M)
Peterson, H. A. (SM)
Polone, R. W. (A)
Reitan, D. K. (SM)
Retherford, R. C. (M)
Revenaugh, J. J. (M)
Rideout, V. C. (F)
Sabroff, R. R. (M)
Sadler, L. S. (M)
Schelbe, E. H. (SM)
Schmidt, W. E. (A)
Seidmore, A. K. (M)
Scott, T. M. (A)
Skiles, J. J. (M)
Slater, R. L., Jr. (M)
Stephan, R. R. (A)
Swift, W. B. (M)
Tiedemann, A. T. (M)
Van Bladel, J. G. (SM)
Vanko, J. A. (M)
Verstoppen, V. (M)
Walkington, W. G. (M)
Wei, Y-M. (M)
Wickhem, R. J. (A)
Woldt, F. R. (M)
Young, C. E. (A)
Zarnstorff, W. C. (M)

Manitowoc (MIL-5)
Heinzen, R. A. (M)

Marion (MIL-5)
Much, C. H. (M)

McFarland (MIL-5)
Pierce, R. L. (M)

Menomonee Falls (MIL-5)
Allmaras, H. C. (M)
Goossens, H. R. (M)
Richardson, R. E. (M)
Ruff, H. M. (A)
Styve, O. W., Jr. (M)

Merrill (TC-5)
Bartelt, C. H. (M)

Middleton (MIL-5)
Miller, J. B. (M)

Milton (MIL-5)
Harris, R. J. T. (M)
Haugen, M. G. (M)

Milwaukee (MIL-5)
Aasterud, J. P. (M)
Adams, R. (M)
Alpert, W. I. (M)
Appleman, C. G. (M)
Armstrong, J. F. (A)
Baird, J. T. (M)
Bakeman, O. R. (M)
Barnum, T. G. (M)
Bartol, T. J. (M)
Baumeister, E. A. (M)
Bernstein, S. (SM)
Blondahl, F. A. (M)
Bores, J. W. (M)
Boutelle, J. O. (A)
Brandt, R. T. (M)
Brantner, H. C. (M)
Brayton, D. F. (M)
Bregantini, J. S. (M)
Budny, B. R. (M)
Burkhalter, B. L. (A)
Burner, L. C. (A)
Butler, L. W. (M)
Calcal, P. P. (M)
Cameli, D. M. (M)
Camos, T. F. (M)
Cather, J. R. (M)
Clare, E. W. (A)
Connerton, B. J. (A)
Cook, K. T. (M)
Cooke, E. R. (A)
Cordes, E. L. (M)
Cork, H. A. (M)
Crawford, F. L. (A)
Croatt, L. A. (M)
Das Gupta, A. K. (A)
De Block, E. T. (M)
Deisinger, J. J. (M)
Dobnick O. X. (A)
Doyen, R. G. (A)
Doylen, D. H. (M)
Drozniaklewicz, D. L. (M)
Du Bose, T. I. (M)
Durand, E. L. (M)
Dzierski, M. P. (M)
Eckert, F. A., Jr. (M)
Eckl, J. J. (M)
Edwards, M. A. (F)
Ehlers, G. M. (SM)
Elliot, W. H. (M)
Elvar, M. (M)
Erb, J. J. (M)
Ernst, R. F. (M)
Evans, R. E. (M)
Fitzgerald, R. R. (M)
Flaningam, L. A. (M)
Flood, F. F. (A)
Flueckiger, N. (A)
Gabriel, R. C. (M)
Gabriele, T. C. (M)
Gainer, W. P. (M)
Gamber, F. S. (M)
Ganiere, H. C. (M)
Garber, B. E. (M)
Garstang, W. W. (SM)
Geiger, L. C. (M)
Genthe, W. K. (M)
Gmelner, G. T. (M)
Goergen, M. N. (A)
Gogolo, E. C. (SM)
Gough, P. R. (M)
Gruszynski, R. T. (M)
Guenther, H. J. (M)
Gutmann, M. (M)
Haertel, D. G. (M)
Hamren, G. C. (A)
Hartmann, D. P. (M)
Hebal, W. H. (M)
Helgeson, V. L. (M)
Hemker, J. B. (M)
Hetzler, L. F. (M)
Hogan, H. A. (M)
Horvath, A. E. (M)
Howell, J. F. (SM)
Howell, P. N. (M)
Hughes, G. C. (M)
Immekus, R. J. (M)
Ishii, T. K. (M)
Jacobi, T. (M)
James, R. A. (A)
Jensen, M. W. (M)
Johnson, G. A. (M)
Johnson, R. J. (A)
Johnson, R. R. (A)
Jordal, V. M. (M)
Kaiser, E. H. (A)
Kark, R. H. (A)
Kelly, D. S. W. (SM)
Kelly, D. V. (M)
Khouri, A. S. (M)
Kite, F. O., Jr. (M)
Kliminski, D. R. (M)
Kinney, T. W. (M)
Knopow, H. S. (M)
Koenig, J. C. (M)
Kokali, F. P. (M)
Kopania, A. A. (M)
Kroman, E. J. (M)
Krug, R. E. (A)
Krupnik, S., Jr. (M)
Kuhn, F. H. (M)
Kunde, P. J. G. (M)
Labby, W. R. (M)
Lade, R. W. (M)
Laeser, P. B. (M)
Laubenstein, A. E. (M)
Leavitt, R. F. (A)
Lecus, C. M. (A)
Lehman, D. R. (A)
Limpel, E. J. (M)
Lindquist, R. D. (A)
Lyon, T. I. (M)
Macheret, R. E. (M)
Maher, J. E. (M)
Maklary, J. R. (A)
Makowski, J. J. (M)
Marot, V. G. (A)
Matthews, R. B. (M)
Matthias, L. H. (M)
May, G. L. (M)
McCall D. L. (M)
McComas J. L. (M)
Meier R. D. (M)
Mezger J. P. (M)
Michaels, E. J. (M)
Michalak, E. M. (M)
Michel, A. N. (M)
Miller, R. D. (A)
Miotke, J. A. (M)
Mittelstadt, D. R. (M)
Monty, B. E. (M)
Mrazek, D. A. (M)
Mundschau, M. J. (M)
Murphy, A. W. (A)
Myers, D. L. (M)
Nance, D. K. (A)
Naughton, G. J. (M)
Neitzel. R. E. (M)
Neitzke, G. G. (A)
Nelson, J. W., Jr. (SM)
Norman, C. A. (M)
North, R. L. (M)
Ollenburg, M. A. (A)
Onstad, P. R. (M)
Oppenheim, R. H. (M)
Pare, T. J. (A)
Perfitt, T. E. (M)
Petzold, D. W. (M)
Pfeil, R. H. (M)
Phillips, R. A. (M)
Pickl, T. J. (M)
Piontek, T. A. (A)
Pozorski, J. J. (M)
Preber, W. J. (M)
Queever, L. (M)
Ragatz, E. C. (M)
Ranson, R. R. (SM)
Rapp, R. L. (M)
Rebman, W. H. (M)
Regis, R. J. (M)
Richards, J. (M)
Richter, W. (F)
Rodewald, M. V. (M)
Rosin, R. J. (A)
Rusch, P. H. (M)
Rynning, A. (M)
Saari, L. V. (M)
Sackett, R. W. (M)
St. John, J. D. (M)
Schimmel, K. J. (A)
Schlaefer, B. J. (M)
Schlageter, G. A. (M)
Schlehlein, G. A. (A)
Schleicher, F. (M)
Schlicht, R. W. (M)
Schlicke, H. M. (SM)
Schumacher, P. J., Jr. (M)
Schutten, H. P. (M)
Seling, T. V. (SM)
Sestak, A. T. (A)
Sherley, M. O. (M)
Sherwood, E. T. (SM)
Shors, J. D. (M)
Siesending, J. W. (A)
Sili, F. J. (A)
Sitzwohl, J. F., Jr. (M)
Smith, A. J. (A)
Smith, C. C. (M)
Snowdon, A. C. (M)
Solt, R. H. (M)
Spak, L. J. (A)
Sparacino, B. J. (A)
Stapp, E. B. (M)
Stefancic, K. (M)
Stevz, D. L. (A)
Straub, L. J. (A)
Striegel, M. E. (M)
Strumpf, H. W. (M)
Sutinen, C. P. (SM)
Tackes, G. G. (A)
Talbot, V. R. (M)
Taus, H. G. (M)
Taylor, F. H. (M)
Thibideau, F. D. (M)
Torkildsen, R. A. (M)
Trinkner, C. C. (A)
Trout, E. D. (M)
Tschantz, L. G. (M)
Uradnicek, R. K. (M)
Van Alstyne, A. (M)
Van Zeeland, F. J. (SM)
Vebber, W. O. (M)
Veerkamp, N. B. (M)
Vemke, G. E. (M)
Voelker, A. H. (M)
Voith, R. J. (M)
Wagner, R. M. (M)
Wagner, W. O. (M)
Weber, F. (M)
Weitermann, B. R. (A)
Weller, D. A. (SM)
West, B. M. (M)
Wetter, R. J. (M)
Wilson, R. F. (M)
Winn, W. C. (M)
Wirth, M. T. (M)
Wittke, R. F. (A)
Wolff, R. L. (M)
Wolniakowski, L. L. (A)
Wood, R. E. (M)
Wulliman, J. C. (A)
Young, R. E. (A)
Y-q, A. G. (M)
Zacher, G. E. (A)
Zoesch, A. C. (A)
Zwarra, H. J. (M)

Minocqua (TC-5)
Martin, H. T. (A)

Monroe (MIL-5)
Evans, O. R., Jr. (M)

Mosinee (TC-5)
Grambsch R. J. (M)

Mukwonago (MIL-5)
Brown, H. W. (A)
Orr, D. W. (M)

Muskego (MIL-5)
Stevenson, D. L. (M)

Nashotah (MIL-5)
Lemke, C. R. (M)

Neenah (MIL-5)
Rasmussen, S. T. (A)

New Berlin (MIL-5)
Beaudoin, L. W. (M)
Wolner, W. B. (M)

Oconomowoc (MIL-5)
Randall, A. E. (M)

Oconto (TC-5)
Ackerman, M. J. (M)
De Witt, C. P. (M)

Oshkosh (MIL-5)
Fink, J. W. (M)
Williams, N. (M)

Pardeeville (MIL-5)
Boss, W. O. (M)

Peshtigo (TC-5)
MacLaughlin, D. C. (A)

Pine River (MIL-5)
Handrich, D. D. (A)

Racine (MIL-5)
Bahr, A. C. (M)
Briedis, G. (A)
Due, R. C. (M)
Edwards, O. S. (A)
Hill, R. G. (A)
Kohner, M. (SM)
MacDowell, G. E. (A)
McMillin, G. L., Jr. (A)
Putra, E. P. (A)
Slater, O. C. (A)
Van Horn, J. H. (SM)
Wilkerson, A. W. (A)

Sauk City (MIL-5)
Kirchstein, J. E. (M)

Saukville (MIL-5)
Nunn, E. D. (M)

Sheboygan (MIL-5)
Mayer, H. J. (M)

Shorewood (MIL-5)
Zelazo, N. (SM)

South Milwaukee (MIL-5)
Asnicar, D. V. (A)
Bautz, T. W. (M)
Birkhauser, W. E. (A)
Bridgen, G. A. (M)
Burg, G. M. (M)
Jacobs, M. (M)
Milner, G. (M)
Oberlander, L. E. (M)
Popp, R. J. (M)
Stuart, R. R. (M)
Zahn, P. E. (M)

Spooner (TC-5)
Edwards, P. E. (A)

Sun Prairie (MIL-5)
Sauer, C. R. (M)
Wable, G. E. (A)

Thiensville (MIL-5)
Runft, A. J. (M)
Sielicki, A. J. (M)
Silverman, D. M. (M)

Tomahawk (TC-5)
Benedikz, N. F. (M)
McGinnis, H. J. (M)

Union Grove (MIL-5)
Harris, J. H. (M)

Walworth (MIL-5)
Richter, R. E, Jr. (A)

Watertown (MIL-5)
West, G. A. (A)

Waukesha (MIL-5)
Beutler, A. J. (M)
Burton, J. T. (A)
Cummings, H. R. (M)
Koenig, E. C. (M)
Moretti, J. A. (M)
Pepper, J. R. (M)

Wausau (TC-5)
Ladwig, T. H. (A)

Wauwatosa (MIL-5)
Bailey, J. E. (M)
Hawley, D. E. (M)
Karsten, J. P. (A)
Kay, R. M. (M)
Kelley, J. P. (M)
Lucas, A. C. (M)
Marlett, N. L. (A)
Miller, B. P. (M)
Pinnow, R. L. (M)
Schlager, K. J. (SM)
Schuppner, H. W. (M)

West Allis (MIL-5)
Ferriss, L. S. (M)
Houle, T. H. (M)
Jasinski, A. J. (M)
Krueger, R. J. (A)
Lofy, F. J. (M)
Paalu, A. (M)
Paul, D. F. (A)
Reinke, H. J. (M)
Taylor, E. D. (M)

West Bend (MIL-5)
Babros, R. E. (M)
Gonring, J. F. (A)

West Depere (MIL-5)
Stangel, W. (M)

Whitefish Bay (MIL-5)
Bailey, H. (M)

Whitewater (MIL-5)
Weinberg, B. L. (A)

Williams Bay (MIL-5)
Norman, E. B. (M)

Wrightstown (MIL-5)
Salava, R. F. (M)

### WYOMING

Casper (DEN-6)
Bruce, J. I. (M)
Fagerstone, D. V. (A)
Hathaway, D. L. (SM)
Jones, M. J. (A)
Young, W. R. (M)

Cheyenne (DEN-6)
Anderson, W. H. (A)
Arford, F. W. (M)
Babcock, D. W. (A)
Boopess, J. W. (A)
Bril, D. H. (M)
Broughall, H. S. (M)
Coleman, G. I. (A)
Dobberstein, R. H. (M)
Dreisoerner, D. A. (A)
Dworian, R. (A)
Ellerbruch, D. A. (M)
Fordham, V. C. (M)
Grove, W. C. (M)
Hagopian, G. A. (M)
Hallick, J. A. (A)
Jester, A. H., Jr. (M)
Kjellburg, R. L. (M)
Lane, L. M. (M)
Lay, P. D. (M)
Leichtweis, D. L. (M)
Loewer, H. C. (A)
Maness, D. H. (M)
Meadows, K. E. (M)
Opheim, L. E. (A)
Parks, K. W. (A)
Powell, W. K. (M)
Rison, D. M. (A)
Rusche, C. L. H. (A)
Rush, D. R. (M)
Shelton, J. T. (M)
Turner, W. P. (A)
Wilker, L. B. (M)
Wright, R. B. (A)

Laramie (DEN-6)
Hirengen, P. V. (M)
Lonsdale, E. M. (SM)
Strock, R. E. (A)

Mountain View (DEN-6)
Taylor, W. R. (M)

Newcastle (DEN-6)
Rinehart, B. H. (M)

Sheridan (DEN-6)
Stanton, J. M. (M)

Warren AFB (DEN-6)
Johnston, R. E. (M)
Schmidt, H. W. (A)

Worland (DEN-6)
Levisay, L. E. (A)



## OVERSEAS MILITARY

APO New York
Agosta, H. A. (M)
Alaia, C. M. (M)
Allen, P. S. (M)
Alley, J. W. (M)
Altman, S. S. (M)
Ament, W. S. (SM)
Andrews, L. A. (M)
Anthony, A. R. (M)
Arnold, R. D. (M)
Arrington, J. L., II (SM)
Aulbach, C. E. (A)
Baier, A. A. (A)
Barber, C. (M)
Batson, J. A. (A)
Baumgartner, J. H. (SM)
Bean, H. C., Jr. (M)
Beckwith, P. B. (M)
Belken, V. J. (M)
Bell, J. W. (A)
Benditzky, E. (M)
Benner, T. A. (M)
Benson, W. H., Jr. (M)
Berger, E. G. (M)
Berghoefer, F. G. (M)
Betts, J. F. (M)
Bills, A. E. (M)
Bilodeau, R. L. (M)
Blachman, N. M. (SM)
Black, K. C. (F)
Blackberry, C. H. (M)
Blakley, D. H. (M)
Blow, T. C. (M)
Bolstridge, L. J. (M)
Borsody, B. F. (SM)
Bowler, J. A. (M)
Braun, M. E., Jr. (M)
Brayshaw, R. A. (M)
Britto, J. D. (M)
Brooks, H. A. (A)
Brooks, N. S. (M)
Bruton, H. C. (SM)
Burritt, E. J. (A)
Busch, S. D. O. (M)
Buxbaum, S. J. (A)
Caffrey, J. V., Jr. (M)
Cassidy, J. J., III (M)
Chandler, D. P. (M)
Chapman, A. K. (M)
Clark, M. F. (A)
Cook, D. E. (M)
Coons, R. J. (M)
Coss, W. L. (M)
Cranston, R. B. (M)
Creacy, J. N. (M)
Criner, J. E. (M)
Curtis, R. W. (SM)
Dakin, M. H. (M)
Dale, H. C. (M)
Dambrauskas, V. (M)
Davis, E. H. (A)
DeValve, R. H. (M)
Dickinson, D. B. (M)
Dickson, J. F. (M)
Doby, W. C. (M)
Domis, J. C. (A)
Doty, A. (M)
Drollinger, R. H. (M)
Drzewicki, D. D. (A)
Duggan, R. W., II. (M)
Depree, J. E. (SM)
Dziuk, J. R. (A)
Eaton, R. C. (SM)
Edson, M. C., Jr. (A)
Eller, G. H. (A)
Elam, E. M. (M)
Ellopoulos, A. J. (M)
Emanovsky, A. E. (M)
Erdman, A. L. (A)
Estabrook, R. K. (A)
Evans, A. L. (A)
Fabijan, F. M. (A)
Fair, R. D. (M)
Fetzer, M. J. (M)
Fiorelli, M. C. (M)
Fliss, A. D. (M)
Flynn, R. J. (M)
Fortner, E. G. (M)
Fouch, J. W. (M)
Fowler, L. D. (M)
Freeland, D. A. (M)
Fuchs, M. J. (M)
Fund, J. L. (A)
Galloway, J. A. (M)
Gamertsfelder, H. E. (M)
Garee, J. A., Jr. (M)
Gammon, C. (M)
Garber, J. F., Jr. (SM)
Gardiner, R. S. (M)
Genge, R. E. (M)
Gentry, K. M. (SM)
George, L. G. (A)
Glenn, A. J. (M)
Glowa, D. S. (M)
Goen, Q. F. (SM)
Gompert, L. T. (M)
Good, F. R. (M)
Godwin, R. L. (M)
Gordon, S. M. (A)
Gorelick, A. P. (M)
Goutos, A. (M)
Grady, J. H. (M)
Graham, H. U. (SM)
Greene, A. N. (M)
Gregory, C. M. (A)
Gundersen, J. R. (A)
Haas, H. P. (A)
Haettenschwiller, D. L. (A)
Hajek, S. J. (M)
Hall, W. W., Jr. (M)
Hancsak, R. P. (M)
Handleman, M. (M)
Hanrahan, J. A. (M)
Hanson, R. L. (M)
Hardy, O. C. (M)
Hart, W. M., Jr. (M)
Hawk, A. L. (M)
Hessel, J. (F)
Hill, L. P. (M)
Hill, R. T. (M)
Hinds, G. C. (M)
Hollander, H. C. (M)
Holmes, H. B., III. (M)
Horvath, M. J., Jr. (M)
Howard, D. F. (M)
Hudson, G. W. (M)
Hunsuck, J. D. (M)
Inserra, J. S. (M)
Isaac, V. L. (A)
Jansen, E. K. (A)
Johnson, A. W. (A)
Johnson, C. W. (M)
Jones, A. H. (M)
Joska, J. S. (M)
Kaiser, E. E. (M)
Kaltenbach, R. F. (M)
Kaluzny, E. F. (A)
Kane, L. P. (M)
Kanne, R. H. (M)
Kaser, L. O. (M)
Keagy, R. B. (M)
Kelly, P. J. (M)
Ketcik, J. M. (A)
Kevorkian, G. (M)
King, J. W., Jr. (M)
Klucarich, S. (A)
Kratsch, P. H. (M)
Kruse, E. S. (M)
Kulojinski, R. J. (M)
Kush, J. J. (M)
Lairmore, G. E. (A)
Lawyer, D. S. (M)
Leggett, A. G., Jr. (M)
Le Guillou, J. L. (M)
Limmer, R. D. (M)
Longworth, R. A. (M)
Louderback, H. W., Jr. (M)
Lovell, D. E. (M)
Lucid, J. R. (M)
Luecker, G. (M)
Lumsden, J. C. (M)
Mabry, J. H. (A)
MacPherson, G. W. (A)
Madsen, J. F. (M)
Manley, T. M. (M)
Mardigian, R. (M)
Marquez, A. (M)
Martin, A. J. (A)
Marvin, A. L., Jr. (M)
Maryeski, W. P. (M)
Mayer, C. R. (M)
McAllister, J. A. (SM)
McCarron, D. J. (M)
McCoy, H. H. (A)
McKim, W. J. G. (M)
McLain, T. E. (M)
McPadden, C. E. (M)
Mellion, H. I. (M)
Michels, R. E. (A)
Miller, D. H. (M)
Mills, B. E. (SM)
Mindedal, J. (M)
Mitchell, W. E. (M)
Monteith, R. B. (A)
Moore, J. E. (A)
Moorman, F. W. (SM)
Morden, R. E. (M)
Moreno, M. R. (M)
Mulder, H. E. (M)
Mullarkey, W. E. (M)
Murphrey, I. G. (M)
Needham, H. A. (M)
Newell, L. T. (SM)
Nicholson, J. E. (M)
Niemann, D. A. (A)
Nothman, M. H. (M)
O'Keefe, W. C. (A)
Olita, J. A. (M)
Ostlund, G. L. (A)
Ott, W. F. (M)
Owen, W. A. (M)
Palmer, L. N. (SM)
Pansch, H. J. (A)
Papa, J. (M)
Pascitti, R. A. (M)
Perry, L. F. (M)
Petersen, R. R. (M)
Phillippi, R. A. (M)
Phillips, W. F. (M)
Pixton, J. R. (M)
Pizzulli, D. (M)
Poppele, R. E. (M)
Porter, F. A. (M)
Poynter, L. H., Jr. (M)
Pranitch, J. (A)
Pryga, J. F. (A)
Quintal, R. J. (A)
Reich, R. F. (M)
Retzbach, W. J. (A)
Ricciardelli, A. M. (SM)
Ritter, F. (M)
Robbins, R. A. (M)
Roder, C. C. (M)
Rollins, J., Jr. (M)
Rothermel, R. S. (M)
Rowe, H. A. (M)
Royer, W. C. (SM)
Russell, H. L. (M)
Sands, W. C. (M)
Sautter, P. J. (A)
Saxton, A. W., Jr. (A)
Schauers, C. J. (M)
Schmickley, J. H. (M)
Schneider, C. J. (M)
Schroeder, G. (M)
Semmelhack, H. P. (M)
Sengel, P. A. (M)
Seybold, L. C., Jr. (M)
Sharp, R. L. (M)
Shey, P. F. (M)
Sidon, A. P. (M)
Sigethy, R. (M)
Simonds, F. M., Jr. (A)
Skinner, A. L. (M)
Sloman, F. A. (A)
Smaker, T. P., Jr. (A)
Smally, E. D. (A)
Smith, C. E. (M)
Smith, M. O. (M)
Smulin, R. (M)
Snyder, N. (SM)
Sommer, J. G., Jr. (M)
Soules, C. W. (M)
Spafford, L. J. (M)
Stangl, F. P. (SM)
Stewart, H. W. (M)
Stone, J. H. (M)
Strelos, E. A. (M)
Stroman, C. F. (M)
Sugimoto, J. Y. (M)
Sutherland, C. E. (M)
Turner, T. B. (M)
Swatek, P. W. (A)
Tessier, H. J. R. (M)
Thom, A. R. (SM)
Timmerman, F. (SM)
Trip, R. E. (M)
Trogdon, F. H. (M)
Tylka, J., Jr. (A)
Urbanski, L. J. (A)
Underwood, B. P. (A)
Villines, W. M. (M)
Volpe, M. (M)
Wahle, J. J. (M)
Walt, B. W., III (M)
Waldemar, L. A. (M)
Walsh, J. P. (M)
Ward, B. L., Jr. (A)
Ward, H. H., III (SM)
Waterman, H. H. (M)
Watlington, F. W. (M)
Webber, P. A. (M)
Welch, C. L. (M)
Wells H. W. (F)
Wells, J. H., Jr. (M)
Westman, H. E. (M)
Whiteley, G. C., Jr. (SM)
Wille, E. A. (M)
Williams, A. C. (A)
Wilmot, R. D. (M)
Wilson, F. C. (A)
Wittig, W. L. (SM)
Wolfe, A. J. (A)
Wood, G. W. (SM)
Wood, H. L. (M)
Woolley, E. E. (A)
Wright, R. K. (A)
Wrigley, J. B. (M)
Wurdemann, W. H., Jr. (SM)
Young, R. W. (A)
Zunich, M. (A)
Zwart, R. (A)

APO San Francisco
Aleksa, J. J. (M)
Antosy, S. J. (M)
Armstrong, J. E. (M)
Austin, F. A. (M)
Averi, R. C. (M)
Barkman, R. N. (A)
Barnhart, R. W. (M)
Barry, G. D. (M)
Bates, W. J. (M)
Beahr, A. W. (A)
Binns, F. W. (M)
Black, J. G. (A)
Blain, E. J. (M)
Blake, G. A. (SM)
Boakes, W. H. (M)
Booth, G. H. (A)
Borlik, R. E. (M)
Bowlby, R. E. (A)
Branch, G. E. (SM)
Bravin, C. (M)
Brown, D. M. (M)
Brown, T. E. (A)
Bryan, C. W. (M)
Burg, K. W. (SM)
Buhrman, M. A. (A)
Bundy, C. W. (SM)
Bunko, M. (M)
Buonanno, C. (A)
Burke, R. M. (A)
Callahan, A. L. (M)
Carpenter, A. B., Jr. (M)
Carr, B. A. (M)
Cattermole, G. B. (M)
Chambers, G. S. (M)
Cheney, F. H. (M)
Conroy, T. P. (M)
Cook, J. D. (M)
Coughlin, J. T. (M)
Delort, R. (M)
Demy, J. C. (M)
Diamond, E. H. (M)
Dick, H. J. (M)
Dolan, B. A. (M)
Donovan, E. J. (M)
Doran, J. W. (A)
Duncan, H. H. (M)
Edlund, R. W. (M)
Emanuel, D. A. (M)
Eustace, R. J. (M)
Evanson, G. L. (A)
Farrar, J. H. (M)
Faust, D. W. (M)
Faust, R. L. (M)
Fisher, R. L. (M)
Flynn, F. A. (M)
Friese, G. A. (M)
Fulton, J. C. (M)
Geesey, F. M. (M)
Gilbo, A. W. (M)
Gillis, J. W. (A)
Goch, S. J. (M)
Goldstein, B. L. (A)
Goss, J. (A)
Gregal, J. (M)
Gremer, C. E. (M)
Haag, S. J. (SM)
Haeckler, W. K. (M)
Hale, C. R. (M)
Hanna, D. L. (M)
Harada, S. (M)
Harding, P. (M)
Harmon, L. W. (M)
Hart, J. E. (M)
Hartman, A. G. (M)
Hayes, C. R. (A)
Hemmye, J. H. (A)
Henning, J. C., III (M)
Hildebrand, D. B. (M)
Hoagbin, J. E. (M)
Hoffman, L. E. (M)
Howe, J. W. (M)
Humphreys, J. D. (M)
Hunt, C. R. (M)
Inman, W. D. (M)
Iwal, K. G. (A)
Jackson, D. A. (M)
Johnson, E. L. (M)
Johnson, J. G. (SM)
Jones, W. G. (A)
Jouvenat, J. M. (M)
Keasler, E. S., Jr. (M)
Keene, E. F. (A)
Kelly, D. R. (A)
Kindell, F. E. (M)
Klimpl, E. W. (M)
Laine, L. C. (M)
Laine, R. U. (M)
Lauts, R. T. (A)
Leach, E. R. (M)
Lemp, J., Jr. (M)
Lenz, W. K. (M)
Little, P. R. (M)
Loewenstern, W., Jr. (M)
Madden, W. B. (M)
Maddison, F. E. (M)
Mangels, R. H. (M)
Manning, G. C. (M)
Martin, A. L. (M)
McCord, J. (M)
McEwan, A. J. (M)
McKnight, C. J. (M)
Menagh, F. H. (SM)
Merkel, M. A. (A)
Miller, B. J. (M)
Monahan, L. P., Jr. (M)
Nash, H. F., Jr. (M)
Neal, M. E. (M)
Nichols, T. O., Jr. (A)
Olsen, J. C. (M)
Pankowski, B. J. (M)
Park, R. L. (M)
Parkkinen, M. (A)
Paul, B. W. (M)
Pepin, G. R. (M)
Pette, D. C. (M)
Potter, W. W. (M)
Powell, R. I. (M)
Quin, K. H. (M)
Radja, J. E. (M)
Ray, R. L. (M)
Reber, L. I. (M)
Reid, J. F. (M)
Reilly, L. W. (M)
Rende, A. A. (M)
Rodgers, J. C. (M)
Rodin, M. C. (SM)
Rogers, D. E. (M)
Rothman, H. L. (A)
Royce, E. R. (M)
Ruggles, K. W. (A)
Sandler, B. (M)
Sanfield, S. H. (M)
Scheetz, R. E. (A)
Schibi, H. R. (M)
Schmedel, J. H. (M)
Scheidler, W. E. (M)
Seaver, G. E. (M)
Sellars, R. F. (M)
Sencenbaugh, D. W. (M)
Shafter, R. E. (A)
Shaver, W. M. (M)
Shea, E. T. (A)
Shelton, R. G. (M)
Shoemaker, F. J. (M)
Simonoff, J. (M)
Smith, A. J. (A)
Smolak, J. P. (A)
Souder, G. H. (M)
Stevens, D. R. (A)
Stewart, F. (M)
Stickney, C. W. (M)
Stiegelmar, L. R. (A)
Stoer, F. T., Jr. (M)
Stute, R. A. (M)
Swanson, K. T. (A)
Swartz, J. L. (M)
Talley, R. P. (M)
Tedesco, J. R. (M)
Teglund, W. B. (M)
Tom, H. (M)
Townsend, N. L. (A)
Tupper, B. C. (M)
Tyler, W. L. (A)
Upham, W. C. (M)
Vallandigham, W. W. (M)
Weil, H. M. (M)
Weiner, J. H. (M)
Wenger, D. B. (M)
Whelan, F. X., Jr. (A)
Wicks, D. S. (SM)
Williams, D. G. (M)
Williams, R. P. (M)
Wilson, G. F. (M)
Wilson, H. D. (M)
Winter, H. (M)
Witsiepe, R. E. (M)
Wolfe, D. C. (M)
Worley, A. R. (SM)
Yanagihara, F. T. (A)

APO Seattle
Gerkin, F. A. (M)
Gikas, G. N. (M)
Greystone, S. R. (M)
Hedberg, R. W. (M)
Owens, J. N. (A)
Prager, S. (M)
Thomoson, G. C. (M)
Thornton, R. R. (A)
Voight, R. O. (M)

## ADEN COLONY

Aden
Bruce, J. R. (M)

## ALGERIA

Alger
Sara. in, A. (A)

## ARABIAN GULF

QATAR

Doha
Cook, G. J. (M)

## ARGENTINA

Buenos Aires (BA)
Andrews, G. J. (SM)
Arbo, O. (A)
Barbieri, M. (M)
Barcala, J. M. (SM)
Bermudez, J. (A)
Bilotti, A. (A)
Blon, J. L. (SM)
Brandt, L. (M)
Brest, U. R. (M)
Canepa, J. A. (M)
Canese, O. R. (A)
Capra, E. L. (M)
Cassiet, A. H. (M)
Castro, S. (A)
Cole, T. J. (A)
Conde, H. O. (A)
Corlat, J. L. (SM)
Cosentino, A. T. (F)
Dallocchio, H. S. (M)
De Los Santos, A. N. (A)
Diaz, J. O. (M)
Dickson, A. R. K. (M)
Diez, F. L. (A)
Di Marco, A. (SM)
Falcone, J. A. (M)
Fernandez, O. C. (SM)
Flint-Halpern, M. (A)
Gamba, D. W. (SM)
Gayoso, R. A. (M)
Glaubach, N. (A)
Glucksmann, A. (A)
Grant, I. C. (SM)
Kirkscether, E. J. (SM)
Kline, L. (A)
Kobilsky, M. J. (M)
Lojkasek, T. (A)
Machain, L. R. (M)
Magel, R. V. X. (SM)
Malvarez, L. M. (SM)
Martinez, J. (A)
Martinez, P. J. (M)
Mateos-Sidron, A. J. (M)
Mattiussi, O. A. (M)
Neistadt, R. B. (M)
Noltreux, P. J. (F)
Noviks, B. (M)
Novillo, H. L. (A)
Nucci, A. M. (M)
Osorio, A. E. (M)
Picard, A. (M)
Pinasco, S. F. (M)
Pluss, C. P. (SM)
Pulver, M. (M)
Rawson, G. (A)
Ricci, A. J. (M)
Rocha, L. F. (M)
Rossi, R. (A)
Schiavi, E. H. (A)
Schwartz, O. (M)
Schweimer, K. P. (M)
Silberman, F. J. (A)
Steiner, J. L. (SM)
Steube, F. R. (A)
Tennant, T. A. J. (A)
Thomae, M. A. (A)

## ARGENTINA

Tufro, A. (SM)
Vaio, C. A. (A)
Valentinuzzi, M. E. (M)
Van Der Lee, A. C. (M)
Van Soanteren, G. H. V. (SM)
Wojciechowski, V. (A)
Zollfrei, C. D. (M)

Caseros (BA)
Boquete, C. B. (M)

Longchamps (BA)
Ciner, E. (M)

Martinez (BA)
Candido, J. V. (SM)

Moreno (BA)
Van Rees, G. A. (M)

Rio Negro (BA)
De Haro, F. O. (A)

San Martin (BA)
Garrido, R. A. P. (A)

San Miguel De Tucuman (BA)
De Zavalia, R. J. L. (A)
Frias, D. E. (SM)

Vincente Lopez (BA)
Pereyra, L. A. (SM)

## AUSTRALIA

### AUSTRALIAN CAPITAL TERRITORY

Canberra
Brown, S. E. (A)
Carden, P. O. (A)
Coombs, J. S. (M)
Graf, G. R. (M)
Hibbard, L. U. (M)
Robertson, D. S. (A)
Wadsworth, B. F. P. (M)
Waugh, J. B. S. (M)

### NEW SOUTH WALES

Alexandria
McFadden, D. R. (A)

Ashfield
Honnor, W. W. (SM)

Beecroft
Hope, R. S. (M)

Bexley
Wardale, A. H. (M)

Blacktown
Hesse, C. M. (A)

Chippendale
Chandler, G. A. (A)
Dobbie, L. G. (SM)
Lampard, D. G. (M)
Minnett, H. C. (M)
Ryan, R. D. (M)

East Lindfield
Thom, F. W. P. (SM)

Eastwood
Guertler, R. J. F. (SM)

Five Dock
Cansick, N. V. C. (A)

Kensington
Harris, R. W. (A)
Laisk, E. (M)

Liverpool
Gruner, L. (M)

Lonqueville
Beard, M. (M)
Swire, B. E. (M)

Mosman
Wyles, D. G. (SM)

Neutral Bay
Stevenson, M. H. (SM)

Orange
Crouch, E. C. (A)

Pennant Hills
Warner, J. (M)

Penshurst
Hansen, I. C. (M)

Randwick
Chinn, H. R. (A)

Roseville
Fisk E. (F)

Sidney
Aitchison, R. E. (M)
Bean, L. P. R. (SM)
Brooks, G. R. (M)
Bushby, F. R. W. (SM)
Fowler, A. (M)
Gutmann, F. (SM)
Hooke, L. A. (SM)
Kirkham, P. (M)
MacDonald, J. A. (M)
Mulvey, D. F. (SM)
Munro, G. H. (SM)
Parish, H. C. (M)
Shearer, R. W. (M)
Williams, E. H. (M)

Turramurra
Cooper, B. F. (M)

Villawood
Hall, G. G. (M)

West Ryde
Benson, J. E. (SM)

Yennora
Finney, K. L. (A)

### QUEENSLAND

Brisbane
Ham, G. (M)
Hoffman, W. C. (M)
Oliver, E. (M)
Wade, C. F. N. (SM)
Webster, H. C. (M)

Indooroopilly
Kennewell, E. M. (A)

### SOUTH AUSTRALIA

Adelaide
Ellesworth, G. (SM)
Mudgway, D. J. (A)
Pybus, A. W. L. (SM)
Trehame, R. F. (A)
Weston, P. E. (M)
Willoughby, E. O. (M)

Beaumont
Davies, R. J. C. (M)

Clarence Park
D'Assumpcao, H. A. (M)

Salisbury
Jones, E. (A)

Woomera
Pickering, L. A. (M)

### VICTORIA

Blackburn
Hooper, E. M. (M)

Brighton
Rubenstein, S. J. (M)
Warner, G. A. (M)

Canterbury
Coate, E. F. (SM)

Chadstone
Vaux, L. J. (M)

East Malvern
Cox, L. V. (M)

Heidelberg
Brodribb, M. I. (M)

Ivanhoe
Chakanovskis, E. (A)

Kensington
Burrows, L. T. (M)

Melbourne
Brownless, S. F. (M)
Faudell, C. L. (SM)
Glover, A. J. G. (M)
Jacoby, A. (A)
Mair, R. B. (SM)
Skelton, T. H. (SM)

Parkville
Caro, D. E. (A)
Muirhead, E. G. (M)

Richmond
Webb, A. L. C. (M)

South Melbourne
McInnes, I. G. (SM)

Sunshine
Blakeley, W. C. (M)

### WESTERN AUSTRALIA

Applecross
Baldock, A. R. (A)

Bellevue
Simrod, R. (A)

Nedlands
Billings, A. R. (SM)

Perth
Hatton, G. H. T. (A)
Hayman, W. G. (M)

## AUSTRIA

Salzburg
Pundleider, H. V. (A)

Vienna
Barrett, A. E. (SM)
Buehler, J. H. (A)
Zenanek, H. (M)

## BAHAMAS

Nassau
Curling, A. E. (A)
Halkitis, J. A. M. (A)
Ingrahm, K. R. (M)
Sherman, A. B. L. (M)

## BELGIAN CONGO

Leopoldville
Franke, G. S. (M)
Nelynick, J. J. (M)
Rouche, N. (M)

## BELGUIM

Antwerp (BNL)
Collette, M. M. (A)
Fettweis, A. L. M. (M)
Hanotte, P. E. (M)

Brussels (BNL)
Belevitch, V. (SM)
Bernaert, A. L. J. (A)
Bouchier, P. (SM)
Bourguignon-Famaey, G. (A)
Carpentier, W. J. O. (M)
Gewillig, M. R. (M)
Heog, Y. V. (M)
Herbays, E. H. (SM)
Hoffmann, J. A. J. L. (SM)
Murphy, B. (M)
Van Roy, J. (M)
Voltagglo, F., Jr. (SM)
Vorobeltchik, J. (M)

Charleroi (BNL)
Desirant, M. C. (SM)

Ghent (BNL)
Buys, W. L. (M)
Meersche, A. J. V. (M)

Kortrijk (BNL)
Vanwormhoudt, M. C. (M)

Louvain (BNL)
Jespers, P. G. A. (M)

Mons (BNL)
Cogneaux, M. (M)

Putte (BNL)
Liekens, A. F. (A)

Uccle-Brussels (BNL)
Marique, J. (SM)

Wezembeek (BNL)
Tavernier, G. C. (M)

Wilrijk (BNL)
Deschuytere, L. C. (M)

## BERMUDA

Hamilton
Hillier, R. J. (M)
Spershott, J. H. (M)

Paget
Amos, A. F. (A)

Warwick
Harries, J. H. O. (SM)

## BOLIVIA

La Paz
Weil, R. B. (M)

## BRAZIL

Alagoas
Lisboa, M. H. De A. (M)

Belo Horizonte
De Castro, E. M. (M)

Pernambuco
Brandt, W. L. (M)

Porto Alegre
Ely, R. S. (M)
Muller F. R. (A)
Peixoto, E. S. (SM)
Ritter, G. (A)

Rio De Janeiro
Amarante, A. J. D. (A)
Araujo, S. P. (A)
Bahiana, L. C. (M)
Bonapace, H. (SM)
Caicoya, J. I. (M)
Correa, A. De C. (M)
Costa, H. (F)
Costa, P. S. (A)
Coutinho, E. O. (M)
Da Luz, A. F. H. B. P. (A)
De Mattos, H. C. (M)
De Medeiros, L. A. (M)
De Oliveira, A. M. (SM)
De Sa, M. A. M. (A)
Do Rosario, L. R. (M)
Farmer, F. H. (M)
Ferreira, D. S. (M)
Frederico, J. C. B. (M)
Fuzesi, Z. (M)
Girard, P. A. (M)
Guimaraes, G. S. C. (M)
Hartenberg, B. (M)
Heininger, W. W. L. (SM)
Herz, G. (M)
Lacombe, C. G. (A)
Leal, J. M. (A)
Maia, G. N. S. (M)
Maranhao, S. M. (A)
Miranda, E. Da S. (A)
Neto, J. V. P. (M)
Penido, E. (A)
Pinheiro, U. B. (A)
Portella, S. M. (M)
Pradal, J. A. (A)
Quacchia, G. M. (M)
Quadra, F. F. (A)
Ribeiro, G. D. (A)
Ribeiro, H. S. G. (A)
Santos, J. C. P. (A)
Schreyer, H. T. (M)
Silva, R. D. E. (A)
Soares, S. (M)
Sobral, J. M. (A)
Valverde, J. F. (M)
Vianna, C. (M)
Wiltgen, J. A. (SM)

Sao Paulo
Barreto, L. A. B. (M)
Baumann, C. (SM)
Beaman, W. G. (A)
Belck, H. B. (M)
Benchimol, A. (M)
Boffi, L. V. (M)
Borda, J. A. (M)
Chow, Y. (M)
Dantine, W. A. (M)
Da Rosa, A. V. (M)
De Arruda, P. R. (A)
De Castro, C. E. R. (A)
De Macedo, A., Jr. (M)
De Miranda, S. M. (A)
Fanta, P. (M)
Funari, B. (M)
Girardelli, L. R. L. (A)
Goldberger, E. (A)
Goldberger, N. (A)
Goldmann, R. D. (A)
Greis, W. F. (M)
Guimaraes, B. Q. (M)
Hertz, J. A. (M)
Hirschfeld, B. (SM)
Kubelka, W. (M)
Leimer, A. A. (M)
Levy, G. I. (M)
Lignon, J. R. (A)
Lopes, C. De P. (M)
Magyar, P. E. (M)
Meyer, L. V. (A)
Moreira, J. S. (A)
Muzzio, J. L. R. (A)
Rittmeister, H. (M)
Rubin, L. (SM)
Senise, J. T. (M)
Sherman, F. L. (M)
Smit, J. (M)
Stamopoulos, C. D. (SM)
Stucken, H. (A)
Tal, C. T. (SM)
Tissi, P. (A)
Tsao, F. A. (M)
Waeny, J. C. C. (M)
Woelz, A. L. (M)

## BRITISH EAST AFRICA

### KENYA

Nairobi
Pegrume, S. A. (M)
Tully, A. (M)

## BRITISH GUIANA

East Coast Demerara
Tibbits, A. E. (A)

Rio Demerara
Greaves, H. A. (M)

## BRITISH OCEANIA

### FIJI ISLANDS

Suva
Peck, D. G. (M)

## BURMA

Rangoon
Aung, U. T. (A)
Ba'Hli, F. (M)
Khin, M. A. (A)
Kyi M. A. (M)
San, P. T. (M)
Than, M. M. (M)
Than, M. P. (M)
Tun, U. T. (A)

## CANADA

### ALBERTA

Anzac (NA-8)
Whyte, J. D. (A)

Androssan (NA-8)
Elwell, A. T. (A)

Bowness (SA-8)
Carlson, C. V. (A)

Calgary (SA-8)
Allan, W. K. (M)
Ball, E. T. (M)
Beck, F. F. (M)
Blank, J. A. (M)
Brownlee, B. P. (M)
Caldwell, L. W., Jr. (M)
Cole, A. M. (A)
Connor, E. C. (A)
Cook, R. E. (M)
Cooley, L. E. (A)
Davis, A. P. (SM)
Dickson, F. J. (A)
Dubber, W. G. (A)
Evans, P. R. N. (A)
Fleming, G. I. H. (M)
Freek, W. L. (M)
Gill, A. L. (A)
Gordon, L. (A)
Gordon, R. E. (M)
Griswold, A. L. (A)
Guthoff, G. H. (A)
Handford, G. B. (M)
Hansen, C. H. (A)
Hemming, G. (A)
Hill, R. F. (A)
Hollingshead, G. W. (A)
Holt, T. C. (A)
Johnson, C. M. (M)
Johnston, C. W. (M)
Kelcey, M. F. (M)
Kerr, W. G. (A)
Kittlitz, N. E. (M)
Kittlitz, R. S. (M)
Lamb, R. W. H. (M)
Larson, V. C. (M)
Lundigan, E. G. (A)
Maberley, G. A. (A)
MacGregor, R. J. (A)
Marshall, D. R. T. (M)
McBride, B. J. (A)
McCowell, W. J. (M)
McDougall, S. B. (A)
McLean, R. A. (M)
Melesko, D. M. (A)
Merry, H. C. (A)
Miller, E. G. (A)
Moore, A. M. (A)
Moore, J. D. (M)
Nawata, T. T. (A)
Parkinson, G. E. (M)
Partin, W. (M)
Peters, R. R. (A)
Porochnuk, W. N. (M)
Sadler, G. L. (M)
Sandrelli, R. D. (A)
Sasso, E. F. (A)
Schafer, E. D. W. (M)
Schulze, G. H. (A)
Sisko, J. R. (M)
Smith, M. F. (A)
Smith, R. E. (M)
Stuart, A. J. (M)
Szojka, F. C. (M)
Umbach, E. A. (A)
Vincent, L. P., Jr. (M)
Watt, K. M. (M)
Werbisky, C. E. (A)
White, G. H. (A)

Cold Lake (NA-8)
Hunt, O. (M)
Stromsmoe, K. A. (M)

Drayton Valley (NA-8)
Hatfield, J. C. (M)

Edmonton (NA-8)
Adler, J. G. (A)
Arksey, G. W. (M)
Baker, L. R. (M)
Banks, K. M. (M)
Bassendowski, E. A. (A)
Berwick, C. D. (A)
Bidulock, G. (M)
Bradbury, W. C. (M)
Burtch, N. (A)
Cable, R. P. (A)
Caldwell, A. (M)
Campbell, T. G. (A)
Cary, S. L. (A)
Cunningham, W. E. (M)
Dowhan, H. (M)
Ducey, R. J. (M)





Earnshaw, A. (M)
Goodman, C. J. (M)
Hall, T. W. (M)
Harwood, E. L. (M)
Henderson, I. W. (A)
Hollingworth, F. (A)
Ingram, G. R. (A)
Iwaniuk, V. P. (A)
Johnson, R. A. (A)
Kennedy, J. G. (A)
Kiss, F. V. (M)
Leitch, J. G. (M)
Leskiw, H. (M)
Lines, E. G. (A)
Lyons, D. M. (A)
MacDonald, D. L. (SM)
Makepeace, F. G. (A)
McMahon, V. J. (M)
Metcalf, W. B. (M)
Neal, J. T. (M)
Nichol, A. C. (A)
Onyshko, S. (M)
Paterson, S. G. (M)
Peterson, D. A. (M)
Petrik, J. (A)
Porteous, J. W. (SM)
Powley, R. K. (A)
Rice, G. R. A. (A)
Royer, D. P. (A)
Sacker, J. E. (M)
Scotten, E. C. (A)
Shelton, A. B. (M)
Stutle, G. O. (A)
Smith, A. O. (A)
Smith, O. A. (M)
Storms, W. A. (A)
Sutcliffe, R. F. (M)
Waddell, T. (A)
Wadson, T. E. (A)
Watts, M. A. (A)
Whitley, W. M. (A)
Zaharichuk, S. (M)
Zowtiak, J. (M)

Granum (SA-8)
Johnson, N. P. (A)

Islay (NA-8)
Waterfield, J. W. (M)

Leduc (NA-8)
Stein, R. A. (M)

Peace River (SA-8)
Gardner, R. J. (A)

Ponoka (NA-8)
Taylor, E. L. (M)

Ralston (SA-8)
Clink, W. L. (M)

Redcliff (SA-8)
Wahl, H. E. (M)

Red Deer (NA-8)
Bartley, G. A. (SM)

St. Albert (NA-8)
Donovan, L. N. (M)
Usher, R. (M)

Sherwood Park (NA-8)
Henderson, R. G. (M)

South Edmonton (NA-8)
Cole, D. R. (A)

Slave Lake (NA-8)
Bayer, M. B. (M)

Sylvan Lake (NA-8)
Jonkman, J. Y. (A)

Trochu (SA-8)
Luoma, A. J. (A)

### BRITISH COLUMBIA

Burnaby (VAN-8)
Aitken, R. (M)
Fraser, F. S. (M)
Kay, D. H. J. (SM)

Castlegar (VAN-8)
Thorp, W. W. (M)

Esquimalt (VAN-8)
Evans, D. J. (M)

Fort Nelson (VAN-8)
Jones, L. M. (M)

Kelowna (VAN-8)
Wyatt, T. E. (A)

Lytton (VAN-8)
Manders, D. F. (SM)

Mission City (VAN-8)
Kyashko, W. (A)

Nanaimo (VAN-8)
Boston, N. E. J. (M)
Carswell, J. D. (A)
Clements, B. C. (A)
Mac Intyre, E. R. (M)
Pirart, M. A. (M)

New Westminster (VAN-8)
Butler, R. H. (A)
Shiu, S. D. W. (M)

North Burnaby (VAN-8)
Dill, H. J. (M)
Greenwood, S. J. (A)
Newton, W. K. (M)
Smith, J. M. (A)
Tracey, W. R. (A)

North Surrey (VAN-8)
Liggins, A. (M)
Ott, E. K. (A)

North Vancouver (VAN-8)
Alfreds, L. J. (SM)
Allaree, R. C. (A)
Crawford, A. M. (M)
Elliott, D. T. (A)
Goldie, H. J. (M)
Hoyles, H. A. (M)
Lynch, T. G. (M)
Marlatt, C. D. (A)
McDonald, R. C. (A)
Morison, D. P. (M)
Neveroski, F. (A)
Niblock, P. A. (SM)
Norman, E. R. (A)
Paxton, A. T. C. (M)
Racey, T. W. (A)
Reyda, D. C. (A)
Saperstein, M. J. (M)
Wheeler, K. L. (A)
Willoner, G. (SM)
Wilson, C. M. (A)

Penticton (VAN-8)
Locke, J. L. (M)
Paton, I. W. (A)

Port Moody (VAN-8)
Chisholm, E. (A)

Read Island (VAN-8)
Taylor, A. H. (SM)

Richmond (VAN-8)
Farey, L. (M)
Hepburn, J. T. (M)
Matheson, C. D. (A)
Vroom, D. R. (A)
White, E. (M)

Savona (VAN-8)
Payne, T. E. G. (A)

South Burnaby (VAN-8)
Knight, G. M. (A)
Smith-Gander, N. C. A. (M)
Trainor, W. J. (M)
Tripp, H. H. (A)

Trail (VAN-8)
Baron, H. D. (A)
Gowans, W. K. (M)

Vancouver (VAN-8)
Bailey, F. C. (M)
Beadle, D. F. (A)
Black, D. T. (M)
Bohn, E. V. (A)
Breeze, J. E. (SM)
Butterfield, L. A. (M)
Carpenter, D. D. (SM)
Chandler, A. H. (M)
Chandler, G. C. (SM)
Clisch, D. F. (A)
Cockburn, B. K. (A)
Cole, R. A. (SM)
Cormack, G. D. (M)
Cringan, F. J. (M)
Crowson, D. B. (M)
Cuddeford, R. A. (M)
Cummings, W. M. (A)
Cushing, T. D. (M)
Deiss, J. P. (M)
Diamond, M. (M)
Eng, T. S. (M)
Falf, S. T. (M)
Frazer, E. J. (M)
Gaines, E. J. (M)
Gray, J. S. (M)
Green, M. E. (SM)
Hale, D. R. (A)
Hale, S. T. (A)
Harding, P. J. R. (M)
Harrow, A. E. (A)
Hewit, H. O. (A)
Hilton, B. C. (A)
Hings, D. L. (M)
Hird, E. V. (M)
Holmes, A. T. (M)
Hopkins, J. A. (M)
Humble, R. S. (A)
Hunter, P. J. A. (M)
Kasvand, T. (A)
Kersey, L. R. (M)
Klaus, E. F. (A)
Klok, B. (A)
Knight, A. G. (A)
Kohler, P. H. (A)
Kolbeins, E. N. (M)
Kruchio, P. (M)
Liebell, A. (M)
Maddison, R. R. (M)
Marsh, B. A. (M)
McCarter, W. L. (M)
McConnell, B. (A)
McCook, J. M. (M)
McDiarmid, D. R. (M)
McDowell, G. E. (M)
McGrath, E. F. (A)
McLennan, D. E. (A)
Mohammed, A. (M)
Moore, A. D. (SM)
Noakes, F. (M)
Norman, R. O. (M)
Phillips, G. E. (A)
Potvin, L. H. (A)
Praeg, W. F. (M)
Price, E. M. (A)
Pye, R. M. (A)
Reader, W. R. (M)
Robson, E. E. (M)
Rogers, J. A. (M)
Saito, Y. (M)
Seabrook, H. B. (M)
Skelding, J. A. (M)
Smith, C. R. (A)
Sodomsky, K. F. (M)
Spencer, R. E. (A)
Spilsbury, A. J. (M)
Steele, G. G. (A)
Steeves, J. G. (M)
Thomson, H. C. (A)
Thomson, W. H. (M)
Tupper, B. R. (F)
Varah, L. A. (A)
Warren, G. D. R. (A)
Weeks, R. L. (M)
Whiteside, R. L. (A)
Younger, G. M. (M)

Victoria (VAN-8)
Adamus, G. S. (M)
Blyth, G. S. (A)
Chorlton, D. J. (M)
Davidson, M. H. (A)
Duston, R. F. (M)
Evans, J. C. (A)
Ford, J. S. (M)
Johns, J. G. (A)
Madill, C. L. (M)
Weir, R. C. (M)

West Vancouver (VAN-8)
Bell, A. R. (M)
Bennett, W. F. (M)
Bonnett, J. D. W. (A)
Doble, R. N. (M)
Whitley, T. (M)

### MANITOBA

Argyle (WIN-6)
Barankvsky, C. (M)

Brandon (WIN-8)
Gomez, A. M. (M)
Hazleton, H. T. (M)

Brooklands (WIN-8)
Bigar, E. (A)

East Kildonan (WIN-8)
Thrasher, P. J. (A)

Fort Churchill (WIN-8)
Titterington, E. J. (A)

Fort Garry (WIN-8)
Colsh, H. O. (M)
Haakonsen, H. M. (M)

Gretna (WIN-8)
Roddick, J. H. (M)

Lac Du Bonnet (WIN-8)
Uhlman, J. C. (A)

Norwood (WIN-8)
Barschel, E. (A)

Portage La Prairie (WIN-8)
Vertrees, J. D. (A)

Rivers (WIN-8)
Strain, E. M. (M)

St. Boniface (WIN-8)
Blackwood, G. W. (M)
Philpott, G. W. (M)
Welbers, J. A. L. (M)

St. James (WIN-8)
Allen, D. E. M. (M)
Gissing, H. R. (SM)

Selkirk (WIN-8)
Tinkler, E. B. (A)

Transcona (WIN-8)
Denyer, J. H. N. (M)
Leite, A. N. (A)

West Kildonan (WIN-8)
Yankewicz, W. W. (M)

Winnipeg (WIN-8)
Ardelian, T. E. (M)
Barnstable, F. H. (M)
Blair, R. G. (M)
Blica, R. S. (A)
Body, H. T. (SM)
Bridges, E. (M)
Brown, J. R. B. (A)
Buchmeier, H. P. G. (M)
Burdeny, D. G. (M)
Cahoon, R. D. (F)
Carleton, G. F. (M)
Clayton, H. C. V. (A)
Cross, I. F. (SM)
Culbert, W. F. (A)
Delory, C. A. G. (M)
Dusang, E. B. (M)
Eldring, M. P. (M)
Enns, E. (M)
Fedorak, W. N. (A)
Froese, A. (M)
Galpin, W. H. (M)
Grausdin, P. (A)
Hackett, F. J. (M)
Harvey, V. H. (A)
Herrington, L. H. (M)
Hooper, A. W. (M)
Hopper, C. J. (M)
Horner, S. G. L. (F)
Jell, R. M. (A)
Jex, J. F. (A)
Johnson, R. A. (M)
Johnston, W. A. R. (M)
Kaitz, F. R. (M)
Kirk, G. R. (M)
Kobewka, P. (M)
Love, G. (M)
MacDonald, P. A. (SM)
Maguire, R. T. (M)
Mann, W. R. (SM)
Marquart, R. G. (M)
McLaren, G. A. (A)
McMath, J. P. C. (SM)
McQuaid, A. C. (A)
Mestery, S. J. (A)
Middleton, L. (M)
Murphy, B. F. (M)
Musick, M. P. (M)
Naqvi, S. I. H. (A)
Newey, D. K. (M)
Noakes, J. F. (A)
Oakes, D. A. (M)
Punshon, R. L. (M)
Raber, M. B. (M)
Roulston, K. I. (SM)
Royko, W. (M)
Saunders, M. G. (M)
Sawka, M. H. (M)
Shapera, G. H. (A)
Shaver, H. B. (A)
Simister, R. M. (M)
Sloker, G. H. (A)
Stinson, A. W. (M)
Stroud, E. L. (M)
Sutton, W. B. (A)
Taylor, D. F. (M)
Tiller, R. W. (A)
Tinkler, R. F. (M)
Trencher, J. W. (M)
Wallace, G. R. (M)
White, T. J. (M)
Williamson, K. H. (M)
Windrick, P. F. (M)
Wormell, H. T. (SM)
Zold, T. (M)

### NEW BRUNSWICK

Bathurst (MON-8)
Cote, J. A. (A)

Chatham (MON-8)
Myles, D. H. (A)

Fredericton (MON-8)
Bailey, C. O. C. (M)
Collier, R. J. (M)
George, D. A. (M)
Lauber, D. H. (M)
Scott, R. N. (M)
Smolinski, W. J. (M)
Wasson, W. D. (M)

Moncton (MON-8)
Grant, D. J. (M)
Kemp, J. R. (M)
Lyon, W. D. (M)

Sackville (MON-8)
Smith, H. M. (SM)

St. John (MON-8)
Bishop, J. G. (M)
Fanjoy, E. M. (M)

### NEWFOUNDLAND

Corners Brook (NEW-8)
Ryde, C. H. (M)

Gander (NEW-8)
Alway, V. J. (M)
Higgins, G. S. (A)

Labrador, (NEW-8)
Tanton, J. E. (A)

Mount Pearl (NEW-8)
Halfyard, R. (M)

St. John's (NEW-8)
Au, G. D. (M)
Bedingfield, J. F. (A)
Bunt, R. H. (M)
Cocker, J. H. (A)
Coe, M. C. J. (M)
Dicks, J. L. (M)
Dorsett, D. T. (M)
Eisler, C. J. (A)
Facey, J. W. (M)
Filyer, J. (A)
Fisher, L. (A)
Gaskell, W. M. (A)
Gladden, M. (M)
Gould, T. C. (A)
Hiertihy, O. G. (M)
Inkson, I. A. (M)
Isaacs, H. A. J. (A)
Jerrett, A. C. (M)
Lippert, R. J. (M)
Mac Gray, M. D. (M)
Manser, D. (A)
Marshall, D. R. J. (M)
Moseley, S. V. (M)
Mulloy, F. A. (A)
Oliver, J. V. (A)
Ross, G. M. (M)
Taagepera, A. (A)
Tibbett, J. E. (A)
Walsh, A. J. (A)
Williams, V. (A)
Witherstone, E. D. (M)

### NOVA SCOTIA

Antigonish (MON-8)
Clarke, E. M. (M)

Armdale (MON-8)
Currie, V. J. (A)

Cornwallis (MON-8)
Pimenoff, V. J. (M)

Darthmouth (MON-8)
Steeves, D. M. (A)

Greenwood (MON-8)
Brown, H. C. (M)
Firlotte, J. L. (M)
Hemiston, J. A. (A)
Lumley, J. N. C. (M)
Salmon, R. L. (A)
Williams, G. L. (M)

Halifax (MON-8)
Apisais, G. J. (M)
Burchill, G. H. (M)
Fowlie, W. D. (M)
Grant, A. S. G. (M)
Greig, A. W. (M)
Hutcheson, J. G. R. (M)
Mac Williams, A. R. (A)
Martlieu, C. H. O. (A)
Murray, C. W. (A)
Robertson, J. J. C. (M)
Storm, A. C. (A)
Wilson, R. W. (M)
Wood, W. (A)

Shelburne (MON-8)
Kent, M. P. (A)

Sydney (MON-8)
Oulton, G. R. (M)
Paris, A. P. (M)

West Berwick (MON-8)
Kelly, T. W. (A)

Wolfville (MON-8)
Tiffotson, J. G. (M)

Woodlawn (MON-8)
White, W. R. (A)

### ONTARIO

Agincourt (TOR-8)
Barringer, A. (A)
Butler, C. A. (M)
Collins, G. S. (M)
Cummings, V. J. (M)
Davis, L. S. (A)
Jones, G. E. (M)
Maine, A. E. (M)
Rethoret, R. H. (M)
Shack, A. G. (M)

Ajax (TOR-8)
Bayly, B. D. F. (F)
Mulholland, G. C. (A)

Almonte (OTT-8)
Maynard, L. A. (M)

Alvinston (L-SWO-8)
Jackson, R. B. (A)

Ancaster (HAM-8)
Fines, W. W. (A)
Fromanger, A. L. (M)
Gomard, P. (M)
Jewell, G. S. (M)
Jeynes, W. E. (M)
Olson, E. (SM)
Ruse, E. (M)
Smith, C. J. (M)
Stapleton, A. A. (A)
Thomas, E. A. (M)
Wiffin, R. F. (M)
Wilder, J. C. (M)

Armstrong (BAY-8)
Cheng, A. (M)

Arnprior (OTT-8)
Boire, P. C. (M)
Wassink, B. J. (A)
Zuidhof, A. (M)

Aurora (TOR-8)
Morris, D. V. (A)

Baden (KW-8)
Gingerich, R. R. (A)

Bancroft (BAY-8)
Shaw, P. D. W. (A)
Stoehr, F. (A)

Barrie (TOR-8)
Baxter, E. G. (M)
Paulin, W. P. (M)

Belleville (BAY-8)
Attridge, D. M. (A)

Baxter, G. I. (A)
Bell, G. L. (M)
Benger, W. C. (SM)
Blacker, H. L. (SM)
Burkett, K. V. (M)
Carey, P. M. (M)
Carlson, D. E. (A)
Clarke, W. E. (M)
Coombs, C. W. (M)
Cowan, D. J. (M)
De Paul, V. A. (M)
Desmond, N. T. (M)
Dryden, T. W. R. (A)
Duke, A. M. (M)
Field, G. C. (M)
Fort, D. E. (M)
Frederick, H. V. (M)
Goodwin, R. N. (M)
Hanna, J. L. (A)
Heaven, W. H. (SM)
Hunt, C. A. (A)
Ives, W. J. (A)
Jamros, A. (M)
Jardine, D. G. (M)
Jarvis, J. A. (SM)
Johns, D. M. (A)
Johnson, M. E. (M)
Jones, A. F. H. (A)
Kostashuk, S. S. (M)
Lind, E. P. (M)
Lund, D. M. (M)
Martin, N. (M)
Mitchell, T. E. (M)
Moore, N. A. (M)
Nelischer, J. E. (M)
Punchard, J. C. R. (F)
Reed, D. E. (A)
Reid, J. N. (A)
Revill, A. D. (SM)
Rickards, C. E. (M)
Ristic, D. (SM)
Robb, A. S. (SM)
Roberts, S. J. (M)
Romaniuk, E. (M)
Rye, E. F. (A)
Rywak, J. (M)
Sillitoe, S. (M)
Smith, R. L. (SM)
Somerville, D. W. (M)
Tanner, R. H. (F)
Vice, D. G. (M)
Walter, M. J. (SM)
Wamboldt, G. L. (M)
Wesbrook, G. E. (A)
Williamson, J. A. (M)
Williamson, R. (SM)

Bells Corners (OTT-B)
Davies, N. G. (M)
Dure, J. D. (M)
Lynch, J. A. M. (SM)
McIntyre, B. J. (M)
Molozzi, A. R. (M)

Bloomfield (BAY-B)
Woods, W. T. (A)

Brampton (TOR-B)
Gracey, T. G. (M)
Saunders, L. E. (A)

Brantford (HAM-B)
Braund, G. E. (A)
Hochner, S. V. (A)
Maksymowicz, W. J. (A)
McConnachie, W. A. (A)
Moore, D. G. (A)
Williams, J. K. (M)

Brockville (OTT-B)
Leeder, W. F. (A)
White, J. E. C. (M)

Bronte-Oakville (HAM-B)
Tickner, A. E. (M)

Burlington (HAM-B)
Beaumont, G. F. (SM)
Cockle, E. S. (M)
Flood, F. M. (A)
Hall, J. M. (M)
Heys, D. M. (M)
Lower, W. M.
Merritt, H. J. (M)
Moes, G. (M)
Musselman, J. A. (M)
Stonelake, D. A. (M)
Webb, H. H. (M)

Byron (LON-B)
Golden, P. (M)
Warr, R. J. (M)

Cardinal Heights (OTT-B)
Miedzinski, J. (SM)

Carlingwood (OTT-B)
Dalzell, T. D. (M)

Carrying Place (BAY-B)
Turney, G. M. (A)

Chalk River (OTT-B)
Cowper, G. (SM)
Goulding, F. S. (SM)
Jones, A. R. (M)

Chatham (L-SWO-B)
Mori, M. R. (A)

Clarkson (TOR-B)
Beattie, D. (M)
Boersma, J. (A)
Heidebrecht, L. E. (M)
Sharf, W. A. (A)
Sipila, O. A. (A)

Clinton (LON-B)
Boostad, F. O. (M)
Lowe, A. W. (M)
Senior, R. N. (M)
Treend, R. S. (A)

Coburg (BAY-B)
Williamson, D. B. (SM)

Coldwater (TOR-B)
Parker, D. L. (M)

Cooksville (TOR-B)
Hastie, F. S. (A)

Copper Cliff (TOR-B)
Stickles, D. (A)

Cornwall (OTT-B)
Hamilton, W. D. (M)
Lapetina, R. A. (A)

Deep River (OTT-B)
Allen, V. H. (M)
Brown, J. C. (M)
Dunlop, D. P. (M)
Hayter, D. M. (M)
Ichil, D. H. (A)

Don Mills (TOR-B)
Adams, R. L. (SM)
Anto, H. (M)
Breckenridge, A. G. (M)
Brown, R. W. (SM)
Carew, S. J. H. (M)
Eastwood, G. C. (M)
Flynn, M. W. (M)
Fryer, K. N. (M)
Gillies, G. A. (M)
Greenwood, R. E. (M)
Lee, G. (A)
Low, A. R. (M)
Millen, T. I. (SM)
Pipe, G. E. (M)
Robinson, J. D. (A)
Robinson, W. A. (M)
Semmelink, A. (SM)
Stevens, A. (A)

Dorchester (LON-B)
Moore, D. (M)

Downsview (TOR-B)
Armstrong, H. D. (M)
Brodsky, S. (A)
Casciato, L. (M)
Cohen, H. A. (M)
Day, C. A. (M)
Freedlander, S. (A)
Geary, B. H. (A)
Hanson, J. V. (M)
Kennedy, H. G. (A)
Lewis, D. H. (M)
McCloskey, A. (A)
McLean, D. J. (M)
Richardson, J. R. (M)
Stephenson, W. R. (M)
Stong, R. A. (A)
Tilston, W. V. (M)
Wall, E. (M)
Williams, N. A. (SM)
Yablo, S. (M)

Dryden (TOR-B)
Ellenwood, D. S. (M)

Dundas (HAM-B)
Anthes, R. G. (SM)
Cannon, E. T. (A)
Csia, J. Z. (A)
Wright, D. F. (M)

Dwight (TOR-B)
Maschmann, F. H. (A)

Eastview (OTT-B)
Storr, J. W. (M)

Eganville (OTT-B)
Lemke, M. F. (M)

Elliott Lake (TOR-B)
Popovich, C. D. (A)

Erindale (TOR-B)
Tucker, D. C. (M)

Etobicoke (TOR-B)
Knott, J. G. (M)
Rocholl, H. C. (A)
Shenton, W. E. (M)
Thompson, R. S. (M)

Fenwick (HAM-B)
Wegman, W. G. (M)

Fonthill (HAM-B)
Smith, R. G. (A)

Fort Erie (HAM-B)
Moratz, W. P. (A)
Waud, E. C. (M)

Fort William (TOR-B)
Andrews, G. R. (M)

Galt (KW-B)
Semple, C. E. C. (M)
Sweet, J. L. (A)

Gananoque (OTT-B)
Olive, G. W. (F)

Georgetown (HAM-B)
Matthies, J. G. (M)
Prust, P. (A)

Goderich (LON-B)
Hurst, R. V. (M)

Gormley (TOR-B)
McWhirter, D. A. (M)

Greensville (HAM-B)
Buxton, A. J. (SM)

Guelph (KW-B)
Armstrong, A. S. (M)
Brown, R. M. (A)
Clegg, G. M. (A)
Irwin, G. J. (SM)
Lacey, J. D. (M)
Mackay, F. S. (SM)
Robinson, C. A. (M)
Shute, J. A. (A)
Valeriote, P. T. (A)

Haliburton (TOR-B)
Dawson, H. W. (A)

Hamilton (HAM-B)
Ames, F. H. (A)
Anderson, J. W. (M)
Bohay, J. A. (M)
Brooks, P. J. (M)
Cambey, L. A. (M)
Cantlon, C. F. (SM)
Cheek, W. A. (A)
Connor, J. J. (A)
Coolsma, S. F. (M)
Dean, W. W. H. (SM)
Edwards, F. H. (M)
Felix, M. O. (SM)
Geldart, W. J. (M)
Gladwin, A. S. (M)
Godfrey, G. F. (A)
Harris, L. R. (M)
Harris, O. E. (A)
Heal, G. L. (A)
Hill, J. H. (M)
Hore, H. B. (A)
Howes, C. N. (M)
Humbert, V. J. (A)
James, W. E. (M)
Kassner, J. (A)
Kelterborn, W. H. (SM)
Kupeczek, F. W. (A)
Litwin, J. D. (A)
Lucyk, J. (M)
Lyons, K. C. (M)
Martin, R. H. (A)
Mason, V. V. (SM)
Meszaros, A. L. (A)
Minchel, C. C. (M)
Pal, G. L. (M)
Prinsen, H. W. (M)
Rapp, E. (A)
Riley, D. (A)
Ross, R. G. (M)
Sandler, A. A. (SM)
Sievert, A. H. (SM)
Silke, A. G. (A)
Slater, H. (A)
Sparrow, J. (M)
Staryk, M. (M)
Todd, H. F. E. (A)
Walker, M. L. (M)
Watts, T. O. (M)
White, E. W. (M)
Wilk, J. (A)
Yakymyshyn, M. M. (M)

Hanover (HAM-B)
Grein, A. E. (A)

Highland Creek (TOR-B)
Gladys, S. J. (M)

Hornby (HAM-B)
Pethany, J. (A)

Huntsville (TOR-B)
Fisher, D. E. (M)

Iondale Heights (TOR-B)
Johnston, K. S. (A)

Iroquois Falls (TOR-B)
Francis, G. S. (A)

Islington (TOR-B)
Atlee, R. Y. (M)
Brammanis, A. (M)
Davis, W. B. (M)
Gent, L. F. T. (M)
Mackie, A. S. (M)
Mathers, F. F. (A)
Moorhouse, K. G. (A)
Provan, R. J. (M)
Wood, A. E. (M)

Jordan Station (HAM-B)
Pond, J. F. (M)

Kapuskasing (TOR-B)
Campbell, J. H. (M)

Kettleby (TOR-B)
Borth, L. A. (M)

King (TOR-B)
Stubbs, R. A. (A)

Kingston (BAY-B)
Broughton, M. B. (M)
Campling, C. H. R. (M)
Chisholm, R. M. (M)
Harrower, G. A. (M)
Hay, J. D. (M)
Hetherington, F. E. (M)
McPherson, J. A. (M)
Pollock, H. S. (A)
Robinson, B. A. (M)
Shine, G. L. (A)
Stewart, H. H. (SM)

Kirkland Lake (TOR-B)
Chapman, K. G. (M)

Kitchener (KW-B)
Albrecht, J. (A)
Allison, M. H. (M)
Banks, F. A. O. (M)
Clark, W. B. (SM)
Cox, G. M. (SM)
Dankwardt, R. W. (M)
Duvall, J. M. (M)
Enns, E. G. (A)
Fellchenfeld, M. M. (M)
Grey, W. J. (M)
Guzik, S. W. (M)
Hass, Z. K. (SM)
Kennedy, T. E. (M)
Kurz, W. (M)
Love, S. F. (M)
Maltby, R. J. (M)
Marsland, J. W. (A)
McKee, W. H. (M)
Mosher, F. M. (A)
Ritz, E. A. (A)
Smallwood, S. G. (A)
Turchan, P. J. (A)
Washburn, J. C. (M)

Lancaster (OTT-B)
McLeod, J. W. (M)

Lansing (TOR-B)
Fisher, G. W. (A)

Leaside (TOR-B)
Brereton, R. L. (M)
Hogan, J. F. (A)
Jackson, A. D. (A)
Webster, C. G. (M)

Lively (TOR-B)
Leask, R. D. (M)

London (LON-B)
Bach, J. R. (SM)
Beninger, G. J. (A)
Blackwell, J. H. (SM)
Branigan, D. (A)
Brouwer, J. J. (A)
Brule, R. J. (M)
Cassar, C. J. (A)
Dearle, R. C. (SM)
Dublncoff, E. (M)
Fallona, J. P. (M)
Ferguson, A. F. (M)
Foster, G. L. (M)
Fulford, J. A. (M)
Graham, B. (SM)
Haight, W. J. (A)
Hay, D. R. (SM)
Hiller, R. R. (A)
Hosker, G. R. (M)
Jackson, N. B. (M)
Jamain, E. R. (M)
Jeffery, J. (A)
Johnston, R. W. (M)
Johnston, S. N. A. (A)
Lopatauskas, J. V. (A)
Luke, R. W. (M)
Moeys, G. L. (A)
Nunn, W. A. (A)
Oliver, W. L. (M)
Parsons, G. W. (M)
Prodger, A. (A)
Prothero, J. W. (M)
Rumbold, D. G. (A)
Ruth, C. G. (M)
Stewart, T. W. W. (M)
Stokes, S. J. (A)
Strik, W. L. (M)
Suchard, D. G. (M)
Thomson, E. A. (A)
Tull, E. H. (SM)
Warder, J. C. (M)
Webber, B. O. (A)
Wilton, R. (SM)
Zelonka, F. A. (M)

Lorne Park (TOR-B)
Grossman, J. S. (M)
Teng, T. (A)

Lowbanks (HAM-B)
Moore, B. W. L. (A)

Maidstone (L-SWO-B)
Hrischenko, G. (A)

Malton (TOR-B)
Frusher, R. J. (M)

Maple (TOR-B)
Pile, J. H. (A)

Milton (HAM-B)
Amis, T. E. (A)

Newmarket (TOR-B)
Filley, W. H., Jr. (M)
Posnikoff, P. W. (M)

Niagara Falls (HAM-B)
Lamont, H. R. (A)
Roberts, W. F. (A)

North Bay (TOR-B)
Davidson, W. J. (M)
Harley, R. L. (A)
Sullivan, T. (M)

North Ottawa (OTT-B)
Henshaw, C. H. (A)

Oakville (HAM-B)
Alsop, J. W. (A)
Aufleger, A. R. (A)
Day, A. G. (M)
Fekyt, D. P. (A)
Goldberger, R. (M)
Maskell, R. F. (A)
Paddon, J. W. (SM)
Taylor, W. H. (A)

Orangeville (TOR-B)
Wray, D. G. (A)

Orillia (TOR-B)
MacQuarrie, R. C. (A)

Oshawa (TOR-B)
Gray, G. E. (A)
Hunt, J. W. (M)
Kerr, R. L. (M)
Marchand, W. C. (M)
Starker, H. H. (A)

Ottawa (OTT-B)
Adey, A. W. (M)
Ahrens, R. H. (M)
Aksim, V. E. (SM)
Andrews, A. G. (M)
Anglin, F. M. (A)
Anthony, F. (A)
Argyle, J. V. (M)
Aylesworth, A. B. (M)
Ayukawa, K. (M)
Baart, J. G. (A)
Baker, H. C. (M)
Ballard, B. G. (F)
Barrett, W. A. C. (M)
Barton, F. S. (F)
Bastock, D. W. (A)
Beauchesne, L. A. (M)
Bechthold, G. H. (A)
Begley, R. G. (M)
Bell, A. C. (M)
Belsher, H. (M)
Belyea, J. L. (SM)
Bennett, J. R. G. (SM)
Bennett, L. F. (M)
Bhattacharyya, B. K. (A)
Bizon, E. (M)
Blevis, B. C. (M)
Blore, W. E. (M)
Boelman, P. M. (A)
Borlase, W. N. (M)
Boulding, J. D. R. (M)
Boyd, G. E. (M)
Bradley, D. J. (M)
Bradley, J. H. (SM)
Brahan, J. W. (M)
Bresee, C. W. (M)
Brooks, G. C. (M)
Broten, N. W. (M)
Brown, R. K. (M)
Brown, W. C. (A)
Brunton, H. W. (M)
Bulger, G. E. (A)
Burtnyk, N. (A)
Byers, V. J. (SM)
Cairns, F. V. (M)
Card, M. L. (SM)
Cardis, R. M. (M)
Carriere, J. M. (M)
Carroll, D. V. (SM)
Castleman, D. H. (M)
Caton, W. A. (M)
Chapman, J. H. (SM)
Chapman, R. (A)
Chown, B. F. (M)
Christensen, P. S. (A)
Chrome, J. T. (M)
Chrzanowski, J. T. (M)
Clark, J. G. (M)
Clemence, C. R. (M)
Coburn, G. S. (M)
Coffey, L. E. (M)
Cole, W. G. (SM)
Coll, D. C. (M)
Collins, W. C. (A)
Cooper, J. E. (M)
Cooper, R. J. G. (A)
Cope, L. G. (A)
Corbett, H. L. (M)
Corbett, L. V. (M)
Couzens, D. T. (M)
Covington, A. E. (SM)
Cox, G. C. (M)
Cox, L. G. (M)
Craven, J. H. (M)
Crutchlow, L. G. (M)
Cumming, W. A. (SM)
Cummins, A. F. (A)
Dashney, D. R. (A)
Davidson, D. W. (A)
Davies, F. T. (SM)
Day, J. W. B. (M)
Des Brisay, A. W. Y. (M)
Dietiker, W. (M)
Doherty, L. H. (SM)
Doucet, D. W. (M)
Duff, G. C. (A)
Dvarionas, A. A. (M)
Elliott, R. E. (A)
Evans, G. (M)



Farkas, J. (M)
Field, G. S. (F)
Field, P. A. (SM)
Flynn, H. (M)
Ford, J. G. (M)
Forster, B. D. (M)
Franklin, C. A. (M)
Fraser, J. S. (A)
Freeman, R. E. (SM)
Friend, R. C. (M)
Funke, E. R. R. (M)
Galbraith, R. A. H. (SM)
Gilbert, M. (M)
Gilmore, J. P. (M)
Glinski, G. (F)
Gooderham, D. (M)
Gouin, W. P. (M)
Grant, D. A. (M)
Green, E. W. (M)
Grundy, D. P. (M)
Grzebien, B. (M)
Hafer, R. A. (M)
Hamilton, J. A. R. (A)
Haney, W. L. (SM)
Hanna, G. F. (M)
Harris, J. E. (A)
Harris, L. H. (M)
Hatton, W. L. (M)
Hazell, J. (A)
Heal, J. A. (M)
Heenan, N. I. (A)
Henderson, D. J. (A)
Henderson, D. P. (M)
Henderson, J. P. (SM)
Henderson, J. T. (F)
Hendry, A. (M)
Hewitt, A. R. (M)
Hewitt, D. S. (A)
Hicks, R. L. (M)
Hildebrandt, A. E. (M)
Holcomb, W. L. (M)
Hood, R. T. (A)
Hoops, J. A. (M)
Horwood, J. L. (M)
Hudson, A. C. (M)
Humphrie, S. (A)
Hunt, A. B. (SM)
Hunt, F. R. (M)
Hurd, R. A. (M)
Hyndman, W. H. (M)
Irvine, G. W. (M)
Itenson, V. A. (M)
Jaques, S. W. (A)
Jelaffke, P. (A)
Jenkins, E. E. (SM)
Jewell, L. (SM)
Jing, V. C. (A)
Johnson, E. F. (M)
Jones, A. W. (M)
Jones, R. H. (M)
Jones, S. G. (M)
Josephy, W. (M)
Joslin, J. D. (M)
Kalra, S. N. (SM)
Kelsey, E. S. (SM)
Kendall, W. S. (M)
Kenney, J. R. (M)
Kenniger, A. (M)
Kerr-Wilson, G. A. (M)
King, V. C. (A)
Kivistik, O. (M)
Klein, E. J. (M)
Kneen, H. V. (A)
Knights, S. F. (SM)
Korczynski, W. F. (M)
Kozlowski, W. J. (A)
Lacey, W. K. (A)
Lake, G. T. (M)
Lavrench, W. (M)
Lee, A. (A)
Lee, H. C. (M)
Le Grand, A. J. (A)
Lemay, R. B. (M)
Lemke, R. L. (A)
Levy, M. M. (SM)
Lindamood, J. M. (A)
Lindsey, G. R. (M)
Lomas, E. G. (SM)
Lougheed, D. G. (M)
Loutit, J. A. (M)
MacKinnon, K. A. (F)
MacLaulich, D. A. (SM)
Magee, A. I. (A)
Mah, H. W. (M)
Mahmud, M. (M)
Makow, D. M. (M)
Manning, R. P. (M)
Mason, L. J. (M)
Matte, G. (M)
Mawdsley, J. S. (M)
McCormick, G. C. (M)
McCuaig, N. E. (M)
McGrail, J. J. (M)
McIntosh, B. A. (M)
McIntosh, J. A. (A)
McKendry, B. A. (M)
McKinley, D. W. R. (F)
McLeish, C. W. (SM)
McManara, A. G. (M)
Medd, W. J. (M)
Meek, J. H. (M)
Mervyn, G. (M)
Mes, J. J. A. F. (M)
Miller, B. G. (M)
Miller, G. A. (SM)
Modley-Jones, H. S. (A)
Moore, D. A. (M)
Moore, L. R. (M)
Myhill, D. A. (M)
Nasmyth, P. W. (M)
Neal, G. (M)
Neale, M. J. L. (M)
Nelson, L. E. (M)
Nickerson, M. L. (M)
Nikkel, R. F. (M)
Nishizaki, T. (M)
Nixon, F. G. (A)
Norton, J. A. (M)
Oliviero, M. A. (M)
Oltheten, J. B. (M)
Ouimet, J. A. (F)
Page, D. F. (M)
Park, F. R. (SM)
Patterson, C. F. (SM)
Pedersen, B. (M)
Pedersen, B. O. (M)
Penner, R. J. (M)
Penstone, S. R. (M)
Perry, E. G. (M)
Petersons, O. (M)
Petrie, L. E. (M)
Phillips, L. W. (A)
Poole, E. C. (SM)
Presentey, S. M. (SM)
Primich, R. I. (M)
Pritchard, J. R. (M)
Puller, J. K. (M)
Quarmby, A. (A)
Raine, H. R. (M)
Rantz, R. D (M)
Rapp, F. J. (M)
Rastogi, R. G. (SM)
Real, R. R. (M)
Redhead, P. A. (SM)
Reiche, H. (SM)
Rempel, C. (M)
Richards, R. S. (M)
Richardson, W. G. (F)
Riordon, J. S. (M)
Riordon, R. C. (M)
Robinson, H. (M)
Robinson, P. A. (A)
Robinson, R. C. (A)
Rogers, T. F. (M)
Rolston, J. G. (M)
Rosebrugh, R. K. (M)
Rowe, W. A. (M)
Rowlatt, J. H. (M)
Rowley, H. (M)
Roy, D. Z. (M)
Ruedy, R. (A)
Sandoz, O. A. (SM)
Sangster, R. (M)
Sawatzky, P. (M)
Schroeder, K. A. (A)
Schwelb, O. (A)
Seaman, E. A. (M)
Searle, W. M. (A)
Sheffield, A. G. (SM)
Shepertycki, T. H. (M)
Sheppard, R. D. B. (SM)
Sheppard, R. (M)
Shurben, W. E. (A)
Simpson, F. W. (M)
Smith, F. E. (A)
Smith, J. N. (A)
Smith, W. B. (SM)
Smyth, H. R. (SM)
Somers, H. (M)
Soucy, C. I. (SM)
Staniforth, A. (SM)
Steel, W. A. (F)
Steele, K. A. (M)
Stevens, E. E. (M)
Stock, E. H. (A)
Stone, D. G. (M)
Stone, S. A. (M)
Sturrock, J. K. (M)
Tahirali, G. W. (M)
Tarnowski, H. J. (A)
Tant, V. E. (SM)
Tatlock, J. F. (A)
Tennuci, J. E. (A)
Thain, R. S. (SM)
Thom, D. C. (M)
Timmers, A. G. W. (M)
Toy, N. D. (A)
Trohon, B. L. (A)
Vogan, E. L. (M)
Von Baeyer, H. J. (F)
Watson, G. D. (SM)
Weaver, W. A. L. (A)
Webb, E. L. R. (SM)
Webb, P. R. W. (A)
Welsh, W. (M)
White, P. W. (M)
White, R. A. S. (M)
White, W. E. (SM)
Whitford, B. G. (M)
Wightman, B. A. (M)
Wilcox, D. A. (A)
Williamson, W. R. (M)
Willows, D. J. (M)
Wilmot, R. D. (M)
Wilson, W. R. (SM)
Witike, P. H. (M)
Wlochowicz, R. (M)
Wolfe, J. L. (M)
Wong, J. Y. (SM)
Wright, R. (SM)
Yurko, M. (M)
Zelding, I. (A)

Painswick (TOR-B)
Warnica, I. H. (A)

Palmerston (KW-B)
Forster, J. S. (A)

Peterborough (BAY-B)
Flemons, R. S. (SM)
Grosso, J. E. (M)
Klingbeil, H. N. (M)
Klodt, R. A. (M)
Long, R. S. (A)
MacKelvie, J. S. (SM)
Young, J. A. I. (M)

Petrolia (TOR-B)
Jackson, F. J. (M)

Pickering (TOR-B)
Brimbecom, R. J. (M)

Port Arthur (TOR-B)
Hunter, W. C. (M)

Port Colborne (HAM-B)
Goertzen, J. (A)
Sinko, J. P. (A)

Port Credit (TOR-B)
Eaton, G. F. (M)
Etches, E. D. (M)
Hummel, W. M. (A)
Mac Lachlan, D. T. (M)
Macumber, M. G. (A)
Sparks, B. B. (A)

Port Dalhousie (TOR-B)
Davey, S. W. (A)

Port Hope (TOR-B)
Taylor, W. (M)

Port Rowan (LON-B)
Martin, J. O. (M)

Preston (KW-B)
Barsony, C. L. (M)
Buchanan, C. E. (A)

Ravenna (KW-B)
Fliegehen, G. D. A. (A)

Renfrew (OTT-B)
Belanger, J. P. (M)
Muller, W. J. (M)

Rexdale (TOR-B)
Freen, P. (M)
George, J. N. S. (A)
Goodacre, B. (M)
Gronstrand, T. L. (A)
Liss, I. M. (M)
Murphy, W. L. (A)
Pelzer, F. W. G. (A)
Ritchie D. K. (SM)

Richmond (OTT-B)
Ling, T. G. (M)

Richmond Hill (TOR-B)
Bull, T. R. (M)
Crean, G. A. (A)
Ford, F. A. (SM)

Riverside (L-SWO-B)
Barnes, E. M. (M)
Buller, B. H. (M)
Le Blanc, R. J. (A)
MacGregor, A. R. (A)
Seidler, H. G. (A)

Rockcliffe (OTT-B)
Fawcett, G. M. (SM)
Sugimoto, M. (M)

Roslin (BAY-B)
Hutson, G. E. (A)

Russell (OTT-B)
Snyder, J. S. (A)

St. Catharines (HAM-B)
Bastings, R. L. (A)
McGee, H. R. (M)

St. Thomas (LON-B)
Hinz, E. J. (A)
MacDonald, R. D. (M)
Onn, W. R. (M)

Sarnia (L-SWO-B)
Thomas, A. (M)

Sault Ste. Marie (TOR-B)
Kraushaar, D. A. (M)
Levasseur, J. R. A. (M)
McRae, D. W. (A)

Scarborough (TOR-B)
Andrews, D. S. (A)
Baby, J. (M)
Bull, R. A. (A)
Davidson, J. W. (M)
Doig, W. J. (M)
Graham, H. E. (M)
Hase, A. M. (M)
Hayes, T. D. (M)
Hull, S. E. (A)
Junas, W. M. (M)
Keen, W. (A)
Kerridge, E. L. (M)
Koster, J. A. (M)
Kufluk, A. (M)
Lazenby, T. W. (A)
McGovern, J. R. (M)
Miller, J. E. C. (M)
Morfitt, D. C. (M)
Noble, D. E. (M)
Paisley, P. P. (M)
Poldne, O. (M)
Preziosi, F. W. (M)
Pugh, W. H. (M)
Rawley, J. W. (M)
Reilly, W. B. (A)
Rippin, D. W. (M)
Ryland, V. N. (M)
Ryll, E. (M)
Sands, J. S. (M)
Swift, R. R. (A)
Thomas, S. D. (A)
Turner, R. J. A. (SM)
Van Steinburg, C. E. (M)
Ward, G. F. (M)
Wood, W. A. (SM)

Smiths Falls (OTT-B)
Warner, C. W. (A)

South Mountain (OTT-B)
Graham, G. L. (A)

Stirling (BAY-B)
Glendinning, B. W. (A)

Stittsville (OTT-B)
Knowles, J. E. (A)
Rowe, G. C. (SM)

Stoney Creek (HAM-B)
Parker, H. J. (A)

Stouffville (TOR-B)
Dulmage, H. B. (SM)

Stratford (KW-B)
King, C. M. (A)

Streetsville (TOR-B)
Meredith, C. C. (M)
Mighton, R. E. (A)
Montemurro, H. R. A. (M)

Sudbury (TOR-B)
Leclaire, R. C. A. (M)
Maki, A. E. (A)
Mazzuchin, G. (A)

Sutton West (TOR-B)
Bridgman, J. M. (M)
Whitney, W. M. (M)

Swansea (TOR-B)
Bow, A. (A)

Thistletown (TOR-B)
Buckles, F. G. (M)
Hynes, K. W. (M)
Kingsworth, A. (SM)
Lockyer, J. E. (A)
Mackett, L. J. (M)
Thomson, J. M. (SM)

Thornhill (TOR-B)
Poulter, R. C. (SM)
Secord, A. H. (M)
Stoddart, T. W. H. (M)
Willcocks, R. C. (A)

Timmins (TOR-B)
Amendola, B. (A)
Mott, E. D. (A)

Toronto (TOR-B)
Anderson, W. H. (M)
Andrau, W. J. (A)
Arnett, J. C. (M)
Arnold, C. P. C. (A)
Bacon, W. H. (M)
Bain, J. D. (SM)
Bain, J. R. (SM)
Baldwin, C. O. (M)
Baldwin, J. H. (SM)
Balmer, P. D. (SM)
Banner, W. G. (M)
Barclay, A. P. H. (SM)
Barker, N. G. F. (M)
Barratt, N. T. (M)
Beaudoin, D. P. (M)
Bennett, L. J. (M)
Berman, S. (A)
Berrevoets, J. (M)
Berry, F. G. (M)
Bhargava, R. P. (M)
Billedeau, V. A. (A)
Black, R. G. (A)
Blois, W. G. (M)
Boll, K. E. (A)
Bond, S. (M)
Brach, E. (M)
Bratsberg, W. P. (M)
Bridgland, C. J. (SM)
Brophy, R. M. (SM)
Brunn, G. F. (M)
Bullock, R. G. (M)
Bura, P. (SM)
Burke, A. C. (M)
Byers, H. G. (SM)
Cary, F. C. (M)
Cass, R. S. (A)
Chambers, J. D. (M)
Chaudhari, A. L. (M)
Cherrington, B. E. (M)
Chisholm, D. J. (A)
Choat, W. F. (M)
Clarke, J. W. (A)
Conway, J. C. (M)
Cook, R. H. (M)
Cox, H. G. (A)
Cox, R. E. (A)
Crossan, G. W. (M)
Dalfyn, H. E. (A)
Dargevics, A. J. (A)
Davis, G. W. L. (M)
Davis, K. J. (A)
Dawson, H. S. (SM)
Deacon, F. W. (A)
Dixon, A. R. (A)
Dmitrevsky, S. (M)
Dmytrasz, W. (A)
Doherty, P. R. (A)
Dunki, F. S. (A)
Dunn, J. R. (M)
Dunn, W. G. (M)
Dutton, I. R. (M)
Dworkin, A. E. (M)
Dyjack, L. C. (A)
Ebersole, J. A. D. (A)
Eisen, D. M. (M)
Erler, K. A. (A)
Evis, F. A. (M)
Farrell, G. L. (M)
Feldman, B. (M)
Fisher, A. M. (A)
Fisken, J. L. (A)
Fitzallen, J. H., Jr. (M)
Forde, D. (M)
French, R. (A)
Gajdemski, F. P. (A)
Gandy, L. D. (M)
Geiger, D. G. (SM)
Ghonaimy, M. A. R. (M)
Giacoletto, J. P. (SM)
Gregson, J. H. (M)
Hallam, P. A. (A)
Hamann, H. F. (A)
Hames, A. L. (M)
Hamilton, H. E. S. (M)
Hansen, B. C. (A)
Haraldsen, K. (M)
Hardcastle, G. W. (A)
Harris, D. L. (M)
Hayles, O. J. (M)
Head, W. G. (A)
Heath, F. J. (SM)
Heenan, P. J. (A)
Henderson, V. L. (SM)
Herring, J. (A)
Hobbs, F. B. (M)
Hooper, J. F. (M)
Hugenholtz, E. H. (SM)
Hunter, J. B. (M)
Issersted, S. G. (M)
Jackson, H. W. (SM)
Jagger, C. E. (M)
Japp, L. G. (M)
Jones, R. (M)
Jordan, E. A. (M)
Jorgenson, G. T. (M)
Karwin, P. R. (M)
Kasner, I. I. (A)
Katchky, M. (M)
Keltz, L. F. (A)
Kemp, R. H. (A)
Kenyon, B. A. (A)
Kerfoot, J. H. (M)
Klican, E. (A)
Knowlton, K. R. (M)
Konn, A. (M)
Korchinski, J. (M)
Kowalik, H. (M)
Kraav, J. (M)
Kravetz, A. J. (M)
Kremko, J. W. (A)
Lane, H. R. (M)
Leary, A. R. J. (M)
Llewellyn-Thomas, E. (M)
Lochanko, A. A. (M)
Long, R. G. (M)
Longstaffe, J. R. (M)
Lott, J. E. (A)
Lowry, C. A. L. (M)
Mac Gregor, H. D. (M)
Mac Kenzie, K. (M)
Mac Leod, R. A. (A)
Maloff, A. (M)
Manning, J. V. R. (A)
Marek, E. (A)
Marshall, D. H. (M)
Martens, G. O. (M)
Martin, F. J. (M)
Martinsons, G. V. (M)
Matthews, J. N. (A)
Maxwell, J. (A)
McAteer, J. (A)
McCord, J. T. (A)
McCurdy, G. E. (M)
McFadden, H. W. (M)
McGregor, B. H. (M)
McIntyre, R. G. (M)
McLaughlin, R. H. (M)
McVity, J. R. G. (A)
Mitchener, H. G. (M)
Moher, R. B. (M)
Morris, F. M. (M)
Muller, S. N. (A)
Murray, R. L. A. (A)
Murton, C. B. (A)
Mylrea, K. C. (A)
Nicolaou, J. C. (A)
Nightingale, A. J. (M)
Nishimura, S. M. (A)
Nylin, M. E. (M)
Oakes, C. R. (M)
O'Beirne, H. (M)
Omura, J. M. (A)
Ormiston, J. W. (A)
Otsuki, J. S. (M)
Ozawa, P. V. (M)
Paisley, S. R. (M)
Parker, T. A. (A)
Paterson, D. J. (M)
Patterson, M. C. (M)
Paul, W. (M)
Pearce, R. G. (A)
Peomik, H. O. (M)
Pickering, J. N. (M)
Pointon, C. G. (A)
Pollock, H. L. (M)
Pounsett, F. H. R. (F)
Price, E. G. (M)
Price, H. (SM)
Price, L. M. (F)
Pringle, D. R. (A)
Pryzdial, E. F. (A)

## CANADA

Putz, H. R. (M)
Qua, E. W. (M)
Quigley, G. T. (SM)
Raymer, R. J. (M)
Rennie, J. C. (SM)
Rennie, J. M. (A)
Rhodes, C. E. (A)
Richaur, F. F. (M)
Richter, E. (M)
Ridout, J. R. (A)
Rogers, H. Z. (M)
Rojenko, P. (A)
Rosenthal, A. L. (SM)
Rowland, H. L. (A)
Roy, D. R. (M)
Salkus, S. (M)
Samuels, K. V. (M)
Sandison, T. A. (SM)
Saville, H. G. (M)
Schofield, W. D. (M)
Schultz, R. M. (M)
Scott, C. R. (A)
Scott, J. V. (M)
Seljak, A. A. (M)
Sharp, V. S. (A)
Shearing, C. G. (M)
Shewchuk, P. D. (A)
Shoemaker, H. F. (SM)
Shutt, S. (M)
Sinclair, G. (F)
Slapsys, A. P. (M)
Slemon, G. R. (M)
Smedmor, G. (A)
Smith, E. D. (A)
Smith, K. C. (M)
Smith, W. R. (M)
Smokorowski, L. F. (M)
Soanes, S. V. (M)
Spendlove, D. S. (M)
Stankovic, J. P. (A)
Stein, H. H. (M)
Stewart, G. L. (SM)
Stocks, J. R. (A)
Story, R. (M)
Straka, M. K. H. (M)
Swan, C. B. (M)
Swan, E. O. (SM)
Sweeny, T. V. (M)
Taraleshkov, B. M. (M)
Tavner, B. H. (A)
Taylor, A. K. (M)
Taylor, M. K. (SM)
Taylor, R. B. (A)
Tennent, B. (SM)
Thompson, R. W. (M)
Tipple, H. L. (M)
Tomcio, N. (M)
Topping, F. V. (SM)
Tuchak, W. G. (A)
Turner, K. A. (M)
Tustin, F. C. (A)
Vallillee, B. D. (A)
Vriesen, K. S. (M)
Ward, R. F. (M)
Warhurst, R. P. (A)
Wedgewood, R. S. (M)
Weedon, G. F. C. (A)
Wells, R. J. (M)
Whyte, J. R. (M)
Wilkinson, C. G. (A)
Willer, M. D. (M)
Williams, A. R. (A)
Williams, R. (M)
Wilson, A. E. (A)
Wilson, R. W. (M)
Wong, R. D. C. (A)
Woolf, G. F. B. (M)
Wywiorski, M. (A)
Yen, J. L. (M)
Zaludek, J. (A)
Zanatta, R. E. (A)

Trenton (BAY-B)
Holmes, W. H. (M)
Pfeiffer, J. T. (M)
Walsh, J. J. (M)

Unionville (TOR-B)
Fischer, E. J. (M)

Vineland (HAM-B)
Gillard, W. H. (M)

Wallaceburg (L-SWO-B)
Lawson, R. (A)

Waterdown (HAM-B)
Chapman, C. N. (SM)
Krawczyk, W. M. (A)
Pynn, R. D. (SM)
Van Marle, J. C. (M)

Waterloo (KW-B)
Dufault, G. J. (M)
East, T. W. R. (SM)
Flumerfelt, L. R. (M)
Kadish, J. E. (SM)
Keeler, J. S. (M)
McCarron, J. J. (M)
McConachie, B. S. (SM)
Morgulis, I. A. (M)
Myers, B. R. (SM)
Reesor, G. E. (M)

Welland (HAM-B)
Blair, F. D. (A)

Wellandport (HAM-B)
Matys, S. J. (M)

West Hill (TOR-B)
Morrison, D. C. (A)

Weston (TOR-B)
Beasley, B. C. (M)
Beckett, A. M. F. (A)
Beechey, D. F. (M)
Dobbin, G. K. (M)
Hobson, R. E. (A)
Naylor, R. W. (SM)
Smith, J. E. (A)
Vejins, M. (A)
Watson, J. P. (M)
Williams, H. S. (A)

Whitby (TOR-B)
Matthews, R. P. (SM)

Willowdale (TOR-B)
Ainlay, A. (SM)
Armitage, G. G. (SM)
Baldwin, J. O. (M)
Bedingham, G. M. (M)
Crouch, M. B. (M)
Davies, B. E. (M)
Eakins, J. R. (A)
Elliot, A. W. D. (M)
Fredericks, M. J. (A)
Giffin, P. A. (A)
Goldman, S. J. (M)
Hackbusch, R. A. (F)
Hanic, J. M. (A)
Hanna, F. M. (SM)
Jordan, J. L. (M)
Kelk, G. F. (M)
Leaver, E. W. (M)
Le Page, R. W. (A)
Martens, A. E. (M)
McLaughlin, G. H. (A)
Mounce, G. R. (M)
Palin, E. L. (SM)
Penrose, R. M. (M)
Piechota, A. (M)
Purdy, T. W. (M)
Richards, G. A. (M)
Rowe, I. H. (M)
Simmons, L. C. (M)
Simpson, J. R. (M)
Ussher, T. H. (M)
Van Dyk, T. (M)
Yachimec, P. (M)

Windsor (L-SWO-B)
Boemer, W. K. (A)
Campbell, L. L. (M)
Clark, R. A. (M)
Clark, S. M. (M)
Elvidge, R. E. (A)
Fletcher, H. R. (A)
Halas, E. (M)
Hitzeroth, E. J. (M)
Jackson, C. M. (M)
Kiss, J. A. (A)
Marzotto, E. J. (A)
Ruse, W. A. (M)
Tuba, W. C. (A)
Turik, M. (A)
Virtue, G. L. (M)
Walker, G. B. (A)
Wood, R. D. (A)

Woodslee (LON-B)
Joyce, J. D. (M)

Woodstock (TOR-B)
Hulse, R. W. (M)

PRINCE EDWARD ISLAND

Summerside (MON-B)
McNeil, J. E. (M)

PROVINCE OF QUEBEC

Aylmer (OTT-B)
Sturrock, R. F. (M)

Aylmer East (OTT-B)
Belrose, J. S. (M)
Signore, S. S. (M)
Terrell, D. S. (M)
Wells, G. (A)

Baie d'Urfe (MON-B)
Booker, C. C. (A)
Rankin, T. G. (SM)
Roloff, W. T. (M)
Whitmore, E. J. (SM)
Wighton, J. J. (M)

Beaconsfield (MON-B)
Allen, R. E. (M)
Bell, J. W. (F)
Dobridge, R. W. (M)
Klipp, C. F. (A)
Mitchell, W. (M)
Theriault, E. E. (M)

Beaconsfield West (MON-9)
Turnbull, J. A. (A)

Beaurepaire (MON-B)
Easton, K. J. (SM)
Lisle, J. R. D. (M)
Penton, R. E. (SM)

Camp Valcartier (QUE-B)
Stovin, W. R. (A)

Candiac (Que-B)
Barcelo, P. O. (A)

Cartierville (MON-B)
Gobeil, C. E. (M)
Lurion, E. (M)

Charlesbourg (QUE-B)
Paul, R. A. (A)

Charny (QUE-B)
Lacroix, D. R. (M)

Chateauguay Basin (MON-B)
Davies, K. P. (M)

Cote St. Luc (MON-B)
Pascal, J. (A)
Pullan, E. (M)
Schon, F. K. K. (M)
Vatcher, B. A. (A)
Walsh, D. (A)

Dierrefonds (QUE-B)
Leeuwen, A. V. (M)

Donnacona (QUE-B)
Julien, G. (M)

Dorval (MON-B)
Bartnikas, R. (M)
Bowie, P. G. (M)
Coughlin, F. J. (A)
Floyd, F. J. (M)
Gelhar, W. O. (M)
Hodgson, A. (M)
Inglis, J. B. (A)
Lawton, B. (M)
Lovas, A. (SM)
Maclennan, N. D. (M)
Ross, A. L. (M)
Scott, R. (SM)

Drummondville (MON-B)
Marceau, J. P. (M)
McWilliam, E. A. (M)
Mechas, M. G. (A)
Millar, R. B. (A)
Payette, R. (M)

Duvernay (MON-B)
Julien, G. J. C. (M)
Kaser, G. H. (M)

Fabreville (MON-B)
Holburn, R. I. (M)

Gaspe (QUE-B)
Trepanier, G. (A)

Granby (MON-B)
Henry, R. A. (M)
Sterling, J. A. (A)
Ursano, A. (M)

Greenfield Park (MON-B)
Rasmussen, F. H. (M)

Halet (OTT-B)
Bellavance, F. (A)

Hampstead (MON-B)
Kingan, J. J. (SM)

Hudson Heights (MON-B)
Summers, L. I. (M)

Hull (OTT-B)
Demers, R. J. H. (M)
Frechette, L. P. (M)

Ile Perrot (MON-B)
Martin, R. E. (A)

Isle Bigras (MON-B)
Clarkson, L. (M)

L'Abord-a-Plouffe (MON-B)
Aston, J. P. (SM)
Kennedy, A. E. (A)
Krijnen, T. M. G. (M)
Neville, A. H. (M)
Smith, G. C. (M)
Weytze, D. W. (M)

Lac Bouchette (QUE-B)
Ohnuma, H. (A)

Lachine (MON-B)
Isaac, V. E. (M)
MacDonald, A. G. (M)
Milne, A. F. (A)
Muirhead, C. R. (SM)
Pavlasek, T. J. F. (SM)
Pinnell, J. E. (SM)
Purse, K. G. (M)
Schofield, E. (A)
Walker, A. S. (M)

Lakeside (MON-B)
Livis, M. J. (A)

Laprairie (MON-B)
Zenner, G. (M)

La Salle (MON-B)
Halliday, R. E. (A)
Wojtowich, B. E. (M)

Lauzon (QUE-B)
Pelletier, R. M. (A)

Laval West (MON-B)
Baumans, H. W. (M)
Van Herwaarden, F. (M)

Longueuil (MON-B)
Paquette, A. (A)
Robillard, P. A. (M)

Louiseville (MON-B)
Beland, B. (M)

Marieville (MON-B)
Bilocq, R. E. (A)

Mascouche (MON-B)
Dixon, G. L. (M)

McMasterville (MON-B)
Stirling, P. H. (M)
Wood, H. H. (M)

Montreal (MON-B)
Adams, C. B. (A)
Adkar, C. K. (M)
Adler, E. L. (M)
Agnew, J. A. (M)
Allinson, M. V. (A)
Amey, G. X. (M)
Archambault, G. (M)
Argue, T. A. (M)
Armstrong, J. (M)
Arsenault, L. (M)
Bachynski, M. P. (SM)
Bailey, G. J. (M)
Baily, F. A. A. (M)
Bantin, W. F. (M)
Barath, F. T. (M)
Barrow, F. A. (M)
Barry, A. (A)
Bar-Urian, M. (M)
Baudot, J. A. (M)
Baylis, G. F. (M)
Beaulieu, W. R. (M)
Beer, W. J. (A)
Belliveau, J. H. (A)
Bellringer, C. C. E. (M)
Beresford, A. C. (M)
Berkovits, G. (M)
Bernier, J. C. (SM)
Berridge, B. M. (M)
Berube, J. P. G. (A)
Berube, R. (M)
Best, D. R. (A)
Bird, L. T. (M)
Blasco, J. (A)
Bonneville, S. (SM)
Bourbonnais, P. J. (M)
Bradley, M. V. (A)
Breton, A. Y. (M)
Brinkmeier, G. J. (M)
Bryden, J. E. (M)
Buck, L. G. (SM)
Buizert, H. (M)
Campbell, C. J. (M)
Campbell, J. A. (SM)
Cardella, O. (M)
Carrick, W. E. (M)
Caruthers, W. E. (M)
Carty, D. G. (A)
Challis, W. L. (A)
Chapman, S. J. (M)
Chipps, G. E. (M)
Chisholm, K. G. (M)
Clarke, H. W. (M)
Clement, L. J. (A)
Conroy, J. M. (SM)
Cook, W. S. (A)
Coppack, K. N. (M)
Curtis, R. H. (M)
Daskis, G. J. (A)
David, E. (M)
Davidson, G. K. (SM)
De Grandpre, J. L. (M)
Delbridge, W. A. (M)
Demers, P. (A)
Derzal, M. (M)
Desjardins, A. A. (A)
Desser, H. (A)
Dewey, D. L. (M)
Douglas, J. C. (M)
Dube, J. J. (M)
Dubreuil, E. J. (M)
East, L. A. W. (SM)
Engert, K. G. (M)
Erlick, P. S. (M)
Ernstsohn, F. A. K. (M)
Fabiszewski, H. (M)
Farnell, G. W. (SM)
Ferenczy, M. (M)
Fisher, C. B. (M)
Fisher, F. S. (M)
Fisher, G. T. (M)
Fisher, S. T. (SM)
Flom, M. (M)
Fodor, N. J. (A)
Foldes, P. (M)
Fong, T. T. (A)
Fortin, C. (A)
Frenette, C. (M)
Frenette, R. H. (M)
Gagnon, P. M. (M)
Gaherty, W. D. (M)
Ganapathy, N. (M)
Garrison, G. J. (M)
Gaulin, R. J. (A)
Gauthier, G. M. (M)
Gavsie, F. J. (M)
Germain, C. (M)
Gilmer, D. R. (M)
Ginsberg, G. (A)
Ginsburg, I. (A)
Gordon, K. I. (M)
Gould, S. (A)
Grant, H. A. (M)
Grant, J. M. (SM)
Gravel, J. J. O. (A)
Groome, G. R. (M)
Groome, G. L. (A)
Guitian, J. E. (A)
Haeberlin, R. O. W. (M)
Hall, J. S. (M)
Hamel, Y. R. (A)
Hamilton, H. A. (M)
Harris, W. P., Jr. (M)
Harrison, B. M. (A)
Hatzidakis, K. (M)
Hauck, H. G. (M)
Haworth, I. F. (A)
Hayes, J. E. (F)
Heaslip, D. E. (A)
Heckman, D. E. (M)
Heckman, G. R. (M)
Henry, C. (A)
Heybroek, C. J. (A)
Hings, H. J. (M)
Ho, P. Y. (M)
Hobbs, N. M. (M)
Hodge, N. H. (M)
Homa, D. M. (M)
Horrigan, E. W. (SM)
Howes, F. S. (F)
Hryhorijiw, W. (M)
Hyman, W. R. (M)
Ingram, D. E. (M)
Inkster, W. J. (M)
Jackson, J. E. (SM)
Jackson, R. W. (M)
Jamieson, F. C. (M)
Janssens, E. L. (SM)
Jensen, T. (A)
Johnston, T. W. (M)
Jutting, W. C. V. B. (M)
Kahn, I. (M)
Katz, L. (M)
Kaufman, H. (M)
Kenedi, R. (M)
Keyes, L. A. (A)
Kinnear, D. R. (M)
Knitel, E. J. M. (SM)
Knott, R. S. (M)
Knox, D. E. (M)
Knox, J. B. (F)
Koblin, S. (A)
Konrad, J. E. (M)
Knuusement, J. (A)
Kubina, S. J. (M)
Kurlents, H. (M)
Kydd, J. G. (A)
La Ferriere, P. J. (M)
Lahaye, C. (M)
Laporte, J. M. (M)
Lavallee, P. (M)
Lavoie, L. (M)
Lee, P. J. L. (M)
Leeson, F. D. (M)
Leitheris, J. P. (M)
Legault, E. G. (M)
Leimwand, J. J. (M)
Lesperance, B. J. (M)
Lind, A. L. (M)
Lindsay, R. A. (M)
Litwin, M. M. (M)
Lukacs, P. (M)
Lunn, H. J. (M)
Mac Donald, F. X. (M)
Mackay, C. J. E. (M)
Mac Kimmie, G. B. (M)
MacLean, T. M. (A)
Macpherson, M. F. (M)
Mahoney, J. A. (M)
Marcotte, J. M. (M)
Margolick, F. H. (SM)
Marquis, L. Y. (A)
Marshall, J. L. (M)
Martin, J. H. (M)
McDonald, D. J. (SM)
McGuire, C. H. (SM)
McGuire, J. (M)
McLean, M. D. (M)
McNeil, B. T. (M)
Meller, I. V. (M)
Mertke, S. H. (M)
Methot, F. R. (A)
Meunier, J. L. (M)
Mierzwinski, J. (A)
Miroshnichenko, A. (A)
Mockler, T. P. (A)
Moen, H. P. (M)
Morford, R. V. (A)
Morrison, A. D. (M)
Morrison, W. B. (M)
Mowbray, D. R. (A)
Murphy, P. E. (M)
Nacar, A. M. (M)
Nachfolger, N. (M)
Nadon, L. (A)
Nagami, T. T. (A)
Naismith, E. G. (M)
Nakamachi, P. Y. E. (M)
Nesvadba, V. V. (A)
Nichols, W. A. (F)
Nienaltowski, W. (M)
Noah, D. J. (A)
Oldfield, P. (M)
Olding, N. R. (SM)
Olman, M. (M)
Oliver, R. A. (A)
O'Neill, G. A. (M)
Omstein, W. (A)
Oxley, A. B. (F)
Pasoff, S. (M)
Patterson, R. McM. (M)
Patton, R. J. (M)
Pauch, J. E. (M)
Paul, K. R. (M)
Pedrosa, J. B. (M)
Pilbe, R. (M)
Polly, J. (A)
Prichodjko, A. (M)
Provost, P. (A)
Provost, Y. (A)
Pscheidl, K. (A)
Pugsley, J. D. (M)
Quinn, S. F. (M)



Reeves, R. (M)
Reid, K. G. (M)
Rolland, S. F. (M)
Rondeau, J. P. (M)
Roth, S. (A)
Ruden, J. (M)
Rumstein, A. (A)
Salvin, S. (A)
Sauchuk, J. M. (M)
Schneider, R. S. (A)
Schwartz, H. H. (SM)
Schwartz, H. H. (M)
Seketj, P. (SM)
Sherman, B. N. (M)
Shkarofsky, I. P. (M)
Short, A. J. (A)
Sibley, G. B. (M)
Silberberg, N. (M)
Smith, F. A. (SM)
Smith, W. J. (M)
Sophianopoulos, A. A. (M)
Steinmetz, N. (M)
Stewart, J. M. (M)
Stowman, J. A. (M)
Strychalski, A. J. (A)
Sumner, H. C. (M)
Tamagi, T. T. (M)
Tateishi, G. (M)
Teany, A. R. (M)
Toczylowski, H. S. (SM)
Tol, J. M. (M)
Trawinski, B. S. (M)
Tucker, R. L. (M)
Turton, E. P. (A)
Venn, B. A. (M)
Vincent, J. J. (M)
Vogel, N. (M)
Wachholz, E. (M)
Wagner, S. (SM)
Wallace, R. J. (SM)
Walsh, B. R. (M)
Warner, G. (M)
Warren, F. G. R. (SM)
Watson, J. C. (M)
Webb, P. P. (M)
Weintraub, G. (M)
White, K. M. (M)
Whitehead, J. R. (SM)
Wilkinson, H. E. (A)
Willmott, R. C. (M)
Wilson, D. S. (A)
Winkel, D. J. (M)
Wong, D. D. P. (M)
Wong, E. Y. C. (M)
Woodman, B. H. (A)
Woonton, G. A. (F)
Woosey, S. (M)
Yates, J. W. (A)
Zakaib, L. J. (M)
Zelinger, G. (M)
Zimmerman, H. (M)
Zommers, O. (M)
Zuran, J. J. (M)

Oka-remont (MON-B)
Blostein, M. L. (M)
Gentner, R. F. (A)
Pinsky, C. (A)
Slaven, L. (M)

Parent (MON-B)
Forbes, J. M. (M)

Pierrefonds (MON-B)
Dunn, E. J. (M)
Kassner, M. H. (M)

Pointe Claire (MON-B)
Anderson, D. A. (SM)
Cameron, B. G. (M)
Collins, J. A. (M)
Curtis, R. W. (M)
Gregory, A. H. (M)
Holm, F. H. (M)
Lee, F. B. (SM)
Mackenzie, D. G. (M)
McIntyre, R. J. (M)
Miller, E. W. (M)
Muller, R. A. (SM)
Papouschek, F. (M)
Price, M. (M)
Rugg, H. H. (SM)
Russell, D. F. (M)
Russell, W. D. (M)
Shearer, C. W. (SM)
Sutherland, J. G. (M)
Thibodeau, D. L. (M)
Wells, A. F. (M)
Whittaker, J. F. (M)
Williams, F. F. (M)
Williamson, R. B. (M)
Wisenden, G. A. (M)

Pont-Viau (MON-B)
Migneault, G. B. (M)

Port Alfred (QUE-B)
Gagnon, L. A. (M)

Prevel (QUE-B)
Wesolowski, M. (A)

Quebec City (QUE-B)
Boulet, L. (SM)
Caron, J. Y. (M)
Chabot, M. A. (M)
Cobb, W. B. (A)
Corbeil, M. J. (M)
Cote, L. J. A. (A)
Cote, P. (A)
Courtenay, T. H. (M)
Cummins, J. A. (M)
Dompierre, A. (M)
Friedmann, E. (A)
Giguere, R. (M)
Gosselin, L. (A)
Guerbilsky, A. (M)
Guevremont, J. U. (M)
Kleebaum, E. G. (A)
Larsen, R. S. (M)
Laurie, K. A. (M)
Lefebvre, R. A. (M)
Legare, G. (A)
L'Heureux, L. J. (M)
Lortie, A. L. (M)
Massicotte, L. D. (M)
McKinnon, D. J. G. (M)
Moir, L. E. (M)
Morewood, H. W. (M)
Oakson, G. (A)
Park, K. R. (A)
Pouliot, J. A. (M)
Rondeau, B. R. (M)
St. Onge, J. L. (M)
Surtees, W. J. (M)
Turner, D. G. (M)
Wildi, T. (M)
Wylie, A. (A)

Rimouski (QUE-B)
Ouellet, A. (M)
Zement, K. H. (M)

Rosemere (MON-B)
Dingwall, R. A. (M)

Rosemont (MON-B)
Robinson, M. R. (A)
Skybyk, D. (A)

Roxboro (MON-B)
Kendall, R. V. (M)
Lees, K. C. (A)
Newton, K. G. D. (M)

Ste. Anne De Bellevue (MON-B)
Birman, G. (M)
Toye, J. M. (M)

St. Bruno (QUE-B)
Boisvert, C. (M)
Davis, J. F. (M)
Despins, L. J. (A)
Kingan, A. J. (M)

Ste. Dorothee (MON-B)
Verwoerdt, W. C. (M)

St. Edouard Defaberville (QUE-B)
Tiberghien, C. M. J., Jr. (M)

St. Eustache Sur Le Lac (MON-B)
Gorman, H. (A)
Hendrick, G. B. (M)

Ste. Foye (QUE-B)
Beaulieu, J. A. (M)
Belak, M. J. (M)
Bernier, J-G. P. (M)
Bobyn, E. J. (M)
Chinnick, R. F. (M)
Dumas, J. E. (M)
Fortin, G. J. E. (M)
Laflamme, A. K. (M)
Letarte, M. (M)
MacAulay, G. D. (M)
Nadeau, A. G. (M)
Park, W. J. (M)
Regniere, J. P. (M)
Thistle, W. G. (M)
Vaillancourt, R. M. (M)

Ste. Genevieve (MON-B)
Bailey, P. H. G. (M)
Haberl, J. F. (M)
Whittaker, J. A. (M)

St. Hubert (MON-B)
Gregory, F. A. (M)

St. Hyacinthe (MON-B)
Leclerc, J-G. (A)

St. Jerome (MON-B)
Rinfret, C. J. (M)

St. Lambert (MON-B)
Barrie, W. H. (M)
Boutin, A. J. J. (M)
Ferris, H. A. (SM)
Hammond, R. E. (SM)
Mathews, H. W. (M)
Roach, C. L. (M)
Rousseau, M. (M)
Solar, L. (M)
Watson, D. J. (M)

St. Laurent (MON-B)
Aasgaard, P. U. (M)
Bousfield, J. A. T. (SM)
Cahn, P. R. G. (M)
Dutkowski, W. (A)
Hands, R. K. (A)
Hanna, D. C. (M)
Lewis, R. (M)
Lumsden, R. B. (SM)
Papas, N. J. (SM)
Rawlins, W. A. (M)
Semple, E. R. (M)
Wilson, S. S. (M)

Ste. Rose De Laval (MON-B)
Andree, A. D. M. (A)
Prins, J. W. (M)
Robinson, H. A. (SM)

St. Sauveur Des Montagnes (MON-B
Jaderholm, H. W. (M)

Ste. Therese De Blainville (MON-B)
Farmer, E. W. (SM)

Schefferville (MON-B)
Crawford, G. H. (A)

Senneterre (MON-B)
Carroll, F. W. (M)

Sept Iles (QUE-B)
Hansen, A. K. (SM)
Kohlstadt, H. M. (M)

Shawinigan (QUE-B)
Fournier, G. (A)

Sherbrooke (MON-B)
Gilbeau, L. E. (M)
Noel, A. J. M. (A)

Sillery (QUE-B)
Boisvert, M. (M)
Du Berger, P. (M)
Gagnon, R. (M)
Galbraith, D. S. (M)
Spindler, G. B. (M)

Sylvestre (MON-B)
Warun, P. (M)

Terrebonne (MON-B)
McKeon, R. M. (M)

Town of Laval Islands (MON-B)
Rhodes, A. J. (M)

Town of Mount Royal (MON-B)
Desaulniers, R. R. (M)
Foster, J. H. (A)
Hall, S. S. (A)
Hoodspith, R. R. B. (SM)
Jackson, K. A. (SM)

Trois Rivieres (QUE-B)
Audet, H. A. (M)
Laperriere, J. J. (M)

Valois (MON-B)
Harris, K. B. (SM)

Verchères (MON-B)
Dandois, G. P. F. (M)
Julien, M. J. R. (A)

Verdun (MON-B)
Belanger, J. P. (A)
Dumas, L. (M)
Galouchko, A. (M)
Parent, G. J. C. (A)

Victoriaville (MON-B)
Langlois, C. M. (M)

Villa St. Martin (MON-B)
Chadwick, S. (M)
Fillon, L. J. (A)
Walker, E. A. (A)

Ville de La Salle (MON-B)
Cagney, T. A. (M)
Pinnell, S. E. A. (M)
Weaver, J. H. (M)

Ville St. Laurent (MON-B)
Brown, D. L. J. (M)
Doucet, M. (A)
Doutre, B. G. (M)
Goulet, P. E. (M)
Hazan, P. L. (M)
Jamshedji, J. S. (M)
Malret, G. F. (A)
Milborne, H. S. (M)
Oakes, H. S. (A)
Robbins, M. A. (M)
Sankey, C. (M)
Sennik, J. J. (M)
Tang, D. (A)

Ville St. Michel (MON-B)
McIlroy, C. J. (M)
Sawitzki, N. (M)

Westmount (MON-B)
Christmas, W. I. (M)
Dorey, J. D. (A)
Heines, J. M. H. (SM)
Holden, R. D. (M)
Norton, R. J. (M)
Raynsford, R. P., Jr. (M)
Smith, P. D. P. (M)

Yamachiche (MON-B)
Bird, C. H. R. (M)

SASKATCHEWAN

Grenfell (REG-B)
McLean, D. W. P. (A)

Gull Lake (REG-B)
Bartole, G. C. (A)

Limerick (REG-B)
Hanson, O. W. (M)

Lloydminster (REG-B)
Sawtell, J. E. (A)

Lockwood (REG-B)
Ritz, E. W. (A)

North Battleford (REG-B)
Sebulsky, E. (A)

Pangman (REG-B)
McGuffin, J. W. (M)

Prince Albert (REG-B)
Hansen, D. R. (A)

Regina (REG-B)
Brock, G. A. (A)
Cozine, L. V. (A)
Dean, H. C. (A)
Ferguson, G. E. (A)
Funk, J. A. (M)
Gibson, E. M. (A)
Gjernes, E. M. (A)
Hawley, K. T. (M)
Hockin, W. J. (M)
Kaldor, H. (M)
Lee, S. F. (M)
McBride, L. E. (M)
McKay, W. (M)
McNeil, J. M. (M)
Moyer, L. S. (M)
Odling, E. C. (A)
Savage, M. C. (A)
Smith, S. K. (M)
Sundeen, P. G. (M)
Un, K. K. (M)

Saskatoon (REG-B)
Cobbold, R. S. C. (M)
De Kat, B. C. (A)
Draper, J. D. (A)
Gordon, D. A. (A)
Green, F. D. (M)
Hiebert, E. A. (A)
Kavadas, A. D. (M)
Michalenko, A. (M)
Moorcroft, D. R. (M)
Ratz, H. C. (M)
Rempel, R. H. (A)
Wacker, A. G. (M)

Weyburn (REG-B)
Baker, K. D. (M)
Ellefson, J. E. (M)

Yorkton (REG-B)
Beck, R. K. W. (A)

YUKON

Whitehorse (NA-B)
Parent, L. E. (M)

CANADIAN ARMED FORCES

Canadian Armed Forces (MON-B)
Cadieux, J. P. (M)
Thom, M. D. (M)

## CANAL ZONE

Balboa
Gorham, J. N. (M)
Overby, H. A. (SM)

Cristobal
Brannan, F. T. (A)

Curundu
Adams, C. W. (A)

Fort Amador
Earl, E. O. (A)

Rodman
Garos, S. J. (A)

## CEYLON

Colombo
Gnanalingam, S. (M)
Weerasinha, M.-A. W. (M)

Panadura
Adikaram, K. B. (A)

## CHILE

El Salvador
Ribbeck, C. S. (A)

Santiago
Cerda, H. E. (A)
Del Rio, J. (A)
Gutierrez, V. G. (A)
Horturia, F. A. (A)
Isely, F. C. (SM)
Llanos, H. G. (A)
Roman-Valenzuela, A. F. (A)
Valtarino, A. D. (M)

Valparaiso
Contreras, P. F. (A)

Vina Del Mar
Aedo, E. M. (A)
Infante, J. M. B. (A)
Martinez, A. E. P. (A)

## COLOMBIA

Bogota (CO)
Amore, I. (M)
Arce, H. H. (M)
Diaz, A. G. (A)
Errante, E. P. (M)
Estevez, C. L. (M)
Fric, M. (A)
Gabriunas, K. B. (A)
Garbrecht, F. S. (M)
Lopez-Aparicio, J. (M)
Neira, T. M. (M)
Ochoa, A. S. (M)
Ospina, A. (M)
Owen, H. (A)
Pick, L. M. (M)
Prada, A. (M)
Reyes, J. H. (A)
Scott, C. B. (M)
Smith, D. L. (A)
Torres-Galvez, C. A. (M)
Villegas, A. A. (SM)
Williams, J. H. (M)

Cartagena (CO)
Alzate, B. (M)
Camacho, L. H. (A)

Medellin (CO)
Nassar, J. E. (M)
Orozco, G. (M)
Vieco, G. (M)

Valle (CO)
Ramirez-Saenz, A. (M)

## COSTA RICA

San Jose
Reyes, C. M. (M)
Vargas, A. V. (A)

## CUBA

Havana
Barranco, A. A. (M)
Borden, F. W. (M)
Collado, R. O. (M)
Condom, I. A. (SM)
De Cubas, J. D. (M)
Estrada-Castro, C. J. (M)
Guiral, R. L. (M)
Leonard, R. B. (A)
Madariaga, J. F. (A)
Magno, H. T. (SM)
Martinez, F. G. (A)
Montes, J. V. (A)
Pazos, E. V. (A)
Pella, A. (M)
Roth, M. C. (M)
Siddall, W. D. (M)
Torres-Ruiz, J. G. (A)

Cienfuegos
Calderin, N. J. (A)

Guantanamo
Audain, R. B. (A)

Santiago De Cuba
Meneau, A. (A)

## CYPRUS

Nicosia
Skerrey, C. E. (M)

## CZECHOSLOVAKIA

Prague
Bena, J. J. (M)
Blecha, J. (A)
Cetkovsky, J. (A)
Djackov, S. (A)
Homa, O. A. (M)
Savel, J. (A)
Sedmidubsky, Z. (M)
Snejdar, V. (M)
Svoboda, F. A. (A)
Ulrych, M. (A)
Vackar, J. F. (M)

## DENMARK

Bagsvaerd
Elnegaard, E. (A)

Charlottenlund
Funch, O. (A)

Copenhagen
Allingham, R. A. (M)
Carstens, L. (M)
Christiansen, J. V. (M)
Faut, B. (M)
Findal, P. (M)

## DENMARK

Gronlund, M. P. S. (A)
Ingerslev, F. H. B. (SM)
Jacobsen, H. V. (M)
Jorgensen, B. (M)
Kjaer, A. N. (M)
Koehler, R. L. (M)
Larsen, B. F. (M)
Larsen, S. E. (M)
Lund, C. O. (M)
Mathiesen, M. (A)
Morch, V. H. (A)
Mortensen, P. (M)
Nag, D. S. (M)
Nielsen, B. A. (A)
Nielsen, J. O. (SM)
Pedersen, S. A. C. (SM)
Pedersen, V. T. (M)
Petersen, B. S. (A)
Rindbo-Petersen, E. (M)
Sauerberg, J. (M)
Skeltved-Jensen, E. (M)
Sorensen, E. V. (A)
Toft, S. C. (M)

Ejde
Thielfoldt, F. (M)

Gentofte
Pedersen, N. T. (A)
Svensson, R. (M)

Glostrup
Jensen, K. B. (M)
Lanogaard, E. (M)

Hareskovby
Knudsen, K. L. (A)

Hellerup
Christensen, O. (A)
Pedersen, A. R. (M)
Pedersen, G. (SM)
Ring, O. (M)
Rybner, J. (F)

Hillerod
Jorgensen, T. S. (M)
Ungstrup, E. E. (A)

Hjallese
Thirup, G. (SM)

Hojbjerg
Norgaard, A. K. (A)
Ranfelt, V. E. B. (M)

Hvidovre
Poulsen, S. W. I. (M)

Kolding
Rasmussen, K. (M)

Naerum
Kjaer, V. (A)

Roskilde
Christiansen, E. M. (A)
Hansen, G. K. F. (M)

Saby
Bagger, P. V. (M)

Skodsborg
Stangerup, P. (M)

Struer
Christensen, K. H. (A)
Jensen, S. E. (M)

Taastrup
Fabrin, K. W. (A)

Vedbaek
Hansen, J. W. (M)

## DOMINICAN REPUBLIC

Ciudad Trujillo
Valde, G. E. (M)

## ECUADOR

Quito
Jacobson, H. P., Jr. (SM)
Lintz, H. E. (M)
Rota, L. (M)
Turrell, P. T. (M)

## EGYPT

Alexandria (EGY)
Ahmed, A.-L. I. (M)
El-Sabbagh, H. H. (SM)
Salem, I. A. (M)

Cairo (EGY)
Abu-Zeid, M. M. (M)
Afifi, M. S. (M)
Amer, S. (A)
Ayas, M. H. (M)
Cassimatis, D. J. (A)
Constantinidis, G. (A)
Elssa, H. A. (M)
El Demerdache, A. R. M. (M)
El-Hadidy, S. A.-W. (M)
El Harty, A. K. (M)
El Kashlan, E. I. (A)
El-Kharadly, M. M. Z. (A)
El Kotoury, A. S. (M)
El-Said, M. A. H. (SM)
Fahmy, A. I. (A)
Fathy, A. E. H. (A)
Hassan, B. (M)
Ibrahim, A. M. (M)
Ismail, M. A. W. (M)
Kamal, A. A. (M)
Mahmoud, A. A. (M)
Mahmound, H. M. (M)
Makar, R. T. (M)
Mikhail, S. L. (SM)
Reda, M. S. (M)
Sourial, R. S. (M)

## EL SALVADOR

San Salvador
Appelt, O. H. (M)
Rahn, R. H. (M)
Richardson, A. S. (M)

## ENGLAND

### BEDFORDSHIRE

Bedford
Kendall, J. T. (SM)

Luton
Butler, J. S. (M)
Youle, E. (M)

### BERKSHIRE

Abingdon
Cooke-Yarborough, E. H. (M)
Roberts, G. (M)
Wells, F. H. (F)
Westwood, D. (M)

Ascot
Sowerbutts, D. (M)

Bracknell
Stainthorpe, R. L. (M)
Wood, J. (M)

Maidenhead
Den Brinker, C. S. (M)

Newbury
Brooke, H. A. (SM)

Old Windsor
MacLeod, W. A. (M)

Reading
Aldridge, E. E. (M)
Cresswell, J. V. (M)
Parry, R. Y. (SM)
Simons, A. H. (SM)

Sunningdale
Taylor, R. H. (M)

Sunning Hill
Kelliher, M. G. (M)

Workingham
Falcon, G. L. (M)

### BUCKINGHAMSHIRE

Aylesbury
Tooley, M. D. (M)

Bletchley
Blackwood, D. (M)
Deards, S. R. (M)

Gerrards Cross
Diver, F. G. (SM)
Morton, H. B. (M)
Pearce, A. F. (SM)

Great Missenden
Reyner, J. H. (SM)

High Wycombe
Ludgate, F. E. (SM)
Simmonds, J. C. (A)

Iver
Rhys-Jones, J. E. (SM)

Newport Pagnell
Boswell, I. I. (A)

Slough
Wilkins, A. F. (F)

Stoke Poges
Ireland, G. R. (M)
McLean, F. C. (SM)

Wolverton
Bentley, J. W. C. (SM)

### CAMBRIDGESHIRE

Cambridge
Beck, A. H. W. (F)
Bonenn, Z. (M)
Cope, J. E. (SM)
Dalgleish, J. W. (SM)
Fuller, D. Q. (M)
Germany, L. W. (M)
Havranek, W. C. R. (M)
Jones, J. D. (SM)
Lubbock, J. K. (M)
Moullin, E. B. (SM)
Nelms, G. L. (M)
Pound, J. P. (M)
Rao, J. (M)
Ratcliffe, J. A. (F)

Fulbourn
Hatton, T. (M)

Stapleford
Elvy, M. T. (SM)

### CHESHIRE

Cheadle
Fielding, E. A. (M)
Roberts, W. G. F. (SM)

Mellor
White, G. J. (M)

Wallasey
Brisbar, P. J. (A)

West Kirby, Wirral
Morris, I. G. (M)

### CORNWALL

Fowey
Sutherland, J. G. A. (SM)

Penzance
Inglis-Smith, P. B. (A)

### CUMBERLAND

Carlisle
Topping, J. (M)

Maryport
Elliott, I. (A)

### DEVONSHIRE

Barnstaple
Rowe, J. M. (M)

Paignton
Macnee, D. H. (SM)

Plymouth
Tynan, J. M. C. (M)

Torquay
Thomas, P. R. (M)

### DORSETSHIRE

Broadstone
Cox, R. J. (M)

Ferndown
Hooper, J. L. (A)

Weymouth
Fry, D. W. (F)

### ESSEX

Abridge
Larman, E. C. (M)

Barking
Bulgin, A. F. (SM)

Chelmsford
Anderson, E. W. (SM)
Cafferata, H. (M)
Charleson, W. A. (A)
Churchman, A. (M)
Cooper, V. J. (M)
Corkhill, R. E. (M)
Deeley, A. R. (M)
Fiocco, G. D. (M)
Forta, S. S. (M)
Helsdon, P. B. (M)
Latham, C. (M)
Markenscoff, A. C. (M)
Parker, J. W. (M)
Smith, F. L. (SM)
Warren, K. A. J. (A)
Young, A. J. (M)

Chigwell
Bulgin, R. A. (M)

Colchester
Howe, F. R. (M)

Dunmow
Harrison, E. (M)

Harlow
Ash, E. A. (M)
Barber, P. F. (M)
Bridges, T. J. (M)
Brown, A. C. (M)
Cade, C. M. (SM)
Harris, K. E. (SM)
Hart, C. J. (M)
Preece, K. E. (M)

Ilford
O'Brien, D. (M)

Romford
Godbold, B. C. (M)
Pitts, W. J. (M)
Stott, H. T. (SM)

Southend-On-Sea
Clark, J. E. (SM)

Theydon Bois
Roberts, R. S. (SM)

Thorpe Bay
Roberts, C. A. (A)
Rodwell, W. E. (A)

### GLOUCESTERSHIRE

Bristol
Ackroyd, J. (M)
Griffin, R. E. (M)
Leeson-Magry, A. J. (A)
McLauchlan, D. J. A. (M)
Summers, L. E. A. (M)

Brockworth
Sniedze, O. A. (A)

Cheltenham
Fisher, E. C. (M)

Kingswood
Evans, R. I. (M)

### HAMPSHIRE

Andover
Connerton, C. D. (SM)

Barton Stacey
Roberts, A. R. V. (M)

Bournemouth
Sieger, J. (SM)

Church Crookham
Kuypers, M. W. (M)

Cosham
Stack-Forsyth, E. F. (SM)

Farnborough
Dale, T. G. M. (M)
Hobday, S. W. (M)

Gosport
Gibbon, C. P. H. (M)

Havant
Rzymowski, E. (A)
Stuart-Monteith, G. (M)

Hythe
Crawford, A. E. (SM)

Portchester
Rouse, F. W. D. (A)

Portsmouth
Bettinson, S. F. (M)
Boden, T. W. (M)
Silvester, D. D. (M)

Southhampton
Carr, E. (A)
Keel, R. (A)

Tadley
Abercrombie, S. D. (SM)

Totton
Nowicki, J. R. (M)

### HERTFORDSHIRE

Aldenham Near Watford
Johnston, D. L. (M)

Barnet
Capelli, M. P. (M)
Wrede, D. F. (M)

Bishops Stortford
Stubbs, R. F. (M)
Wall, P. K. (SM)

Boreham Wood
Laverick, E. (SM)

Brookmans Park
Voyner, Z. F. (M)

Harpenden
Chaffey, R. (M)
Knight, D. J. (M)

Hatfield
Millward, M. A. (M)

Hemel Hempstead
Hornby, F. R. (A)

Hertford
Parker, A. H. (M)

Hitchin
Sowerby, J. McG. (M)

Hoddesdon
Lyons, C. L. (SM)

Letchworth
Cartwright, J. R. (M)
Lewis, F. J. (M)

Radlett
Hedges, T. C. (M)
Howse, H. A. G. (SM)

Rickmansworth
Davidson, I. A. (M)
Montgomery, A. W. (F)

Stevenage
Evans, V. O. (A)
St. Clair, A. M. (M)
Schotten, H. G. (M)

Tring
Silson, R. G. (A)

Waltham Cross
Deal, A. W. (M)

Ware
Hicks, B. W. (M)

Welwyn Garden City
Grenly, M. (A)
Smith, A. A. (M)

### KENT

Bexley
Herdman, T. L. (M)

Bexleyheath
Brown, D. C. (M)
Bugeja, A. A. (M)

Bromley
Higham, E. H. (M)
Kiryluk, W. (M)
Stoner, C. R. (M)

Christchurst
Fischbacher, R. E. (SM)
Francis, C. J. (SM)
Simmons, B. D. (M)

Dover
Smye-Rumsby, B. A. A. (M)

Farnborough
Vedy, L. G. (A)

Fawkham
Scully, C. T. (SM)

Hayes
Binyon, B. (SM)

Orpington
Harrison, K. W. (SM)
Lawrence, E. (SM)
Saraga, W. (SM)

St. Mary Cray
Eckersley, P. P. (F)

Sevenoaks
Hasselt, M. V. (SM)

Sidcup
Ashbridge, N. (F)
Spagnoletti, P. H. (M)

Walmer
Knight, S. G. (M)

### LANCASHIRE

Accrington
Bleasdale, J. (A)

Liverpool
Brown, A. G. (M)
Chalmers, D. (A)
McKenna, M. F. (M)
Watkinson, F. (A)

Manchester
Bowden, B. V. (SM)
Brown, R. H. (M)
Cobb, J. W. (M)
Cutteridge, O. P. D. (SM)
Jackson, W. (F)
Williams, F. C. (F)

Ormskirk
Panagakis, H. (M)

Prescot
Muir, L. M. (A)

Roby
Kirk, J. G. (M)

Ulverton
Oxley, R. F. (SM)

Warrington
McDermott, H. R. (A)

Wythenshaw
Searby, N. H. (SM)

### LEICESTERSHIRE

Loughborough
Bardell, J. D. (A)

Oadby
Ball, L. F. (M)

### LINCOLNSHIRE

Lincoln
Cooper, J. D. (M)



### MIDDLESEX

Ealing
Taylor, R. W. (M)

Enfield
Fleming-Williams, B. C. (SM)
Lee, E. M. (SM)
Oldham, C. A. (A)
Ramji, S. (M)
Rantzen, H. B. (SM)
Sly, R. J. (A)

Feltham
Toombs, J. (M)

Greenford
Mac Lachlan, V. D. (M)

Hampton
Clark, K. (A)

Harrow
Dawe, F. W. (M)

Hayes
Addie, R. W. (M)

Hounslow
Hughes, R. (M)
O'Hanlon, D. M. V. (M)
Sullivan, R. W. J. (SM)

Kenton
Espley, D. C. (F)

London
Abel-Harry, C. B. (M)
Adorian, P. (SM)
Barlow, D. (M)
Barlow, H. M. (F)
Bearup, T. W. (SM)
Bedford, L. H. (F)
Bevan, P. A. T. (SM)
Birch, D. A. (M)
Bishop, H. (F)
Black, C. P. (A)
Boyle, H. (M)
Brown, J. (SM)
Brown, R. C. (M)
Bryant, G. H. (M)
Bunyan, S. A. (A)
Bunzl, T. F. (M)
Bury, G. J. (M)
Campbell, A. F. (M)
Cattanes, E. (SM)
Chrees, S. T. (M)
Cloud, P. R. (M)
Coffee, R. A. (M)
Coote, F. S. (SM)
Cotton, A. F. R. (SM)
Cotty, W. F. (A)
Cowley, R. I. (SM)
Crosfield, J. F. (M)
Dawes, E. J. (SM)
De Klerk, J. (SM)
Dent, F. D. (A)
Dumert, V. (M)
Earp, C. W. (SM)
Ellis, J. B. (M)
Ellis, L. W., Jr. (M)
Faulkner, H. (F)
Finney, R. (M)
Flack, W. I. (SM)
Fleming, P. A. (SM)
Foster, H. G. (SM)
Gagne, R. E. (M)
Gann, G. D. (M)
Godfrey, S. S. (A)
Grant, F. W. (SM)
Greig, J. (SM)
Griffiths, W. H. F. (SM)
Halsey, J. E. (A)
Hassan, A. M. (M)
Heaton-Armstrong, L. J. (SM)
Hirshman, C. L. (SM)
Ho, C. F. (A)
Hogg, F. L. (SM)
Holland-Martin, C. G. (M)
James, I. J. P. (SM)
Jasper, F. H. C. (M)
Jesty, L. C. (F)
Jezierski, E. C. J. (A)
Jones, A. H. (M)
Khan, A. H. (A)
Lamont, K. (M)
Lawson, A. N. (M)
Lawson, C. J. V. (M)
Layzell, L. M. (M)
Lindsay, P. A. (M)
Mahant, M. C. (M)
Marzolini, R. G. A. (M)
Max, J. (M)
Meyer, L. W. (SM)
Minton, M. (SM)
Mirk, D. B. (SM)
Mist, R. F. (A)
Morant, A. J. (M)
Nadarajah, S. S. (A)
Nanda, N. C. (M)
Oberai, A. S. (M)
Parker, J. D. (SM)
Parr, G. (SM)
Payne, C. E. (M)
Pocock, H. S. (SM)
Rastorgoueff, V. (M)
Robertson, A. A. (M)
Rose, A. (M)
Rose, S. P. (A)
Schwarz, H. F. (M)
Scott, J. C. W. (F)
Shefer, J. O. (M)
Shelley, B. J. (M)
Simpson, J. S. (M)
Sivagnanasunderam, T. (A)
Spooner, F. E. (M)
Starr, A. T (SM)
Starr, C. H. (SM)
Straughan, T. A. (M)
Strong, C. E. (F)
Thomas, H. A. (SM)
Trim, R. M. (M)
Troutbeck, W. H. (M)
Ullrich, E. H. (F)
Valder, F. L. (M)
Van Messel, J. (M)
Voelcker, H. B., Jr. (M)
Williams, G. M. E. (M)
Wilson, A. G. (M)
Wynn, R. T. B. (SM)
Zacharov, B. (M)

North Harrow
Davies, M. C. (M)

Northwood
Dempsey, M. W. (A)

Pinner
Thurnell, D. P. (SM)

Potters Bar
Neill, S. F. M. (SM)

Staines
Hollister, R. H. (A)
Warr, H. J. J. (M)

Stanmore
Harvey, J. R. (SM)
Russell, C. R. (M)

Stanwell, Nr. Stainer
Parnell, H. R. (M)

Sunbury-On-Thames
Irvin, J. L. (A)

Twickenham
Gill, A. J. (F)

Wembley
Mace, D. G. W. (SM)
Rubenstein, G. (M)

Wembley Park
Bray, W. J. (A)

### NORFOLK

Gorleston-On-Sea
Rayment, K. I. (A)

Great Yarmouth
Dyson, A. A. (M)

Norwich
Clayton, E. G. (A)
Le Fevre, P. E. (M)

Stradbroke
Mieville, L. C. V. (M)

### NORTHAMPTONSHIRE

Kingsthorpe
Benham, C. M. (M)
Kaye, J. B. (M)

Kislingbury
Gardner, F. (M)

### NORTHUMBERLAND

Newcastle-On-Tyne
Hare, J. (M)
Hodgson, C. C. V. (M)

### NOTTINGHAMSHIRE

Beeston
Morris, D. J. (M)
Pollard, J. R. (M)

Radcliffe-On-Trent
Douglas, A. (M)

Stapleford
Clewes, A. B. (A)

University Park
Symonds, F. W. (M)

### OXFORDSHIRE

Oxford
Alcock, A. J. (M)
Lichtenberg, A. J. (M)

### SHROPSHIRE

Wolverhampton
Taylor, D. H. J. (M)

### SOMERSETSHIRE

Bath
Fairfax, O. M. (SM)

Keynshan
Jackson, W. R. (SM)

Stratton-On-The-Fosse
Smith, C. W. (M)

Weston-Super-Mare
McCall, D. R. (M)

### STAFFORDSHIRE

Cannock Wood
Barrett, J. (M)

Rugeley
Kannan, S. (M)

Stoke-On-Trent
Gautby, H. R. B. (A)

Walsall
Hardcastle, C. (M)
Whitehead, E. A. N. (M)

### SUFFOLK

Brockford
Thomas, W. D. (A)

### SURREY

Banstead
Smith-Rose, R. L. (F)

Chertsey
Walton, J. H. (M)

Chessington
Bovill, A. W. (M)
Briggs, R. H. (M)

Cobham
Gardiner, D. J. (M)

Coulsdon
Clemett, C. J. (M)

Croydon
Ringham, G. B. (SM)

Dorking
Jones, E. E. (M)

East Molesey
Hersch, W. (M)

Epsom
Butler, L. H. (A)

Esher
Reeves, R. (SM)

Farnham
Clarke, G. F. (A)
Dawes, T. J. (A)
Parsons, A. N. (M)

Horley
Godfrey, R. M. (SM)

Guildford
Rouse, J. A. (A)
Williams, R. C. G. (SM)

Kingston-on-Thames
Kinross, R. I. (M)

New Malden
Hills, W. J. (M)

Peaslake
Egan, D. F. (SM)

Redhill
Roberts, D. A. E. (M)

Reigate
Eddison, H. T. D. (A)

Richmond
Head, J. E. (M)

South Croydon
Carpenter, R. E. H. (SM)

Surbiton
Kerr-Waller, R. D. (M)

Sutton
Wood, H. R. A. (M)

Tadworth
Somerville, T. (SM)

Virginia Water
Hutcheson, P. (M)
Webster, A. (M)

Walton-on-Thames
Budge, R. K. (A)

Weybridge
Hansford, I. V. (M)
Pitman, D. A. (M)

Woking
Dale, L. (M)
Gabriel, R. P. (M)

Woldingham
Goodey, R. A. H. (SM)

Worcester Park
Walker, T. H. (M)

### SUSSEX

Burgess Hill
Turner, H. (SM)

Ferring by Sea
Havranek, W. A. (M)

Goring-by-Sea
Smale, J. A. (F)

Hastings
Mortlock, A. (M)

Littlehampton
Moon, C. D. (A)

Worthing
Payne, L. S. (F)

### WARWICKSHIRE

Coventry
Boyer, F. A. (SM)
Crocker, C. H. (A)
Florez, J. P. (M)
Wilson, R. (A)

Kenilworth
Keen, A. W. (SM)

Leamington Spa
Montgomerie, G. A. (A)

Rugby
Hibberd, R. G. (SM)
Hulme, F. H. (M)

Solihull
Maskell, W. A. C. (SM)
Walker, H. (SM)

Sutton Coldfield
Farrell, R. L. (M)

### WILTSHIRE

Devizes
Savage, W. B. (M)

Stratton St. Margaret
Clarke, B. C. (M)

Swindon
Clarke, S. P. (SM)
Potok, M. H. N. (M)
Ringrose, J. W. (M)

### WORCESTERSHIRE

Birmingham
Allen, W. S. (SM)
Jones, H. H. (A)
Morrow, R. E. (SM)
Truscott, D. N. (M)

Evesham
Smith, C. (A)
Sturley, K. R. (SM)

Gt. Malvern
Dunmer, G. W. A. (SM)

Malvern
Carter, R. H. A. (SM)

### YORKSHIRE

Bradford
Greenwood, S. W. (M)
Patchett, G. N. (M)

Harrogate
Brady, E. (A)

Leeds
Brayshaw, G. S. (SM)

Rotherham
Smith, E. G. (M)

Sheffield
Bagshaw, G. W. (SM)
Benson, F. A. (M)
Cullen, A. L. (SM)
Holroyd, W. H. (M)
Jurkus, A. P. (A)

Shipley
Villipsons, J. (M)

Yarm-on-Tees
Bloom, M. S. (M)

## ETHIOPIA

Addis Ababa
Abaderash, T. K. W. (A)
Desta, B. (M)
Gouin, P. L. (M)
Kraemer, E. H. (M)
Macfarlane, J. T. (M)
Mehta, B. B. (M)

## FINLAND

Helsinki
Kanerva, O. (A)
Luoto, U. A. (M)

Hyvinkaa
Ivars, R. E. (M)



## FRANCE

### AISNE

Soissons
Simms, T. C. (A)

### ALPS MARITIMES

Annecy
Friedrichs, G. (M)

Vence
Behm, L. F. (A)

### ARDENNES

Tarze
Oudard, A. (A)

### CORREZE

Brive
Roncier, R. (M)

### GIRONDE

Bordeaux
Duhamel, J. P. (A)

### ISERE

Grenoble
Namian, P. P. (A)

### LOIRET

Orleans
Delvigne, A. F. (A)

### MEURTHE ET MOSELLE

Pont-A-Mousson
Lemettre, R. J. (M)

### NIEVRE

Garchy
Haubert, A. (SM)

### NORD

Jeumont
Ducastiel, G. (M)

### RHONE

Lyon
Biolley, E. J. M. (M)
Dejardin, G. L. (SM)

### SEINE

Antony
Fromageot, A. P. A. (SM)
Musson-Genon, R. P. A. (SM)

Bobigny
Calon, A. E. (A)

Boulogne-Billancourt
Bergman, C. W., Jr. (M)
Brown, E. W., Jr. (M)
Fratkin, B. (M)
Schwartz, A. J. (A)
Souriau, P. J. (M)
Stocker, G. A. (M)
Williams, R. E. (M)

Bourg-La-Reine
Brodin, J. (A)
Gauvenet, A. J. (A)

Chatenay Malabry
Robieux, J. H. (M)
Boudouris, G. (SM)

Clamart
Blassel, P. P. (M)

Clichy
Warin, M. (A)

Colombes
Cosnard, F. F. (A)
Duprez, J. L. (M)

Courbevoie
Masson, C. M. (A)

Fontenay-Aux-Roses
Grivet, P. A. (A)
Surdin, M. M. (SM)
Weill, H. (M)

Gentilly
Beurel, J. (A)

Issy-les-Moulineaux
Goudet, G. (F)
Voge, J. P. (SM)

Levallois
Gandin, P. (A)

Malakoff
Besson, P. (M)

Montrouge
Zwobada, R. L. (SM)

## FRANCE

Nanterre
Frankel, J. (M)

Neuilly
Lebail, P. E. (M)
Lochard, J. C. (M)

Nogent-sur-Marne
Clavier, P. J. (M)

Pantin
Churg, E. (A)

Paris
Aigrain, P. R. (M)
Alsberg, E. (SM)
Angot, A. M. (SM)
Baconnet, J. (M)
Berterottiere, R. L. (M)
Berthaud, M. C. (M)
Bloch, R. M. (A)
Bodez, P. M. (M)
Boutry, G. A. (SM)
Brachet, C. (SM)
Bricaud, J. M. (SM)
Busquet, P. R. (M)
Carrus, P. A. (M)
Chauchat, J. N. (M)
Chiron, B. P. (M)
Christensen, P. E. (A)
Cohen, R. (A)
Cornett, J. R. (M)
Courtillot, E. P. (SM)
David, P. B. (SM)
De Bozas, G. D. (M)
Deloraine, E. M. (F)
Deschamps, R. A. (SM)
Dreyfus, P. L. (A)
Esculier, G. G. (M)
Fabricant, P. (M)
Feissel, H. G. (SM)
Ferrier, P. A. (A)
Floquet, J. (A)
Fuks, A. (A)
Gazale, M. J. (M)
Gerten, N. (M)
Ghertman, J. (A)
Giboin, E. (SM)
Girerd, J. L. M. (M)
Guyot, L. F. (A)
Hamner, A. P. (A)
Hoffman, R. B. (SM)
Horwinski, E. R. (M)
Israel, R. (A)
Jarleton, P. (SM)
Karamberis, G. (M)
Kelton, M. R. (M)
Klein, G. J. P. (M)
Labin, E. (SM)
Labinaz, E. (SM)
Lacarriere, C. (A)
Larquier, R. (SM)
Lehmann, G. J. (SM)
Lermoyez, M. J. (A)
Lestel, J. H. (M)
Levy, L. (M)
Libchaber, J. A. (M)
Luppe, R. (M)
Mandel, P. (SM)
Martin, A. V. J. (SM)
Mercier, J. M. (SM)
Moisson, A. A. (SM)
Monleone, J. (M)
Nozieres, H. (A)
Ortusi, J. A. (SM)
Pallud, P. C. (SM)
Pardo, A. (A)
Pernice, J. R. (SM)
Plaszczynski, R. (A)
Ponte, M. J. H. (F)
Robin, G. (M)
Salmet, G. (A)
Silleni, S. R. (M)
Sirel, M. (M)
Sokoloff, B. A. (A)
Sold, U. (M)
Soerring, F. E. (M)
Stevenson, L. A., Jr. (M)
Sulzer, H. G. (M)
Sundt, P. C. (M)
Touraton, E. R. (SM)
Vassy, E. J. (A)
Williams, J. R. L. (M)

Plessis-Robinson
Weissfloch, A. J. (SM)

Puteaux
Boss, C. A. (M)
Mimoun, G. L. (A)

Suresnes
Gutton, M. H. (A)

SEINE-ET-OISE

Brunoy
Thun, R. J. (M)

Chatou
Gilotaux, P. (M)

Chaville
Saintesprit, G. L. (SM)

Fontainebleau
Morgan, S. G. (M)

Garches
Muller, J. J. (A)

Le Vesinet
Piel, G. J. (M)

Louveciennes
Sauvanet, M. M. (SM)

Mareil-Marly
Berline, S. D. (SM)

Orsay
Doehler, O. (SM)
Guenard, P. R. G. (F)
Victor, C. P. A. (A)
Warnecke, R. R. (F)

Port Marly
Mourier, G. (SM)

Rueil-Malmaison
Barret, J. P. (M)

St. Cloud
Champelx, R. P. (SM)
Deschamps, J. D. (M)
Goublin, R. O. (A)

St. Germain
Baron, J. (M)
Beurtheret, C. A. (SM)
Raymond, F. H. (SM)

Taverny
Comte, G. N. (M)

Versailles
De Collgny, G. (M)
Oswald, J. R. (A)
Prache, P. M. (M)

Villiers-sur-Marne
Halbguerax, M. E. (M)

## GERMANY

### BADEN

Backnang
Koch, E. L. (SM)

Karlsruhe
Rothe, H. (F)

Stuttgart
Pilcoy, R. (M)
Ramsayer, K. H. (A)

Ulm-Donau
Bruck, L. (SM)
Bruckmann, H. P. (SM)
Fraenz, K. O. (SM)
Grasselt, K. (A)
Hess, H. A. (M)
Runge, W. T. (SM)

### BAVARIA

Erlangen
Mayr, J. (A)

Landshut
Schuh, C. F. (A)
Velth, W. (M)

Munich
Baier, T. E. J. (M)
Fischer, K. (A)
Gross, F. F. (A)
Guidi, W. R. (M)
Henrici, J. (SM)
Klamka, N. (M)
Kleen, W. J. (F)
Knoll, M. (SM)
Mostafa, K. (A)
Peters, J. F. (SM)
Piloty, H. T. (SM)
Rohde, L. (F)
Ruger, J. F. (M)
Saal, R. S. (SM)
Schultz, J. J. (M)
Trauboth, H. H. (M)
Tsui, F. F. (M)
Von Trentini, G. (SM)
Wharton, C. B. (SM)

Neu-Ulm
Kotowski, P. (A)

Nurnberg
Ghosh, S. (A)
Hecker, W. (M)
Matare, H. F. (SM)
Pieplow, H. (SM)
Unger, E. (M)

Oberfaffenhofen
Knausenberger, G. E. (M)
Ulbricht, G. (M)

### BREMEN

Bremen
Busch, C. W. (M)

### HAMBURG

Hamburg
Borgnis, F. E. (SM)
Joetten, K. K. F. (M)
Mathieu, G. A. (F)
Severin, H. K. F. (SM)

### HESSE

Bad Homberg
Paehr, H. W. (SM)

Biblis
Symons, W. E. (M)

Darmstadt
Moller, R. (F)
Papoulis, A. (SM)
Walther, A. (SM)
Zinke, O. (SM)

Frankfurt Am Main
De Vos, J. M. (M)

Lampertheim
Loback, L. L. (M)

Ruesselsheim-Main
Pfeifer, E. (A)

Wetzlar
Uebermuth, H. W. (M)

Wiesbaden
Brod, F. W. (A)
Heimann, W. (M)
Schnupp, P. (A)

### HOLSTEIN

Malente
Kuhnke, H. (SM)

### LOWER SAXONY

Gottingen
Meyer, E. W. (SM)

Hanover
Klotz, E. W. K. (SM)
Schonfeld, W. H. (M)

Hildesheim
Funck, H. E. (A)

### RHEINLAND

Ludwigshafen
Weiland, F. A. (A)

Mainz
Hedgecock, N. E. (M)

Porz-Rhein
Riepka, H. C. (SM)

### WEST GERMANY

Berlin
Fock, H. W. (A)
Gundlach, F. W. (SM)
Heyne, H. H. (SM)
Hore, K. (M)
Nestel, W. (SM)
Ruhmann, A. A. (SM)
Zickermann, C. A. (SM)

### WESTPHALIA

Aachen
Swamy, A. (M)

Duesseldorf
Buetow, M. (A)
Wosnik, J. (SM)

Koln-Mulheim
Horn, H. (F)

Krefeld
Effertz, F. H. (M)

### WURTTEMBERG

Beimerstetten
Fruendt, H. H. W. (SM)

Konstanz
Kleinsteuber, W. G. (SM)

## GREECE

Athens
Aristogenis, G. S. (A)
Basbas, L. T. (M)
Cassapoglou, C. B. (M)
Goqos, A. C. (M)
Ilias, D. (M)
Karlambas, N. (A)
Katsaounis, P. C. (A)
Katzelis, N. G. (M)
Myroyannis, A. J. (M)
Pampoucas, T. V. (M)
Papadopoulos, D. A. (SM)
Perpinias, A. E. (M)
Soldatos, G. (M)
Theodoropoulos, W. N. (M)
Tsinteas, G. S. (A)
Vergis, M. (A)

Canea
Icihhakis, M. A. (M)

## GUAM

Agana
Belford, K. R. (A)
Goodwin, C. E. (A)
Houser, C. R. (A)

## GUATEMALA

Guatemala City
Guaragna, L. F. (M)
Pokorny, V. J. (M)
Whitehead, J. (M)

## HAITI

Port-au-Prince
Michel, R. (A)

## HONG KONG

Hong Kong
Braude, A. N. (M)
Chen, Y. C. (A)
Cheung, W. S. H. (M)
Dale, P. R. (M)
Loh, S. C. (M)
Louttit, L. W. (A)
Luk, Y. K. (M)
Monfon, L. (M)
More, H. Y. H. (M)
Ping, C. (M)
Shum, Y. S. (A)
Talbot-Jones, R. V. (M)
Tsang, S. F. (A)
Yuan-Yung, Y. (M)

Kowloon
Cheng, C. C. (A)
Chui, T. Y. (M)
Fung-Fai, L. (A)
Lee, T. Y. (M)
Shih, S. L. (M)
Toye, N. (M)
Wing, L. H. (M)
Wu, R. S. (M)

## HUNGARY

Budapest
Egri, E. (A)
Lajos, P. (A)

## ICELAND

Akureyki
Bjarqmundsson, I. (A)

Keflavik
Jonsson, S. G. (A)

Reykjavik
Halldorsson, S. (M)
Thorkelsson, S. (A)

## INDIA

### ANDHRA PRADESH

East Godavary (IND)
Raju, D. V. S. (M)

Kakinada (IND)
Murty, G. N. (M)
Rao, V. V. L. (SM)
Satyanarayana, M. (M)
Subrahmanyam, G. (M)

Secunderabad (IND)
Eugene, A. F. (SM)
Rao, H. J. (M)

Visakhapatnam (IND)
Kurma, V. R. (M)

Waltair (IND)
Rao, B. R. (SM)
Rao, M. S. (SM)

### BIHAR

Bihar (IND)
Sinha, N. K. (M)

Chakradharpur (IND)
Venkatraman, M. P. (M)

Patna (IND)
Sen, K. K. (M)

Purnea (IND)
Neogy, S. C. (A)

Ranchi (IND)
Roy, K. M. (M)

### BOMBAY

Ahmadabad (IND)
Kotadia, K. M. (SM)
Pandit, J. D. (A)

Amraoti (IND)
Sankar, M. S. (A)

Baroda (IND)
Contractor, S. N. (M)
Sen, S. M. (M)

Bombay (IND)
Agarwal, S. P. (A)
Bengalli, N. K. (M)
Bhatnagar, H. M. (M)
Billimoria, R. P. (M)
Bulsara, M. S. (A)
Conesa, R. (M)
Daruvala, D. J. (M)
Dastidar, P. R. (A)
Dastur, J. B. (A)
Gandhi, C. D. (M)
Ganguly, S. K. (M)
Ghose, A. K. (M)
Huang, G. T. C. (A)
Husein, A. E. (M)
Kamat, V. V. (M)
Kantebet, S. R. (F)
Katre, V. S. (A)
Kuchela, K. S. (M)
Lakhanpal, D. D. (SM)
Langguth, P. O. (SM)
Merchant, V. V. (A)
Mirchandani, I. T. (A)
Motwane, H. V. (A)
Padmanabhan, S. V. (A)
Pai, M. V. (A)
Phatak, R. K. (SM)
Ramachandra, M. (M)
Rangwalla, A. A. (M)
Shroff, T. R. (A)
Sukhadia, P. U. (M)
Vachha, R. P. (A)
Valshampayan, R. K. (M)
Wadia, B. H. (M)

Fort Bombay (IND)
Kohli, F. C. (M)

Jogeshware (IND)
Telang, V. S. (M)

Nasik (IND)
Rajendra, Y. L. (M)

Poona (IND)
Mishra, S. (A)
Phatak, S. Y. (A)
Prabhakar, A. (M)
Raman, S. (A)
Row, D. P. (SM)
Swaminathan, K. (A)
Virkar, D. V. (SM)

Rajkot (IND)
Taneja, S. P. (M)

Sangli (IND)
Kanitkar, G. C. (A)
Raju, T. A. (M)

Thana (IND)
Chaturvedi, G. N. (A)

### DELHI

Delhi (IND)
Bhatt, N. B. (SM)
Ponnappa, B. M. (M)
Ramabhadran, S. (A)
Wadhwa, L. K. (M)

Faridabad (IND)
Balasundaram, N. (SM)

New Delhi (IND)
Bannerjay, P. N. (A)
Deobhakta, P. N. (A)
Gadadhar, N. V. (M)
Gokam, G. D. (SM)
Gupta, P. P. (A)
Joshi, M. V. (SM)
Kumar, V. (M)
Matange, N. D. (SM)
Narayanan, M. A. (M)
Peterson, P. R. (M)
Ramamurthy, T. V. (A)
Rao, K. L. (M)
Subramanian, C. S. (M)
Subrahmanyan, T. R. (M)
Tandan, R. K. (M)

### KERALA

Palghat (IND)
Peter, J. P. (M)

Trivandrum (IND)
Nair, P. R. (A)
Panikkar, R. S. (M)

Udyogamandal (IND)
Ramani, R. V. (A)

### MADHYA PRADESH

Bhilai (IND)
Sardesai, S. N. (M)

Indore (IND)
Jain, P. L. (M)
Kalani, P. S. (M)



Jabalpur (IND)
Chaurasia, H. K. (M)
Ghose, A. (M)
Mishra, N. K. (A)
Mithal, C. K. (M)
Pal, P. C. (M)
Pandya, R. N. (M)
Sanwale, V. S. (SM)

Nagpur (IND)
Joshi, M. G. (M)

Raipur (IND)
Shukla, R. S. (M)

Seoni (IND)
Agrawal, J. P. (M)

### MADRAS

Annamalainagar (IND)
Vijayaraghavan, K. (M)

Coimbatore (IND)
Gangadharan, G. (A)

Madras (IND)
Chauhan, M. V. (M)
Jayaraman, S. N. (A)
Logan, S. (A)
Patel, S. N. (M)
Pattabiraman, J. (SM)
Ramachandran, D. N. (A)
Rao, K. R. (M)
Saifuddin, M. (M)
Sitharaman, M. R. (A)
Sivaswami, R. S. (M)
Thangavelu, K. S. (M)

Madurai (IND)
Mohamed, M. K. (M)

Nungambakam (IND)
Belgamvala, M. K. (A)

### MYSORE

Bangalore (IND)
Alya, S. V. C. (SM)
Baliga, B. V. (SM)
Chatterjee, R. (M)
Chatterjee, S. K. (M)
Chidambaram, R. (M)
Nagaraja, N. S. (M)
Naidu, M. K. R. (M)
Prakash, K. S. S. (A)
Rajagopal, E. S. (A)
Rajamani, V. S. (M)
Ramachandran, C. V. (M)
Ramachandran, P. (M)
Rao, P. L. S. (M)
Ravi, S. (M)
Shenoy, R. P. (M)
Sreenivasan, K. (SM)
Subramaniam, C. R. (M)
Subrahmanyam, V. (M)
Suryan, G. (M)

Belgaum (IND)
Rao, K. V. (A)

Dharwar (IND)
Paramasivayya, G. S. (M)

### NEPAL

Katmandu (IND)
Kanskar, K. R. (A)

Nepal (IND)
Singh, R. P. (M)

### PUNJAB

Ambala (IND)
Bhashyam, S. R. (SM)

Patiala (IND)
Anand, V. B. (SM)

### RAJASTHAN

Ajmer (IND)
Toshniwal, G. R. (SM)

Kotah Jn. (IND)
Vasanthvrajan, M. N. (M)

Pilani (IND)
Agarwala, S. S. S. (M)
Chatterjee, A. K. (SM)
Jain, J. D. (M)
Mukerji, M. M. (SM)
Singh, A. (SM)

### UTTAR PRADESH

Aligarh (IND)
Alhashmi, H. A. (SM)

Allahabad (IND)
Krishnaji. (SM)
Mukerjee, T. (A)
Swarup, P. (M)

Dehra Dun (IND)
Singh, R. V. (M)

Gorakhpur (IND)
Chandra, A. N. (M)

Lonavla (IND)
Nair, B. K. S. (M)

Lucknow (IND)
Chakravarti, S. P. (SM)
Joshi, C. P. (SM)
Madan, M. P. (SM)
Saxena, A. P. (M)

Roorkee (IND)
Bhattacharjee, D. K. (A)
Das, P. N. (SM)

### WEST BENGAL

Belgharia (IND)
Ghosh, S. R. (A)

Calcutta (IND)
Banerjee, A. (M)
Chatterjee, S. D. (SM)
Correa, W. R. (M)
Ghose, B. K. (A)
Kamat, D. S. (M)
Krishnaswami, M. S. (M)
Mukherjee, B. (A)
Piplai, A. (A)
Rao, N. V. (M)
Raha, H. N. (M)
Sen, B. M. (M)
Seshadri, G. (A)
Sharma, I. S. (A)
Sweet, C. M. (M)
Verma, J. K. D. (M)

Howrah (IND)
Bose, B. K. (M)

Kharagpur (IND)
Chatterjee, B. (M)
Emery, W. L. (SM)
Mullick, S. K. (A)
Rajagopalan, P. K. (A)

## INDONESIA

Bandung
Liong, L. K. (M)
Samaoen, M. S. C. E. E. (M)

Djakarta
Ciapo, R. O. (M)

## IRAN

Tehran
Bassin, M. (A)
Clement, P. F. (M)
Evans, W. C. A. (M)
Farman-Farmaian, C. (M)
Nuban, E. (M)

## IRAQ

Baghdad
Al-Rubayi, N. A. (M)
Boghossian, A. B. (M)
Siddiqi, M. I. (A)

## IRELAND

### (NORTHERN)

### ANTRIM

Belfast
Allen, T. P. (SM)
Kelliway, B. J. (M)
McBride, J. M. W. (SM)
Ryan, W. D. (M)

### TYRONE

Strabane
Smyth, W. (A)

### (REPUBLIC OF)

### DUBLIN

Blackrock
Ferguson, J. D. (SM)
O'Donnell, J. G. (M)

Dublin
Poole, H. H. (A)

Dun Laoghaire
Smith, T. F. (M)

Sandymount
Slator, S. L. (A)

Shankill
Williams, K. F. (M)

Terenure
Seale, E. G. (A)

## ISRAEL

Beersheba (ISR)
Mahler, Y. (M)

Canoth Near Gedera (ISR)
Eytan, K. (A)

Dear Na Galil Hamaravi (ISR)
Kasovich, M. (M)

Givat Haylm (ISR)
Bier, D. (M)

Haifa (ISR)
Baneth, M. (A)
Bekker, D. (M)
Cederbaum, I. (SM)
Delson, J. K. (M)
Dobkin, L. (M)
Elazari, H. (A)
Feld, R. (A)
Fuchs, A. (M)
Galil, U. (M)
Gur-El, A. S. (M)
Joselevich, M. (M)
Kluger, I. A. (M)
Mayer, A. D. (A)
Merchav, S. J. (M)
Nathan, A. (SM)
Ollendorff, F. (F)
Ophir, D. (A)
Paz, I. M. (M)
Politch, J. (A)
Ronen, J. (A)
Rosen, D. (A)
Rubin, M. M. (A)
Selder, M. (M)
Sturlesi, B. E. (A)
Weissberg, E. (M)
Werner, M. (M)
Wulkan, A. A. (A)
Zakai, M. (A)
Zaks, Z. W. (A)

Jerusalem (ISR)
Orbach, S. (M)
Reichbach, M. (M)
Schorr-Kon, J. J. (M)
Suss, J. T. (M)
Weinman, J. (SM)

Kiryat Bialik (ISR)
Amariglio, I. (A)
Ni an, A. (M)

Kiryat Haylm (ISR)
Kurtz, Y. (A)

Kiryat Motzkin (ISR)
Bar-David, I. (A)
Bar-Lev, A. (A)
Brandman, Z. I. A. (A)
Burwin, E. (A)
Fischmann, A. F. (M)
Herzberg, E. N. (M)
Lehman, M. (M)
Marlin, A. (M)
Mass, J. (M)
Mor, R. (A)
Schoen, T. E. (M)
Shamir, J. (A)
Shekel, J. (SM)
Tkatsh, M. (M)
Welsiltzer, J. (M)

Rehovoth (ISR)
De Roos, R. (M)
Fischler, H. (M)
Kass, S. (M)
Korman, M. M. (SM)
Porath, N. (M)
Riesel, H. (A)
Rosenfeld, P. (A)
Scheidlinger, Z. (M)
Shrikman, S. (M)
Sivan, J. (M)
Tepper, L. (M)

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Boksenbaum, E. (M)
Bronstein, D. (M)
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Hellinger, H. R. J. (M)
Kamil, T. (A)
Katzir, L. (A)
Kelmer, Y. (M)
Kinche, S. (M)
Lerner, T. (A)
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Maydan, D. (A)
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Scharf, M. (M)
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Waffle, W. M. (M)
Winter, Z. (A)

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Mano, K. (SM)
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Nagai, K. (M)
Nagai, K. (SM)
Nimura, T. (SM)
Nishida, S. (SM)
Nishizawa, J. I. (M)
Oizumi, J. (SM)
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Saito, H. (M)
Shibata, Y. (M)
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Uchida, H. (SM)
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Tokyo (TOK)
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Aoi, S. (A)
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Cohen, C. L. (M)
Endo, K. (A)
Ezoe, H. (SM)
Fujii, T. (SM)
Fujii, T. (A)
Fujimura, Y. (A)
Fukata, M. (M)
Fukushima, K. (A)
Fumeno, I. (A)
Harashima, O. (SM)
Harigae, S. (A)
Hayashi, I. (M)
Hayashi, R. (A)
Hikosaka, S. (A)
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Hirayama, H. (A)
Hosono, T. (M)
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Ida, K. (A)
Ieiri, S. (M)
Ieiri, S. (A)
Iimura, N. (A)
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Ikegami, F. (M)
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Morita, K. (SM)
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Namba, S. (F)
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Okada, T. (A)
Okada, T. (M)
Okamura, S. (M)
Okamura, S. (M)
Okochi, J. A. M. (M)
Omi, H. (SM)
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Onoe, M. (M)
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Oyama, S. (A)
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Shinkawa, H. (SM)
Shiozaki, Y. (A)
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Soto, K. (A)
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Sunaoshi, T. (A)
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Mahmoud, M. A. (A)

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Villa, A. R. (A)
Wenzel, P. H. (A)
Whidden, G. H. (M)
Vanofsky, L. G. (M)
Zorrilla-Carcano, M. (M)

### MEXICO

Cuautitlan
Yovanovich, J. M. (A)

### NUEVO LEON

Monterrey
Buchwald, C. E. (SM)
Noriega, J. M. D. (M)

### VERACRUZ

Poza Rica
Ebergenyi, A. B. (A)

## MOROCCO

Marrakech
Nadaud, C. A. (M)

Rabat
Sabbah, J. (M)
Tangier
Mellard, D. (A)
Pugh, M. D. (M)

## NETHERLANDS

Amstelveen (BNL)
Sirks, J. C. (M)

Amsterdam (BNL)
Abdel-Nour, K. (M)
Broersma, C. B. (SM)
De Bruyne, P. (A)
Lehmann, W. K. (M)
Schering, D. C. (M)
Schotel, G. (SM)
Van Wijngaarden, A. (SM)
Varekamp, J. F. (M)

Blaricum (BNL)
Siezen, G. J. (SM)

Delft (BNL)
Ensing, L. (M)

Eindhoven (BNL)
Alma, G. H. P. (SM)
De Miranda, J. R. (SM)
Greefkes, J. A. (SM)
Heijboer, R. J. (M)
Nijenhuis, W. (A)
Ooiman, A. (SM)
Rinia, H. (F)
Rubio, J. C. (M)
Stumpers, F. L. H. M. (SM)
Tellegen, B. H. (F)
Ten Haaf, F. E. L. (M)
Van Der Burgt, C. M. (SM)
Van Overbeek, A. J. W. M. (SM)
Verschuur, J. J. (M)
Zijlstra, P. (SM)

Hilversum (BNL)
Breimer, S. (M)
Graaff, B. (M)
Van Hall, J. N. (SM)

Laren N.H. (BNL)
Lulofs, W. (SM)

Leiden Z.H. (BNL)
Seeger, C. L. (A)

Meerveldhoven (BNL)
Gradus, H. H. J. M. (M)

Nijmegen (BNL)
De Miranda, H. A. (M)
Egmond, A. J. L. V. (M)
Samwel, J. A. (M)
Van Vessem, J. C. (SM)

Oegstgeest (BNL)
Byvoet, J. A. (M)
Hekster, S. (M)

Ryswyk Z.H. (BNL)
Janssen, T. A. M. (M)

The Hague (BNL)
Barrow, B. B. (SM)
Bartholome, P. J. (M)
Bijl, P. C. J. (SM)
Bloemsma, J. (SM)
Blum, H. (SM)
Browne, S. (SM)
Clark, R. G. (SM)
De Lobao, F. J. C. (M)
De Voogt, A. H. (M)
Evers, J. (A)
Goldmann, A. S. (A)
Gudmandsen, P. E. (M)
Heaton, A. R. (SM)
Heeroma, H. H. (M)
Houtsmuller, J. (SM)
Janssen, J. M. L. (SM)
Krinos, J. D. (M)
Lammerts, C. A. (M)
Luther, M. L. (M)
Metzelaar, W. (SM)
Nanni, B. (M)
Op Den Orth, J. M. (SM)
Scholz, M. P. E. (M)
Schurr, P. M. E. (SM)
Staples, E. B. (SM)
Van Duyne, D. M. (M)
Van Soest, J. L. (SM)
Voet, I. M. (M)
Wildhagen, G. A. (SM)
Wille, H. (SM)
Williams, H. P. (SM)

Utrecht (BNL)
Corsmit, A. F. (A)
Wouters, H. M. (M)

Valkenburg Z.H. (BNL)
Elenbaas, A. R. (M)

Voorburg Z.H. (BNL)
Monup, B. (M)
Van Berkel, P. L. M. (M)
Van Nauta Lemke, H. R. (M)

Wassenaar (BNL)
Van Duuren, H. C. A. (SM)
Van Dyl, B. (SM)



## NETHERLANDS ANTILLES

Curacao
Van Haaren, R. H. C. (SM)

St. Martin
Dovale, H. R. (A)

## NEW ZEALAND

### NORTH ISLAND

Auckland
Betson, C. (A)
Crawford, W. C. (A)
Mayo, L. E. (A)
Spackman, I. H. (A)

Gisborne
Paulson, E. J. (M)

### SOUTH ISLAND

Dunedin
Martin, L. H. (SM)

## NICARAGUA

Managua
Guerrero, M. A. (M)
Robinson, H. E. (M)

## NORWAY

Bergen
Bakken, O. (M)
Dahl, H. (SM)
Hils, P. T. (SM)
Mack, E. (M)
Wessel-Berg, T. (A)

Blindern
Nickelsen, J. C. (M)

Kongsberg
Steensen, S. A. (M)

Lillestrom
Eggestad, M. (M)
Hedemark, R. (A)
Jaeger, T. C. (A)
Lied, F. (A)
Monrad-Krohn, L. (A)

Ljan
Eliassen, K. E. (A)

Oslo
Bostad, J. (M)
Gaudernack, L. F. (SM)
Haraldsen, H. P. (M)
Hisdal, B. J. (M)
Hvinden-Haug, L. H. (M)
Kulvik, E. (SM)
Overby, H. (SM)
Rorholt, B. A. (M)
Scheel, C. F. (M)
Snedkerud, O. T. (A)
Steinsto, O. (M)

Skedsmokorset
Holm, C. (A)

Trondheim
Engvik, S. B. (M)
Tangvik, S. (M)

## OKINAWA

### RYUKYU

Naha
Onaga, K. (M)
Sakumoto, I. (M)

## PAKISTAN

### EAST PAKISTAN

Dacca
Ahmed, W. (SM)

### WEST PAKISTAN

Karachi
Ayoob, A. S. (SM)
Chagla, H. R. (M)
Farooq, M. O. (M)
Gysbers, J. R. (A)
Hasan, S. (M)
Rafi, M. A. (M)
Sattar, S. A. (SM)
Ullah, I. (M)
Yousafi, K. N. (M)

Peshawar
Khan, A. A. (M)
Mirza, A. L. (A)

Rawalpindi
Haq, S. (M)
Kariml, A. A. (M)

## PERU

Ilo
Berrevoets, G. J. (A)

Lima
Demetrick, J., Jr. (A)
Gonzalez, A. M. (M)
La Pierre, V. M. (SM)
La Puented, C. (A)
Schlicher, K. G. (M)
Teodori, D. C. (A)
Woodman, R. F. (M)

Talara
Sekimotto-Pinillos, R. A. (M)

## PHILIPPINES

Baguio
Aquinaldo, P. A., Jr. (M)
Glover, F. N. (M)

Davao
Obra, R. S. (A)

Manila
Aquinaldo, J. A. (A)
Bentley, A. D., Jr. (M)
Bercovitz, N., Jr. (M)
Bethel, C. D., Jr. (SM)
Carreon, D. G. (M)
De Luzuriaga, E. R. (M)
Gamboa, A. C., Jr. (A)
Hidalgo, M. T. (M)
Lim, M. (M)
Picornell, J. J. (M)
Reynolds, R. A. (A)

Quezon
Albarracin, M. B., Jr. (M)
Yogore, M. G. (M)

San Juan
Ozaeta, E. H. (A)

## POLAND

Warsaw
Auerbach, J. E. (A)
Barwicz, W. (A)
Czechowski, A. (A)
Groszkowski, J. (M)
Hennel, J. (SM)
Klemozycki, L. (A)
Litwin, R. (M)
Ryzko, S. (A)
Smolinski, A. K. (SM)
Wojnar, A. (A)

## PORTUGAL

Lisbon
Chubbuck, E. L. (M)
Da Cunha, A. M. C. (M)
De Bivar, A. M. B. (SM)
De Figueiredo, R. J. P. (M)
Esten, P. W. (SM)
Fernandes, A. A. D. (M)

Porto
Vrooman, D. H. (A)

## PORTUGUESE EAST AFRICA

### MOZAMBIQUE

Lourenco Marques
Davis, D. A. (M)

## PUERTO RICO

Bayamon
Boyd, L. K. (SM)
Moreno, M. (A)

Cayey
Polachowski, B. A. (A)

Cidra
Nieves, R. A. (A)

Guayama
Blondet-Bloise, L. (A)

Hato Rey
Hester, F. A. (SM)
Serra, M. A. (A)

Mayaguez
De Quevedo, J. L. G. (SM)
Dueno, B. (M)
Fiol, L. E. (M)
Fischbach-Nazario, H. (M)
Mercado, T. (M)

Playa de Ponce
Castillo, E. A. (A)

Rio Piedras
Arce-Blanco, R. (M)
Mercado, C. R. (A)
Villafane, F. (A)
Wood, J. F. (M)

Roosevelt
Wiggins, A. M. (SM)

San Juan
Acosta, R. J. (M)
Castanera, J. R. (M)
Firoi, A. (M)
Jones, T. L. (M)
Lanigan, D. F. (M)
Negroni, J. A. (M)
Perry, R. P. (A)
Salas, R. E. (M)

Santurce
Arzuaga, J. (M)
Binder, J. T. (SM)
Castaner, A., Jr. (A)
Esteban, R. (M)
Mayo, G. A. (A)
Petersen, R. L. (M)

Villa Nevarez
Cifuentes-Marrero, V. (M)

## REPUBLIC OF CHINA

### TAIWAN

Pan-Geo
Wang, C. (M)

Taichung
Bourret, P. L. (M)

Taipei
Chou, T. (M)
Kao, C. (M)
Ong, H. (M)
Phillips, R. H. (M)
Yang, C. (M)

## REPUBLIC OF PANAMA

Panama
Chu, M. (A)
Larson, A. G. (M)
Rivera-Cardona, B. A. (M)

## RHODESIA & NYASALAND

### NYASALAND

Lilongwe
Davies, K. J. (M)

### SOUTHERN RHODESIA

Salisbury
Miles, V. G. (M)
Patterson-Jones, E. A. (SM)
Reeves, J. M. (M)
Smuts, M. N. (A)
Stevenson, K. (M)

## RUMANIA

Bucharest
Tanasescu, T. A. (SM)
Toma, V. I. (M)

## SAUDIA ARABIA

Dhahran
Barnes, L. (M)
Mueller, E. H. (SM)
Rieg, R. V. (M)

## SCOTLAND

### AYRSHIRE

Carclule
Rodger, J. B. (A)

Irvine
Hawkes, R. C. (A)

### EAST LOTHIAN

North Berwick
Oliphant, A. J. (M)
Oliphant, W. D. (SM)

### FIFE

Rosyth
Welling, A. J. (A)

St. Andrews
Campbell, C. K. (M)

### LANARKSHIRE

Glasgow
Chamberlain, E. (A)
Eaton, J. C. (M)
Howe, G. W. O. (F)
Maclean, D. J. H. (M)
Weaver, C. (M)

### MIDLOTHIAN

Edinburgh
Bruce, D. C. (M)
Conner, C. I. (M)
Pringle, R. W. (SM)
Small J. E. (M)

### RENFREWSHIRE

Greenock
Tait, J. S. R. (A)

## SINGAPORE

Dyson, G. N. (M)
Geasley, M. (M)
Ho, L. H. (M)
Hock, T. C. (M)
Khor, T. H. M. (M)
Saunter, H. D. (M)
Tan, Y. S. (M)
Thomson, J. G. (M)
Whitley, R. H. (M)

## SPAIN

Barcelona
Lopez, F. C. G. (A)
Pascucci, A. (SM)
Zobel, E. V. (M)

Cartagena
Sauras, P. P. (M)

Madrid
Collno, A. (SM)
Escolano, M. (M)
Espinosa, M. (SM)
Gavilan, E. E. (A)
Herrero, M. C. (SM)
Lara, A. (M)
Millan, A. (M)
Sowell, P. W. (M)

Palafrugell
Owen, K. (M)

## SUDAN

Khartoum
Ghobrial, I. (M)

## SWEDEN

Alvsbyn
Joste, S. V. (M)

Arboga
Olsson-Seffer, R. (A)

Bjornstorp
Gyllenkrok, T. (A)

Bofors
Gertzell, S. G. (A)

Danderyd
Schleimann-Jensen, A. (F)

Enskede
Axelling, G. S. (M)
Edsman, K. S. (M)

Farsta
Magnusson, B. (M)

Goteborg
Aurell, C. P. (M)
Ekelof, S. (SM)
Hellstroem, P. G. (A)
Heyman, B. C. (M)
Lundwall, B. H. (A)
Olving, S. (M)
Orhaug, T. A. (M)
Oxs, A. (M)
Rolf, A. (M)
Stomberg, A. V. (M)
Tengblad, R. G. (M)
Wannerskog, C. (M)

Haegersten
Person, L. B. (M)
Scheffelowitz, H. (A)

Lidingo
Bjork, N. A. N. (M)
Dalen, G. S. (M)
Fredrikson, K. V. M. (M)
Friden, S. G. (A)
Grandqvist, C. E. (F)
Gustafsson, L. (M)
Hakansson, P. E. (A)
Martensson, I. (M)
Norrelgen, G. A. (A)
Persson, I. (M)
Scholdstrom, R. K. O. (A)
Solders, P. G. (A)
Stalberg, N. G. (M)
Stannow, J. C. (A)
Westerhult, B. C. O. (A)

Linkoping
Hellgren, G. P. (M)
Jiewertz, B. (M)
Knutsson, B. K. J. (M)
Peres, O. F. (M)

Ludvika
Faxo, E. L. (A)

Malmo
Ljungman, N. H. (M)
Romell, G. D. R. (M)

Molndal
Hoglund, J. B. (M)
Viogh, M. E. (A)
Yngvesson, Y. K. (M)

Norrkoping
Braune, E. H. J. (M)

Orebro
Hartman, D. A. B. (M)

Roslags-Nasby
Markesjo, G. A. (A)
Nyberg, S. L. (A)

Saltsjobaden
Lundgren, E. H. (A)

Stockholm
Ahlgren, S. I. (A)
Algotsson, L. (A)
Andersson, K. N. (A)
Anjou, L. A. (M)
Aslund, N. R. D. (A)
Backmark, N. (M)
Behr, K. E. (A)
Blomberg, K. H. (F)
Brundin, B. H. E. (A)
Ehnborg, A. V. (A)
Ejewall, L. A. (A)
Elfving, A. L. (M)
Enander, B. N. (M)
Fagerlind, S. G. (A)
Ferner, E. J. U. (M)
Granlev, S. G. (SM)
Haard, B. (M)
Hansson, H. W. (M)
Houbaer, A. J. (A)
Jacobson, B. (A)
Josephson, B. A. S. (M)
Karlstedt, L. (A)
Katzeff, K. (M)
Kinberg, C. (A)
Kruse, O. S. N. (M)
Laurent, T. (SM)
Lindstrom, G. (M)
Lofgren, E. O. (SM)
Nelson, R. H. (M)
Nerhag, O. (A)
Nilsson, B. N. A. (A)
Norrby, H. J. (A)
Ohrvik, S. O. (A)
Olszanski, H. H. P. (M)
Overby, S. L. (SM)
Palmblad, B. (A)
Persson, N. I. C. (A)
Persson, T. P. (A)
Ramskold, O. S. H. (A)
Richter, H. F. (A)
Ridderstrand, L. G. I. (A)
Sem-Sandberg, S. (M)
Sivers, C. H. V. (SM)
Sparrendahl, G. E. W. (A)
Stemme, E. (A)
Styren, K. (M)
Sundquist, A. (M)
Tomner, S. J. A. (M)
Tornquist, J. (M)
Von Utfall, J. C. J. (M)
Vos, M. (SM)
Wahlstrom, G. (A)
Warring, S. E. (M)
Weidstam, E. (SM)
Werthen, H. L. O. (M)
Wiklund, T. E. (A)

Stocksund
Feichtinger, A. F. (M)

Trollbacken
Bjerre, P. (M)

Tyreso
Arosenius, L. T. H. (A)

Uppsala
Tove, P. (M)

Vallingby
Mollfors, H. G. (M)

Viggbyholm
Bergstrom, R. G. (A)

SWITZERLAND

SWITZERLAND

Adliswil
Baumgartner, R. H. (A)
Nordby, K. S. (A)

Ambri
Cello, T. (M)

Baden
Epprecht, G. W. (M)

Basel
Fenyves, F. L. (SM)
Hagger, H. J. (M)
Huber, P. K. (A)
Menzi, H. U. (M)
Thalmann, V. (A)
Winter, R. A. (M)

Bern
Bachmann, A. E. (SM)
Dipelmann, H. (M)
Gerber, W. (M)
Lang, G. J. (M)
Racine, J. R. (A)
Rathe, E. J. (M)

Carouge
Jorgensen, F. V. (A)
Petermann, L. A. (SM)

Chateau d'Oex
Roch, A. A. (M)

Ennetbaden
Mueller, A. V. A. (M)

Frauenfeld
Baumer, H. S. (M)

Fribourgh
Harris, A. (M)
Simpson, B. H. (M)

Geneva
Bruland, R. V. (M)
Cheretakis, A. P. (A)
Doolittle, W. P. (M)
Embrechts, A. C. (SM)
Gayer, J. H. (SM)
Goldberg, R. (A)
Gracie, J. A. (SM)
Gross, G. C. (F)
Hayes, L. W. (F)
Langeneeger, P. B. (A)
Lapostolle, P. M. (SM)
Mussard, M. E. (A)
Smith, R. (A)
Sundaram, P. S. M. (SM)
Suxdaram, V. (SM)
Svoboda, I. J. J. (M)
Van Der Lans, J.H. M. (M)

Hegnau
Gloor, B. (M)

Kilchberg
Kaufmann, P. (M)
Schlaeppi, H. P. (M)

Kloten
Holtz, R. F. (SM)

Kusnacht
Weber, G. C. (A)

Lutry
Demieville, H. (M)

Mannedorf
Brumm, I. G. (M)

Munchenbuchsee
Anselmi, S. C. (M)

Neuchatel
Bonanomi, J. A. (M)
Christeler, A. (M)
Kartaschoff, P. (M)

Nussbaumen
Schonsleben, M. W. (A)
Weiss, H. (A)

Oberrieden
Speiser, A. P. (SM)

Rueschlikon
Proebsier, W. E. (A)

St. Prex
Villars, C. P. (M)

Urdorf
Braun, A. F. (M)

Uster
Gibas, H. A. S. (SM)

Villars sur Ollon
Lebel, J. D. (M)

Wabern
Kilchenmann, K. (M)
Schoeberlein, W. (M)

Wettingen
Neck, H. (M)

Wettswil
Molinari, H. A. (M)

Winterthur
Druey, W. (SM)

Wueren Lingen
Staub, F. (A)

Zollikerberg
Keller, J. (A)
Schiess, G. (M)
Stutz, T. O. J. (M)
Sulzer, R. F. (M)

Zollikon
Karolus, A. (SM)
Ruth, L. C. (M)
Stronschneider, W. (SM)

Zug
Kistler, R. J. (M)

Zurich
Angehrn, T. W. (M)
Baumann, E. (SM)
De Quervain, A. P. (M)
Furrer, F. E. (M)
Gaumann, T. (M)
Guanella, G. (SM)
Gurewitsch, A. M. (SM)
Hohermuth, H. U. (M)
Klein, A. L. (M)
Koller, R. (M)
Kriner, J. I. (A)
Margna, C. R. (M)
Meisling, T. H. (SM)
Nalos, E. J. (SM)
Oertli, E. H. (A)
Russell, G. M. (M)
Schneider, M. V. (M)
Shah, R. R. (M)
Strutt, M. (F)
Stuber, R. (M)
Sun, S. R. K. (SM)
Tank, F. (F)
Walder, E. (M)
Weinberger, I. (A)
Wohler, G. O. (M)

TAHITI

Papeete
Baker, G. R. (M)

TANGANYIKA

Dar Es Salaam
Greig, C. (M)

TASMANIA

Hobart
Roberts, R. E. (M)

THAILAND

Bangkok
Bintasan, L. (M)
Chitinanda, P. (M)
Makino, Y. (M)
Tantraporn, V. (M)
Utaisen, S. (M)

TURKEY

Ankara
Argon, B. R. S. (M)
Esmer, M. (M)

Istanbul
Apaydin, P. (A)
Ataman, A. (M)
Ozker, T. (SM)
Ulmer, E. K. F. (M)
Uzgoren, F. (A)

Izmir
Septekin, T. (A)

UNION OF SOUTH AFRICA

CAPE OF GOOD HOPE

Cape Town
Dunbar, J. (A)
Gilmour, R. R. (SM)
Lennox, C. H. (M)

Kimberley
Morris, H. R. (M)

NATAL

Durban
Chapson, E. (A)
Phillips, W. E. (SM)
Poole, D. O. (M)
Thomson, H. J. (M)

Stanger
Karodia, A. M. (A)

TRANSVAAL

Johannesburg
Bichara, M. R. E. (A)
Brickhill, G. A. (A)
Jamieson, R. T. (M)
Kucera, F. L. (M)
Lichtenstein, A. H. (A)
Silbermann, H. (SM)
Sive, F. (A)
Suttner, R. (M)
Van Gogh, W. D. (M)

Pretoria
Malan, D. G. (M)
Zawels, J. (SM)

Wolmaransstad
Lipschitz, S. (M)

URUGUAY

Montevideo
Figueira Moran, W. (M)
Guimaraes, A. (A)
Larranaga, G. A. (M)
Sapelli, W. J. (A)

U.S.S.R.

Leningrad
Shmakov, P. V. (A)

Moscow
Akulin, M. S. (SM)
Boroditch, V. S. (SM)
Bourdoun, G. D. (SM)
Denisenko, I. N. (A)
Efimov, E. A. (A)
El Meshad, Y. A. (A)
Ermakov, V. I. (SM)
Fedorovitch, E. (SM)
Furdujev, V. V. (SM)
Govladinov, V. A. (SM)
Kazanski, G. P. (SM)
Kostanjanz, B. A. (A)
Lichushin, I. P. (SM)
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WAKE ISLAND

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Colwyn Bay
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WEST INDIES FEDERATION

GRENADA

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JAMAICA

Cross Roads
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Kingston
Dixon, A. E. (A)
Samuels, R. P. (M)
Shing, A. I. L. (A)
White, R. A. (A)

TRINIDAD

Curepe
Woonsam, J. L. (M)

Port of Spain
Borde, E. H. (A)
Fung, J. H. (A)

San Fernando
Bell, R. J. (M)

YUGOSLAVIA

Ljubljana
Bremsak, F. (M)

Zagreb
Albert, V. R. (M)

# HELPFUL HINTS
## for using the IRE DIRECTORY

A few minutes' study of the basic layout of the IRE DIRECTORY will help you to find the information for which you are looking more quickly and more accurately. At first glance, the IRE DIRECTORY may seem to be confusing, but by using the various portions of the book as listed below, you will find your way around easily, and will discover that it is actually a very simple arrangement, and a much more logical one than a purely alphabetical terminology listing.

***PINK SECTION*** at the front of the products and firms section contains a terminology index listing every product, major and minor, for which a list of manufacturers is given. Page numbers refer you to the page on which the listings for that product begin. Following this alphabetical index is a copy of the questionnaire which is sent to the firms who have furnished us with product information. A quick look through this questionnaire will help greatly in understanding the product arrangement. At the top of the first page of the pink section is a small index referring you to the opening page of the complete-data spread section, the alphabetical directory, and each of the three product directories.

***THE COMPLETE DATA SPREAD SECTION*** (pages 1-134) contains product advertisements of great usefulness to the reader. Most of these advertisements are two pages or more, and all of them contain complete information on the products manufactured by the advertising firms—specifications, prices, illustrations, and suggested applications.

***ALPHABETICAL DIRECTORY OF MANUFACTURERS*** (pages 135-240) contains a list of 3,843 firms representing the majority of buying and selling power in the radio-electronic industry. Each firm listing contains the complete mailing address and telephone number for the firm. Following the state name in the firm address, a list of code numbers is given. These numbers refer to the 104 major products listed in the book (for quick reference to the meaning of the codes, use the questionnaire form in the pink section). Following the telephone number is the year in which the firm was founded, the total number of employees, the number of IRE members employed, and the net radio-electronic sales during the last fiscal year.

***THE THREE DIRECTORIES OF PRODUCTS ARE:***

1. Complete Equipment
2. Components
3. Materials and Services

This breakdown into three directories saves you from traveling through many products in which you are not interested at the moment, and helps you to turn immediately to the listings for the type of product you want, following a straight line to your destination. Use the Machol edge index at the top of the first page of the pink section to locate immediately the first page of the appropriate directory, then use the Machol edge index at the beginning of each directory to find the specific product you want. You don't even have to know the page number—the index will find it for you automatically!

***104 MAJOR PRODUCTS*** are listed within these three Directories. Each product listing contains a number of sub-headings so that you may know specifically what each firm makes. To interpret the code numbers shown after each firm's listing, consult the first page of that product class, where the sub-headings are defined. You will note that advertisements are positioned throughout the book in the most appropriate listing section, so that the advertisement for a relay manufacturer will appear in the relay section, to help you with further information on his product. Every advertiser's listing shows you the page number on which his advertisement may be found, and you will derive more value from this book if you consult these advertisements for facts you cannot find in the listings.

***COMPLETE ADDRESS LISTINGS*** are given only for advertisers in this section. If you wish to locate the address and telephone number for any other firm, it will be necessary to use the alphabetical directory.

***THE DISTRIBUTION SECTION*** is class 105, the last class in the book. This section contains a list of 2014 manufacturers representatives, distributors and jobbers, grouped geographically. See page 707 for a more complete explanation of the use of this section.

***ADVERTISER'S INDEX*** appears on pages 129-134 and on pages 766-768.

## How to Use the Machol Edge Index

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High speed reference is a major objective of the IRE DIRECTORY. To this end we have adopted the Machol Edge Index system, and these indexes:

Advertisers Index, pages 129-134 and 766-768.

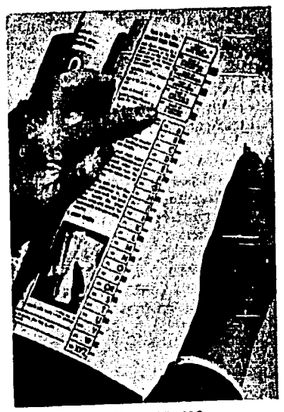
Key to Products, Pink Section.

Index to Spreads, 1.

Detailed Machol edge indexes will be found on the first page of the alphabetical Directory and each of the three major product Directories, pages 135, 241, 359, and 597. The Machol system will help you find both alphabetical and product sections swiftly.

### HOW TO USE

1. Bend the Directory almost double with the front cover page on the inside.
2. Hold in your right hand with your four fingers near to the bound edge and your right thumb near the middle of the open side of this page.
3. From the heavy or light line symbol adjacent to the subject you seek, run your eyes across the page edges until you reach the horizontally corresponding symbol.
4. OPEN THERE!



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**1961** Edition prepared by The Advertising Department of the Institute of Radio Engineers, 72 W. 45th St., New York 36, N.Y.
William C. Copp, Mgr.; Lillian Petranek, Asst.; Carl Maier, Production; Hugh Keays, Research.

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# 1961 IRE DIRECTORY

## Complete Data Spreads

The full spirit of the IRE DIRECTORY is to give the reader-engineer "facts" in complete detail, and specific enough to be of useful service. Our advertisers have recognized this, and many have made their copy presentation full of useful specifications and illustrations.

Actually, a Directory Publisher cannot hope to describe products adequately in standardized listings. Only the Advertiser, using display space, and with his own intimate knowledge of his service or product, can do the job right.

The advertisers listed below have done their utmost to provide the reader with engineering data in full detail, through spreads and catalogs filed in this book for easy access and permanent reference. This can prove to be the most useful part of the 1961 IRE DIRECTORY to you.

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# NEW DOUBLE USE
# MIL-R-94B Style RV6 ½" Dia.
# ¾ Watt VARIABLE RESISTOR

CTS®

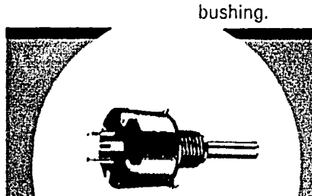
## UNIQUE CARBON-CERAMIC ELEMENT
## Helps 1 Control Do 2 Jobs:

**1** Surpass MIL-R-94B Style RV6 stability under military environmental conditions including moisture resistance and thermal cycling.

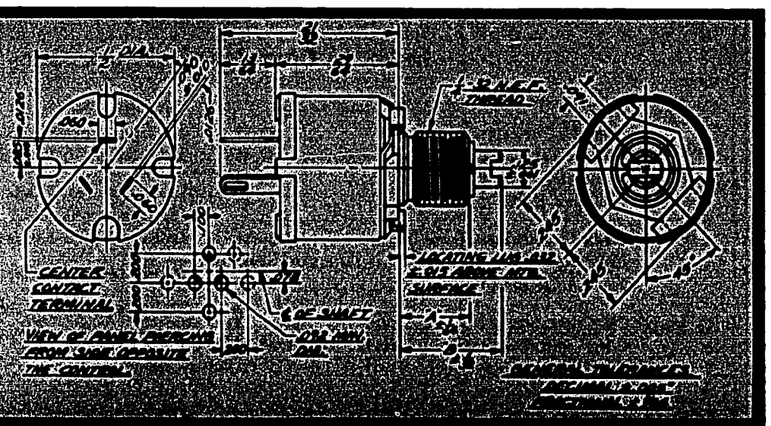
**2** Provide full ¾ watt power rating @ 70°C with derating to zero at 150°C on most values (25% to 50% better than MIL-R-94B Style RV6) for higher load and temperature applications. Result of efficient ceramic-to-metal heat sink.

**Other Features:**

- High insulation resistance.
- Internal hi temp O ring seal between shaft and bushing.
- For better continuity and reliability, resistance element has double contactor paddles with adequate spring range.



SERIES 300.
Actual Size



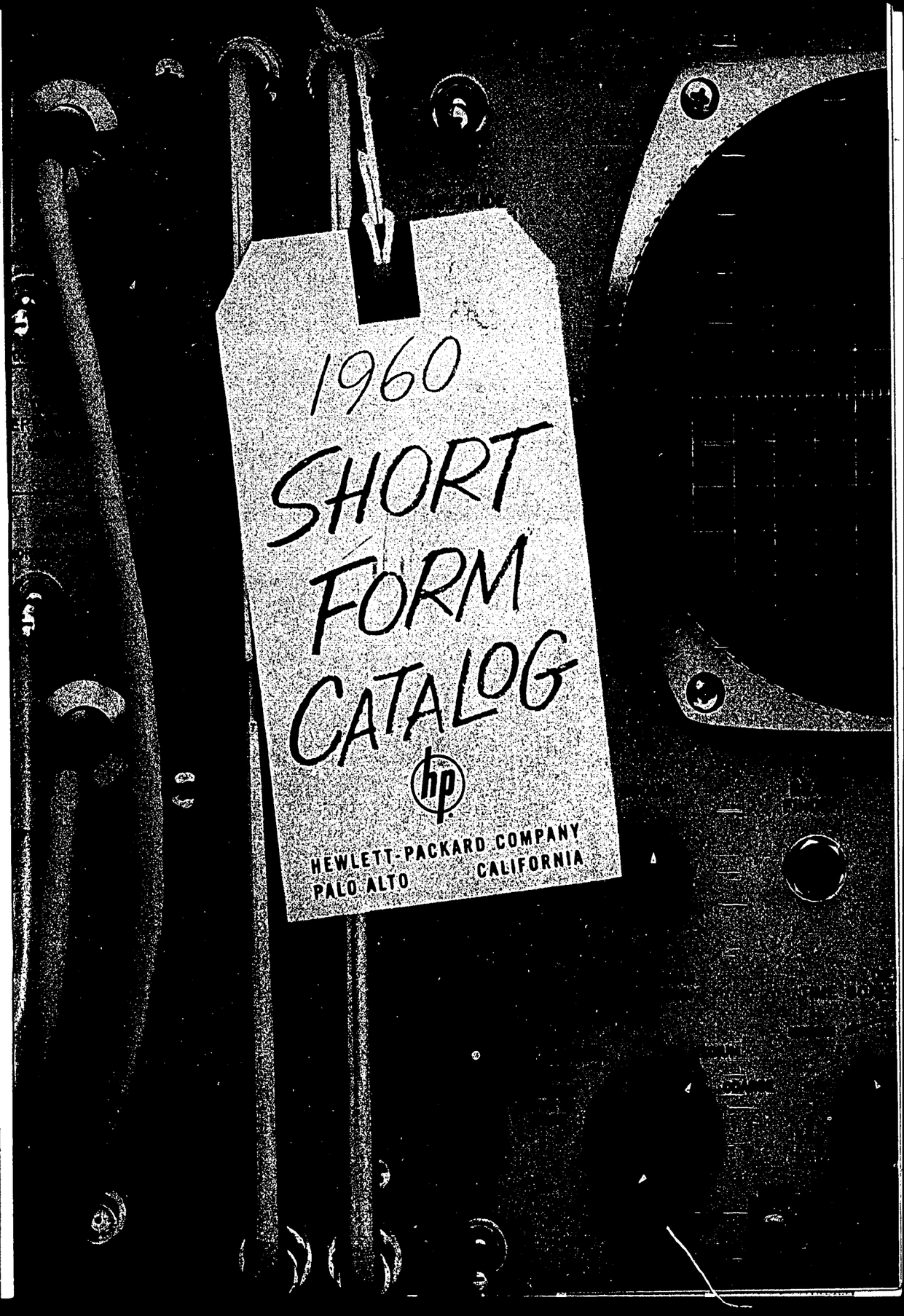
**Specifications**

| | |
|---|---|
| Resistance Range: | 1000 ohms thru 1 megohm (linear taper). Tolerances ·20% or ·10%. |
| Wattage & Temp. Rating: | ¾ watt at 70 C derated to no load at 150 C (1K to 250K and 120 C on values over 250K) with 350 VDC max. safe operating voltage across end terminals. (Compares to ½ watt and 120 C in MIL-R-94B). |
| Stability: | Exceeds MIL-R-94B, Characteristic Y. |
| Rotation Angle: | 295 · 3 . |
| Shaft Dia.: | .125 · .001 . |
| Shaft Length: | Variable in ⅛ increments. |
| Shaft Trim: | Available with MIL-R-94B, style RV6 standard .031 · .005 wide x .031 · .010 .000 screwdriver slot. Flats also available. |
| Standard Mounting Bushings: | MIL-R-94B style RV6 standard ¼ 32 N.E.F. 2A by ¼ long non-locking bushing and ¼ 32 N.E.F. 2A by ½ long locking bushing. |
| Other Mounting Bushings: | ¼ 32 N.E.F. 2A by ⅜ long locking and non-locking bushing. |
| Special Construction: | Waterseal bearing. |

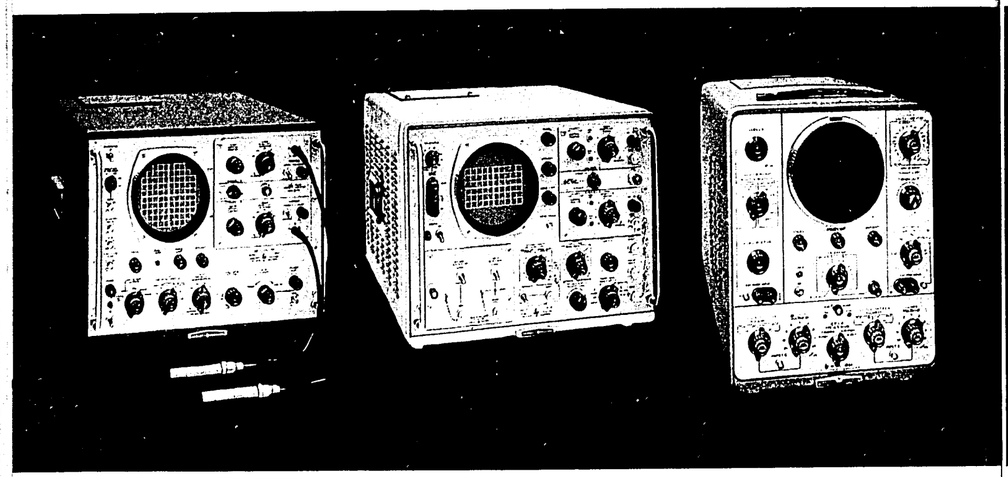
*Immediate delivery* **on standard types from distributors' stocks.**

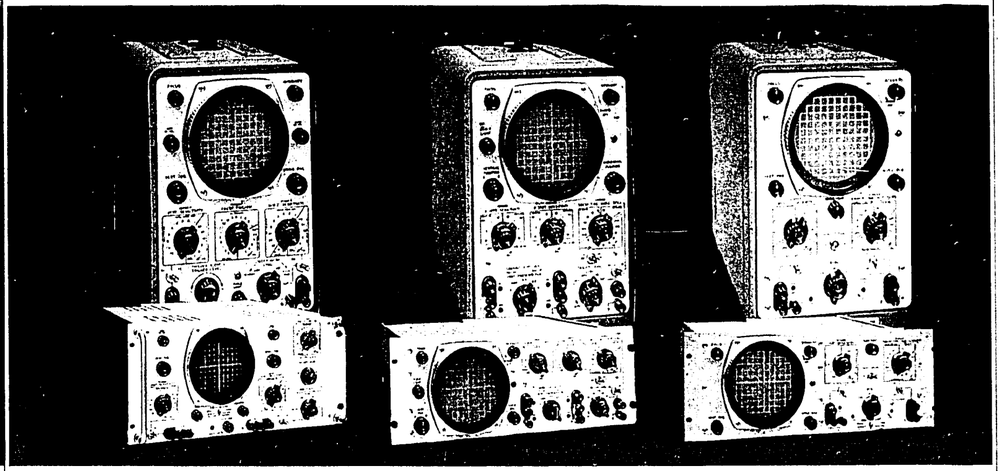
CTS manufactures a complete line of composition and wirewound variable resistors for military, industrial and commercial applications. CTS Specialists will gladly help solve your variable resistor problems. Contact your nearest CTS office today.

CTS Corporation

# hp offers complete coverage in quality oscilloscopes – DC to 500 MC!





## hp 185A DC to 500 MC

This revolutionary new sampling oscilloscope gives you fatigue-free viewing of *repetitive short pulses requiring a bandwidth up to 500 MC.* A rise time of less than 0.7 m$\mu$sec permits direct measurement and observation of fast phenomena. Bright, traces are provided even at repetition rates of 50 cps.

### Dual Trace Amplifier

Model 187A Dual Trace Amplifier (plug-in), permits observation and comparison of two high speed phenomena simultaneously, or highly accurate time measurements. Both channels have independent sensitivity and positioning controls; may be used separately. Vertical sensitivity is 10 mv/cm to 200 mv/cm; vernier increases sensitivity to 3 mv/cm. Dynamic range is wide; 3 MC to 2 v peak. New-design 100,000 ohm probes minimize circuit loading.

### 0.1 m$\mu$sec/cm to 100 m$\mu$sec/cm

Horizontal sweep speeds range from 0.1 m$\mu$sec/cm (with expander) to 100 m$\mu$sec/cm. Delayed sync pulse (on front panel) is available for triggering circuits under test. X–Y recorder output permits permanent records of high-speed phenomena. Other features: time and amplitude calibrators, beam finder, traditional panel arrangement.

### Typical Measurements

Model 185A is particularly useful in measuring transistor response time, memory-unit and diode switching time, determining pulse jitter and analyzing and comparing millimicrosecond signal components.

## hp 160B - DC to 15 MC

New hp 160B, guided by exacting MIL specifications, is presented as the most dependable, widely useful oscilloscope available.

A new design approach using two sets of plug-ins insures maximum versatility, yet does not require you to buy circuitry you do not need.

### X-Y Recorder Output

New horizontal (time axis) plug-ins include hp 166C Display Scanner making the 160B the world's first general purpose scope with an X–Y recorder output. This output covers the full scope bandwidth and makes possible high resolution, permanent X–Y records of repetitive waveforms. Another plug-in, hp 166D Sweep Delay Generator, offers a unique mixed sweep feature permitting detailed analysis of one pulse in a wave-train, while retaining display (on a slower time scale) of the entire wave preceding the pulse of interest.

### Dual Trace Amplifier

New vertical plug-ins will permit scope operation under widely varying input conditions. Typical is hp 162A Dual Trace Amplifier, 20 mv/cm unit permitting simultaneous viewing of two phenomena or differential amplification of signals from dc to 14 MC.

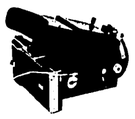
Model 160B uses premium components and latest design techniques throughout. 24 calibrated sweep times, 0.1 $\mu$sec/cm to 5 sec/cm, $\pm$ 3% accuracy. 7 step magnifier increases fastest sweep to 0.02 $\mu$sec/cm. Internal, line voltage or external trigger; horizontal sensitivity 0.1 v/cm to 10 v/cm; vernier to 25 v/cm.

## hp 150A/AR - DC to 10 MC

Models 150A/AR are intended as the most broadly useful, convenient high quality 10 MC scopes offered. A variety of plug-ins (see below) provide dual trace or differential input, or high amplification eliminating preamplifiers on input from most transducers.

### Automatic Trigger

Sweep Range 0.02 $\mu$sec/cm to 15 sec/cm; 24 sweeps 0.1 $\mu$sec/cm to 5 sec/cm, 3% accuracy. Internal, line voltage or external triggering, pos. or neg. slopes. Has sweep magnifier, vernier; horizontal amplifier; sensitivity 200 mv/cm to 15 v/cm. Vertical amplifier dc to 10 MC, optimum transient response and rise time less than 0.035 $\mu$sec. Calibrating voltages, 1 KC square wave, 0.2 mv to 100 v peak, accuracy 3%. $1,100.00 (cabinet), $1,200.00 (rack mount).



**hp 196A Oscilloscope Camera.** Most convenient recording camera available. Object-to-image size ratio 1 to 0.9 views full 10 cm graticule width. One-hand mounting and multiple picture setting. Easy access to *f*-stop and shutter while camera mounted. Permits viewing image with both eyes while photographing. Employs Polaroid® Land Camera back, Wollensak 3" *f*/1:9 lens. 7 shutter speeds 1/100 to 1 sec. Weight only 9 lbs. $425.00.

*Data subject to change without notice. Prices f. o. b. factory.*



For details, circle #4 on Reader Service Card



## hp 130B/BR - DC to 300 KC

Termed the finest low frequency oscilloscope ever offered, hp 130B/BR combine big scope performance and positive dependability with 1 mv sensitivity and the convenience of "universal" automatic trigger, no preamplification from most transducers and direct reading simple controls.

### Similar X and Y amplifiers

Models 130B/BR have similar horizontal and vertical amplifiers with sensitivity 1 mv/cm to 125 v/cm. Input circuits are balanced on the 6 most sensitive ranges; single ended input dc or ac coupled. 21 sweep times may be directly set, instrument sweeps 1 $\mu$sec/cm to 12.5 sec/cm, triggering is internally, by line power, or externally by 0.5 v or greater. Includes x 5 magnifier for all internal sweeps increasing fastest sweep time to 0.2 $\mu$sec/cm. hp 130B (cabinet) or 130BR (rack) $650.

## hp 122A/AR - Dual Trace

Model 122A/AR is a dual trace, 200 KC oscilloscope providing two separate traces for simultaneous study; single trace available when desired. Twin vertical amplifiers, alternate and chopped presentation, differential input, automatic syncing and x 5 sweep expansion. Ideal for direct comparison of filter, amplifier, output/input or with vibration testing apparatus.

### Sweeps 5 $\mu$sec/cm to 200 msec cm

15 calibrated sweeps; vernier extends slow sweep to 0.5 sec/cm, expander extends fast sweep to 1 $\mu$sec/cm. Automatic trigger; manual override sets trigger between + 10 and 10 v. Vertical amplifiers dc to 200 KC (dc coupled) or 2 cps to 200 KC (ac coupled). Sensitivity 10 mv/cm to 100 v/cm. Horizontal amplifier same bandwidth as vertical, sensitivity 0.1 v/cm to 100 v/cm. hp 122A (cabinet) or 122AR (rack mount), $625.00.

## hp 120A/AR - DC to 200 KC

Ideal for industrial or production line work as well as daily lab jobs, Model 120A/AR is outstanding in both value and "big scope" performance features. This instrument covers DC to 200 KC, has the hp universal trigger circuit. Also offers automatic synchronization on any internal or external voltage including line power.

### Sweeps 1 $\mu$sec cm to 0.5 sec cm

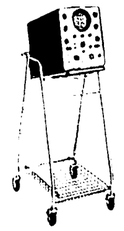
Features include 15 calibrated sweeps in 1-2-5 sequence, sweep speeds range 5 $\mu$sec/cm to 0.5 sec/cm, "times-5" sweep expansion on all ranges, high sensitivity calibrated vertical amplifiers. All power supplies are regulated for steady, drift-free traces. Automatic trigger and base line. Bright, clear trace for photographing transients. Extra compact Model 120AR is only 7" high. Utmost dependability, rugged construction. hp 120A (cabinet) or 120AR (rack), $435.00.

## New amplifiers, accessories for your hp 150A/AR 10 MC oscilloscope



**hp 154A Voltage/Current Dual Channel Amplifier** (above, left) permits simultaneous measurement, observation of voltage and current. Channel switching by alternate sweeps or 100 KC chopper. $430.00. **hp 153A Very High Gain Amplifier** (above, right) permits many measurements direct from transducer without preamplification. Sensitivity 1 mv/cm to 125 v/cm, dc to 500 KC. $125.00. **hp 152B Dual Trace Differential Amplifier** switches electronically between A, B channels at 100 KC or alternating. Sensitivity 0.05 v/cm to 50 v/cm. $250.00. **hp 151B High Gain Amplifier** provides 5 mv/cm sensitivity, dc to 10 MC. $200.00.





**hp AC-115B Oscilloscope Testmobile.** For hp oscilloscopes, 4" rubber tired wheels, heavy chrome tube construction, tilts 'scope to 30° in 7½° increments, folds for storage, shipping. $85.00.



For details, circle #5 on Reader Service Card

# hp Oscillators – 0.008 to 10,000,000 cps

Hewlett-Packard now offers 13 high quality, fast and accurate oscillators, each an exceptional value and each engineered to do a specific job best. Each incorporates the famous RC resistance capacity circuit pioneered by hp. This circuit makes possible instruments that are highly stable, wide range, compact and portable; instruments that are extremely simple to operate and require no tedious re-setting or adjustment during operation.

| Instrument | Primary Uses | Frequency Range | Output | Price |
|---|---|---|---|---|
| -hp- 200AB | Audio tests | 20 cps to 40 KC | 1 watt/24.5 v | $150.00 |
| -hp- 200CD | Subsonic through ultrasonic audio and ultrasonic tests | 5 cps to 600 KC | 160 mw or 10 v/600 ohms; 20 v open circuit | 170.00 |
| -hp- 200J | Interpolation, frequency measurements | 6 cps to 6 KC | 160 mw/10 v | 300.00 |
| -hp- 200SR | Driving -hp- 739AR Frequency Response Test Set | 5 cps to 600 KC | 3 v rms into 50 ohms | 185.00 |
| -hp- 200T | Telemetry, carrier current tests | 250 cps to 100 KC | 160 mw or 10 v/600 ohms; 20 v open circuit | 450.00 |
| -hp- 201C | High quality audio tests | 20 cps to 20 KC | 3 w or 42:5 v/600 ohms | 225.00 |
| -hp- 202A | Low frequency measurements | 0.008 to 1200 cps | 28 mw or 30 v p-p/4000 ohms | 525.00△ |
| -hp- 202C | Servo equipment tests, measurements | 1 cps to 100 KC | 160 mw or 10 v/600 ohms | 300.00 |
| -hp- 205AG | High power audio tests, gain measurements | 20 cps to 20 KC | 5 watts | 500.00△ |
| -hp- 206A | High quality, high accuracy audio tests | 20 cps to 20 KC | + 15 dbm | 750.00△ |
| -hp- 207A | Audio sweep generation | 20 cps to 20 KC | 160 mw or 10 v/600 ohms | 325.00 |
| -hp- 233A | Carrier oscillator—current tests | 50 cps to 500 KC | 3 w/600 ohms | 500.00 |
| -hp- 650A | Wide range video tests | 10 cps to 10 MC | 15 mw/3 v | 490.00△ |

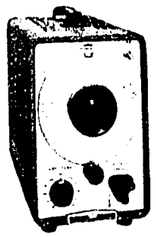
△ Rack mounted instruments $15.00 less.

### hp 200 Series Audio Oscillators

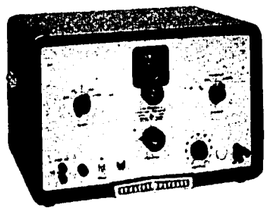


For audio and ultrasonic measurements hp offers popular Models 200AB and 200CD. Both have highest stability and accurate tuning circuits. Low impedance operating levels plus superior insulation guarantee long years of trouble-free dependability. Operation is simple; just three controls; no zero setting necessary. hp 200AB, 20 cps to 40 KC, $150.00. hp 200CD, 5 cps to 600 KC, $170.00.

### hp 207A Sweep Oscillator



This new audio oscillator provides continuous single-sweep frequency coverage from 20 cps to 20 KC. No band switching is needed; dial accuracy is 4%, and the instrument also provides a flexible 10 v/600 ohm output usable balanced or with one side grounded. Frequency response is 3% full range, distortion and hum are less than 1%. hp 207A *may be swept by hand or a motor driven model is available.* (Specify H02 207A.) hp 207A, $325.00. H02 207A, $625.00.



### hp 202A Function Generator

Compact, multi-purpose source of transient-free test voltages from 0.008 cps to 1,200 cps. Continuously variable through 5 bands; offers exceptional stability (within 1%) and distortion less than 1% to 100 cps. Sine, square or triangular waves may be selected by a front panel switch; the 30 volt output peak-to-peak is constant for all wave forms and over full frequency range. hp 202A, $525.00△.

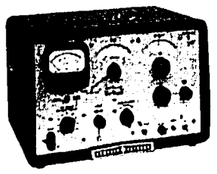


### hp 650A Test Oscillator

Covering 10 cps to 10 MC, hp 650A is a highly stable, wide band instrument for audio, supersonic, video and rf measurements. Output is flat within 1 db full range; voltage range is 0.00003 to 3 v. In addition to 600 ohm impedance, voltage divider provides a 6 ohm impedance. Distortion less than 1% to 100 KC. $490.00△.

# hp Distortion, Wave Form Analyzers – 20 cps to 50 KC

### hp 302A Wave Analyzer



New, completely transistorized, this advanced instrument provides direct, accurate wave component measurement without troublesome calibration or stabilization. Measurement range 20 cps to 50 KC. The instrument is hum free, requires little power, needs no warm-up, has very sharp acceptance circuits plus an AFC. May be battery operated (18 to 28 volts). Simple operation, rugged, trouble-free. $1,750.00△.

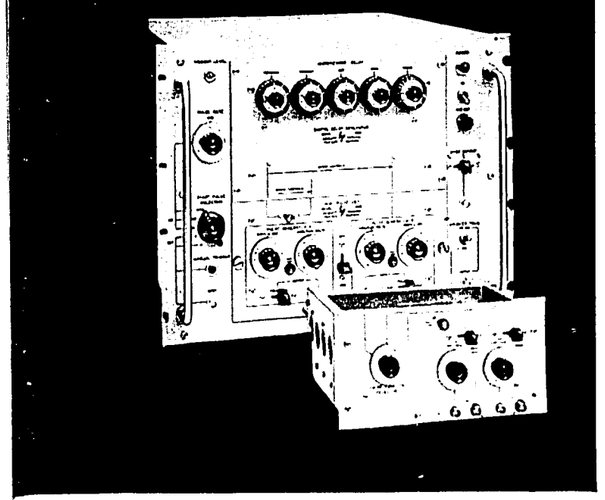
| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|---|---|---|---|---|
| -hp- 302A | Wave form analysis | 20 cps to 50 KC | Direct reading, no calibration needed | $1,750.00△ |
| -hp- 330B | Measures total audio distortion | 20 cps to 20 KC | Includes input amplifier, VTVM | 410.00△ |
| -hp- 330C | For FM broadcast measurements | 20 cps to 20 KC | Special VU meter to meet F.C.C. requirements | 440.00△ |
| -hp- 330D | For AM, FM broadcast measurements | 20 cps to 20 KC | AM detector and VU meter to meet F.C.C. requirements | 500.00△ |

△ Rack mounted instruments $15.00 less.









### hp 219A Dual Trigger Unit

This plug-in drawer for hp 218AR supplies trigger pulses of positive polarity, 50 volts, 0.1 μsec rise time from a 50-ohm source. Pulse A occurs at $T_o$ or $T_1$ as selected by switch; Pulse B is triggered at $T_2$. hp 219A, $100.00

### hp 219B Dual Pulse Unit

This plug-in drawer for hp 218AR produces two high-power pulses which are continuously adjustable in width, 0.2 to 5 μsec and in amplitude from 0 to 50 volts, positive or negative polarity. The leading edge of these pulses can be set to occur at the beginning or end of the selected time interval. Both pulses are brought out to separate front panel jacks but may be switched to a common jack with no change in level or output impedance. hp 219B, $450.00.

### hp 219C Digital Pulse Duration Unit

This plug-in drawer for hp 218AR produces a high power output pulse whose delay and duration are digitally controlled. The pulse is available in both polarities simultaneously, and is continually adjustable in amplitude up to at least 15 volts from a 90-ohm source. It may also be obtained from a directly coupled 500-ohm source with an amplitude of at least 90 volts. hp 219C, $350.00.

# hp 218AR Digital Delay Generator

Independently adjustable time intervals or pulse delays
±0.1 μsec time interval accuracy
Crystal oscillator time base
Regulated power supplies

Model 218AR Digital Delay Generator is a totally new instrument applicable to many types of timing measurements including calibrating the range determining circuits of radar receivers, etc. The generator is built to rigid standards and is suitable for military use. It provides two precision time intervals or pulse delays, either of which are independently adjustable from 1 to 10,000 microseconds in 1 microsecond steps. These time intervals are accurate to within 0.1 microsecond ±0.001% of the selected value, and may be initiated from an internal multivibrator, 10 cps to 10 KC, or from an external rate generator, 0 cps to 10 KC. Total jitter does not exceed 0.02 microseconds in either case. The instrument also provides a 50-volt synchronizing output pulse at the beginning or end of a time interval, and a 1 microsecond timing comb output at the front panel.

### No count ambiguity

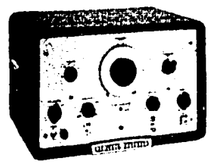
A unique feature of the new hp 218AR is its time base, a pulsed crystal controlled oscillator. The oscillator starts at $T_o$ and stops at the last output pulse. This eliminates the "plus-or-minus-1-count" ambiguity of many counter circuits in such application.

Model 218AR is a completely self-contained instrument, requiring only one or more hp 219 series plug-ins to perform a broad variety of time and delay generation measurements. Simplicity and flexibility are increased by the large variety of output signals provided by the plug-in units. The instrument is particularly compact and well-designed; etched circuits and the use of plug-ins materially increase circuit accessibility.

The instrument's power supplies are fully regulated to avoid effects of line voltage variations. It is available as hp 218AR, rack mount. $2,000.00.

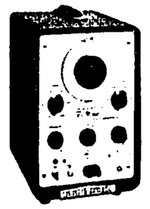
# hp Square Wave and Pulse Generators

### hp 212A Pulse Generator



Provides continuously variable, high-power "fast pulses" of superior wave form. Combines broad general usefulness with 0.02 μsec rise and decay time to meet requirements of radar, TV and nuclear work. Pulse length variable 0.07 to 10 μsec; minimum overshoot; 50 watt peak power (50 v to 50 ohms load). Low impedance means accurate pulses can be delivered at a distance from the instrument. Repetition rate variable 50 to 5,000 pps; controlled internally or externally. Synchronizing pulse available in advance of, or following output pulse. $585.00 (cabinet), $570.00 (rack mount).

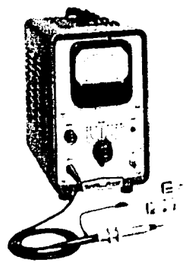
### hp 211A Square Wave Generator



Versatile, wide range instrument for testing oscilloscopes, networks, video and audio amplifier performance, modulating signal generators and measuring time constants. Offers simple control of electronic switches; is also convenient for indicating phase shift, frequency response, transient effects. Two separate outputs (a) 7 volt 75 ohm circuit for TV work; (b) 55 volt 600 ohm output for high level work. Both have full amplitude variation. Instrument operates free-running or externally synchronized with positive going pulse or sine wave of 5 volts minimum amplitude. $300.00 (cabinet), $305.00 (rack mount).

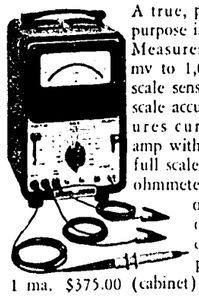
# DC and AC Voltmeters; DC Milliammeter

## 411A 1 KMC NEW! Millivoltmeter



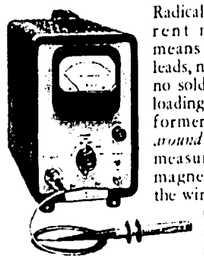
Millivolt sensitivity and two easy-reading linear voltage scales in 1-to-3 ratio make the all-new 411A perhaps the most widely useful voltmeter you have ever seen. Measure 10 mv to 10 v full scale, 5 KC to 1 KMC; get usable indications to 4 KMC! Db scale gives readings from −42 to +33 db for convenient gain measurements. Seven probe tips meet all measurement requirements. Galvanometer recorder output. Unique photoelectric chopper gives new standard of noise-free, drift-free low voltage readings. 411A (with one probe tip). $450.00.

## 412A Precision Volt-Ohm-Ammeter



A true, precision, multipurpose instrument at last! Measures dc voltage 0.02 mv to 1,000 v (max. full scale sensitivity 1 mv, full scale accuracy 1%). Measures currents 1 μa to 1 amp with ± 2% accuracy, full scale (13 ranges). As ohmmeter, measures 0.02 ohms to 5,000 megohms. Low noise, drift. Recorder output provides 1 v or 1 ma. $375.00 (cabinet), $380.00 (rack).

## 428A Clip-On DC Milliammeter



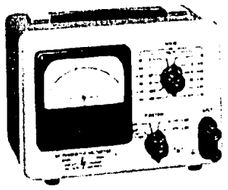
Radical approach to current measurements means no breaking of leads, no dc connections, no soldering, no circuit loading. "Current transformer" probe clamps *around* wire under test, measures by sampling magnetic field around the wire. Readily measures dc current in presence of strong ac. Covers 0.3 ma to 1 amp; accuracy ± 3%. $475.00 (cabinet), $480.00 (rack).

## 425A Microvolt-Ammeter



New, high sensitivity, high stability microvolt meter reading end scale voltages of 10 μv to 1 v in 11 ranges. Also reads currents of 10 μμa to 3 ma in 18 steps, 1-3-10 sequence. Accuracy ± 3% on all ranges. Drift is less than 4 μv per day referred to input terminals. Input impedance 1 megohm ± 3% on all voltage ranges. Instrument can also be used as a 100 db amplifier providing up to 1 v output from signals as small as 10 μv. Amplifier ac rejection is at least 3 db at 0.2 cps and 60 db at 60 cps and above. $500.00 (cabinet), $505.00 (rack).

## 403A Transistorized AC Voltmeter



Battery-operated, portable, weighs less than 5 lbs., transistorized, covers 1 cps to 1 MC and 100 μv to 300 v rms (max. full scale sensitivity 1 mv). Also reads db direct from −72 to +52 db. 400 hours battery life (6 mos. average use). Noise less than 30 μv on all but lowest range. Average reading meter; accuracy ± 3% to 500 KC, ± 5% to 1 MC. Input impedance 2 megohms; high overload capacity. $250.00.

## 405AR Automatic DC Digital Voltmeter



Literally "touch-and-read" measuring speed. Automatic range, polarity selection, covers 0.001 v to 1,000 v (accuracy ± 0.2% of reading ± 1 count). New novel circuitry provides a stability of readings virtually eliminating jitter in the last digit. Floating input, analog-to-digital conversion, digital recorder output and front panel switch to hold ranges. *Just 7" high!* $825.00.

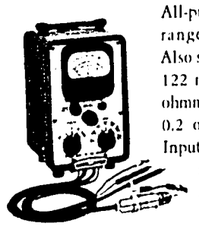
| Instrument | Primary Uses | Frequency Range | Voltage or Current Range | Input Impedance | Price |
|---|---|---|---|---|---|
| -hp- 400D | Wide range ac measurements High sensitivity | 10 cps to 4 MC | 0.001 to 300 v 12 ranges | 10 megohms 15 μμf shunt | $225.00 |
| -hp- 400H | High accuracy wide range ac measurements | 10 cps to 4 MC | 0.001 to 300 v 12 ranges | 10 megohms 15 μμf shunt | 325.00 |
| -hp- 400L | Log voltages, linear db measurements | 10 cps to 4 MC | 0.001 to 300 v 12 ranges | 10 megohms 15 μμf shunt | 325.00 |
| -hp- 403A | Battery-operated portable; fast, accurate, hum-free ac measurements | 1 cps to 1 MC | 0.001 to 300 v 12 ranges | 2 megohms 40, 20 μμf shunt | 250.00 |
| -hp- 405AR | Direct, automatic voltage measurement. Recorder output, automatic polarity | dc | 0.001 v to 1,000 v (accuracy ±0.2% of reading ±1 count) | 11 megohms to dc | 825.00 |
| -hp- 410B | Audio, rf, VHF measurements; dc voltages; resistances | dc; ac—20 cps to 700 MC | 1.0 to 300 v 7 ranges | dc—122 megohms; ac—10 megohms/ 1.5 μμf | 245.00 |
| -hp-411A | Millivolt, db readings to kilomegacycle range | 5 KC to 1 KMC | 10 mv to 10 v, 7 ranges | —— | 450.00 |
| -hp- 412A | Precision voltage, current resistance measurements | dc | 1 mv to 1,000 v 1 μa to 1 amp | 10 to 200 megohms, depending on range | 375.00 |
| -hp- 425A | Read μv, μμa; 100 db amplifier; medical, biological, physical, chemical | dc voltages as 100 db amplifier | 10 μv to 1 v 11 ranges | 1 megohm ± 3% | 500.00 |
| -hp- 428A | Clip-on milliammeter eliminates direct connection, circuit loading | dc | 0.3 ma to 1 amp, 6 steps, ±3% accuracy | —— | 475.00 |
| -hp- 456A | Current measurements on meters, scopes | 60 cps to 4 MC | 1 ma to 1 amp rms | —— | 190.00 |
| -hp- 738AR | Voltmeter Calibrator | dc pos. or neg. 400 cps sine wave | 300 μv to 300 v | Works into 3 to 10 megohms | 875.00 |
| -hp- 739AR | Frequency response test set | 300 KC* to 10 MC (*5 cps with -hp- 200SR) | 3 v output | —— | 450.00 |

## 456A AC Current Probe



Permits measurement of current on indicating meters such as 400D, 400H, 400L (below) or oscilloscopes. Exclusive new "current" probe clamps *around* wire under test, needs no physical connection, does not load circuit. Range 1 ma to 2 amps peak, accuracy 2% at 1 KC, response ± 5% 60 cps to 4 MC. $190.00.

## 410B Vacuum Tube Voltmeter



All-purpose test instrument, range, 20 cps to 700 MC. Also serves as dc VTVM with 122 megohms impedance, or ohmmeter for measurements 0.2 ohms to 500 megohms. Input capacity 1.5 μμf, 10 megohms input resistance. $245.00 (cabinet), $265.00 (rack).

## 400 Series Voltmeters

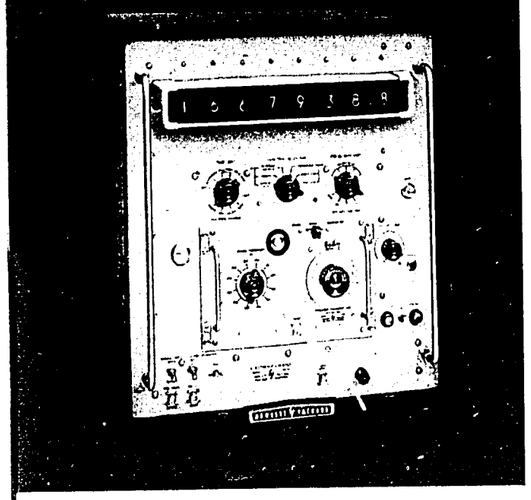


Three series 400 voltmeters cover 10 cps to 4 MC. 400D provides 2% accuracy, 400H offers 1% accuracy with 5" mirror scale. 400L, logarithmic version, has true log voltage scale, 5" linear db scale, accuracy 1% of full scale. Measurement 1 mv to 300 v full scale 400D, $225.00; 400H, $325.00; 400L, $325.00.









# 524C Precision Electronic Counter

- Bright, big-number readout
- Stability 3 parts in $10^8$ short-term
- Direct, fast, automatic readings
- Covers frequencies 10 cps to 220 MC*
- Measures time interval 1 μsec to 100 days
- Measures period 0 cps to 10 KC
- Resolution 0.1 microseconds
- No calculation or complex setup
- Easily used by non-technical personnel
- High sensitivity, impedance, reliability

* With proper plug-ins.

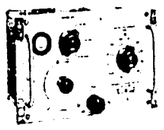
Bright, steady, big-number readout, and crystal oscillator stability of 5 parts in $10^8$ per week—these are significant advances incorporated in the 524C Electronic Counter.

*The 524C permits you to buy only the basic counting facilities you need now—later on add inexpensive plug-ins to triple and quadruple the usefulness of your counter.*

The basic 524C reads frequency 10 cps to 10.1 MC over any of 5 selected intervals. Display time is variable, counts are automatically reset, action is repetitive, readings are direct without calculation or interpolation; an automatic illuminated decimal point is included.

The instrument is of highest quality throughout and employs a military design approach. 524C, less plug-ins, $2,300.00 (cabinet); $2,275.00 (rack mount). also offers Model 524D, similar but with 8 vertical readout units, at lower price.

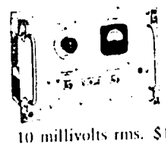
## 5 PLUG-IN UNITS INCREASE FLEXIBILITY, USEFULNESS FOR MANY MEASUREMENTS



**525A Frequency Converter.** Extends 524's direct reading range to cover 10 cps to 100 MC with no loss in accuracy. Provides additional amplification to increase video sensitivity to 0.1 v through 524's basic 10 cps to 10.1 MC range. $250.00.



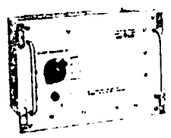
**525B Frequency Converter.** Converts 524 for direct readings 100 to 220 MC in decade steps. Maintains same high accuracy throughout range; provides high sensitivity for low level work. $250.00.



**526A Video Amplifier.** Increases 524 sensitivity to 10 mv for low power frequency measurement 10 cps to 10.1 MC. Accuracy same as counter; minimum input 10 millivolts rms. $175.00.



**526B Time Interval Unit.** Permits 524 to measure interval 1.0 μsec to 100 days. Accuracy of ± 1 count ± 524 stability. Reads in sec, msec or μsec. Triggering from separate "stop" or "start" on pos. or neg. going waves. Trigger adjustable −192 to +192 volts. $175.00.



**526C Period Multiplier.** Permits 524 to measure period over 100, 1,000 or 10,000 cycles of unknown, thus providing greater accuracy for mid-range frequency readings. Front panel switch selects desired period. $225.00.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|---|---|---|---|---|
| -hp- 524B Frequency Counter | Frequency, period measurements | 10 cps to 10.1 MC (Freq.) 0 cps to 10 KC (Period) | Direct reading, no interpolation; stability about 2/1,000,000/week | $2,150.00■ |
| -hp- 524C Frequency Counter | Frequency, period measurements | 10 cps to 10.1 MC (Freq.) 0 cps to 10 KC (Period) | Direct reading, no interpolation; stability $5/10^8$ per wk | 2,300.00■ |
| -hp- 524D Frequency Counter | Frequency, period measurements | 10 cps to 10.1 MC (Freq.) 0 cps to 10 KC (Period) | Direct reading, no interpolation; stability $5/10^8$ per wk | 2,150.00■ |
| -hp- 525A Frequency Converter | Extends 524 range to 100 MC; increases basic sensitivity | 10 cps to 100 MC | Accuracy same as basic counter; 0.1 v rms min. input | 250.00 |
| -hp- 525B Frequency Converter | Extends 524 range from 100 to 220 MC; high sensitivity | 100 MC to 220 MC | Accuracy same as basic counter; 0.2 v rms min. input | 250.00 |
| -hp- 526A Video Amplifier | Increases 524 sensitivity to 10 millivolts | 10 cps to 10.1 MC | Accuracy same as basic counter; 10 mv rms min. input | 175.00 |
| -hp- 526B Time Interval Unit | Measures interval 1 μsec to 100 days | 1 μsec to $10^7$ sec | Accuracy ± 1 count ± 524 stability | 175.00 |
| -hp- 526C Period Multiplier | Period measurement | Extends range of 524 to measure 10,000 periods | Greater accuracy in period measurement | 225.00 |

■ Rack mounted instrument $25.00 less.

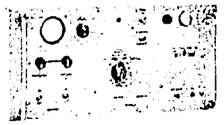
# Other hp Frequency Measuring and Monitoring Equipment

## hp 113AR Clock



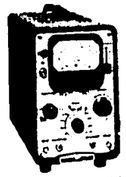
Precision time measuring instrument for adjusting frequency standards, and comparing high stability oscillators and time signals with WWV. Compares on a time basis with a 10 μsec resolution (equals $1*10^{-7}$ stability over 24 hours). Accepts 100 KC input; provides essentially jitter-free 1 second tick output. Meets MIL-E-16400 for operation in extreme environment. Uniquely accurate, reliable. Input voltage 0.5 to 5 v rms; input impedance 500 ohms. Transistorized; operates from hp 724AR Standby Power Supply (data on request) or 24 v dc. $2,500.00.

## hp 100ER Frequency Standard



High convenience new frequency standard offers unique advantages. Completely satisfactory in most applications formerly requiring primary standard. In many areas useful stability of $5*10^{-8}$ exceeds WWV because of Doppler shift. Multiple outputs include 6 sine and 4 pulse signals, plus timing comb. Includes built-in scope for Lissajous comparisons. Rated load 50 ohms at 1 MC and 100 KC; 5,000 ohms at lower frequencies. $900.00.

## hp 500B/C Frequency Meters



Directly measures frequency of voltages 3 cps to 100 KC; expanded scale allows any 10% or 30% of range to be measured full scale. Sensitivity 0.2 v rms (sine waves), 1 v peak for pulses. Input impedance 1 megohm with 40 μμf shunt; accuracy independent of line voltage changes. Also available as hp 500C, calibrated for direct reading in rpm. hp 500B/C, $285.00 (cabinet), $290.00 (rack mount).

## hp 521 Industrial Counters



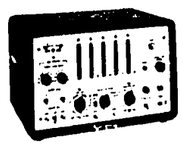
-hp- 521D

Low cost, simple operation, almost limitless uses characterize hp 521 Industrial Counters. hp 521's measure frequency, random events per unit of time; with transducers also measures rps, speed, rpm, weight, pressure, temperature, etc. hp 521A reads direct in cps, rpm, and rps; display time is variable. Frequency range 1 cps to 120 KC, accuracy ± 1 count ± accuracy of power line frequency (usually ± 0.1%); input min. 0.2 v rms; input attenuator adjusts sensitivity 0.2 to 100 v rms, input impedance 1 megohm with 50 μμf shunt, gate time 0.1 and 1 sec, also Manual Gate. hp 521C same as 521A except has greater accuracy, crystal controlled time base and 5-place (instead of 4-place) registration with count capacity of 99,999. hp 521D same as 521A except has in-line readout in bright, large numerals. hp 521E similar to 521C but has 5-place, in-line readout. hp 521G similar to 521A but measures to 1.2 MC (5 places). Prices: see above table.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|---|---|---|---|---|
| -hp- 100ER Frequency Standard | Establish standard frequencies; calibrate, measure time | 6 sine 10 cps to 1 MC; 4 pulse, 10 cps to 10 KC | Stability $5/10^8$ per week Timing comb. | $ 900.00 |
| -hp- 113AR Frequency Divider, Clock | Adjust freq. standards; comparisons | 100 KC input | 1 pps tick output for comparison with wwv, etc. | 2,500.00 |
| -hp- 500B Electronic Frequency Meter | Rapid frequency measurements | 3 cps to 100 KC | 9 ranges ±2% accuracy. Input 0.2 to 250 volts | 285.00 |
| -hp- 500C Electronic Tachometer Indicator | Rpm measurements | 180 to 6,000,000 rpm | Similar to 500B but calibrated in rpm | 285.00 |
| -hp- 506A Optical Tachometer Pickup | Rps and rpm measurement | 300 to 300,000 rpm | Phototube and light source; output 1 v rms | 125.00 |
| -hp- 508A Tachometer Generator | Shaft speed measurement | 15 to 40,000 rpm | Output 60 cycles per revolution | 100.00 |
| -hp- 508B Tachometer Generator | Shaft speed measurement | 15 to 30,000 rpm | Output 100 cycles per revolution | 100.00 |
| -hp- 508C Tachometer Generator | Shaft speed measurement | 15 to 25,000 rpm | Output 120 cycles per revolution | 100.00 |
| -hp- 508D Tachometer Generator | Shaft speed measurement | 15 to 5,000 rpm | Output 360 cycles per revolution | 100.00 |
| -hp- 520A Nuclear Scaler | For counting high-rate pulses | Capacity 100 counts in 2 decades. 10,000,000 pps counting rate | 100:1 divider for operation of low speed scalers | 615.00△ |
| -hp- 521A Industrial Electronic Counter | Measure frequency, speed | 1 cps to 120 KC | Direct reading, accurate within ±1 count ±0.1%, 4 place registration | 475.00 |
| -hp- 521C Industrial Electronic Counter | Measure frequency, speed | 1 cps to 120 KC | Direct reading, accuracy within ±1 count ±0.01%, 5 place registration | 650.00 |
| -hp- 521D Industrial Electronic Counter | Measure frequency, speed | 1 cps to 120 KC | Same as 521A except has in-line digital readout | 675.00 |
| -hp- 521E | Measure frequency, speed | 1 cps to 120 KC | Same as 521C except has in-line digital readout | 875.00 |
| -hp- 521G | Measure frequency, speed, elapsed time | 1 cps to 1.2 MC | Direct reading, accuracy ±1 count ±0.1% 5 place registration | 650.00 |
| -hp- 522B Electronic Counter | Frequency, period, time interval measurements | 10 cps to 120 KC | Direct reading, accuracy ±1 count ±0.001% | 915.00△ |
| -hp- 523B Electronic Counter | Frequency, period, time interval | 10 cps to 1.2 MC | Direct reading, accuracy ±1 count ±2/1,000,000 | 1,245.00 |
| -hp- 523CR | Frequency, period, time interval | 10 cps to 1.2 MC | Direct reading, accuracy ±1 count ±2/1,000,000, In-line digital readout, 10-line code arrangement | 1,485.00 |
| -hp- 523DR Electronic Counter | Frequency, period, time interval | 10 cps to 1.2 MC | Direct reading, accuracy ±1 count ±2/1,000,000 | 1,285.00 |

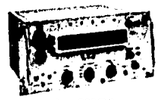
△ Rack mounted instruments $15.00 less.

## hp 522B Electronic Counter



Compact, low cost, versatile instrument for frequency, period *or* time measurements. Measures frequency 10 cps to 120 KC, time interval 10 μsec to $10^5$ sec. Reads direct in cps, KC, seconds or milliseconds. Count automatically reset, action repetitive. Stability of time base 1/100,000 per week. Easily used by untrained personnel. High quality, completely self-contained, bright, clear numerals; ideal industrial as well as lab instrument. $915.00△.

## hp 523CR/DR Electronic Counters

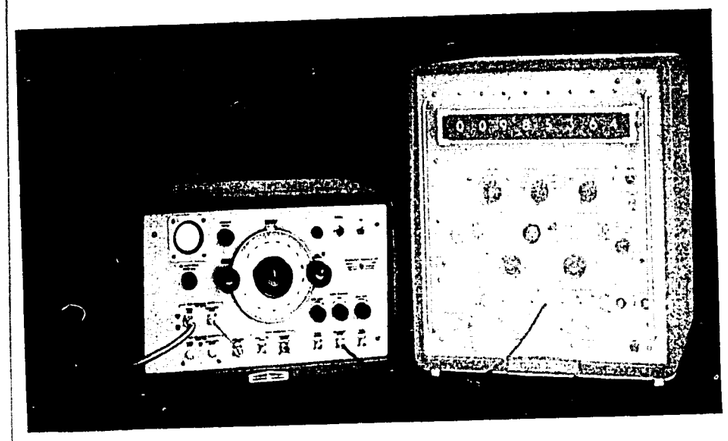


-hp- 523CR

Model 523CR is a revolutionary all-purpose counter measuring frequency 10 cps to 1.2 MC, time interval 1 μsec to 27.8 hours, period 0.00001 cps to 100 KC. Stability 2/1,000,000 per week. Results displayed in sec, msec, μsec or KC; automatic decimal. Display time variable 0.1 sec to 10 sec or indefinitely. Accuracy ± 1 count plus crystal stability, 5 gate times. Usable with 100 KC primary standard. Pulse output for Z-axis oscilloscope modulation. hp 523DR similar but has neon numeral column readout. hp 523CR, $1,485.00; hp 523DR, $1,285.00.



# hp 540A/540B Transfer Oscillator



Measure frequency to 18.0 KMC quickly, easily, with electronic counter accuracy. Avoid guesswork, end "trial and error," eliminate expensive setups. Measure on pulsed, AM, FM, CW and noisy circuits.

*Just two hp instruments*—Model 540B Transfer Oscillator and a 524 series electronic counter, (with plug-ins) are all the equipment you need to measure unknown frequencies up to 12.4 KMC swiftly and accurately.

This simple, two instrument setup is particularly useful for quick CW and AM frequency measurement, FM center frequency and deviation checks, and frequency of high-noise signals. Frequencies of pulsed signals can be measured using an external oscilloscope. Overall accuracy is better than 10 times that of the best microwave wavemeters; and on clean CW signals, is about 1/1,000,000.

## New Mixers

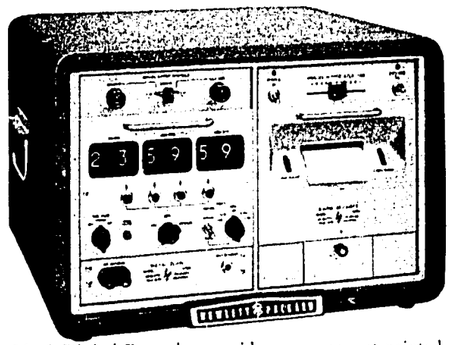
For use with the 540A, 540B and other mixing applications, hp 934A and P932A Harmonic Mixer (not pictured) provide untuned mixing action from 1 to 12.4 KMC and from 12.4 to 18 KMC, respectively. Maximum input power is 100 mw and minimum output is at least 0.1 mv rms with 0 dbm input. Fittings mate with hp 540, 524, 525A. hp 934A, $150.00. hp P932A, $250.00.

## Brief Specifications, hp 540B

**Oscillator Freq. Range:** 100 to 220 MC.
**Harmonic Freq. Range:** Up to 12.4 KMC.
**Stability:** Better than 0.002%/minute
**Output:** 2 volts into 50 ohms.
**Amplifier Gain:** 40 db max. 1 v output.
**Oscilloscope:** 100 cps to 200 KC; vert. sens. 5 mv rms/inch.
**Price:** $750.00△.

Model 540A, similar to 540B, but requires an external mixer above 5 KMC. $615.00△.

# hp 560A/561B Digital Recorder, 570A/571B Digital Clock



- Continuous digital record from hp and Dymec counters, voltmeters, other equipment
- Direct reading, simple hookup
- Accuracy identical to driving instrument
- Records five 11-digit lines per second
- Secondary, coding data entered simultaneously

*hp 560A Digital Recorder* provides a permanent printed record of all types of test data. In addition, a unique analog output makes possible graphic recording of very small data variations.

The analog output is a voltage or current proportional to the number represented by any three consecutive digits of recorded data. This digitally-derived analog output provides zero-suppression which is virtually error-free. An inherent range-shifting feature keeps the record on scale. Expanded scale records with extreme resolution can thus be made using conventional potentiometer or galvanometer recorders.

Model 560A is normally furnished with 6 plug-in comparators for 6-digit presentation; additional comparators may be plugged in at any time.

*hp 561B Digital Recorder* requires 10-line coded decimal entry with separate connection for each position of each print wheel so that the instrument may be operated from the hp 405AR Digital Voltmeter, hp In-Line Frequency Counters or relays, stepping switches and beam switching tubes.

*hp 570A* (shown installed) *and 571B Digital Clocks* mount in the left-hand side of hp 560A and 561B respectively, and add time-of-day information to other recorded data. These clocks can also control rate at which measurements are made. In-Line, 6-place numeric readout; maximum 23 hours, 59 minutes, 59 seconds. Operates from internal or external time base.

**Prices:** hp 560A (with 6 comparators), $1,265.00△; hp 561B, $1,065.00△; hp 570A (fits 560A), $1,050.00; hp 571B (fits 561B), $950.00.

△ Rack mounted instrument $15.00 less.

# Microwave Impedance Measuring Equipment



### hp 416A Ratio Meter

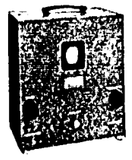
Automatically combines forward and reverse signals and displays their ratio directly, irrespective of common amplitude variations. Contains rf power monitor indicating proper power level. Rear terminal signal available to operate oscilloscope or recorder. Suitable for single and swept frequency operation. $475.00△.



### hp 415B Standing Wave Indicator

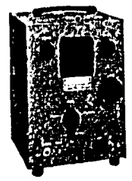
For all waveguide and coaxial slotted sections. Gives readings in SWR or db. Single frequency operation; 315 to 2020 cps. Low noise level, 0.1 μv (full scale) sensitivity, 60 db. calib. attenuator. $200.00.

### hp 803A vhf Bridge



Provides direct impedance measurements in vhf range, 2 to 2,000 ohms, −90° to +90° phase angle. Wide frequency range 52 to 500 MC; makes measurements down to 5 MC and up to 1,000 MC. Fast, simple to use. $800.00.

### hp 417A vhf Detector



Super-regenerative (AM) receiver covering all frequencies from 10 to 500 MC in 5 bands. Designed for use with hp 803A Bridge. 5 μv sensitivity full range. Single frequency control, reads direct in MC. $350.00.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|---|---|---|---|---|
| -hp- 360A-D Low Pass Filters | Eliminates harmonic voltages from uhf systems | Cut-off frequencies A- 700 MC C-2,200 MC B-1,200 MC D-4,100 MC | 50 db rejection at 1.25 cutoff freq. | $ 40.00 |
| -hp- 415B Standing Wave Indicator | SWR indicator or null indicator | Uses external detectors | 0 to 70 db attn. Max. sensitivity 0.1 μv | 200.00 |
| -hp- 416A Ratio Meter | Reflection coefficient measurements | Uses external detectors | Continuous swept frequency presentation; accuracy ±3% | 475.00△ |
| -hp- 417A vhf Detector | vhf bridge detector. (for -hp- 803A) | 10 to 500 MC | Approx. 5 μv sensitivity | 350.00 |
| -hp- 803A vhf Bridge | Measurement of vhf impedance, SWR | 52 to 500 MC | 2 to 2,000 ohms impedance −90° to +90° phase angle | 800.00 |
| -hp- 805A Coaxial Slotted Section | Measurement of SWR | 500 to 4,000 MC | For Type N Connectors flexible cables | 450.00 |
| -hp- 805B Coaxial Slotted Section, | Same as above | Same as above | For rigid 7/16" RG44/U line | 450.00 |
| -hp- 806B Coaxial Slotted Section | Same as above (mounts in 809B) | 3,000 to 12,000 MC | For Type N Connectors flexible cables | 200.00 |
| -hp- 809B Universal Probe Carriage | G, C, J, H, X, M and P 810 Waveguide Sections Supports 806B section, also | | Accepts 442B, 444A probes | 160.00 |
| -hp- 814B Universal Probe Carriage | Supports K and R 815B Waveguide Slotted Sections | | Accepts Untuned Probe 446B | 200.00 |

△ Rack mounted instruments $15.00 less.

### hp 360 Low Pass Filters



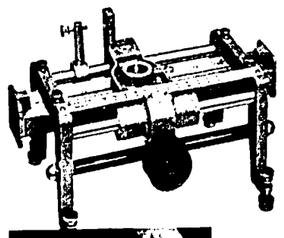
Isolating filters which speed microwave measurements by eliminating harmonics, permitting transmission at single, known frequency only. Particularly necessary in slotted line, filter characteristic, receiver response, similar measurements. Table above gives cut-off frequency; insertion loss not over 3 db; nominal impedance 50 ohms. hp 360A, B, C or D, $40.00.

### hp 805A/B Slotted Lines

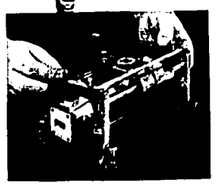


Original hp "parallel-plane" design insures utmost mechanical rigidity, less leakage, greater accuracy, low SWR of 1.02 or 1.04 (depending on model). Range 500 MC to 4 KMC, reads in cm and mm to 0.1 mm. hp 805A, for 50 ohm Type N use, hp 805B, for 46.3 ohm RG 44/U stub supported 7/8" O.D. coax. hp 805A/B, $450.00.

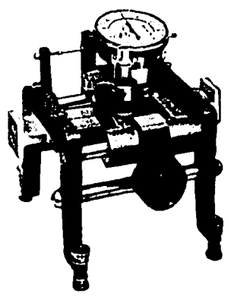
## hp 809B/814B Universal Probe Carriages



hp 809B and 810B



Quick, easy waveguide interchange



hp 814B, 815B, 446B

Models 809B and 814B are precision built mechanical assemblies operating, respectively, with hp 810B and 815B series slotted sections.

Combination of the 809B carriage and 810 slotted sections covers 2.6 to 18.0 KMC. Combination of 814B carriage and 815B series sections covers 18.0 to 40.0 KMC. For prices see table above.

On either carriage, waveguides can be interchanged in seconds for real savings on engineering time. Only one probe is required for each carriage to cover full frequency range. Manufacture is of highest quality to assure positive mechanical positioning of interchangeable waveguides and precise installation of mating hp probes (see table, "Waveguide Test Equipment"). hp 809B has a vernier scale reading to 0.1 mm and is equipped for dial gauge mounting. hp 814B has a dial read directly to 0.1 mm and interpolated to 0.01 mm.

**hp 810B Slotted Sections.** hp 810B, for mounting in 809B carriage, is a flanged, waveguide section with accurately machined slot. Slot is tapered at ends to minimize reflection. Available in 7 waveguide bands, 3.95 through 18.0 KMC*

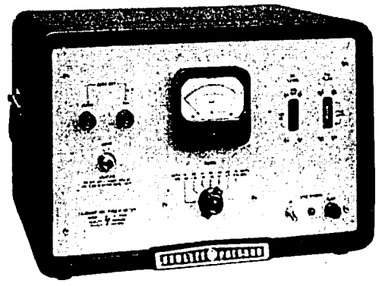
**hp S810A.** Complete slotted section assembly including probe carriage. In 2.6 to 3.95 KMC (S-band) size only. *

**hp 815B Slotted Sections.** For mounting in 814B carriage. Available K and R bands, 18.0 to 40.0 KMC. These sections are accurately machined so that they are quickly and easily interchanged, and precisely positioned.*

*For prices, see Waveguide Test Equipment table.



# Microwave Power Measuring Equipment



### hp 434A Calorimetric Power Meter

Just connect and read powers 10 mw to 10 watts! Covers dc to 12.4 KMC. No barretter or thermistor needed. No external terminations or plumbing. Measures CW or pulsed power. Two simple controls; no technical skill required.

hp 434A Calorimetric Power Meter is factually, the fastest, easiest way yet devised to measure powers accurately from 10 milliwatts to 10 watts, dc to 12.4 kilomegacycles.

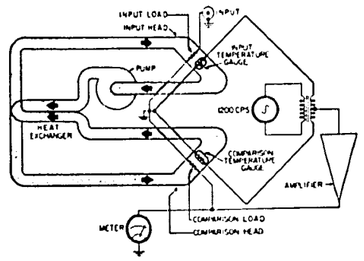
With the 434A, measurement is literally as simple as connecting to the 50 ohm, type N front panel terminal and reading power directly. Thus the instrument is particularly suited for use by non-technical people.

#### Compact, self-contained

hp 434A fills the range between bolometer microwave power meters (such as the popular hp 430C, below) and conventional calorimeters for powers above 10 watts. But unlike previous cumbersome equipment suggested for its range, the new hp 434A is compact, moderate in cost, completely self-contained, and needs no detectors or external plumbing whatsoever.

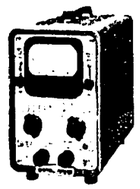
#### Brief Specifications

**Input Power Range:** 7 ranges; full scale readings 0.01 to 10 watts.
**Frequency Range:** dc to 12.4 KMC.
**Dc Input Impedance:** 50 ohms ± 5 ohms at input jack.
**Input SWR:** Less than 1.7 full range, less than 1.3 to 5 KMC.
**Meter Response (full scale):** Less than 5 seconds.
**Controls:** Zero Set, Meter Range.
**Accuracy:** Within 5% of full scale.
**Price:** $1,400.00 (cabinet); $1,385.00 (rack mount).




Circuitry, hp 434A

### hp 430C Microwave Power Meter



No computations! Provides instantaneous, automatic power readings *direct* in dbm or mw at all frequencies for which there are suitable bolometer mounts. For CW measurements, uses either 1/100 amp. fuse or Sperry 821 barretter. Also measures CW or pulsed power with negative coefficient thermistor. Provides up to 16 ma bias current. Operates with all mounts in adjacent table. Range 0.02 to 10 mw. $250.00.

### hp 477B Coaxial Thermistor Mount



For frequency range 10 MC to 10 KMC. SWR less than 1.5. Thermistor element is 200 ohm negative. No tuning required; not susceptible to burnout. $75.00 (including thermistor).

### hp 764D-767D Dual Directional Couplers



New high directivity dual coaxial couplers make reflectometer measurements practical in vhf and uhf coax systems. Flat response, high power capacity, low insertion loss. Four models, covering 216 to 4,000 MC collectively, 764D/765D $160.00. 766D/767D $150.00.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|---|---|---|---|---|
| -hp- 430C Microwave Power Meter | Measurement of rf power | Depends on Bolometer Mount | 0.02 to 10 mw ±5% accuracy | $ 250.00 |
| -hp- 434A Calorimetric Power Meter | Measurement of rf power | dc to 12.4 KMC | Direct reading, no barretters, thermistors or terminations; CW, pulsed | 1,400.00△ |
| -hp- 475B Tunable Bolometer Mount | Measurement of rf power (with 430B/C) | 1,000 to 4,000 MC | Matches 50 ohm line to 100 or 200 ohms | 300.00 |
| -hp- 476A Universal Bolometer Mount | Measurement of rf power (with 430B/C) | 10 to 1,000 MC | No tuning required SWR less than 1.25 | 85.00 |
| -hp- 477B Coaxial Thermistor Mount | Measurement of rf power (with 430C) | 10 MC to 10 KMC | No tuning required SWR less than 1.5 | 75.00 |
| -hp- 485 Waveguide Detector Mount | Measurement of rf power | 2,600 to 12,400 MC | Full coverage of waveguide band | See Table Waveguide Equipment |
| -hp- 487B Waveguide Thermistor Mount | Measurement of rf power | 3,950 to 40,000 MC | Full coverage, no tuning, 1.5 SWR except K/R487B 2.0 | See Table Waveguide Equipment |
| -hp- 764D Dual Directional Coupler | Reflectometer and rf power measurements | 216 to 450 MC | Coupling attenuation* 20 db, directivity 30 db | 160.00 |
| -hp- 765D Dual Directional Coupler | Reflectometer and rf power measurements | 460 to 945 MC | Coupling attenuation* 20 db, directivity 30 db | 160.00 |
| -hp- 766D Dual Directional Coupler | Reflectometer and rf power measurements | 940 to 1,975 MC | Coupling attenuation* 20 db, directivity 26 db | 150.00 |
| -hp- 767D Dual Directional Coupler | Reflectometer and rf power measurements | 1,900 to 4,000 MC | Coupling attenuation* 20 db, directivity 26 db | 150.00 |

*Power handling capacity all 764/767 series couplers 50 watts CW, 10 Kw peak.

# Waveguide Test Equipment—2.6 to 40.0 KMC

Basic, low-cost elements offer utmost flexibility for assembly of exact instrumentation required. Each unit covers entire range of its waveguide size. Careful engineering, simple, sturdy mechanical design, highest quality manufacture insures accurate, multi-purpose operation.

| Instrument | Coaxial Type N Conn. | "S" 3" x 1½" 2.6 - 3.95 KMC | "G" 2" x 1" 3.95 - 5.85 KMC | "C" 1.718" x .423" 4.9 - 7.05 KMC | "J" 1½" x ¾" 5.2 - 8.2 KMC | "H" 1¼" x ⅝" 7.05 - 10 KMC | "X" 1" x ½" 8.2 - 12.4 KMC | "M" .850" x .475" 10 - 15 KMC | "P" .702" x .391" 12.4 - 18 KMC | "K" .500" x .250" 18 - 26.5 KMC | "R" .360" x .220" 26.5 - 40 KMC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Adapter, Waveguide to Coax | | $281A $50 | G281A $40 | | J281A $35 | H281A $30 | X281A $25 | | P290A $25 | | |
| Cover to Choke Flange | | $290A $45 | G290A $50 | | J290A $35 | H290A $30 | X290A $15 | | | | |
| Waveguide to Waveguide | | -hp- 292 Series: HX292B $25, MX292A $40, MP292A $40, NP292A $40, NK292A $40 | | | | | | | | | |
| Attenuators Fixed 3, 6, 10, 20 db | | $370A $75 | G370A $75 | | J370A $65 | H370A $40 | X370A $55 | | P370A $60 | K370A $100 | R370A $100 |
| Precision Fixed | | $372 $375 | G372 $250 | | J372 $140 | H372 $120 | X372 $100 | | P372 $115 | | |
| Flap, 25 db max. | | $375A $120 | G375A $110 | C375A $110 | J375A $100 | H375A $90 | X375A $90 | | P375A $100 | K375A†† $140 | R375A†† $180 |
| Calibrated, precision | | $380A $260 | G382A $500 | C382A $500 | J382A $350 | H382A $350 | X382A $275 | M382A $300 | P382A $275 | K382A†† $425 | R382A†† $450 |
| Detector Mounts | 420A $50 | | | | | H421A $95 | X421A $75 | M421A $125 | P421A $105 | | |
| | 420B $75 | | | | | | | | | | |
| | 440A‡ $85 | | | | | | | | | | |
| | | $485D* $170 | G485D*$170 | | J485D* $170 | | | | | | |
| | | $485A‡ $140 | G485B‡ $95 | | J485B‡ $90 | H485B‡ $85 | X485B‡ $75 | | | | |
| Thermistor Mounts (Fixed tuned)■ | 477B $75 | | G487B $95 | | J487B $90 | H487B $80 | X487B $75 | M487B $110 | P487B $110 | K487B†† $150 | R487B†† $225 |
| Frequency Meters, Reaction | | | | C530A $160 | J530A/B** | H530A $120 | X530A $120 | | P530A $150 | | |
| Direct Reading | | | G532A■■ | | J532A■■ | H532A $195 | X532B $150 | M532B $275 | P532A $210 | K532A $230 | R532A $250 |
| Directional Coupler, Cross Guide: 20, 30 db | | $750 $150 | G750 $120 | | J750 $80 | H750 $70 | X750 $50 | | | | |
| Directional Couplers, Multi Hole: 3,10, 20 db | | $752 $375 | G752 $250 | | J752 $140 | H752 $120 | X752 $100 | M752 $130 | P752 $115 | K752†† $175 | R752†† $200 |
| Slotted Sections, Waveguide | | $810A* $450 | G810B§ $110 | C810B $110 | J810B§ $110 | H810B§ $110 | X810B§ $90 | M810B§ $110 | P810B§ $110 | | |
| Slotted Sections, Waveguide | | | | | | | | | | K815B†† $265 | R815B†† $265 |
| Tuners, Slide Screw | | $870A $225 | G870A $185 | C870A $170 | J870A $150 | H870A $130 | X870A $125 | M870A $130 | P870A $130 | K870A†† $250 | R870A†† $300 |
| E - H | | | | | | | X880A $130 | | P880A $150 | | |
| Waveguide Phase Shifter | | | | | J885A $500 | | X885A $400 | | P885A $550 | | |
| Terminations, Low Power | | $910A $60 | G910A $50 | C910A $55 | J910A $35 | H910A $30 | X910B $25 | | P910A $30 | | |
| Terminations, High Power | | $912A $200 | | | | | X912A $75 | | | | |
| Moving Load | | $914A $100 | G914A $75 | | J914A $70 | H914A $60 | X914B $50 | M914B $65 | P914A $55 | K914B†† $250 | R914B†† $250 |
| Standard Reflections | | | | | | | X916 $100 | | | | |
| Adjustable Shorts | | $920A $150 | G920A $125 | | J920A $100 | H920A $75 | X920A $75 | M920B $75 | P920A $75 | K920A†† $140 | R920A†† $150 |
| Waveguide Shorting Switch | | | | | | | X930 $100 | | P932A $250 | | |
| Harmonic Mixer | 934A $150 | 1 to 12.4 KMC | | | | All Frequencies | | | | | |
| Broad Band Probe | 442B§ $40 | | | | | | | | 446B $145 | 18 to 40 KMC | |
| Broad Band Probe, Untuned | | | | 444A $40 | 2.4 to 18 KMC | | | Model 25 clamps, $2.50 each, all bands | | | |
| Waveguide Clamps, Stands | | Model 24 stand, $3.00 | | | | | | | | | |

†For use with barretter or crystal. ‡For use with barretter only. *Complete assembly including carriage. §Mounts in 809B Carriage. ■■ Price on request.
■ Includes Thermistor, installed. **J530A, 5.85 to 8.2 KMC, $120; J530B, 5.20 to 7.05 KMC, $150. * Includes barretter; checked for square law characteristics.
†† Available with circular flanges equivalent to UG-425/u for K bands and UG-381/u for R bands. Specify by adding suffix "C" to model number: i.e., K487BC.

### 382A Precision Attenuators



Previously offered for frequencies 3.95 through 18.0 KMC, popular 382A series precision attenuators are now available in "K" and "R" bands, 18.0 to 40.0 KMC. "K," "R" band attenuators are of new, space-saving design (see photo). Direct reading, one control tuning, high power handling capacity. Attenuation 0 to 50 db full range, independent of frequency. Phase shift constant with attenuation. For prices G, C, J, H, X, M and P382A, see table above. K382A, $425.00. R382A, $450.00.

### 281A Waveguide - Coax Adapters

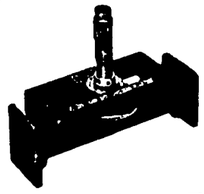



For convenient transition between waveguide and coax systems. Each unit covers a full waveguide range with SWR less than 1.25. Type N coax fitting (female). AN-waveguide flange. For S, G, J, H and X bands, 2.6 to 12.4 KMC. $25.00 to $125.00.

### 487B Thermistor Mounts

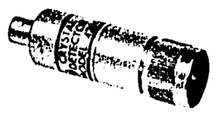


For fast, accurate waveguide power measurements. Each unit covers full range of its waveguide frequency. No tuning needed, SWR 1.5 max., except K and R bands, SWR 2.0 max. Max. power 10 mw. Rugged construction, high temperature coefficient thermistors virtually eliminate burnout. For G, J, H, X, M, P, K and R bands. 3.95 to 40.0 KMC. $75.00 to $225.00.



### 870A Slide Screw Tuners

For flattening waveguide systems, matching, etc. Probe position and penetration adjusts to setup reflection canceling existing reflection. Precision lead screw or micrometer varies probe insertion; vernier adjusts probe position. Corrects SWRs of 20 with accuracy of 1.02 SWR. For S, G, C, J, H, X, M, P, K, R, bands, 2.6 to 40.0 KMC. $125.00 to $300.00.



### 420A/B Crystal Detectors

Employs a silicon crystal to detect rf signals in Type N coaxial lines. Covers frequencies 10 MC to 12.5 KMC, sensitivity approx. 0.01 v/0.1 mw, frequency response ± 3 db full range. Uses modified 1N26 crystal, max. SWR 3. $50.00 each. Also available in matched pairs as 420B, $150.00 pair.

### 444A/446B Untuned Probes



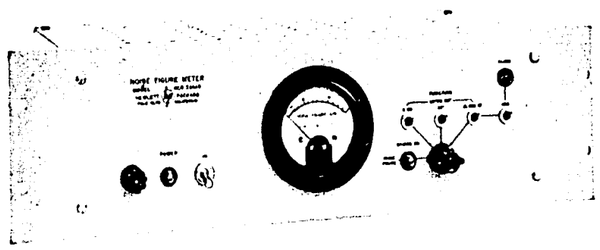
444A is modified crystal (1N76 or 1N26) plus small antenna in convenient housing. Probe penetration easily variable; may be locked in position. No tuning needed; sensitivity superior to most elaborate single or double tuned probes. Range 3.0 to 18 KMC; fits ¾" bore. *New 446B*, for 814 Probe Carriage, similar but covers K and R bands, 18.0 to 40.0 KMC. 444A, $40.00. 446B, $145.00.



For details, circle #14 on Reader Service Card



# NEW! Noise Measuring Equipment

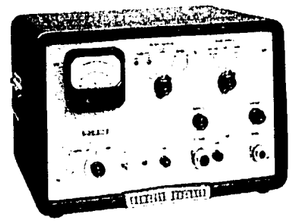


## 344AR Noise Figure Meter

This automatic, transistorized new instrument *reliably and continuously measures noise figure on operating radars.* Its fast meter response lets you optimize noise figure during operation. Its high sensitivity (can be decoupled 20 db from transmitter line) minimizes system degradation and effectively extends radar range. The instrument is militarized for dependability in all environments.

Model 344AR is used with a remote modulator and noise source so that high voltage slip-rings are unnecessary. During radar scan the 344AR termination is passive to eliminate spurious reflections from appearing as target. 1 MC bandwidth, 25 or 30 MC input, designed for pulse rep rates of 90 to 500 pps but usable with most jitter repetition systems.

Required gain between 344AR and noise source is 35 db ± 5 db. Input impedance is 75 ohms, return loss 20 db, 20 to 40 MC. Accuracy (excluding excess noise accuracy) is ± 0.5 db, 0 to 12 db; ± 1 db, 12 to 20 db. Simple front panel calibration, remote metering if desired. Optional alarms indicate noise figure above preset level, or failure in noise source current. 344AR, $1,600.00 *(Approximately. Depends on options and modifications.)*



342A Noise Figure Meter

343A vhf Noise Source, temperature limited diode broadband source, 10 to 600 MC, 5.2 db noise, $100.00.

345B IF Noise Source, 30 or 60 MC (others to order); 4 impedances, 5.2 db noise. $75.00.

347A Waveguide Noise Source, Argon gas discharge tubes in waveguide section; for bands S, G, J, H, X and P, 2.6 to 18.0 KMC, $190.00 to $250.00.

## 340B/342A Noise Figure Meters

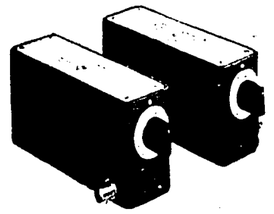
General-purpose instruments making possible, in minutes, receiver and component alignment jobs that once took hours. Simplifies accurate alignment; encourages better maintenance; better performance.

340B automatically measures, continuously displays IF or rf amplifier noise figure at 30 or 60 MC; other freq. on order. $715.00 (cabinet); $700.00 (rack).

342A, similar, operates on 30, 60, 70, 105, 200 MC. 30 MC and 4 other frequencies between 38 and 200 MC on order. $815.00 (cabinet); $800.00 (rack).

(NOTE: Models 340B and 342A available only in the U. S. A. and Canada.)

## 355A/B Attenuators—0 to 132 db



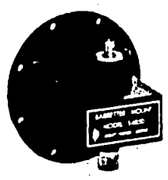
Here are two 50 ohm attenuators providing, together, 0 to 132 db attenuation in 1 db steps from dc to 500 MC! 355A provides 0 to 12 db attenuation in 1 db steps; 355B provides 0 to 120 db attenuation in 10 db steps. One simple control for each attenuator; overall full range accuracy is ± 0.25 db for 355A. For 355B, accuracy is ± 1 db to 250 MC; ± 2 db to 500 MC. 355A or 355B, $125.00.

### 350 Attenuators

Basic bridged-T high accuracy attenuators (not pictured). 350A matches 500 ohm lines, 350B matches 600 ohms. Maximum 110 db attenuation in 1 db steps. 5 watts capacity, high accuracy, compact, low cost. 350A or 350B, $85.00.

## More equipment, available for most waveguide frequencies

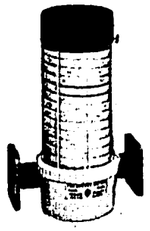
### 485 Detector Mounts



Three basic series offered; *S485A* for S band (no tuning, 1.35 SWR, 821 element); *485B*, for G, J, H, X bands (tunable, 1.25 SWR (with barretter) full range. 1N23, 1N21 or 821 element); *485D* for S, G, J bands (factory-installed 821 barretter). $75.00 to $170.00.

△ Rack mount instrument $15.00 less.

### 532 Waveguide Frequency Meters



New design for G, J, H, M, P, K, R bands. Wide band, direct reading, no interpolation or charts. Comprises a high Q resonant cavity tuned by choke plunger; no sliding contacts. Transmits almost full power at resonance; resonance indicated by 1.5 db dip in output. Precision tuning mechanism; no back-lash. Also similar model for X-band. $150.00 to $275.00.

### 752 Multi-Hole Couplers



Precision directional couplers available in 3 models with coupling factors of 3, 10 and 20 db. Coupling accuracy ± 0.4 db except K, R bands which are ± 0.7 db. Directivity better than 40 db full range, coupling variation not over ± 0.5 db full range. Primary guide SWR less than 1.05. S, G, J, H, M, X, P, K, R bands, 2.6 to 40.0 KMC. $100.00 to $375.00

For details, circle #15 on Reader Service Card

# Wide Band Amplifiers for Fast Circuit Work

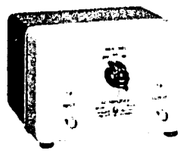
## Traveling-Wave Tube Amplifiers



hp offers Traveling-Wave Tube Amplifiers for all frequencies 2 to 12.4 KMC. hp 490B, 492A and 494A are low level, high gain amplifiers with 30 and 25 db gain; they offer amplitude, pulse, phase or FM modulation. hp 491A is a high power traveling-wave tube amplifier having a rated output of 1 watt, 2 to 4 KMC. All amplifiers have exclusive hp helical coupling system, and employ encapsulated traveling-wave tubes that can be readily replaced. hp 490B/491A, $1,460. hp 492A/494A, $1,500.

| Instrument | Primary Uses | Frequency Range | Characteristics | Price |
|---|---|---|---|---|
| -hp- 450A Amplifier, Stabilized | General purpose lab amplifier | 10 cps to 1,000,000 cps | 20 and 40 db gain, frequency response ±½ db | $ 140.00 |
| -hp- 460AR Amplifier, Wide Band | Wide band, pulse amplification | 100 KC to 120 MC | 20 db gain, rise time 0.003 μsec | 185.00 |
| -hp- 460BR Amplifier, Fast Pulse | Pulse amplification high output | 100 KC to 120 MC | 15 db gain, 125 peak volts | 225.00 |
| -hp- 466A ac Amplifier | General purpose lab amplifier | 10 cps to 1 MC | 20, 40 db gain; freq. response ± 0.5 db | 150.00 |
| -hp- 490B Traveling-Wave Tube Amplifier | Amplification throughout "S" band | 2 to 4 KMC | 30 db gain; mμsec rise time; 10 mw output | 1,400.00 |
| -hp- 491A Traveling-Wave Tube Amplifier | High power "S" band amplification | 2 to 4 KMC | 30 db gain; mμsec rise time; 1 watt output | 1,400.00 |
| -hp- 492A Traveling-Wave Tube Amplifier | Amplification through most of "G" and "J" bands | 4 to 8 KMC | 30 db gain; mμsec rise time; 10 mw output | 1,500.00 |
| -hp- 494A Traveling-Wave Tube Amplifier | Amplification throughout "X" band | 7 to 12.4 KMC | 25 db gain; mμsec rise time; 5 mw output | 1,500.00 |

## 466A ac Amplifier



General-purpose transistorized instrument amplifier offering standard gains of 20 and 40 db, ± 0.2 db at 1000 cps. Distortion less than 1%, 10 cps to 100 KC. Frequency response ± 0.5 db 10 cps to 1 MC, output 1.5 v rms across 1500 ohms, noise 75 μv rms, referred to input; input impedance 1 megohm with 20 μμf shunt. Battery powered, 150 hours operation; or ac driven. Weight just 3 lbs. $150.00.

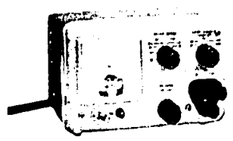
## 460AR/BR Fast Pulse Amplifiers



hp 460AR Wide Band Amplifiers, in cascade with hp 460BR Fast Pulse Amplifiers, provide up to 90 db gain, 125 v open circuit. This permits direct connection to oscilloscope deflection plates. Rise time 0.003 μsec. Will amplify millimicrosecond pulses. Over 100 MC band width for 'scopes. hp 460AR, $185.00. hp 460BR, $225.00.

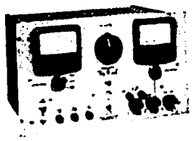
# Regulated and Klystron Power Supplies

## 721A Power Supply



New, completely transistorized, compact, regulated supply. Output 0 to 30 v, continuously variable. 150 ma maximum output, output impedance less than 0.2 ohms. Regulation, no load to full load, 0.3% or 30 mv whichever is greater. Line voltage change of ± 10% causes output change of less than 0.3% or ± 15 mv, whichever is greater. Front panel switch limits maximum output current preventing damage to transistors, etc., from accidental overload. Reads ma, v direct. $145.00.

## 712B Power Supply



This hp instrument features high regulation of 50 mv no load to full load, 0.1 millisecond transient response, internal impedance 0.1 ohms in series with 25 μh; full-load maximum hum less than 500 μv, sealed transformers, chokes and condensers. 0 to 500 v, 200 ma supply and fixed 300 v tap providing a 50 ma, 300 to 800 v variable supply for klystron operation. $365.00△.

| Instrument | Primary Use | Characteristics | Price |
|---|---|---|---|
| -hp- 711A Laboratory Power Supply | General purpose regulated dc supply for lab and field use | 0 to 500 volts @ 100 ma | $250.00 |
| -hp- 712B Power Supply | Same as 711A | 0 to 500 volts @ 200 ma | 365.00△ |
| -hp- 715A Klystron Power Supply | Regulated beam, reflector source for low power klystrons | 250 to 400 volts @ 50 ma | 300.00 |
| -hp- 721A Transistor Power Supply | Powering transistors, similar applications | 0 to 30 v, 150 ma | 145.00 |

△ Rack mounted instruments $15.00 less.

## 711A Power Supply

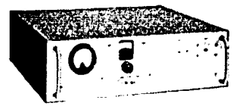
High regulation, 0 to 500 volt supply with separate meters. Ideal for powering experimental setups, other basic applications, including driving low level amplifiers, constant frequency oscillators and other setups requiring highly stable voltages. Regulation 0.5% or 1.0 volt, whichever is greater, no load to full load or on line voltages 110/230 v ± 10%. Less than 1.0 mv ripple, overload relay protection. Includes two 6.3 v ac 3 amp supplies. $250.00 (rack mount, $255.00).





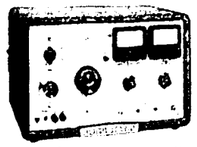
# Signal Generators – 50 KC to 21 KMC

## NEW! Frequency Doublers to 40 KMC



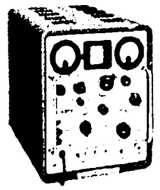
Operating on harmonic generation principles, new hp 938A and 940A Frequency Doubler Sets provide output from 18 to 26.5 KMC and 26.5 to 40.0 KMC respectively. The Doublers can be driven by hp 626A or 628A Signal Generators, hp 686A and 687A Sweep Oscillators or by klystrons. The input signal may be CW, pulsed or swept; thus Doublers retain flexibility of driving instrument. Output approx. 0.5 to 1 mw with hp Signal Generators; input power is 10 mw to 200 mw. Output monitor accuracy ± 1 or 2 db. 100 db attenuator accurate within ± 2% of reading or 0.2 db. hp 938A, $1,500.00. hp 940A, $1,500.00.

## 606A Standard Signal Generator



New, ultra-modern; 50 KC to 65 MC. Output 3 v full range, continuous attenuation to 0.1 μv. MO-PA circuit with full feedback loop provides constant output full range. Low distortion, broad modulating capabilities. Typical hp speed, ease of operation; occupies ¼ bench space normally needed for generators of this frequency. $1,200.00△.

## 608D vhf Signal Generator



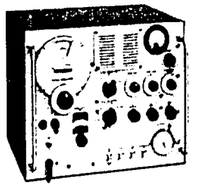
10 to 420 MC. Highest stability. Low incidental FM or frequency drift. Calibrated output 0.1 μv to 0.5 v throughout range. Built-in crystal calibrator provides frequency check accurate within 0.01% each 1 and 5 MC. Master-oscillator, intermediate and output amplifier circuit design. Premium quality performance, direct calibration, ideal for aircraft communications equipment testing. $1,100.00.

hp 608C vhf Signal Generator. High power (1 v max.) stable, accurate generator for lab or field use. 10 to 480 MC. Ideal for testing receivers, amplifiers, driving bridges, slotted lines, antennas, etc. $1000.00.

| Instrument | Frequency Range | Characteristics | Price |
|---|---|---|---|
| -hp- 606A | 50 KC to 65 MC | Output 0.1 μv to 3 v. Full feedback loop, low distortion | $1,200.00△ |
| -hp- 608C | 10 to 480 MC | Output 0.1 μv to 1 v into 50 ohm load. AM, pulse, or CW modulation. Direct calibration | 1,000.00■ |
| -hp- 608D | 10 to 420 MC | Output 0.1 μv to 0.5 v. Incidental FM less than 0.001% | 1,100.00■ |
| -hp- 612A | 450 to 1,230 MC | Output 0.1 μv to 0.5 v into 50 ohm load. AM, pulse, CW or square wave modulation. Direct calibration | 1,200.00■ |
| -hp- 614A | 800 to 2,100 MC | Output 0.1 μv to 0.223 v into 50 ohm load. Pulse, CW or FM modulation. Direct calibration | 1,950.00■ |
| -hp- 616B | 1,800 to 4,200 MC | Output 0.1 μv to 0.223 v into 50 ohm load. Pulse, CW or FM modulation. Direct calibration | 1,950.00■ |
| -hp- 618B | 3,800 to 7,600 MC | Output 0.1 μv to 0.223 v into 50 ohm load. Pulse, CW FM or square wave modulation. Direct calibration | 2,250.00■ |
| -hp- 620A | 7,000 to 11,000 MC | Output 0.1 μv to 0.223 v into 50 ohm load. Pulse, FM or square wave modulation. Direct calibration | 2,250.00■ |
| -hp- 623B | 5925 - 6575 MC<br>6575 - 7175 MC<br>7175 - 7725 MC<br>(specify) | Output 70 μv to 0.223 v into 50 ohm load. FM or square wave modulation. Separate power meter and wave meter section | 1,900.00 |
| -hp- 624C | 8,500 to 10,000 MC | Output 2.23 μv to 0.223 v into 50 ohm load. Pulse, FM or square wave modulation. Separate power meter and wave meter section | 2,265.00△ |
| -hp- 626A | 10 to 15.5 KMC | Output 10 dbm to —90 dbm. Pulse, FM, or square wave modulation. Direct calibration | 3,250.00■ |
| -hp- 628A | 15 to 21 KMC | Output 10 dbm to —90 dbm. Pulse, FM, or square wave modulation. Direct calibration | 3,250.00■ |

△ Rack mounted instruments $15.00 less.
■ Rack mounted instrument $25.00 less.

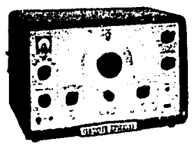
## 626A/628A shf Signal Generators



New instruments, bringing high power, wide range, convenience and accuracy 10 to 21 KMC range. Frequencies, output voltage directly set and read. Output 10 to 20 db better than previous spot-frequency sets SWR better than 1.2 at 0 dbm and lower. Internal pulse, FM or square wave modulation; also external pulsing or FM'ing. hp 626A, 10 to 15.5 KMC, $3,250.00. hp 628A, 15 to 21 KMC, $3,250.00.

# Swept Frequency Oscillators

## 686A Electronic Sweep Oscillator



Totally new kind of backward-wave device eliminating sweep motors, tuning plungers, range limitations, etc. Covers all or part of X-band with flexible, *quiet* electronic sweep. Simple to operate, direct reading, continuously adjustable sweep width and rate, 10 mw output minimum, frequency sweep linear with time. Has slow sweep for recorders; fast for oscilloscope; single sweep manually started or externally triggered, external FM, AM modulation. Ultimate in X-band sweep oscillators, $2,900.00△.

| Instrument | Frequency Range | Characteristics | Price |
|---|---|---|---|
| -hp- 682A | 1.0 to 2.0 KMC | Electronically swept; variable sweep rate, width. Output 10 mw, SWR 3.1 or less Pulse, square wave, FM, AM modulation | $3,090.00△ |
| -hp- 683A | 2.0 to 4.0 KMC | | 3,000.00△ |
| -hp- 684B | 4.0 to 8.1 KMC | | 2,900.00△ |
| -hp- 686A | 8.2 to 12.4 KMC | | 2,900.00△ |
| -hp- 687A | 12.4 to 18.0 KMC | | 3,400.00△ |

△ Rack mounted instruments $15.00 less.

*Data subject to change without notice.* *Prices f. o. b. factory.*

## Sales and Service Representatives in North America

+ Indicates Instrument Repair Stations.

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CEdar 3-7522

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882-6873

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534-5733
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1320 Prospect Street
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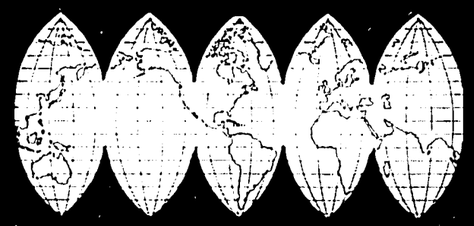
**Tucson, Arizona**
Neely Enterprises
232 So. Tucson Blvd.
MAin 3-2564

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**Montreal, Quebec**
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3333 Cavendish Blvd.
HUnter 9-8495 and 8496

**+ Toronto 10, Ontario**
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RUssell 1-6174

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Telefon 55 47 27

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Allahabad 1

The Scientific Instrument
Company, Ltd.
240, Dr. Dadabhai Naoroji Road
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The Scientific Instrument
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11, Esplanade East, Calcutta 1

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B-7, Ajmeri Gate Extn.
New Delhi 1

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30, Mount Road, Madras 2

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6 Feierberg St., Tel-Aviv
Phone 4288

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31868

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**CONDENSED CATALOG 1960**

# LAMBDA

Precision Laboratory Power Supplies



**LA Series**
0-34 VDC, 5 and 10 AMP,
Transistorized • Pages 2, 3



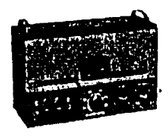
**LT Series**
0-32 VDC, 1 and 2 AMP,
Transistorized • Page 4



**COM-PAK Series**
Up to 525 VDC, up to 1500 MA,
Tube Type • Page 5



**100 MA Series**
Up to 325 VDC, 0 to 100 MA,
Tube Type • Page 6



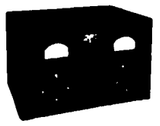
**100 MA Series**
Up to 325 VDC, 0 to 100 MA,
Tube Type • Page 6



**200 MA Series**
0 to 500 VDC, 0 to 200 MA,
Tube Type • Page 6



**300 MA Series**
Up to 325 VDC, 0 to 300 MA,
Tube Type • Page 7



**500 MA Series**
0 to 500 VDC, 0 to 500 MA,
Tube Type • Page 7

**GUARANTEED**
FOR A FULL
**5 YEARS**

Lambda gives you the strongest proof of consistent, trouble-free power supply performance ever offered: a guarantee covering workmanship and materials (except for tubes and fuses) for *five full years.*

## Lambda's experience and plant devoted solely to power supplies

Lambda manufactures only power supply equipment. Lambda's plant and personnel are devoted solely to the design and manufacture of the finest power supply equipment available.

## Market surveys rank Lambda first

Lambda quality is consistently recognized by electronic engineers who specify power supplies. In every independent study Lambda always leads the field.

**LAMBDA ELECTRONICS CORP.**
11-11 131 STREET • COLLEGE POINT 56, N. Y. • INDEPENDENCE 1-8500

For details, circle #19 on Reader Service Card

# LAMBDA LA Series
## Regulated Power Supplies
# 5 and 10 AMP · 0-34 VDC

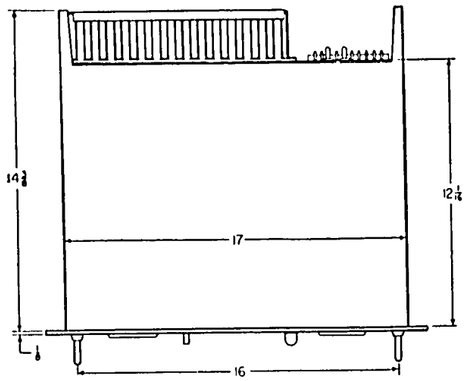
## CONVECTION COOLED



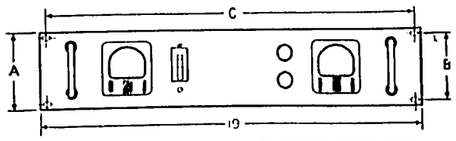

## 3½" PANEL HEIGHT ON 5 AMP MODELS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| LA 50-03AM | (with meters) | 0-34 VDC, 0-5A | $425 | LA 50-03A | (without meters) | 0-34 VDC, 0-5A | $395 |
| LA100-03AM | (with meters) | 0-34 VDC, 0-10A | $540 | LA100-03A | (without meters) | 0-34 VDC, 0-10A | $510 |

DIMENSION DRAWINGS




TOP VIEW OF ALL MODELS




FRONT VIEW OF LA 50-03AM MODELS

| MODEL † | A | B | C |
|---|---|---|---|
| LA 50—03A | 3½" | 3" | 18⅝" |
| LA 100—03A | 7" | *4" | 18¼" |

* LA100-03A is notched per RETMA Standards
† Includes metered models with suffix "M"

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## Features of Lambda LA Series

- Compact panel height—only 3½" on 5 amp model
- Convection cooled—no internal blowers to wear out or maintain
- Specially designed, high efficiency radiator heat sinks
- Ambient temperature 50°C—continuous duty
- Excess ambient thermal protection
- Special transistor circuitry provides independent protection against transistor complement overload
- Protected by magnetic circuit breakers
- Short circuit proof
- All transistor—no tubes
- Silicon rectifiers
- 100-130 VAC input
- Excellent regulation—low output impedance—low ripple
- Fast transient response
- Special, high purity foil, hermetically sealed long-life electrolytic capacitors
- Hermetically sealed transformer designed to MIL-T-27A
- Remote sensing and DC vernier

For details, circle #20 on Reader Service Card

## CONDENSED DATA:

### DC OUTPUT

**Regulated for line and load**

| MODEL | VOLTAGE [1] | CURRENT [2] | PRICE |
|---|---|---|---|
| LA50-03A | 0-34 VDC | 0- 5A | $395 |
| LA50-03AM | 0-34 VDC | 0- 5A | 425 |
| LA100-03A | 0-34 VDC | 0-10A | 510 |
| LA100-03AM | 0-34 VDC | 0-10A | 540 |

[1] The output voltage for each model is completely covered in four steps by selector switches plus vernier control and is obtained by summation of voltage steps and continuously variable DC vernier as follows:

| MODEL | VOLTAGE STEPS |
|---|---|
| LA 50-03A, LA 50-03AM | 2, 4, 8, 16 and 0-4 volt vernier |
| LA100-03A, LA100-03AM | 2, 4, 8, 16 and 0-4 volt vernier |

[2] Current rating applies over entire output voltage range.

**Regulation:** *Line* Better than 0.15 per cent or 20 millivolts (whichever is greater). For input variations from 100-130 VAC.
*Load* Better than 0.15 per cent or 20 millivolts (whichever is greater). For load variations from 0 to full load.

**Transient Response:** *Line* Output voltage is constant within regulation specifications for step function line voltage change from 100-130 VAC or 130-100 VAC.
*Load* Output voltage is constant within regulation specifications for step-function load change from 0 to full load or full load to 0 within 50 microseconds after application.

**Ripple and noise:** Less than 1 millivolt rms with either terminal grounded.

### AC INPUT

100-130 VAC, 60 ± 0.3 cycle. This frequency band amply covers standard commercial power lines in the United States and Canada.

### OVERLOAD PROTECTION

**Electrical and thermal:** Magnetic circuit breaker front panel mounted. Special transistor circuitry provides independent protection against transistor complement overload. Fuses provide internal failure protection. Unit cannot be injured by short circuit or overload. Thermostat, manual reset, rear of chassis. Thermal overload indicator light front panel.

### CONTROLS

**DC Output Controls:** Voltage selector switches and adjustable vernier-control rear of chassis.

**Remote DC Vernier:** Provision for remote operation of DC Vernier.

**Remote Sensing:** Provision is made for remote sensing to minimize effect of power output leads on DC regulation, output impedance and transient response.

### PHYSICAL DATA

**Size:**

LA-50-03A 3½" H x 19" W x 14⅜" D
LA-100-03A 7" H x 19" W x 14⅜" D

**Panel Finish:** Black ripple enamel (standard). Special finishes available to customers' specifications at moderate surcharge. Quotation upon request.

For details, circle #21 on Reader Service Card

## Ordering Information

**All Lambda Power Supplies are sold direct by LAMBDA to the purchaser.**

### IDENTIFICATION
We can serve you more quickly and accurately when you give us the model number of the power supply in which you are interested, and a short description. (For example: Model 50-R for rack mounting.)

### PRICES
The prices in this catalog are F.O.B. factory College Point, New York. Necessarily they are subject to change without notice.

### TERMS — Net 30 days.

### SHIPMENT
Express shipment in our experience has provided the fastest and safest delivery of power supplies. Unless you specifically request otherwise, your order will be forwarded in this manner. Urgent needs can be shipped by air express or air freight in accordance with your instructions.

### QUOTATIONS
All written quotations will be honored for 30 days from the date on which they are made.

### TAXES
All applicable taxes, federal, state and local, are extra.

### DELIVERY
Under normal conditions, we ship from stock. If circumstances do not permit immediate delivery on a particular model, you will be notified at once and a firm shipping date will be given you. Urgent requirements often can be handled on an expedited basis. Your mail, telephone or telegraph order or inquiry will bring you a same-day reply. Our New York City telephone number is INdependence 1-8500.

### SHIPMENT TO FACTORY
Please communicate with us before shipping power supply equipment so that we can arrange with you to keep your "down time" to a minimum.

### REPAIR PARTS
These are always in stock for immediate shipment for repair purposes. When ordering a repair part, please give the number on the component itself. Also state the model number, serial number, and, if possible, date of original purchase.




ALL LAMBDA POWER SUPPLIES GUARANTEED FOR 5 YEARS

# LT Series Power Supplies

## TRANSISTORIZED




| | | |
|---|---|---|
| LT 1095M (with meters): | 0-32 VDC, 0-1 AMP | $315.00 |
| LT 2095M (with meters): | 0-32 VDC, 0-2 AMP | 395.00 |
| LT 1095 (without meters): | 0-32 VDC, 0-1 AMP | 285.00 |
| LT 2095 (without meters): | 0-32 VDC, 0-2 AMP | 365.00 |

## Features of the LT Series

- Ambient 50°C
- Specially designed, high efficiency radiator heat sinks
- All transistor—no tubes
- 50-400 cycles input
- Protected by magnetic circuit breakers
- Special, high-purity foil, hermetically sealed long-life electrolytic capacitors
- Excess ambient thermal protection
- Fast transient response
- Hermetically-sealed transformer—designed to MIL-T-27A
- Remote sensing and DC vernier
- Compact—only 3½" panel height
- Special transistor circuitry provides independent protection against transistor complement overload

**CONDENSED DATA:**

### DC OUTPUT

**Regulated for line and load**

| MODEL | VOLTAGE [1] | CURRENT [2] | PRICE |
|---|---|---|---|
| LT 1095M | 0-32 VDC | 0-1 AMP | $315.00 |
| LT 2095M | 0-32 VDC | 0-2 AMP | 395.00 |
| LT 1095 | 0-32 VDC | 0-1 AMP | 285.00 |
| LT 2095 | 0-32 VDC | 0-2 AMP | 365.00 |

[1]Voltage range for each model is completely covered in four continuously variable bands as follows:

| MODEL | VOLTAGE BANDS |
|---|---|
| LT-1095, LT-1095M | 0-8, 8-16, 16-24, 24-32 |
| LT-2095, LT-2095M | 0-8, 8-16, 16-24, 24-32 |

[2]Current rating applies over entire voltage range.

**Regulation:** *Line* Better than 0.15 per cent or 20 millivolts (whichever is greater). For input variations from 105-125 VAC.
*Load* Better than 0.15 per cent or 20 millivolts (whichever is greater). For load variations from 0 to full load.

**Transient Response:** *Line* Output voltage is constant within regulation specifications for step-function line voltage change of plus (+) 10 volts or minus (−) 10 volts within the limits of 105-125 VAC.
*Load* Output voltage is constant within regulation specifications for step-function load change from 0 to full load or full load to 0 within 50 microseconds after application.

**Ripple and Noise:** Less than 1 millivolt rms.

### AC INPUT

105-125 VAC, 50-400 CPS.

### OVERLOAD PROTECTION

**Electrical and thermal:** Magnetic circuit breaker, front panel mounted. Special transistor circuitry provides independent protection against transistor complement overload. Fuses provide internal failure protection. Unit cannot be injured by short circuit or overload. Thermostat, manual reset, rear of chassis. Thermal overload indicator light front panel.

### CONTROLS

**DC Output Controls:** Band-switches and screw-driver adjusting vernier-control, rear of chassis.

**Remote DC Vernier:** Provision for remote operation of DC vernier.

**Remote Sensing:** Provision is made for remote sensing to minimize effect of power output leads on DC regulation.

### PHYSICAL DATA

**Size:**
LT-1095....3½" H x 19" W x 14⅜" D.
LT-2095....3½" H x 19" W x 14⅜" D.

**Panel Finish:** Black ripple enamel (standard). Special finishes available to customers' specifications at moderate surcharge.

For details, circle #22 on Reader Service Card

# COM-PAK Series Power Supplies

## TUBE-TYPE




| | | | |
|---|---|---|---|
| C-280 | (without meters): | 0-200 VDC, 0-200 MA..... | $184.50 |
| C-281 | (without meters): | 125-325 VDC, 0-200 MA..... | 159.50 |
| C-282 | (without meters): | 325-525 VDC, 0-200 MA..... | 169.50 |
| C-480 | (without meters): | 0-200 VDC, 0-400 MA..... | 259.50 |
| C-481 | (without meters): | 125-325 VDC, 0-400 MA..... | 244.50 |
| C-482 | (without meters): | 325-525 VDC, 0-400 MA..... | 259.50 |
| C-880 | (without meters): | 0-200 VDC, 0-800 MA..... | 340.00 |
| C-881 | (without meters): | 125-325 VDC, 0-800 MA..... | 315.00 |
| C-882 | (without meters): | 325-525 VDC, 0-800 MA..... | 360.00 |
| C-1580 | (without meters): | 0-200 VDC, 0-1500 MA..... | 550.00 |
| C-1581 | (without meters): | 125-325 VDC, 0-1500 MA..... | 575.00 |
| C-1582 | (without meters): | 325-525 VDC, 0-1500 MA..... | 650.00 |

For Com-Pak Series models with meters, add the suffix "M" to the model number and add $30 to the unmetered model price.

## Features of Com-Pak Series

- Exclusive design, height only 5¼" (C-200 and C-400 series), 7" (C-800 series) and 8¾" (C-1500 series)
- Hermetically-sealed transformer—designed to MIL-T-27A
- Transient free output
- Semi-conductor rectifiers for higher efficiency in C-400, C-800 and C-1500 series
- Overload protection with built-in blown-fuse indicators
- Stable, low noise wire wound reference networks and multipliers
- Oil-filled, hermetically-sealed capacitors
- Conservatively rated for continuous duty
- Advanced packaging for optimum thermal and mechanical design
- Easy service access without removal from rack; all tubes readily accessible for replacement
- Provision for remote DC vernier voltage adjustment
- Heavy-duty barrier type terminal block located for convenient rack cabling

**CONDENSED DATA:**

### DC OUTPUT

**Regulated for line and load**

**(See data under photograph)**

Voltage range for each model is completely covered in four continuously variable bands as follows:

| MODELS | VOLTAGE BANDS |
|---|---|
| C-280, 480, 880, 1580 | 0- 50, 50-100, 100-150, 150-200 |
| C-281, 481, 881, 1581 | 125-175, 175-225, 225-275, 275-325 |
| C-282, 482, 882, 1582 | 325-375, 375-425, 425-475, 475-525 |

Current rating applies over entire voltage range.

**Regulation:** *Line* Better than 0.15% or 0.3 Volt (whichever is greater). For input variations from 105-125 VAC.
*Load* Better than 0.25% or 0.5 Volt (whichever is greater). For load variations from 0 to full load.

**Transient Response:** *Line* Output voltage is constant within regulation specifications for step-function line voltage change of plus (+) 10 volts or minus (−) 10 volts rms within the limits of 105-125 VAC.
*Load* Output voltage is constant within regulation specifications for step-function load change from 0 to full load or full load to 0.

**Ripple and Noise:** Less than 3 millivolts rms.

### AC OUTPUT

(unregulated)...6.5 VAC (at 115 VAC Input).[3]
C-200 Series...10 AMP; C-400 Series...15 AMP;
C-800 Series...20 AMP; C-1500 Series...30 AMP.

[3]Allows for voltage drop in connecting leads. Isolated and ungrounded.

### AC INPUT

105-125 VAC, 50-400 CPS

### OVERLOAD PROTECTION

**Electrical:** AC and DC fuses, front panel, with built-in blown-fuse indicators. Fuse, rear of chassis.

### CONTROLS

**DC Output Controls:** Band-switches and screw-driver adjusting vernier-control, rear of chassis.

### PHYSICAL DATA

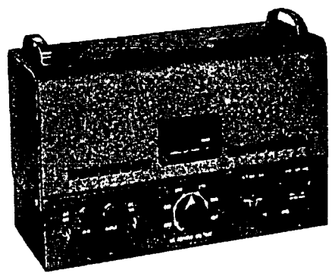
**Size:**
C-200 Series....5¼" H x 19" W x 14⅜" D.
C-400 Series....5¼" H x 19" W x 14⅜" D.
C-800 Series....7" H x 19" W x 14⅜" D.
C-1500 Series...8¾" H x 19" W x 14⅜" D.

**Panel Finish:** Black ripple enamel (standard). Special finishes available to customers' specifications at moderate surcharge.

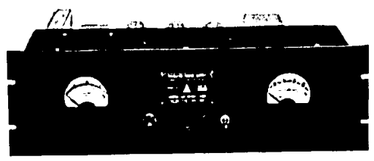
For details, circle #23 on Reader Service Card

# 100 MA Series

Portable Models



MODEL 25: 200-325 VDC, 0-100 MA..... $69.50
MODEL 26: 100-200 VDC, 0-100 MA..... 79.50



Rack Models

MODEL 28: (without meters) 200-325 VDC, 0-100 MA. $59.50
MODEL 29: (without meters) 100-200 VDC, 0-100 MA. 69.50
MODEL 28M: (with meters) 200-325 VDC, 0-100 MA. 89.50
MODEL 29M: (with meters) 100-200 VDC, 0-100 MA. 99.50

**CONDENSED DATA**

**DC OUTPUT**

**Regulated for line and load**

(See data under photograph)

Voltage is continuously variable over entire range. Current rating applies over entire voltage range.

**Regulation:** Line Better than 1%.
Load Better than 1%.

**Internal Impedance:** Less than 10 ohms.

**Ripple and Noise:** Less than 10 millivolts rms for Models 25 and 28. Less than 5 millivolts rms for Models 26 and 29.

**AC OUTPUT**

**(unregulated)** 6.5 VAC at 3A (at 115 VAC input).

**AC INPUT**

105-125 VAC, 50-400 CPS.

**PHYSICAL DATA**

**Size:** 8" H x 14" W x 6" D. Models 25, 26.

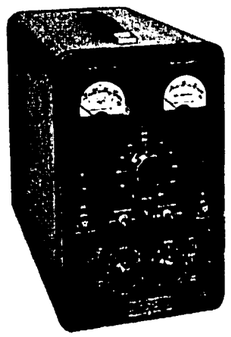
**Finish:** Two-tone gray ripple enamel.

**Size:** 5¼" H x 19" W x 8" D. Models 28, 29.

**Finish:** Black ripple enamel (standard). Special finishes available to customers' specifications at moderate surcharge.

# 200 MA Series

MODEL 71: 0-500 VDC,
0-200 MA
0-50, 0-200 VDC bias
$310.00



## Special Features

- Continuously variable output 0-500 VDC
- Conservatively rated for continuous duty
- Oil-filled, hermetically sealed capacitors
- Vacuum-varnish impregnated transformers and chokes
- Magnetic circuit breakers
- Vernier high voltage adjustment
- 30-second time-delay relay circuit
- Every specification lab-checked before shipment

**CONDENSED DATA**

**DC OUTPUT NO. 1**

**Regulated for line and load**

(See data next to photograph)

Voltage is continuously variable over entire range. Current rating applies over entire voltage range.

**Regulation:** Line 0.15% or 0.3 volt.
Load 0.15% or 0.3 volt.

**Internal Impedance:** Less than 4 ohms.

**Ripple and Noise:** Less than 5 millivolts rms.

**AC OUTPUTS**

**(unregulated)** Two outputs, isolated and ungrounded. Each is 6.5 VAC at 5A.

**AC INPUT**

105-125 VAC, 50-60 CPS.

**PHYSICAL DATA**

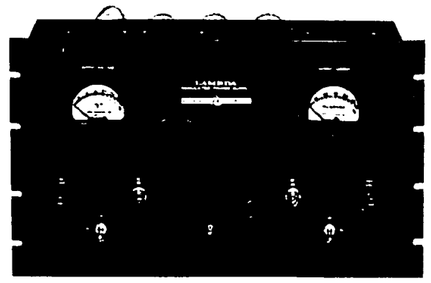
**Cabinet Style:** Portable. Leather carrying handle.

**Size:** 13" H x 8¾" W x 14½" D.

**Finish:** Two-tone gray ripple enamel.

For details, circle #24 on Reader Service Card

# 300 MA Series



32M (with meters): 200-325 VDC, 0-300 MA.....$169.50
33M (with meters): 100-200 VDC, 0-300 MA..... 184.50
32 (without meters): 200-325 VDC, 0-300 MA.... 139.50
33 (without meters): 100-200 VDC, 0-300 MA.... 154.50

## Special Features

- Conservatively rated for continuous duty
- Oil-filled, hermetically sealed capacitors
- 50 to 400 CPS input
- Vacuum-varnish impregnated transformers and chokes
- Separate AC and DC switches
- Every specification lab-checked before shipment

**CONDENSED DATA**

**DC OUTPUT**

**Regulated for line and load**

(See data under photograph)

Voltage is continuously variable over entire range. Current rating applies over entire voltage range.

**Regulation:** Line Better than 1%.
Load Better than 1%.

**Internal Impedance:** Less than 4 ohms.

**Ripple and Noise:** Less than 10 millivolts rms.

**AC OUTPUTS**

**(unregulated)** Two outputs, isolated and ungrounded. Each is 6.5 VAC at 5A.

**AC INPUT**

105-125 VAC, 50-400 CPS.

**CONTROLS**

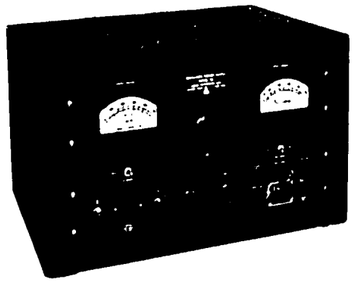
**DC Output Control:** Screw driver adjusting control, rear of chassis.

**PHYSICAL DATA**

**Size:** 10½" H x 19" W x 9¼" D.

**Finish:** Black ripple enamel (standard). Special panel finishes available to customer's specifications at moderate surcharge.

# 500 MA Series



50: 0-500 VDC, 0-500 MA, 0-50, 0-200 VDC bias, $440.00
50R: 0-500 VDC, 0-500 MA, 0-50, 0-200 VDC bias, 420.00

## Special Features

- Continuously variable output 0-500 VDC
- Conservatively rated for continuous duty
- Oil-filled, hermetically sealed capacitors
- Vacuum-varnish impregnated transformers and chokes
- Magnetic circuit breakers
- Vernier high voltage adjustment
- 30-second time-delay relay circuit
- Every specification lab-checked before shipment

**CONDENSED DATA**

**DC OUTPUT NO. 1**

**Regulated for line and load**

(See data under photograph)

Voltage is continuously variable over entire range. Current rating applies over entire voltage range.

**Regulation:** Line 0.15% or 0.1 volt.
Load 0.5% or 0.3 volt.

**Ripple and Noise:** Less than 8 millivolts rms.

**AC OUTPUTS**

**(unregulated)** Two outputs, isolated and ungrounded. Each is 6.5 VAC at 5A.

**AC INPUT**

105-125 VAC, 50-60 CPS.

**PHYSICAL DATA**

**Mounting:** Model 50R: Standard 19" rack mounting.
Model 50: Cabinet model.

**Size:** Model 50R: 10½" H x 19" W x 14¼" D.
Model 50: 12½" H x 22" W x 15" D.

**Panel Finish:** Black ripple enamel.

For details, circle #25 on Reader Service Card

# CHECK LIST OF LAMBDA REGULATED D. C. POWER SUPPLIES

| Model | Style | Voltage Range (VDC) | Current Range | Regulation Impedance Ripple (Table I) | 6.3 VAC Output (Amps) | Meters | Output Voltage Control | Output Terminals | Size Weight (Table II) | Price (U.S. and Canada) F.O.B. Factory College Pt., N. Y. |
|---|---|---|---|---|---|---|---|---|---|---|
| **REGULATED POWER SUPPLIES — RACK MOUNTING** | | | | | | | | | | |
| **TRANSISTORIZED** | | | | | | | | | | |
| LT-1095 | Rack | 0-32 | 0-1 AMP | A | — | None | Rear | Rear | S-1 | 285.00 |
| LT-1095M | Rack | 0-32 | 0-1 AMP | A | — | 2½" rect | Rear | Rear | S-1 | 315.00 |
| LT-2095 | Rack | 0-32 | 0-2 AMP | B | — | None | Rear | Rear | S-1 | 365.00 |
| LT-2095M | Rack | 0-32 | 0-2 AMP | B | — | 2½" rect | Rear | Rear | S-1 | 395.00 |
| LA-50-03A | Rack | 0-34 | 0-5 AMP | C | — | None | Rear | Rear | S-2 | 395.00 |
| LA-50-03AM | Rack | 0-34 | 0-5 AMP | C | — | 2½" rect | Rear | Rear | S-2 | 425.00 |
| LA-100-03A | Rack | 0-34 | 0-10 AMP | D | — | None | Rear | Rear | S-3 | 510.00 |
| LA-100-03AM | Rack | 0-34 | 0-10 AMP | D | — | 3½" rect | Rear | Rear | S-3 | 540.00 |
| **TUBE REGULATED** | | | | | | | | | | |
| C-280 | Rack | 0-200 | 0-200 MA | E | 10A | None | Rear | Rear | S-4 | 184.50 |
| C-280M | Rack | 0-200 | 0-200 MA | E | 10A | 3½" rect | Rear | Rear | S-4 | 214.50 |
| C-281 | Rack | 125-325 | 0-200 MA | E | 10A | None | Rear | Rear | S-4 | 159.50 |
| C-281M | Rack | 125-325 | 0-200 MA | E | 10A | 3½" rect | Rear | Rear | S-4 | 189.50 |
| C-282 | Rack | 325-525 | 0-200 MA | E | 10A | None | Rear | Rear | S-4 | 169.50 |
| C-282M | Rack | 325-525 | 0-200 MA | E | 10A | 3½" rect | Rear | Rear | S-4 | 199.50 |
| C-480 | Rack | 0-200 | 0-400 MA | F | 15A | None | Rear | Rear | S-4 | 259.50 |
| C-480M | Rack | 0-200 | 0-400 MA | F | 15A | 3½" rect | Rear | Rear | S-4 | 289.50 |
| C-481 | Rack | 125-325 | 0-400 MA | F | 15A | None | Rear | Rear | S-4 | 244.50 |
| C-481M | Rack | 125-325 | 0-400 MA | F | 15A | 3½" rect | Rear | Rear | S-4 | 274.50 |
| C-482 | Rack | 325-525 | 0-400 MA | F | 15A | None | Rear | Rear | S-4 | 259.50 |
| C-482M | Rack | 325-525 | 0-400 MA | F | 15A | 3½" rect | Rear | Rear | S-4 | 289.50 |
| C-880 | Rack | 0-200 | 0-800 MA | G | 20A | None | Rear | Rear | S-5 | 340.00 |
| C-880M | Rack | 0-200 | 0-800 MA | G | 20A | 3½" rect | Rear | Rear | S-5 | 370.00 |
| C-881 | Rack | 125-325 | 0-800 MA | G | 20A | None | Rear | Rear | S-5 | 315.00 |
| C-881M | Rack | 125-325 | 0-800 MA | G | 20A | 3½" rect | Rear | Rear | S-5 | 345.00 |
| C-882 | Rack | 325-525 | 0-800 MA | G | 20A | None | Rear | Rear | S-5 | 360.00 |
| C-882M | Rack | 325-525 | 0-800 MA | G | 20A | 3½" rect | Rear | Rear | S-5 | 390.00 |
| C-1580 | Rack | 0-200 | 0-1500 MA | H | 30A | None | Rear | Rear | S-6 | 550.00 |
| C-1580M | Rack | 0-200 | 0-1500 MA | H | 30A | 3½" rect | Rear | Rear | S-6 | 580.00 |
| C-1581 | Rack | 125-325 | 0-1500 MA | H | 30A | None | Rear | Rear | S-6 | 575.00 |
| C-1581M | Rack | 125-325 | 0-1500 MA | H | 30A | 3½" rect | Rear | Rear | S-6 | 605.00 |
| C-1582 | Rack | 325-525 | 0-1500 MA | H | 30A | None | Rear | Rear | S-6 | 650.00 |
| C-1582M | Rack | 325-525 | 0-1500 MA | H | 30A | 3½" rect | Rear | Rear | S-6 | 680.00 |
| 28 | Rack | 200-325 | 0-100 MA | J | 3A | None | Rear | Rear | S-7 | 59.50 |
| 28M | Rack | 200-325 | 0-100 MA | J | 3A | 3½" rect | Rear | Rear | S-7 | 89.50 |
| 29 | Rack | 100-200 | 0-100 MA | K | 3A | None | Rear | Rear | S-7 | 69.50 |
| 29M | Rack | 100-200 | 0-100 MA | K | 3A | 3½" rect | Rear | Rear | S-7 | 99.50 |
| 32 | Rack | 200-325 | 0-300 MA | L | 2 @ 5A | None | Rear | Rear | S-8 | 139.50 |
| 32M | Rack | 200-325 | 0-300 MA | L | 2 @ 5A | 3½" rect | Rear | Rear | S-8 | 169.50 |
| 33 | Rack | 100-200 | 0-300 MA | L | 2 @ 5A | None | Rear | Rear | S-8 | 154.50 |
| 33M | Rack | 100-200 | 0-300 MA | L | 2 @ 5A | 3½" rect | Rear | Rear | S-8 | 184.50 |
| 50R | Rack | 0-500 | 0-500 MA | M | 2 @ 5A | 4½" rect | Front | Fr & rear | S-9 | 420.00 |
| | | 0-50 | Bias | N | | | | | | |
| | | 0-200 | High Imped. | P | | | | | | |
| **REGULATED POWER SUPPLIES — PORTABLE AND BENCH** | | | | | | | | | | |
| 25 | Bench | 200-325 | 0-100 MA | J | 3A | None | Front | Front | S-10 | 69.50 |
| 26 | Bench | 100-200 | 0-100 MA | K | 3A | None | Front | Front | S-10 | 79.50 |
| 50 | Bench | | | | | See Model 50R above | | | S-11 | 440.00 |
| 71 | Portable | 0-500 | 0-200 MA | Q | 2 @ 5A | 3½" rect | Front | Front | S-12 | 310.00 |
| | | 0-50 | Bias | R | | | | | | |
| | | 0-200 | High Imped. | S | | | | | | |

**TABLE I**
DC OUTPUT VOLTAGE REGULATION, IMPEDANCE, RIPPLE

| | REGULATION | | Internal Impedance (ohms) | Ripple, rms (millivolts or %) |
|---|---|---|---|---|
| | Line Voltage AC* | Load (min to max) | | |
| | Less than | Less than | Less than | Less than |
| A | 0.15% or 20MV | 0.15% or 20MV | 0.50 | 1MV |
| B | 0.15% or 20MV | 0.15% or 20MV | 0.025 | 1MV |
| *C | 0.15% or 20MV | 0.15% | .01 | 1MV |
| *D | 0.15% or 20MV | 0.15% | .005 | 1MV |
| E | 0.15% or 0.3V | 0.25% or 0.5V | 6 | 3MV |
| F | 0.15% or 0.3V | 0.25% or 0.5V | 3 | 3MV |
| G | 0.15% or 0.3V | 0.25% or 0.5V | 1.5 | 3MV |
| H | 0.15% or 0.3V | 0.25% or 0.5V | 0.75 | 3MV |
| J | 1% | 1% | 10 | 10MV |
| K | 1% | 1% | 10 | 5MV |
| L | 1% | 1% | 4 | 10MV |
| M | 0.15% or 0.1V | 0.5% or 0.3V | 2 | 8MV |
| N | 0.1% | unregulated | 3,300 | 2MV |
| P | 0.1% | unregulated | 17,500 | 5MV |
| Q | 0.15% or 0.3V | 0.15% or 0.3V | 4 | 5MV |
| R | 0.1% | unregulated | 5,500 | 2MV |
| S | 0.1% | unregulated | 25,000 | 5MV |

*100 to 130 VAC. All other Models 105-125 VAC

**TABLE II**
SIZES AND WEIGHTS

| | Size H x W x D (Inches) | WEIGHT Net (lbs) | Shipping (lbs) |
|---|---|---|---|
| S-1 | 3½ x 19 x 14⅜ | 35 | 65 |
| S-2 | 3½ x 19 x 14⅜ | 55 | 85 |
| S-3 | 7 x 19 x 14⅜ | 100 | 130 |
| S-4 | 5¼ x 19 x 14⅜ | 53 | 80 |
| S-5 | 7 x 19 x 14⅜ | 84 | 100 |
| S-6 | 8¾ x 19 x 14⅜ | 120 | 140 |
| S-7 | 5¼ x 19 x 8 | 19 | 23 |
| S-8 | 10½ x 19 x 9¼ | 42 | 52 |
| S-9 | 10½ x 19 x 14¼ | 89 | 140 |
| S-10 | 8 x 14 x 6 | 19 | 23 |
| S-11 | 12½ x 22 x 15 | 110 | 158 |
| S-12 | 13 x 8¾ x 14½ | 49 | 85 |

## GENERAL SPECIFICATIONS

Sufficient tolerance is incorporated in the specifications to allow for normal commercial component and tube deviations. Tube replacements may be made with any equivalent tubes meeting E.I.A. specifications.

**INPUT** 105-125 VAC, 50-400 CPS, single phase. Exceptions: Models 50, 50R and 71—105-125 VAC, 50-60 CPS, Models LA50-03A and LA100-03A—100-130 VAC, 60 ± 0.3 cycle.

**DC OUTPUT** *Voltage Range:* Continuously variable over ranges specified, except where otherwise noted.

*Current Range:* The current ranges given apply to the entire DC output voltage range, and for input voltages from 105 to 125 VAC, and in the case of LA models 100-130 VAC, no "de-rating" is necessary.

*Polarity:* Either positive or negative terminal may be grounded.

**AC OUTPUT** The AC output is unregulated, isolated and ungrounded. It has a value of slightly higher than 6.3 V (when fully loaded) at an input of 115 VAC. This value allows for voltage drop in connecting leads. Dual outputs may be connected in series or parallel.

**DUTY CYCLE** Continuous duty at full load.

**METERS** Where meters are indicated, a separate voltmeter and milliammeter are provided.

**OVERLOAD PROTECTION** Ample protection is provided against external overload and internal failure conditions by means of fuses.

Circuit breakers of the magnetic, "trip-free" type are employed in Models 50, 50R, 71, LT and LA series, as protection against external overloads. And in the LT and LA series, the transistor complement is independently protected by special transistor circuitry.

**STYLE** Rack Models are designed for mounting on standard 19" relay racks.

Bench Models are provided with compact, specially-designed, ventilated cabinets equipped with carrying handles. The power supply units may be removed from their cabinets for mounting in standard relay racks (except Models 25, 26 and 71).

**RATINGS AND COMPONENTS** All components used are of the highest quality and are operated well within manufacturers' ratings. Hermetically sealed, oil-filled capacitors are used exclusively, except in LT series and LA series, where special high purity foil, long-life electrolytics are used. Hermetically sealed transformers designed to MIL-T-27A are used in the LA series, LT series and Com-Pak series. Ample safety factors are provided in the design to insure the long life, and the dependable, trouble-free operation so desirable in industrial and laboratory applications.

*All specifications and prices subject to change without notice.*

**LAMBDA ELECTRONICS CORP.**
11-11 131 STREET • COLLEGE POINT 56, N. Y. • INDEPENDENCE 1-8500

For details, circle #26 on Reader Service Card

# FREQUENCY COUNTERS

CATALOG 605

**Frequency:**
10 cps to 10 MC basic counter
10 cps to 500 MC with plug-ins

**Period:**
0.01 cps to 100 KC

**Total Events:**
1 to 99,999,999

**Time Interval:**
1 μs to 10,000,000 secs

**Connections:**
Printer

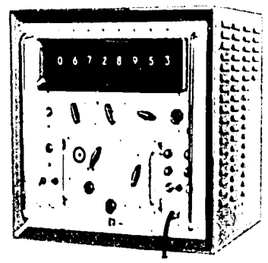
**Dimensions:**
Rack — 19 x 17 1/32 x 16
Bench — 19½ x 18½ x 18¾

**Weight:**
95 pounds

**Standard Oscillator:**
1 part $10^6$ short time
2 parts $10^6$ per week
Model 14-20A $1,700.00

• • •

**High Stability Oscillator:**
3 parts $10^9$ per minute period
1 part $10^8$ per day
5 parts $10^8$ per week
Model 14-20AT $2,000.00
Nixie Readout — Model suffix "N"
$280.00 additional




**Model 14-20AN (Nixie Readout) with Frequency Converter 14-21**

## PLUG-INS FOR 14-20 SERIES COUNTERS

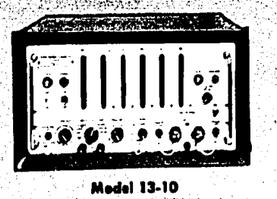
| | Frequency Converter | Frequency Converter | Frequency Converter | Video Amplifier | Time Interval | Period Multiplier |
|---|---|---|---|---|---|---|
| **Range** | 10 MC to 100 MC (10 cps to 10 MC as amplifier) | 100 MC to 220 MC | 10 MC to 500 MC | 10 cps to 10 MC | 1 μs to 10,000,000 secs | 0 to 100 KC |
| **Sensitivity in Volts** | 0.01 rms as converter<br>0.1 rms as amplifier | 0.2 rms | 0.2 rms | .01 rms | 1 peak | 1 rms |
| **Input Impedance** | 50 ohms as converter<br>1 megohm shunted (40 mmf μμf as amplifier) | 50 ohms approx | 50 ohms approx | | 1 megohm 40 μμf shunt | 1 megohm 40 μμf shunt |
| **Accuracy** | Same as basic counter | Same as basic counter | Same as basic counter | | ± 1 count for μsec duration; oscillator stability for long duration | Direct 0.3%; 10,000 period average, 0.00003% |
| **Model** | 14-21 | 14-22 | 14-26 | 14-23 | 14-24 | 14-25 |
| **Price** | $250.00 | $250.00 | $595.00 | $150.00 | $175.00 | $225.00 |

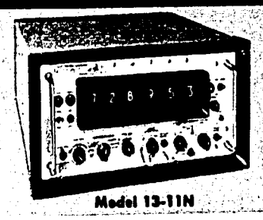
For details, circle #27 on Reader Service Card

**NORTHEASTERN ENGINEERING, INC.**
MANCHESTER, NEW HAMPSHIRE

# FREQUENCY COUNTERS

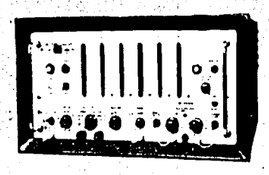
## 120 KC COUNTERS

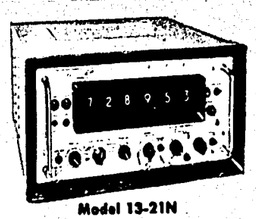

Model 13-10


Model 13-11N

| | Model 13-10 | Model 13-11N |
|---|---|---|
| **Frequency** | 10 cps to 120 KC | 10 cps to 120 KC |
| **Time Interval** | 10 μs to 100,000 secs | None |
| **Standard Oscillator**<br>1 part $10^6$ short time<br>2 parts $10^6$ per week | MODEL 13–10<br>$795.00 | MODEL 13–11<br>$695.00 |
| **High Stability Oscillator**<br>3 parts $10^9$ per one minute period<br>1 part $10^8$ per day<br>5 parts $10^8$ per week | MODEL 13–10T<br>$1,095.00 | MODEL 13–11T<br>$995.00 |

## 1.2 MC COUNTERS


Model 13-20


Model 13-21N

| | Model 13-20 | Model 13-21N |
|---|---|---|
| **Frequency** | 10 cps to 1.2 MC | 10 cps to 1.2 MC |
| **Time Interval** | 1 μs to 100,000 secs | None |
| **Standard Oscillator**<br>1 part $10^6$ short time<br>2 parts $10^6$ per week | MODEL 13–20<br>$995.00 | MODEL 13–21<br>$895.00 |
| **High Stability Oscillator**<br>3 parts $10^9$ per one minute period<br>1 part $10^8$ per day<br>5 parts $10^8$ per week | MODEL 13–20T<br>$1,295.00 | MODEL 13–21T<br>$1,195.00 |

**Period: 0 to 50 KC**

**Total Events: 1 to 999,999**

**Connections: Printer and Scope**

**Dimensions: Rack — 19 x 8¾ x 15½ deep**
**Bench — 20¾ x 10¼ x 16½ deep**

**Weight: 50 pounds**

**Nixie Readout — Model suffix "N" $210.00 additional**

**Prices and Specifications subject to change without notice.**

For details, circle #28 on Reader Service Card

# COUNTER ACCESSORIES, READOUTS, FREQUENCY STANDARDS, DECADES, LAB CARTS



**DIGITAL PRINTER**

**MODEL 14-27** $875.00 All Electronic Matrix 8 digit capacity

| | | | |
|---|---|---|---|
| **Print Rate:** | 1.5 lines per second | **Power:** | 115 V AC, 100 VA |
| **Drive Source:** | 1-2-2-4 binary | **Dimensions:** | 17 x 17 x 7 high |
| **Print Signal:** | Minus 15 volts | **Mounting:** | Rack or Bench |

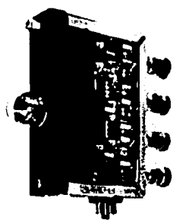


**FREQUENCY CALIBRATOR**

**MODEL 14-31** $770.00

| | |
|---|---|
| **Dimensions:** | 6¾ x 5¼ x 17 |
| **Weight:** | 13 pounds |
| **Output Frequency:** | 100 KC sine wave |
| **Stability:** | ±3 parts $10^9$ per one minute period at 25 degrees C<br>±1 part $10^8$ per day or less<br>±5 parts $10^8$ per week |
| **Output Level:** | 0.2 V rms |
| **Input Power:** | 115 V, 60 cps, ±10 V |

# DECADE PLUG-IN COUNTERS Series 140 and 120


MODELS 140-40N and 140-100N

| | 140-40* | 140-100* | 140-1100* | 120-100 Preset |
|---|---|---|---|---|
| **Max Count KC/sec** | 40 | 120 | 1200 | 120 |
| **Resolution μsec** | 8 | 4 | 0.5 | 4 |
| **Voltage Driving (Pulse)** | −50 | −70 | −20 | −70 |
| **Voltage Output (Pulse)** | −100 | −100 | −75 | −100 |
| **Power** vac/amps<br>vdc/ma | 6.3/1.2<br>300/9 | 6.3/1.2<br>300/14 | 6.3/1.2<br>300/47 | 6.3/1.5<br>300/17 |
| **Mounting** | Octal | Octal/11 pin | Octal/11 pin | Octal |

*Add "N" for Nixie Model Prices on Request

# SCOPE, COUNTER, TEST CARTS






| | | | | |
|---|---|---|---|---|
| **Model** | 20–1 | 20–2 | 20–3 | 20–4 |
| **Use** | Any bench mounting | Counters, Plug-ins | Rack Mounts and Bench Mounts | Scopes — Slant Top |
| **Dimensions**<br>**Weight** | 23 x 23 x 36.5<br>85# | 23 x 23 x 36.5<br>95# | 23 x 23 x 36.5<br>90# | 19 x 26 x 36<br>80# |
| **Price** | $49.50 | $64.50 | $54.50 | $49.50 |

Notes: Optional — 2 Brakes — $6.50 extra per cart. Standard finish — light gray enamel MIL-E-15090B. Handles and hardware — brass, nickel plate. Shipped — knocked down.

For details, circle #29 on Reader Service Card

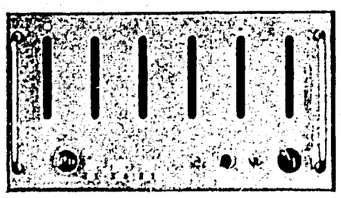
TEL: NAtional 2-6485
P.O. Box 150

**NORTHEASTERN ENGINEERING, INC.**

25 SOUTH BEDFORD STREET
MANCHESTER, NEW HAMPSHIRE

# CONTINUOUS TIME INTERVAL METERS AND DIGITAL DATA RECORDING SYSTEMS FOR TESTING INERTIAL GYROS, ACCELEROMETERS AND SIMILAR DEVICES

## MODEL 70-1 TIMER

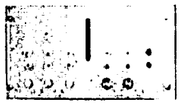


This timer has many applications other than that of testing inertial gyros, for which it was originally designed. Due to an electronic storage, it measures *continuous* time intervals. The count in storage is read out or printed out, while the interval is being measured.

When used in gyro testing, the timer measures elapsed time between pulses generated by the rate table. Both increments and continuous intervals are measured and the output is either time increment or incremental merus (milli earth rate units). This "timer with a memory" measures continuous time intervals to the nearest 0.001 seconds. When properly triggered, the decade counters transfer their count to storage, automatically re-set, and continue to count in less than 1 milli-second. The count held in storage is printed or punched on tape or card.

Internal crystal oscillators generate either a 10.00000 KC standard frequency or a 10.02738 KC sidereal. Six digits can be printed. Maximum time interval with standard time base is 999.999 seconds. Output is 1-2-2-4 code, 0-90 V level.

### MODEL 70-2 TIME AVERAGING UNIT

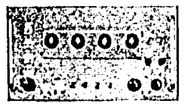


The time averaging unit averages out eccentricities present in test tables. It electronically averages output of two pick-ups such as photocells on the M.I.T. Type "D" tables.

The Model 70-2 has one input for each of the two pulse sources. It has two outputs: one presents a trigger pulse to the timer only after the second trigger pulse is received by the unit. The second output presents a variable frequency to the timer as a variable time base.

A self check feature checks the internal gating. Indicator lights show the proper sequence of operation.

### MODEL 70-3 TABLE ANGLE INDICATOR



In measuring drift rate of inertial gyros, table angle corresponding to rate data must be known. This information is furnished by: Nixie readout, and printed or punched readout adjacent to the corresponding time or meru data.

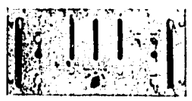
The Model 70-3 may be used with 10 degree, 1 degree, 0.1 degree or 10 minute data. It may be used to trigger the 70-1 timer to give a times 10 degree average by stepping the 70-3 directly with the table pulse generator.

### MODEL 70-4 KEYBOARD CONTROL PANEL



The control panel is used with the tape punch output and contains the metering, switching and indicators for the system. It also contains a manual keyboard for punching such information on the tape as gyro number, temperature, table number, revolution number, etc.

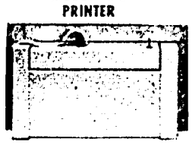
### MODEL 70-5 GYRO DECELERATION UNIT



The 70-5 records data for plotting curves of deceleration versus speed. Any number of runs may be recorded on one tape. Gyros with rundown times of 5 minutes or more can be plotted up to 60 points. Miniature gyros with rundown time of 30 seconds or less may be plotted up to 15 points.

Data may be processed in the computer and curves plotted by a point plotter; or may be reduced and plotted manually. Determination of friction, windage and pre-load are obtained.

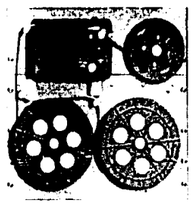
### MODEL 70-6 PRINTER



This specially designed unit embodies a code converter with up to 4 input pulses and 1 output pulse to utilize the binary code output of the decade scalers. The matrix is solid state.

Direct reading may be in meru (milli earth rate units). The associated error is less than 0.1% between ±10 meru.

### MODEL 70-7 TAPE PUNCH



The tape punch readout punches two tapes simultaneously so that one tape can be processed at any time during the run, while the other tape will contain information for more than one run.

The tape punch data may be reduced in the computer to provide: fourier coefficients; gyro unbalance; residuals for each unbalance point; RMS gyro drift rate, etc.

### MODEL 80-1 TIMER

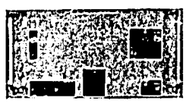


The 80 Series test equipment was designed to utilize the Farrand inductosyn, driven by the rotating test table.

The 80-1 timer measures *continuous* time intervals to ±1 μsec. Due to the time interval required for the particular printer readout used, the minimum time interval is 0.3 seconds so therefore, any greater interval is measured to an accuracy of ±1 μsec.

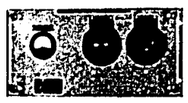
Timer can selectively be triggered by positive or negative pulses. It contains its own 100 KC time base or can be driven from an external standard. It has an attenuator on the input and a 1 sec and 10 sec self check. Output is binary coded decimal. Seven place readout is visible from front panel for reading self check as well as for viewing operation.

### MODEL 80-2 PRESET COUNTER



The inductosyn signal is fed to the preset counter. This special counter is designed to give pulses at zero cross-over of the inductosyn signal. These pulses are fed through a series of dividers and then through the output of the preset counter. Divisions are selectable from a front panel control. The 80-2 is calibrated for the following degrees per readout: 2, 10, 18, 20, 90, 360, 720. Front panel indicators visually show input pulses and output pulses.

### MODEL 80-3 TILT ANGLE INDICATOR UNIT



The tilt angle indicator Model 80-3 allows the setting of a precise angle of the test table with the inductosyn. Angles can be repeated to within 0.25 second of arc.

The unit contains excitation equipment for the inductosyns. Tilt angle readout, including a precision gear train, vernier reading dials, and a null indicator are integral.

For details, circle #30 on Reader Service Card

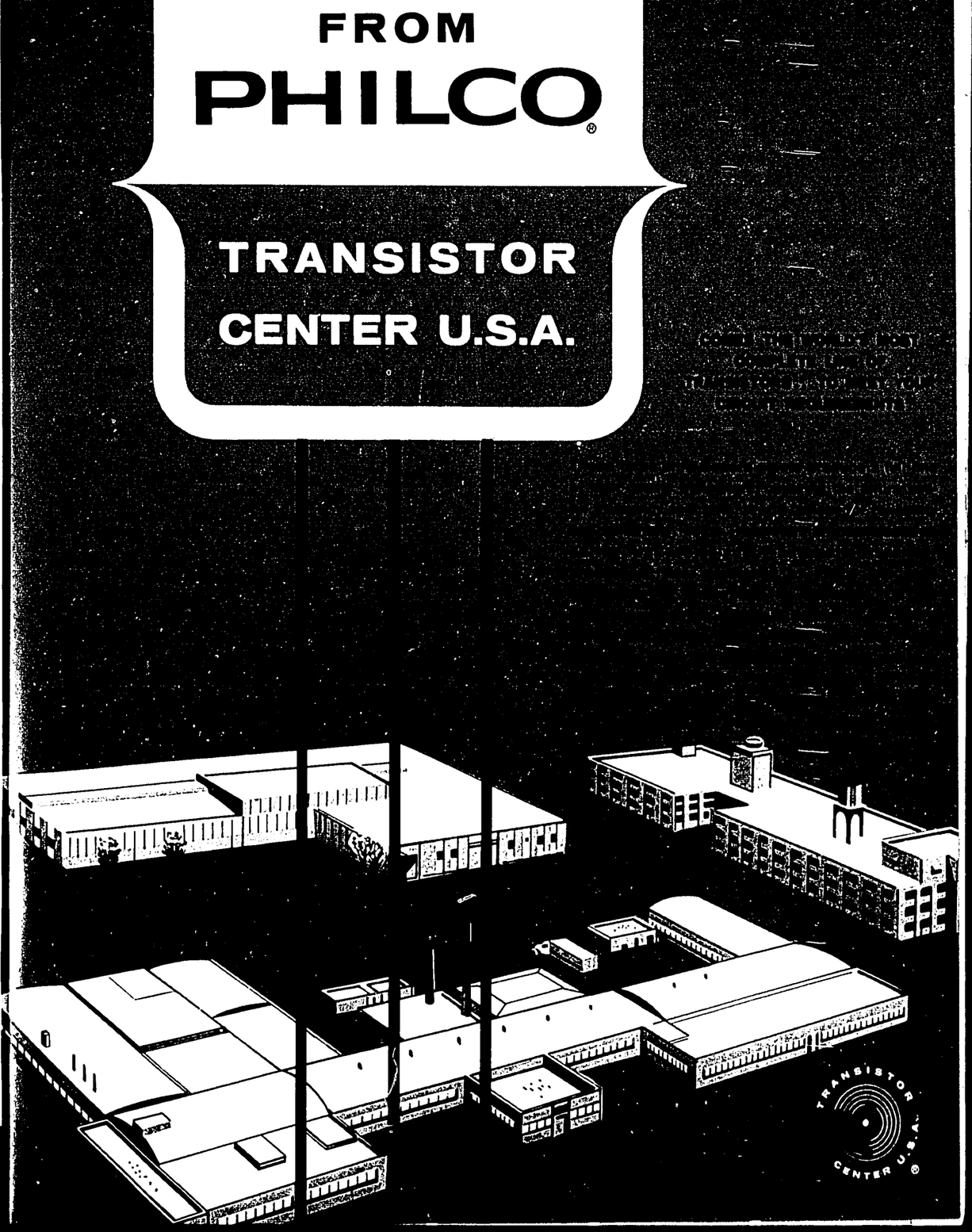
**NORTHEASTERN ENGINEERING, INC.**

MANCHESTER, NEW HAMPSHIRE

FROM

PHILCO®

TRANSISTOR CENTER U.S.A.



# PHILCO *The world's most complete line of transistors!*



## SURFACE BARRIER TRANSISTORS (SBT**)

| TYPE | GAIN $h_{fe}$ | FREQUENCY $f_{max}$ in mc | APPLICATIONS |
|---|---|---|---|
| 2N128 | 40 | 60 | General communications; MIL specifications |
| 2N240 | 30 | Switching rates 10mc | High-speed switch; controlled hole storage and saturation characteristics; MIL specifications |
| 2N344 | 22 | 50 | General purpose; narrow beta spread (11-33) |
| 2N345 | 35 | 50 | General purpose; similar to 2N344 with higher beta |
| 2N346 | 35 | 75 | General purpose; like 2N344 and 2N345 but higher frequency |

## MICRO ALLOY TRANSISTORS (MAT*)

| TYPE | GAIN $h_{FE}$ | FREQUENCY | APPLICATIONS |
|---|---|---|---|
| 2N393 | 75 | Switching rates 15mc | High-speed, high-gain switch; MIL specifications |
| 2N1122 | Min 25 | Switching rates 12mc | High-voltage, high-speed switch |
| 2N1122A | Min 25 | Switching rates 12mc | Higher voltage version of 2N1122 |
| 2N1411 | 75 | Switching rates 15mc | High frequency switch; MIL specs |
| 2N1427 | 75 | Switching rates 15mc | General purpose, high-speed switch |

## MICRO ALLOY DIFFUSED-BASE TRANSISTORS (MADT*)

| TYPE | GAIN | FREQUENCY $f_{max}$ in mc | APPLICATIONS |
|---|---|---|---|
| 2N499 | 10 db @ 100 mc | 320 | VHF amplifier; MIL specifications |
| 2N501 | $h_{FE}$ 35 | Switching rates 25mc | Ultra-fast switch; typical $t_r$ 13 mμsec, $t_s$ 7 mμsec, $t_f$ 7 mμsec |
| 2N501A | $h_{FE}$ 35 | Switching rates 25mc | Rated at 100°C; MIL specifications |
| 2N502 | 10db @ 200 mc | 650 | VHF amplifier |
| 2N502A | 11.5db @ 200 mc | 750 | Rated at 100°C; MIL specifications |
| 2N503 | 12.5db @ 100 mc | 350 | VHF amplifier |
| 2N504 | 46db @ 455 kc | Minimum 50 | IF amplifier; high level logic switch |
| 2N588 | 14db @ 50mc | 250 | General purpose RF-IF amplifier |
| 2N1158 | 25mw PO | at 200 mc | UHF power oscillator |
| 2N1204 | $h_{FE}$ 60 | Switching rates 30mc | High current switch & core driver |
| 2N1494 | $h_{FE}$ 60 | Switching rates 30mc | High current, high power switch & core driver |
| 2N1495 | $h_{FE}$ 60 | Switching rates 20mc | Higher voltage version of 2N1204 |
| 2N1496 | $h_{FE}$ 60 | Switching rates 20mc | Higher voltage version of 2N1494 |
| 2N1499 | $h_{FE}$ 50 | Switching rates 10mc | High-speed, saturated switch |
| 2N1500 | $h_{FE}$ 50 | Switching rates 25mc | Ultra-fast switch; typical $t_r$ 13 mμsec, $t_s$ 7 mμsec, $t_f$ 7 mμsec |

## MINIATURE TRANSISTORS

| TYPE | GAIN $h_{fe}$ | FREQUENCY $f_{\alpha b}$ in mc | APPLICATIONS |
|---|---|---|---|
| 2N207 | 100 | 2 | Low-level amplifier; particularly suited for hearing aid use; N.F.† 15db max |

*Trademarks Reg. U.S. Pat. Off.
**Trademark Philco Corp.
†Noise Figure at 1 μv reference level across 1,000 ohms

For details, circle #32 on Reader Service Card

## MINIATURE TRANSISTORS

| TYPE | GAIN $h_{fe}$ | FREQUENCY $f_{\alpha b}$ in mc | APPLICATIONS |
|---|---|---|---|
| 2N207A | 100 | 2 | Low-level amplifier; particularly suited for hearing aid use; N.F.† 10db max |
| 2N207B | 100 | 2 | Hearing aid input stage; other extremely low noise applications; N.F.† 5db max |
| 2N534 | 100 | 1 | High voltage amplifier switch |
| 2N535 | 100 | 2 | Low-level amplifier and switch; N.F.† 10db max. |
| 2N535A | 100 | 2 | Low-level amplifier and switch; N.F.† 5db max |
| 2N535B | 100 | 2 | Low-level amplifier and switch; N.F.† 0db max |
| 2N536 | $h_{FE}$ 150 | Switching rates 150kc | Low-level switch at pulse rates up to 150kc |

## SILICON SURFACE ALLOY DIFFUSED-BASE TRANSISTORS (SADT*)

| TYPE | GAIN $h_{fe}$ | FREQUENCY | APPLICATIONS |
|---|---|---|---|
| 2N1199 | $h_{FE}$ 25 | Switching rates 10mc | NPN high-speed silicon switch; max $t_r$ 70 mμsec, $t_s$ 20 mμsec, $t_f$ 40 mμsec |
| 2N1267 | 11 | 24db at 4.3mc | NPN silicon amplifiers and oscillators |
| 2N1268 | 20 | 25db at 4.3mc | |
| 2N1269 | 50 | 26db at 4.3mc | |
| 2N1270 | 11 | 24db at 12.5mc | NPN silicon amplifiers and oscillators |
| 2N1271 | 20 | 25db at 12.5mc | |
| 2N1272 | 50 | 26db at 12.5mc | |
| 2N1472 | $h_{FE}$ 35 | Switching rates 10mc | NPN high frequency silicon switch |
| 2N1663 | $h_{FE}$ 50 | Switching rates 10mc | Higher beta version of 2N1199 |

## SILICON SURFACE ALLOY TRANSISTORS (SAT*)

| TYPE | GAIN $h_{FE}$ | FREQUENCY $f_T$ in mc | APPLICATIONS |
|---|---|---|---|
| 2N495 | $h_{fe}$ 20 | $f_{max}$ 21mc | General purpose; MIL specs |
| 2N496 | 16 | Switching rates 1mc | High-speed switching; MIL specs |
| 2N1118 | $h_{fe}$ 20 | $f_{max}$ 18mc | General purpose; MIL specs |
| 2N1118A | $h_{fe}$ 25 | $f_{max}$ 18mc | General-purpose amplifier, high beta (15-35) |
| 2N1119 | 16 | Switching rates 1mc | High-speed switching; MIL specs |
| 2N1428 | 30 | 35 | General purpose, low-cost, high-frequency, silicon amplifier and switch; TO-1 case |
| 2N1429 | 30 | 35 | Electrical equivalent of 2N1428 in TO-5 case |

## MEDIUM FREQUENCY TRANSISTORS

| TYPE | GAIN $h_{FE}$ | FREQUENCY | APPLICATIONS |
|---|---|---|---|
| 2N597 | 70 | Switching rates 1mc | High-voltage general purpose amplifier and switch |
| 2N598 | 125 | Switching rates 500kc | 500kc logic switching |
| 2N599 | 175 | Switching rates 1mc | Logic switching rates up to 1mc; core driver; MIL specifications |
| 2N600 | 125 | Switching rates 500kc | 1 watt peak power dissipation for 0.1 sec; stud mount |

For details, circle #33 on Reader Service Card

## MEDIUM FREQUENCY TRANSISTORS

| TYPE | GAIN $h_{FE}$ | FREQUENCY | APPLICATIONS |
|---|---|---|---|
| 2N601 | 175 | Switching rates 1mc | High-power core driver; typical rise time 0.1 μsec; stud mount |
| 2N1123 | 70 | Switching rates 300kc | High-voltage power amplifier and switch; stud mount |
| 2N1478 | 70 | Switching rates 300kc | Switching applications |

## PULSE AMPLIFIER TRANSISTORS

| TYPE | GAIN $h_{FE}$ | FREQUENCY $f_{\alpha b}$ in kc | APPLICATIONS |
|---|---|---|---|
| 2N670 | $h_{fe}$ 100 | 700 | High peak current pulse amplifier; relay driver |
| 2N671 | 100 | 700 | High power version of 2N670; stud mount |
| 2N672 | Min 20(SAT) | Switching rates 100kc | High-current switching core driver; controlled rise, fall and store times |
| 2N673 | Min 20(SAT) | Switching rates 100kc | High power version of 2N672; stud mount |
| 2N674 | $h_{fe}$ 100 | min 400 | 75 volt version of 2N670 |
| 2N675 | 100 | min 400 | 75 volt version of 2N671 |

## MEDIUM POWER TRANSISTORS

| TYPE | GAIN $h_{FE}$ | FREQUENCY $f_{\alpha b}$ in mc | APPLICATIONS |
|---|---|---|---|
| 2N223 | $h_{fe}$ 110 | 0.6 | Audio driver; exceptional beta lin. |
| 2N1416 | $h_{fe}$ 110 | 0.6 | Matched pair of 2N223's |
| 2N224 | 90 | 0.51 | Audio output; exceptional beta linearity |
| 2N225 | 90 | 0.51 | Matched pair of 2N224's |
| 2N226 | 60 | 0.4 | Audio output and switch; exceptional beta linearity |
| 2N227 | 60 | 0.4 | Matched pair of 2N226's |
| 2N1124 | $h_{fe}$ 100 | 1 | High-voltage, general-purpose industrial amplifier and switch |
| 2N1125 | $h_{fe}$ 75 | 1.6 | High-voltage, medium-frequency amplifier and switch |
| 2N1128 | $h_{fe}$ 100 | 1 | Exceptionally linear beta; audio driver and output |
| 2N1129 | 165 | 0.75 | General-purpose, high beta, audio and switch |
| 2N1130 | 125 | 0.75 | General-purpose audio and switch; exceptional beta linearity |

## POWER TRANSISTORS

| TYPE | GAIN | FREQUENCY $f_{\alpha e}$ in kc | APPLICATIONS |
|---|---|---|---|
| 2N386 | 33db at 5w PO | 14 | High-voltage, high-power amplifiers, servo amplifiers, converters and switches |
| 2N387 | 33db at 5w PO | 12 | High-voltage, high-power amplifiers, servo amplifiers, converters and switches |

REFERENCE CHART FOR PHILCO TRANSISTORS

Write for Your Free Copy of this Handy Reference Chart.

**Address: Dept. 504**
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PHILCO

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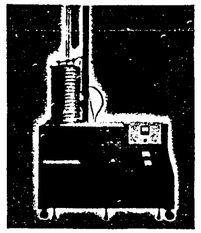
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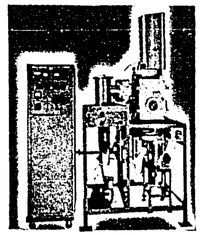
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# Kinney® HIGH VACUUM EQUIPMENT



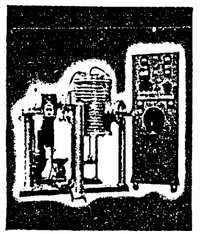
### ULTRA HIGH VACUUM SYSTEMS

The KINNEY UH-9A is the first Ultra High Vacuum System producing working pressures in the order of 1 x $10^{-9}$ mm Hg with realistic time cycles. The UH-9E, employing Electronic pumping, is a companion system. Both are equipped with fittings customarily found in High Vacuum Evaporators. Ask for Bulletins 4150.1 and 4160.1.



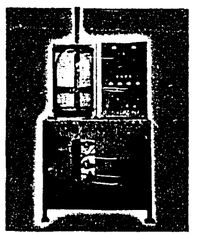
### FLOATING ZONE REFINER

An important advance in the purification of semi-conductor materials and refractory metals, this KINNEY development will process loads 6" to 10" long and up to 1½" in diameter with purification heretofore unattainable. Chamber suitable for use with vacuum or inert gas atmosphere. Ask for Bulletin 4501.1.



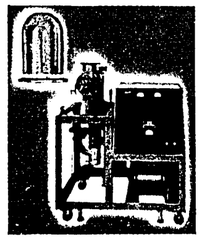
### F-9 UNIVERSAL LABORATORY FURNACE

Laboratory furnace of improved design with a capacity of 5 lbs. of steel or similar volume of other metals if crucible is tilt poured; or 25 lbs. if bottom plug pouring is employed. Can be provided with resistance or induction heaters to attain temperatures in excess of 2000° C. Ask for Bulletin 4560.1A.



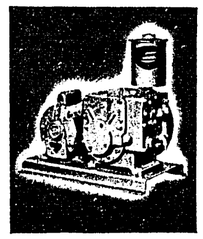
### HIGH VACUUM EVAPORATORS

The KINNEY Line of High Vacuum Evaporators embraces sizes from small laboratory units to high production equipment with chambers 6 ft. in diameter. Model R-2 illustrated has a high capacity pumping system which will produce pressures in the order of 1 x $10^{-4}$ mm Hg. in seven minutes. Ask for Bulletin 4100.1D.



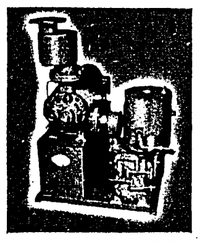
### PACKAGED PUMPING SYSTEMS

KINNEY Packaged Pumping Systems afford speedy evacuation of chambers, tanks, bell jars, tubes, etc., with ultimate pressures to 1 x $10^{-7}$ mm Hg. Systems consist of KINNEY Cold Trap, Fractionating Oil Diffusion Pump, two-stage Mechanical Pump, Operating and Control Panel. Ask for Bulletin 4000.1.



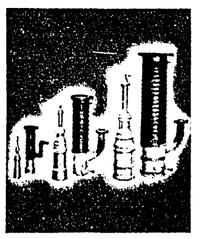
### MECHANICAL HIGH VACUUM PUMPS

The KINNEY Line of Single-Stage Mechanical Pumps spans the range from 13.0 to 780 cfm free air displacement and attains ultimate pressures to .010 mm Hg or better. Two-Stage Pumps attain pressures to .002 mm Hg with models ranging from 2.0 to 46.0 cfm free air displacement. Ask for Bulletins 3120.1 and 3150.1.



### MECHANICAL BOOSTER VACUUM PUMPS

A major advance in vacuum technology . . . developed to produce clean, dry vacuum with maximum speed and at lowest cost. These Kinney two-stage and four-stage Pumps, covering a range from 30 to 5100 cfm free air displacement, attain ultimate pressures of .0002 mm Hg. or lower. Ask for Bulletin 3180.1.



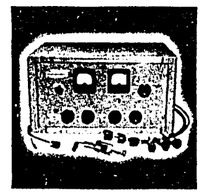
### OIL DIFFUSION PUMPS

KINNEY High Speed and Fractionating Oil Diffusion Pumps offer high pumping speed in the low micron region. High Speed models—1" to 10" . . . Fractionating models—2" to 16" and higher. KINNEY straight-through and right-angle Poppet Valve Baffles also available. Ask for Bulletins 3270.1 and 3290.1.



### HIGH VACUUM VALVES

KINNEY High Vacuum Valves comprise a broad selection of sizes in globe, diaphragm and gate types for manual or pneumatic operation. All KINNEY Valves are mass spectrometer leak-tested prior to shipment. ½" to 3" sizes for screwed fittings . . . 1" to 32" sizes for flanged connections. Ask for Bulletin 3421.1.



### VACUUM GAGES

The KINNEY Series GICT Ionization-Thermocouple Gages are superior instruments covering the Vacuum pressure range from 3000 microns to 1 x $10^{-3}$ mm Hg. Two meters provide for simultaneous Ionization and Thermocouple Gage readings. Cabinet and Panel mounted models. Ask for Bulletins 3800.1 and 3811.1.

### HIGH VACUUM ACCESSORIES

High Vacuum Valves, Packaged Power Units, Low Voltage and Rectified Power Supplies, Liquid Nitrogen Cold Traps, Complete Gage Systems, Ionization Gage Tubes, Feed-throughs of all sizes, Rotary Motion Devices, Headers, Filament Holders, Pyrex and Stainless Steel Bell Jars, Bell Jar Guards, Japanese Fan Shutters, Work-Holding Fixtures, Tripods, Gaskets, Highest Purity Coating Materials.

**KINNEY** VACUUM DIVISION
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- ☐ Ultra High Vacuum Systems
- ☐ Floating Zone Refiner
- ☐ Laboratory Furnaces
- ☐ Evaporators
- ☐ High Vacuum Valves

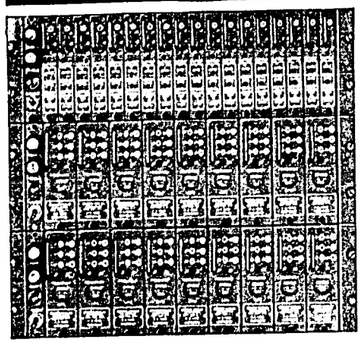
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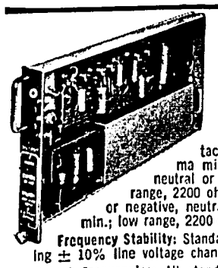
For details, circle #35 on Reader Service Card

# Northern Radio TRANSISTORIZED Voice Frequency Carrier Telegraph Systems



**18 CHANNELS IN ONLY 15¾" PANEL SPACE**

***Top shelf shows 18 FS Tone Keyers, Type 211, Model 1; Next 2 shelves contain 9 each FS Tone Converters, Type 212, Model 2.***



## FREQUENCY SHIFT TONE KEYER
### Type 211, Model 1

**Keying Inputs, levels and impedances:** 1: Contact keying (internal battery to "dry" contacts) 1 ma min.; 2. DC current pulses, positive or negative, neutral or polar; high range, 220 ohms, 30 ma. min; low range, 2200 ohms, 0.5 ma. min.; 3. DC voltage pulses, positive or negative, neutral or polar; high range, 100,000 ohms, 10 volts min.; low range, 2200 ohms, 1 volt min.

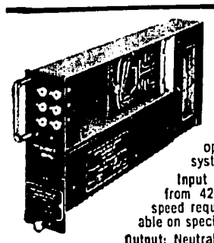
**Frequency Stability:** Standard Networks ± 2 cps total for all causes including ± 10% line voltage change and ± 25°C. from 25°C. temperature change.

**Output Frequencies:** All standard VF carrier channels from 425 to 3315 cps. Bandwidth dependent on keying speed requirements. Other frequencies and bandwidths available on special order.

**Output Level and Impedance:** 5 dbm maximum, into 600 ohms, unbalanced. May be paralleled with any number of other Keyers operating on different frequencies in the same audio system.

**Power Requirements:** 14 V DC, 15 MA. Two transistorized power supplies and one automatic change-over relay are mounted on the rear of each mounting shelf.

**Dimension:** ⅞" wide x 5¼" high x 10½" deep.



## FREQUENCY SHIFT TONE CONVERTER
### Type 212, Model 2

**Input Level and Impedance:** —48 dbm to +8 dbm into 600 ohms, unbalanced. May be paralleled with any number of other converters operating on different frequencies in the same audio system.

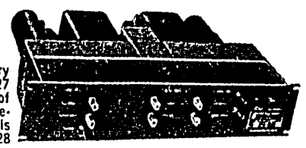
**Input Frequencies:** All standard telegraph VF channels from 425 to 3315 cps. Bandwidth dependent on keying speed requirements. Other frequencies and bandwidths available on special order.

**Output:** Neutral DC voltage pulses of 5 volts maximum across a 2000 ohm external load. Polar pulses ± 10 volts across a 2000 ohm external load. Output drives appropriate voltage-to-current converters, such as Northern Radio Type NRC 691 Transistor Relay which provides "Dry Contact" Keying to external battery supply.

**Power Requirements:** 14 V DC at 30 MA. Two transistorized power supplies and one automatic change-over relay are mounted on the rear of each mounting shelf.

**Dimensions:** 1⅞" x 5¼" x 11¾" deep. For rack mounting a number of these units, a shelf assembly is available accommodating nine (9) units in a panel height of 5¼".

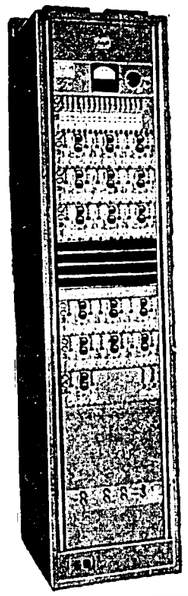
## LINE BATTERY P.S. PANEL



The Northern Radio Line Battery Power Supply Panel, Type 227 Model 1, is used as a source of DC power for teleprinter, telegraph and similar circuits. It is equipped with two (2) Type 228 Model 1 Power Supplies, to provide DC requirements for a group of eighteen (18) or less teleprinter channels. The two Power Supplies are normally mounted on the Line Battery Power Supply Panel, Type 227 Model 1, with one Supply operating and the second "standing-by." An automatic transfer circuit is provided on the panel to place the "stand-by" unit in operation should the first supply fail. The Line Battery Power Supply Panel, Type 227 Model 1, is 3½" high x 19" long. The AC input and DC output circuits are isolated from each other and also from chassis so that either side of the circuit may be grounded, or left ungrounded as may be determined.

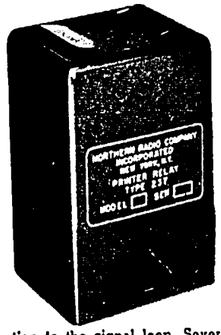
**Technical Data:**
AC Input: 115/230 volt, 50/60 cycles AC ± 10%. Output Voltage: 120 volts DC nominal. Maximum Output Current: 1.2 amperes. Maximum Output Ripple Voltage: 2%.

## 16-CHANNEL DIVERSITY SYSTEM



- Diversity switching sensitivity from —60 dbm to 0 dbm

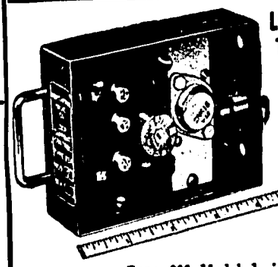
The Northern Radio Voice Frequency Telegraph Terminal, Type 235 Model 1, is a multi-channel frequency shift communications terminal used for transmission and reception of telegraph, teleprinter or telemetering signals over channels subject to fading or attenuation changes, such as long distance point-to-point radio circuits. It provides the necessary equipment for transmission of 16 intelligence channels over one (1) voice frequency circuit, and diversity reception of 16 similar channels, received through two (2) voice frequency circuits. The two (2) voice frequency receiving circuits are normally obtained from radio receivers arranged for space diversity reception. Means are provided to allow reception on a frequency diversity basis rather than space diversity. A combination of space and frequency diversity may be utilized for maximum reliability, when conditions are such as to require same. All the necessary equipment may be mounted in approximately ⅔ of one standard 7-foot telegraph rack.




## PRINTER RELAY
### Type 237, Model 1

The Northern Radio Printer Relay, Type 237 Model 1, is used as a coupling device between a DC teleprinter signal loop and the printer selector magnet. It replaces electro-mechanical signal relays and their associated local DC power supplies normally used with printers, providing the advantages of relays and improving printer performance but eliminating the maintenance problems which electro-mechanical relays introduce.

This device effectively isolates the reactance of the printer selector magnet, presenting a resistive termination to the signal loop. Several printers equipped with this device can, therefore, be connected in series with the same signal loop without harmful interaction between them. The Printer Relay may be used with either polar or neutral keyed signals. When neutral signals are supplied, the device automatically selects the proper operating level for the loop current supply, and can therefore tolerate large changes in absolute values of loop current without introducing appreciable distortion into the printer selector magnet. It normally mounts within the housing of the teleprinter.



## LOOP CURRENT CONTROL
### Type 238 Models 1 and 2

The Northern Radio Loop Current Control, Type 238 Model 1, is used as a current "normalizer" in DC teleprinter signal loops, to automatically maintain loop current at the optimum value despite changes in loop resistance or loop supply voltage.

The Loop Current Control, Type 238 Model 1, is designed for use in loops requiring a nominal 60 milliamperes operating current, while the Model 2 is designed for a nominal 20 milliampere circuit. Both models incorporate a calibration control to allow reasonable variations from these design values.

**Input Impedance:** Variable. Automatically changes as necessary to maintain "constant current" in the circuit to which connected. Maximum and minimum limit of operation are specified by allowable voltage drops across the terminals of the device.

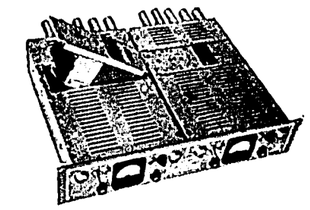
**Voltage Limits:** Maximum—80 volts; Minimum—5 volts.

**Operating Currents:** Model 1: 60 milliamperes (adjustable 55-75 milliamperes). Model 2: 20 milliamperes (adjustable 10-30 milliamperes).



# MULTI-CHANNEL FREQUENCY SHIFT TONE TELEGRAPH SYSTEMS

These Multi-Channel Telegraph Systems are audio carrier systems capable of multiplexing such circuits as telephone lines, VHF, UHF, or radio frequency links—or practically any type circuit from which a two-wire audio circuit can be derived. Designed to meet any speed requirements, these systems are fully electronic, without relays or moving parts to wear. They can be used for high-speed printer, Morse or time division Multiplex circuits, as well as such application as Telemetering, Control Circuits and Servo-Mechanisms. Instantaneous and complete sending and channel control permits any binary code groups, either "Clear Text" or "Cryptographic," to be channelized without need for additional phasing or synchronizing equipment, while paralleling of channels will allow for transmission of other type codes, such as 3 element cable code. The completely independent operation of each channel, including its own power supply, localizes faults to one channel only, leaving other channels unaffected. Individual channel separation filters are used at both transmitting and receiving ends. This arrangement allows for sending telegraph or control signals over a circuit carrying, simultaneously, other forms of intelligence: or for two-way communications on the same line. The audio frequency shift principle of transmission provides for high fidelity of signal reproduction over a wide range of signal levels as well as under severe noise or interference conditions. Circuit requirements of any speed, shift and center frequency can readily be met. The systems illustrated are for use on printer circuits up to 100 WPM channel capacity. The system arrangement is very flexible, permitting grouping of the basic units into various arrangements of Multiplex Systems. These systems can be made to accommodate a large variety of channel numbers and speeds to meet any individual requirements. The flexibility is further improved by the fact that the racks, power control units, and terminal connection panels are the same for both transmitting and receiving terminals.

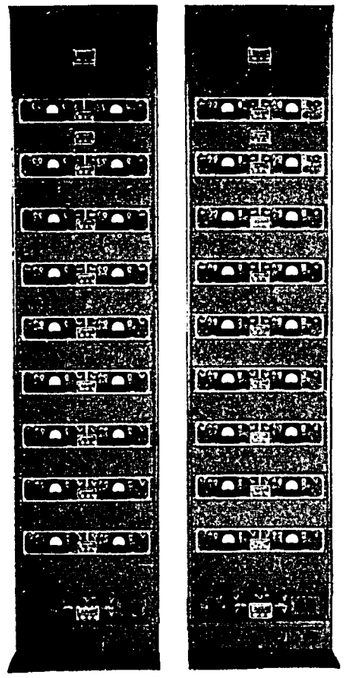


**DUAL FS TONE KEYER; TYPE 153 MODEL 3:**

Keying Input.... Relay contacts, ± DC current or voltage pulses, neutral or polar.

Input Level.... DC voltage: ± 10 volts min. DC current: 45 ma min., ± or polar. Relay: contact rating 5 ma min.

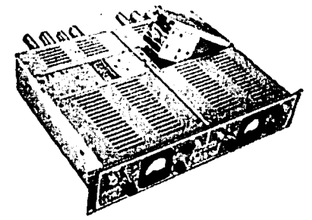
Keying Input Z... DC voltage: 100K ohms. DC current: 220 ohms.



TRANSMITTER



RECEIVER



**DUAL FS TONE CONVERTER: TYPE 152 MODEL 3:**

Input Z: 600 ohms, unbalanced.

Input Level:—40 dbm to 0 dbm.

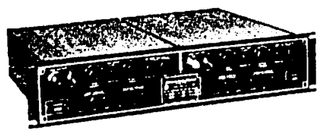
Input Frequencies: 18 channels, 425-3315 cps, 170 cycle spacing.

Keying Speed: 45 dot cycles.

## DUPLEX TELEGRAPH SYSTEM FOR MULTI-CHANNEL TONE EQUIPMENT

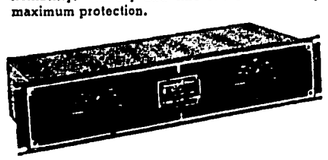
SEVEN NEW FEATURES in this system—simple 4-position switch selects from 12 possible duplex combinations: duplex operation between stations connected via carrier telegraph channels; *all-electronic*, without relays or moving parts; polar or neutral for either half duplex or full duplex; break-in now also possible for all *half*-duplex circuits; provided with positive feature to prevent space signal lock-out; includes individual line battery for each channel.

The Northern Radio Duplex Telegraph System consists of one each Dual Frequency Shift Tone Keyer, Type 153 Model 3; Dual Duplex Selector Panel, Type 200 Model 1; Dual Loop switch Panel, Type 200A Model 1; and Dual Frequency Shift Tone Converter, Type 152 Model 3.



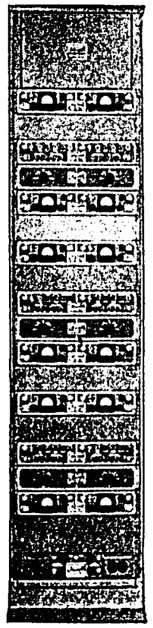
**DUAL DUPLEX SELECTOR PANEL Type 200 Model 1**

The Dual Selector Panel provides 12 loop options, patching facilities for monitoring purposes and channel routing, including the possibility of patching-in another tele-printer loop circuit (T-junction). Any of the 12 loop options are available and may be selected for the Dual Loop Switch Panel by simple strapping arrangements. It has an individual line battery for each channel for greatest circuit flexibility. Battery and line fuses are also provided for maximum protection.

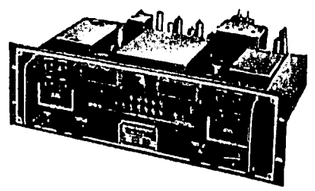


**DUAL LOOP SWITCH PANEL Type 200A Model 1**

The Dual Loop Switch Panel rapidly selects half-duplex and/or full duplex mode of operation for any of the 4 standard loop options by front panel switching available from the 12 loop options in the Dual Duplex Selector Panel.



## REGENERATIVE REPEATER
### TYPE 207 MODEL 1



This new Regenerative Repeater—the most advanced in the industry—is designed for use in telecommunication circuits to re-shape and re-time distorted signals for local use or retransmission. Special provision has also been made for its use on half-duplex where it will not only regenerate the ordinary teleprinter signals but also faithfully reproduce such special signals "break" signals and "mark restoration" information. *Outstanding features include:* . . . maximum acceptable signal distortion: new circuitry accepts up to 47% mark or space distortion: "floating" input & output circuits: completely electronic output, no relays: greater timing circuit stability: time base derived from highly stabilized L-C oscillator: adaptable to any speed: low-pass filter & frequency-determining elements are plug-in units: completely self-contained: includes power supply & line battery.

**TECHNICAL DATA:**

**Input Keying Signal Requirements:** (1) Neutral keying, positive or negative sense, (a) on-off 60 ma pulses, (b) on-off voltage pulses 10-100V into 100K ohms, (2) Polar keying, (3) Dry contact keying.

**Frequency Stability of Time Base Generator:** Less than 1 point range loss for ± 10% line voltage variation or ± 20° C ambient change from 25° C.

**Sampling Time:** Approximately 50 microseconds.

**Output:** Electronic tube outputs: (a) neutral 65 ma. max. into 2K ohms, (b) polar 33 ma (max.) into 2K ohms.

**Power Requirement:** 125 watts approx. 110/220V, 50/60 cps.

**Mounting:** Standard 19" rack mounting, 5¼" panel.

Pace-Setters in Quality Communication Equipment
NORTHERN RADIO CO. inc.
147 W. 22nd ST., NEW YORK 11, N. Y.
In Canada: Northern Radio Mfg. Co. Ltd.
1950 Bank St. Billings Bridge Ottawa Ontario

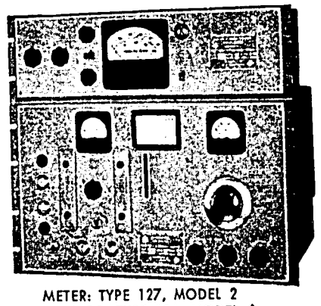
# Northern Radio FREQUENCY SHIFT TERMINAL EQUIPMENT

## FREQUENCY and SHIFT MONITOR SYSTEM

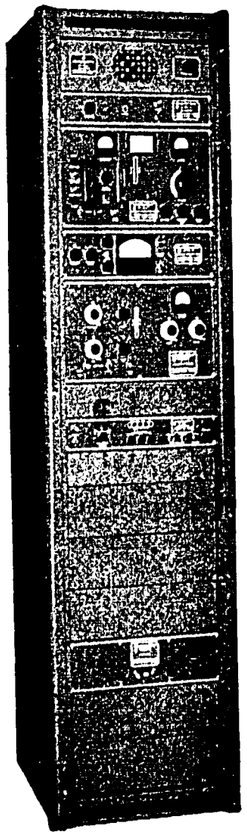
This system consists of a Type 106 Frequency and Shift Monitor and a Type 127 Frequency Meter. It is designed as a secondary standard to monitor the frequency and amount of shift of transmitter carrier output. It is particularly intended to measure the frequency shift of a mark and space (FS) signal either when setting up for traffic or under normal keying conditions.

The Monitor's stability is better than 2 cycles per megacycle over an ambient temperature range of 0-50° C—using crystals having a temperature coefficient of only 3 parts/million/degrees C. Range is 2.5-30 mc with 10 crystal-controlled frequencies (separate panel trimmers for each); use of external oscillator also provided for. Frequency Shift range is 10-10,000 cps. Less than 100 millivolts RF input needed for 2 volts audio output.

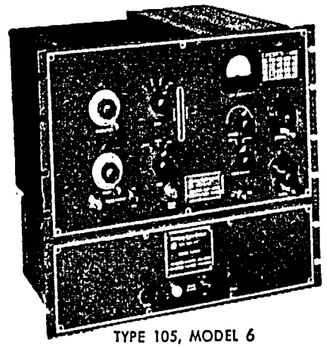
The Frequency Meter is specially designed with selectable normal and fast-acting damping factors, permitting frequency measurements of signals while keying. Its accuracy is 2% of full scale for the ranges 0-200, 500, 2000, 5000, 20,000 cps.



METER: TYPE 127, MODEL 2
MONITOR: TYPE 106, MODEL 4



TYPICAL TRANSMITTER TERMINAL for TWINPLEX OPERATION



TYPE 105, MODEL 6

## FREQUENCY SHIFT KEYER

*Supersedes and replaces its leader predecessor, Type 105, Model 4.*

- Highest stability achieved by any FS Keyer.
- Increased frequency range 1.0 to 7.0 mc.
- Pre-selection of proper FS for any particular transmitter frequency multiplication.
- Permits use with external oscillator without need of adapters.
- Improved accessibility for even easier maintenance.
- Direct-reading frequency calibration of shift from 0 to 1000 cps.
- FS dial adjusts "Mark" and "Space" frequencies equally above and below the carrier position.
- Direct-reading frequency calibration of mixer and output tuning dials from 1.0 to 7.0 mc.
- Direct reading calibration of output frequency vernier ± 600 cps.
- Pulse-shaping circuit permits operation within assigned band-width with no adjacent channel radiation.
- Linear carrier shift up to 1400 cps for Fax operations.



## TWINPLEX COMBINER TYPE 177 MODEL 1

For twinplex operation, the transmitting terminal includes a Twinplex Combiner Type 177 Model 1.

The Twinplex communication system makes possible a 2-channel radio circuit whereby 2 non-synchronous or synchronous telegraph transmissions modulate a single radio carrier wave causing the carrier to assume one of four specific frequencies with 400 cps separations.

The Combiner converts the four possible conditions of two telegraph signals (M1-M2, M1-S2, S1-M2, S1-S2) respectively into one of four voltages related in a 0-1-2-3 manner. The Combiner output voltage modulates the Frequency Shift Keyer.

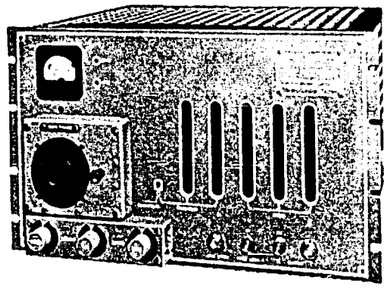
The two telegraph channels provide the same operational flexibility as that of two separate single channel FS systems. One can, for example, simultaneously use channel #1 on 60 wpm teletype and channel #2 on high-speed Morse or Time-Division Multiplex.

**TECHNICAL DATA:**

*Keying Inputs:* 1. Contacts; 2. DC current pulses, positive, negative, or polar; 3. DC voltage pulses, positive, negative, or polar.
*Input Level:* 1. DC Voltages: ± 10 volts minimum; 2. DC Current: ma. minimum.
*Keying Speed:* 240 Words per minute maximum.
*Output Impedance:* 10,000 ohms.
*Keying Input Impedance:* 1. DC Voltage: 100,000 ohms. 2. DC Current: 220 ohms.
*Output Level: Neutral:* 0 to 25 volts; Polar: +6 to −6 volts.
*Output Voltage Conditions:* Four output voltages are to be proportioned as follows assuming linear F.S. Keyer characteristic.
Input: $M_1$ $M_2$, $M_1$ $S_2$, $S_1$ $M_2$, $S_1$ $S_2$; Output 0, 1, 2, 3.
Individual level adjustments provided.
*Power Requirements:* 100/220 volts, 50/60 cycles. Approximately 50 watts. Connections at rear of chassis.
*Dimensions:* 3½" High x 19" Wide x 10" Deep.



## VARIABLE MASTER OSCILLATOR TYPE 173 MODEL 1



The Northern Radio Company Variable Master Oscillator provides a continuously variable source of radio frequency energy with a stability of approximately 1 cycle per megacycle in the range of 2 to 4 megacycles. It may be used as the basic control oscillator for diversity receivers, high frequency transmitters and other communications devices, or as a laboratory standard for test and measurement functions.

Its ease of operation and direct reading of frequency make it an outstandingly useful device where precise frequency control must be maintained by completely unskilled personnel. No curves, interpolations or calculations of any kind are required in its use. Frequency is set approximately to the desired value by rotating the oscillator dial. The last three digits of the frequency automatically pulls in to the valve pre-set on the switches and holds with an accuracy that exceeds that of most temperature-controlled crystal oscillators.

**HIGH FREQUENCY OSCILLATOR**

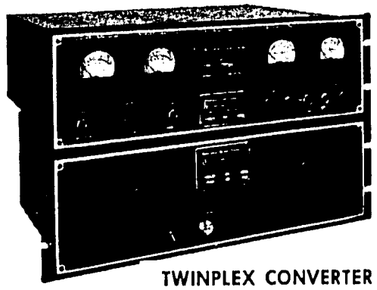
Output Frequency: 2-4 MC continuously variable.
Stability for any combination of temperature range from 0 to 50° C, and line voltage of 115 to 230 ± 10%: Approximately 1 cycle per megacycle.
Output level: ½ watt into 75 ohm load. Lever control on rear of chassis.
Readability: ± 2.5 cycles per second. Direct digital readout on mechanical and electronic counters.
Resettability: Absolute.

**BEAT FREQUENCY OSCILLATOR**

Output Frequency: 400-800 KC crystal controlled.
Output Level: 3.5 volts into 1000 ohm load. Level control on rear of chassis.

**TIME BASE CRYSTAL OSCILLATOR**

Output frequency 100 KC
Stability for 0 to 50° C and ± 10% Line Voltage change: 0.2 part per million for any 12 hour period; 1.0 part per million for thirty days.
Output Level: Approximately 2 volts.
Output Impedance: Approximately 100,000 ohms.

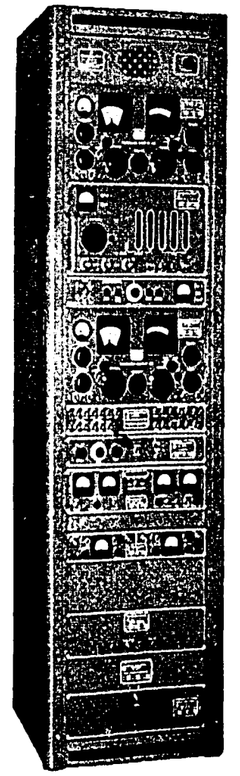


## TWINPLEX CONVERTER TYPE 178 MODEL 1

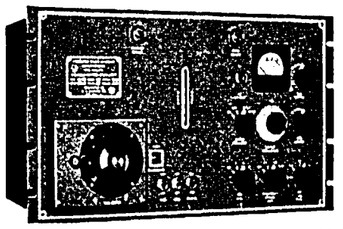
This Twinplex communication system makes possible a 2-channel radio circuit whereby 2 non-synchronous or synchronous telegraph transmissions modulate a single radio carrier wave by causing the carrier to assume one of four specific frequencies with 400 cps separations.

The receiving equipment consists of the Twinplex Converter Type 178 Model 1 and a single or diversity receiver such as the Northern Radio Type 110 Dual Diversity Receiving System. The Converter demodulates and separates the four audio tones from the radio receiver(s) into two channels each carrying the originally transmitted intelligence. The Twinplex Converter replaces the standard FS Converter for this purpose.

The two telegraph channels provide the same operational flexibility as that of two separate single channel FS systems. One can, for example, simultaneously use channel #1 on 60 wpm teletype and channel #2 on high-speed Morse or Time-Division Multiplex. It further permits the reception of channel #1 signals on all standard FS converters (tunable to 400 cps shift) without need for a Twinplex Converter: this is valuable for "Forked Circuit Operation" where the intelligence of channel #1 is intended for pick-up by other receiving stations which are not equipped for Twinplex Reception in addition to the main receiving stations which are so equipped. Reception of channel #2 (or of both channels) requires the receiving end to be equipped with a Twinplex Converter.

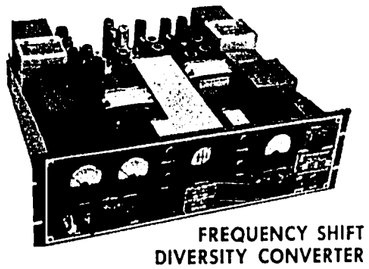


TYPICAL RECEIVER TERMINAL for TWINPLEX OPERATION



## VARIABLE MASTER OSCILLATOR TYPE 115, MODEL 1

The Variable Master Oscillator Type 173 (above) may be replaced by this Variable Master Oscillator Type 115 Model 1 which is designed principally for use in diversity reception to supply variable or crystal HFO voltage to the receivers. Its variable frequency has a stability equivalent to that obtained by non-temperature-controlled crystal oscillators. It also provides 3 HFO crystals for operation of diversity receivers where fixed frequencies are required, and 2 BFO crystals.



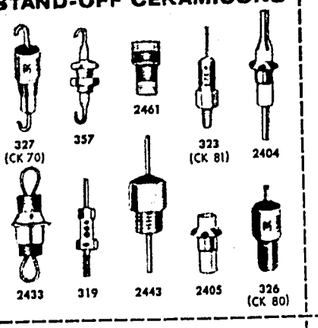
## FREQUENCY SHIFT DIVERSITY CONVERTER TYPE 174, MODEL 1

For use with either single-receiver frequency diversity systems or 2-receiver space diversity systems. By means of plug-in units, any reasonable number of channels is available between the frequencies of 425 and 3315 cps for either frequency or space diversity operation. For standard FS operation, the plug-in networks provide shift adjustments from 100 to 1000 cps shift.
Normal Input Level: −40 to +10 VU (Zero VU = 1MW into 600 ohms). (Satisfactory operation on fades to −60 VU.)
Limiter Recovery Time: Negligible for a 40 VU differential between Mark and Space frequencies.
Output: 65 ma into 2000 ohms floating (self-contained line battery).
Keying Speed: Maximum of 40 dot cycles with narrow band frequencies diversity. Up to 400 dot cycles with the wide band networks.
Monitor: 2-inch Cathode Ray tube
1 input phone jack
2 input volume level indicators
1 output current indicator

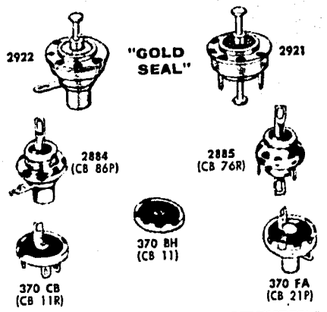
Pace-Setters in Quality Communication Equipment
NORTHERN RADIO COMPANY, inc.
147 WEST 22nd ST. NEW YORK 11, NEW YORK
In Canada: Northern Radio Mfg. Co., Ltd., 1950 Bank St., Billings Bridge, Ottawa, Ontario

# ERIE ELECTRONIC COMPONENTS

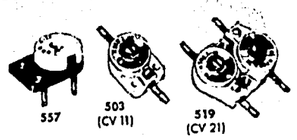
### FEED-THRU AND STAND-OFF CERAMICONS®



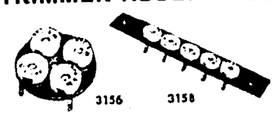

### BUTTON®-MICA CAPACITORS




### TRIMMER CERAMICONS®




### CUSTOM TRIMMER ASSEMBLIES

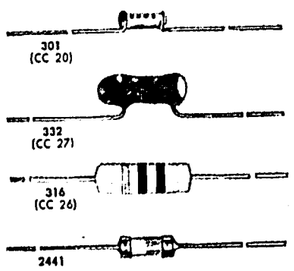



### TUBULAR TRIMMERS

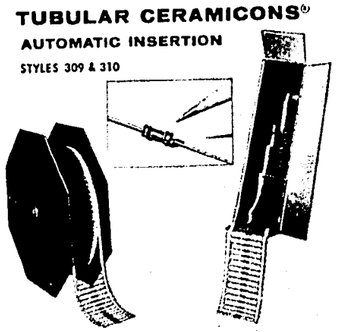



Available in many other styles

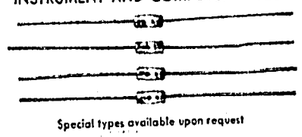
### TUBULAR CERAMICONS®




### TUBULAR CERAMICONS®
AUTOMATIC INSERTION
STYLES 309 & 310

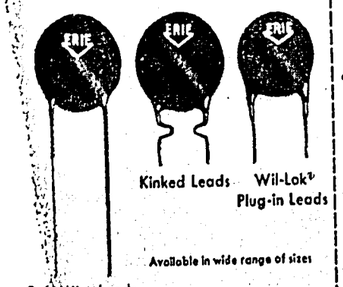


### GERMANIUM AND SILICON DIODES
GENERAL PURPOSE
INSTRUMENT AND COMPUTER TYPES

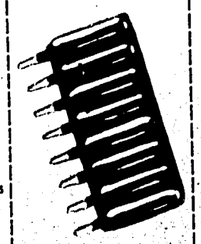


Special types available upon request

### DISC CERAMICONS®
TRANSISTOR • Hi-K® & T.C. • Hi-VOLTAGE

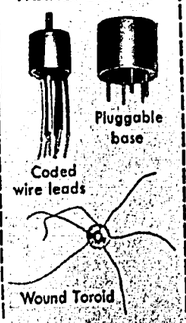



### "PAC" Pre-Assembled Components

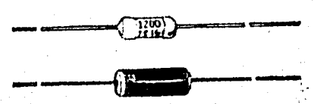


Printed Wiring Board

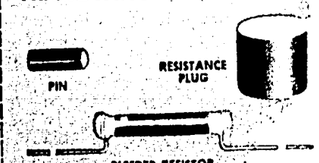
### MINIATURE PULSE TRANSFORMERS




### PRECISION FILM RESISTORS



### RESISTANCE PRODUCTS




## ERIE ELECTRONICS DIVISION
ERIE RESISTOR CORPORATION

MAIN OFFICES: ERIE, PA., U.S.A. • FACTORIES: ERIE, PA. • HOLLY SPRINGS, MISS. • TRENTON, ONTARIO, CANADA



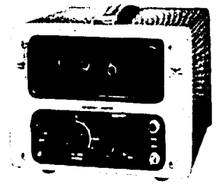
For details, circle #41 on Reader Service Card



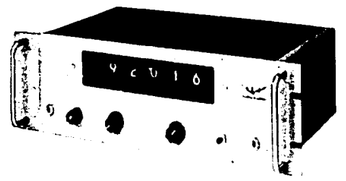
# ERIE INSTRU/MATION® for INDUSTRY

- ELECTRONIC COUNTERS
- DIGITAL INSTRUMENTS
- INTERVAL TIMERS
- CONTROL SYSTEMS

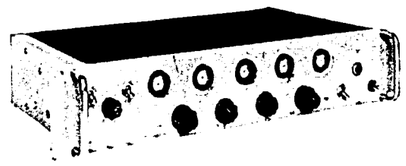
MODEL 100T: FREQUENCY COUNTER



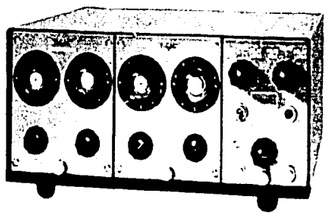
MODEL 720: FREQUENCY-FLOW-RPM COUNTER



MODEL 400: UNIVERSAL COUNTER TIMER



MODEL 320: PRE-SET COUNTER



ALSO AVAILABLE—MODEL 210: TIME INTERVAL METER  MODEL 130: EVENTS-PER-UNIT TIME METER

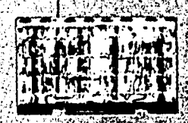
## ERIE-PACIFIC DIVISION OF ERIE RESISTOR CORPORATION
12932 SO. WEBER WAY, HAWTHORNE, CALIFORNIA

## CUSTOM BUILT ELECTRO MECHANICAL ASSEMBLIES

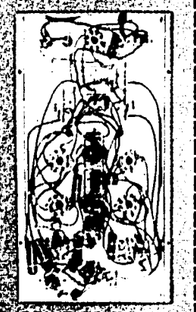
ANY TYPE OF ELECTRONIC OR ELECTRICAL ASSEMBLY, EFFICIENTLY AND ECONOMICALLY MANUFACTURED TO YOUR SPECIFICATIONS



PRINTED-BOARD ASSEMBLY

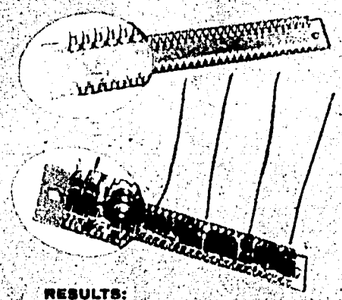


ERIE-MATIC ASSEMBLY



POINT-TO-POINT WIRING ASSEMBLY

### The ERIE Strip Package System



FEATURING:
- Automatic clip assembly
- Automatic connector cutting
- Automatic component soldering

RESULTS:
- Lower production costs
- Higher reliability in solder connections
- Easier servicing

## ERIE ELGIN LABORATORIES, INC.
SUBSIDIARY OF ERIE RESISTOR CORPORATION
WATERFORD, PENNSYLVANIA



For details, circle #40 on Reader Service Card

# electron tubes

ask **Amperex** about electronic tubes and semiconductors for every industrial and communications application.

**HELPFUL CHARTS & LITERATURE FREE:** Write for CONDENSED TUBE CATALOG, information at a glance, rapid tube data reference tables, 31 pages of condensed information arranged for quick reference. Address your distributor or Amperex direct.


5868

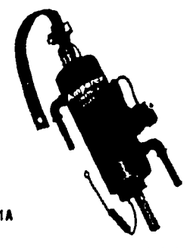

DX151



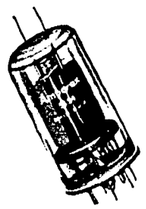
6961



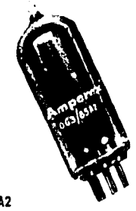
6757


5551A

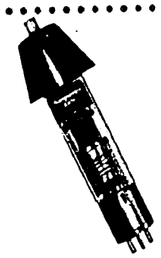

2N1516



5894

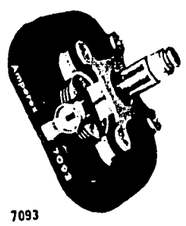


OG3/85A2

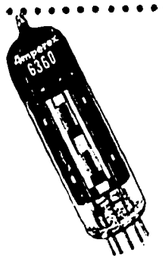

5870



7377



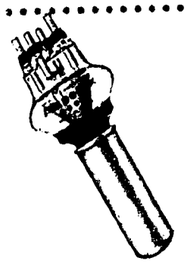
7093



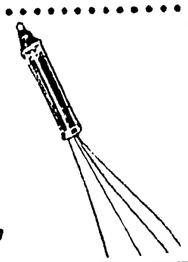
6360



6939

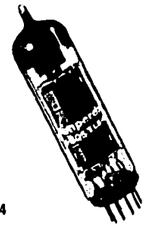

6800


18517


6977



6688



6BQ5/EL84


6693


7459

For details, circle #42 on Reader Service Card

# Amperex®

For details, circle #43 on Reader Service Card

**ELECTRONIC CORPORATION**
230 DUFFY AVE., HICKSVILLE, L. I., N. Y.
WEIls 1-6200

IN CANADA: ROGERS ELECTRONIC TUBES & COMPONENTS. 116 VANDERHOOF AVE., TORONTO 17, ONTARIO

**COMMUNICATION**
**INDUSTRIAL**
**RECTIFICATION**
**SPECIAL PURPOSE**
**RADIATION DETECTION**
**AMATEUR**
**ELECTRO-MEDICAL**
**SEMICONDUCTORS** (SEE FOLLOWING PAGE)

Detailed Data Sheets on any of these tubes, and applications engineering service are yours for the asking.

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| Tube Type | Users Allowance |
|---|---|
| 889RA | $20.00 |
| 891R, 892R | 30.00 |
| 5604 | 75.00 |
| 5667 | 20.00 |
| 6445 | 30.00 |
| 6447 | 30.00 |
| 6757 | 75.00 |
| 6801 | 75.00 |

**Price on request.
‡Price includes 10% Fed. Excise Tax.
ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

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| Type No. | Price |
|---|---|
| **BEAM POWER TUBES** | |
| 807 | $3.00 |
| 6146 | 5.00 |
| 6159 | 5.00 |
| PE06/40N | 5.95 |
| **DIODE, CLIPPER** | |
| 6339 | $44.50 |
| **COUNTERS, GEIGER** | |
| 75N | $ 16.50 |
| 75NB3 | 16.50 |
| 80N | 45.00 |
| 90CB | 27.00 |
| 90NB | 27.00 |
| 90NB4 | 27.00 |
| 100C | 54.00 |
| 100CB | 58.00 |
| 100HB | 54.00 |
| 100N | 43.50 |
| 100NB | 46.00 |
| 120C | 90.00 |
| 120CB | 95.00 |
| 120N | 90.00 |
| 120NB | 95.00 |
| 150N | 61.00 |
| 150NB | 66.00 |
| 153C | 91.00 |
| 160G | 66.00 |
| 170G | 110.00 |
| 180G | 50.00 |
| 200C | 67.00 |
| 200CB | 71.00 |
| 200HB | 67.00 |
| 200N | 56.00 |
| 200NB | 58.50 |
| 230C | 43.00 |
| 230N | 41.00 |
| 240C | 43.00 |
| 240N | 41.00 |
| 912NB | 53.00 |
| 18503 | 28.00 |
| 18508 | 127.00 |
| 18509-01 | 22.40 |
| 18510 | 127.00 |
| 18515 | 186.50 |
| 18516 | 206.25 |
| 18517 | 373.00 |
| 18518 | 412.50 |
| **COUNTER, DECADE** | |
| 6370/EIT | $16.50 |
| **DIODE, DAMPER** | |
| ‡6R3/EY81 | $1.40 |
| **TWIN DIODE** | |
| ‡5726/E91AA | $1.90 |
| **DIODE, VTVM** | |
| 6923/EA52 | $11.00 |
| **IGNITRONS** | |
| 5551A/652 | $ 65.00 |
| 5552A/651 | 99.00 |
| 5553B/655 | 245.00 |
| 5555/653B | 316.00 |
| 5822A | 116.00 |
| **TUNING INDICATORS** | |
| ‡1M3/DM70 | $ .98 |
| ‡6BR5/EM80 | 1.23 |
| ‡6CD7/EM34 | 1.48 |
| ‡6DA5/EM81 | 1.23 |
| ‡6FG6/EM84 | 1.48 |
| **KLYSTRONS** | |
| DX122 | ** |
| DX123 | ** |
| DX124 | ** |
| DX151 | ** |
| **KLYSTRON, REFLEX** | |
| 2K25 | $39.50 |

| Type No. | Price |
|---|---|
| **MAGNETRONS** | |
| 2J42 | $160.00 |
| 2J48 | 250.00 |
| 4J47 | ** |
| 4J57 | ** |
| 4J58 | ** |
| 4J59 | ** |
| 5586 | 417.00 |
| 5657 | 417.00 |
| 5780A | ** |
| 6589 | ** |
| 6972 | 325.00 |
| 7091 | ** |
| 7093 | ** |
| **PENTODES** | |
| ‡6AU6 | $ 1.05 |
| ‡6BQ5/EL84 | 1.30 |
| ‡6CA7/EL34 | 2.88 |
| ‡6CW5/EL86 | 1.43 |
| ‡6EH7/EF183 | 1.45 |
| ‡6EJ7/EF184 | 1.45 |
| ‡8BQ5/XL84 | 1.30 |
| 828 | 27.60 |
| ‡45B5/UL84 | 1.45 |
| 5654/E95F | 2.85 |
| *5847/E182F | 14.90 |
| 6007/5913 | 1.25 |
| 6008/5911 | 1.25 |
| 6083 | 14.25 |
| 6084/E80F | 3.00 |
| 6227/E80L | 3.05 |
| ‡6267/EF86 | 1.38 |
| 6375 | 8.40 |
| 6686/E81L | 4.10 |
| 6687/E91H | 1.30 |
| 6688/E180F | 6.80 |
| *6688A | 6.86 |
| 6689/E83F | 3.60 |
| ‡7189 | 1.80 |
| 7693/E90F | 3.25 |
| E99F | 3.25 |
| EFP60 | 7.50 |
| ‡EL37 | 2.88 |
| **PENTODE, DUO-DIODE** | |
| ‡6DC8/EBF89 | $1.60 |
| **TRIODE-PENTODES** | |
| ‡6BL8/ECF80 | $1.70 |
| ‡6BM8/ECL82 | 1.60 |
| ‡6U8 | 1.65 |
| ‡50BM8/UCL82 | 1.50 |
| E80CF | 3.60 |
| **PHOTOMULTIPLIERS** | |
| 52AVP | $120.00 |
| 57AVP | 850.00 |
| 58AVP | 850.00 |
| 150AVP | 62.00 |
| 50AVP-SP | 78.00 |
| 150AVP-SP | 76.00 |
| 150CVP | 84.00 |
| 51UVP | 308.00 |
| 53UVP | 462.00 |
| **RECTIFIERS** | |
| ‡1S2A/DY87 | $ 1.38 |
| ‡5AR4/GZ34 | 2.10 |
| ‡5R4G-Y | 1.90 |
| ‡6CA4/EZ81 | 1.05 |
| ‡6V4/EZ80 | .75 |
| 575A | 22.15 |
| 673 | 22.15 |
| 8020AX | 24.00 |
| **RECTIFIERS, MERCURY** | |
| 857B | $235.00 |
| 866AX | 2.65 |
| 869B | 160.00 |
| 869BL | 160.00 |
| 872AX | 9.90 |
| 6508 | 80.00 |
| 6693 | 25.00 |
| 7136 | 25.00 |
| 8008AX | 10.65 |
| **RECTIFIERS, XENON** | |
| 3B28 | $ 6.50 |
| 4B32 | 13.50 |

| Type No. | Price |
|---|---|
| **VOLTAGE REFERENCE TUBES** | |
| OE3/85A1 | $2.25 |
| OG3/85A2 | 2.25 |
| 5651 | 1.78 |
| **VOLTAGE REGULATORS** | |
| OA2 | $1.26 |
| OB2 | 1.32 |
| 90C1 | 2.25 |
| 6354/150B2 | 2.55 |
| **TETRODES** | |
| *‡2ER5 | $ 1.40 |
| *‡3ER5 | 1.40 |
| 4-125A | 36.00 |
| 4-250A | 46.50 |
| 4-400A | 48.00 |
| 4CX250B | 45.00 |
| *‡4ER5 | 1.40 |
| 4X150A | 33.15 |
| 4X150D | 33.15 |
| 4X250B | 42.50 |
| 4X250F | 42.50 |
| 4X500A | 128.50 |
| *‡6ER5/EC95 | 1.40 |
| 6075 | 250.00 |
| 6076 | 305.00 |
| 6079 | 60.00 |
| 6155 | 36.00 |
| 6156 | 46.50 |
| 6883 | 5.00 |
| 6979 | 42.50 |
| 7527 | 48.00 |
| **TETRODES, BEAM** | |
| 813 | $21.10 |
| **TWIN TETRODES** | |
| 829B | $19.00 |
| 832A | 15.90 |
| 5894 | 25.00 |
| 6252 | 25.00 |
| 6360 | 5.15 |
| 6907 | 25.00 |
| 6939 | 12.00 |
| 7377 | 25.00 |
| 7378 | ** |
| **THYRATRONS** | |
| 2D21 | $ 1.22 |
| 3C23 | 11.98 |
| 632B | 36.00 |
| 5632/C3J | 15.50 |
| 5684/C3JA | 19.80 |
| 5685/C6JA | 29.30 |
| 5727/E91N | 2.50 |
| AX260 | 150.00 |
| **THYRATRONS, HYDROGEN** | |
| 6268 | $32.50 |
| 6279 | 45.00 |
| **THYRATRONS, MERCURY** | |
| 5557/FG17/967/1701 | $ 9.50 |
| 5559 | 23.00 |
| 5560/FG95 | 33.00 |
| 5869 | 25.00 |
| 5870 | 100.00 |
| 6786 | 200.00 |
| AX105/FG105 | 53.33 |
| **THYRATRONS, XENON** | |
| 2050 | $ 1.85 |
| 5544 | 30.50 |
| 5545 | 29.30 |
| **TRIODES** | |
| *2FY5 | $ 2.90 |
| *3FY5 | 2.90 |
| *6FY5 | 2.90 |
| ‡6GM8/6GM8 | 2.28 |
| ‡6Q4/EC80 | 3.00 |
| ‡6R4/EC81 | 2.55 |
| 356 | 660.00 |
| 450TH | 77.00 |

| Type No. | Price |
|---|---|
| TRIODES (Con't) | |
| 450TL | 77.00 |
| 501R/5759 | 225.00 |
| 502/5760 | 210.00 |
| 502R/5761 | 235.00 |
| 504R | 245.00 |
| 805 | 20.10 |
| 810 | 25.65 |
| 811A | 6.90 |
| 812A | 6.90 |
| 833A | 47.90 |
| 834 | 19.30 |
| 838 | 20.00 |
| 845 | 20.80 |
| 849 | 185.00 |
| 849A | 185.00 |
| 880 | 595.00 |
| 889A | 221.00 |
| 889RA | 347.00 |
| 891 | 275.00 |
| 891R | 430.00 |
| 892 | 270.00 |
| 892R | 425.00 |
| 5604 | 570.00 |
| 5619 | 423.00 |
| 5658 | 565.00 |
| 5666 | 280.00 |
| 5667 | 370.00 |
| 5771 | 660.00 |
| 5823/Z900T | 1.95 |
| *5842 | 14.90 |
| 5866 | 20.00 |
| 5867 | 30.00 |
| 5868 | 55.00 |
| 5923 | 165.00 |
| 5924 | 231.00 |
| 5924A | 275.00 |
| 6333 | 290.00 |
| 6445 | 455.00 |
| 6446 | 305.00 |
| 6447 | 465.00 |
| 6756 | 388.00 |
| 6757 | 535.00 |
| 6758 | 173.00 |
| 6759 | 206.00 |
| 6800 | 350.00 |
| 6801 | 505.00 |
| 6960 | 150.00 |
| 6961 | 210.00 |
| 7092 | 125.00 |
| 7237 | 180.00 |
| 7459 | 230.00 |
| HF200 | 49.50 |
| HF201A/468 | 34.50 |
| HF300 | 40.50 |
| ZB3200 | 395.00 |
| **TRIODE, INDICATOR** | |
| 6977/DM170 | $2.50 |
| **TWIN TRIODES** | |
| *‡4ES8/XCC189 | $2.28 |
| *‡5ES8 | 2.28 |
| ‡6AQ8/ECC85 | 1.45 |
| ‡6DJ8/ECC88 | 2.28 |
| *‡6ES8/ECC189 | 2.28 |
| ‡6J6/ECC91 | 1.40 |
| 9AQ8/PCC85 | 1.55 |
| ‡12AT7/ECC81 | 1.53 |
| ‡12AU7/ECC82 | 1.23 |
| ‡12AX7/ECC83 | 1.28 |
| ‡17EW8/HCC85 | 3.50 |
| 5920/E90CC | 2.40 |
| 6085/E80CC | 3.00 |
| 6201/E81CC | 2.95 |
| 6211 | 2.35 |
| 6463 | 2.95 |
| *6922/E88CC | 4.75 |
| 7062/E180CC | 2.10 |
| 7119/E182CC | 2.95 |
| 7316 | 1.40 |
| E92CC | 2.00 |
| **TRIGGER TUBES COLD CATHODE** | |
| Z50T | $1.75 |
| Z70U/7710 | 1.56 |
| Z300T | 4.00 |
| Z804U/7713 | 3.45 |
| **HEPTODE** | |
| 6687/E91H | $1.30 |
| **BEAM DEFLECTION TUBE** | |
| 6218/E80T | $15.00 |

# tubes

COMMUNICATION
INDUSTRIAL
RECTIFICATION
SPECIAL PURPOSE
RADIATION DETECTION
AMATEUR
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SEMICONDUCTORS
(SEE FOLLOWING PAGE)

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For details, circle #43 on Reader Service Card

**ELECTRONIC CORPORATION**
230 DUFFY AVE., HICKSVILLE, L. I., N. Y.
WEllis 1-6200
IN CANADA: ROGERS ELECTRONIC TUBES & COMPONENTS, 116 VANDERHOOF AVE., TORONTO 17, ONTARIO


| Type No. | Price |
|---|---|
| **BEAM POWER TUBES** | |
| 807 | $3.00 |
| 6146 | 5.00 |
| 6159 | 5.00 |
| PE06/40N | 5.95 |
| **DIODE, CLIPPER** | |
| 6339 | $44.50 |
| **COUNTERS, GEIGER** | |
| 75N | $ 16.50 |
| 75NB3 | 16.50 |
| 80N | 45.00 |
| 90CB | 27.00 |
| 90NB | 27.00 |
| 90NB4 | 27.00 |
| 100C | 54.00 |
| 100CB | 58.00 |
| 100HB | 54.00 |
| 100N | 43.50 |
| 100NB | 46.00 |
| 120C | 90.00 |
| 120CB | 95.00 |
| 120N | 90.00 |
| 120NB | 95.00 |
| 150N | 61.00 |
| 150NB | 66.00 |
| 153C | 91.00 |
| 160G | 66.00 |
| 170G | 110.00 |
| 180G | 50.00 |
| 200C | 67.00 |
| 200CB | 71.00 |
| 200HB | 67.00 |
| 200N | 56.00 |
| 200NB | 58.50 |
| 230C | 43.00 |
| 230N | 41.00 |
| 240C | 43.00 |
| 240N | 41.00 |
| 912NB | 53.00 |
| 18503 | 28.00 |
| 18508 | 127.00 |
| 18509-01 | 22.40 |
| 18510 | 127.00 |
| 18515 | 186.50 |
| 18516 | 206.25 |
| 18517 | 373.00 |
| 18518 | 412.50 |
| **COUNTER, DECADE** | |
| 6370/EIT | $16.50 |
| **DIODE, DAMPER** | |
| ‡6R3/EY81 | $1.40 |
| **TWIN DIODE** | |
| ‡5726/E91AA | $1.90 |
| **DIODE, VTVM** | |
| 6923/EA52 | $11.00 |
| **IGNITRONS** | |
| 5551A/652 | $ 65.00 |
| 5552A/651 | 99.00 |
| 5553B/655 | 245.00 |
| 5555/653B | 316.00 |
| 5822A | 116.00 |
| **TUNING INDICATORS** | |
| ‡1M3/DM70 | $ .98 |
| ‡6BR5/EM80 | 1.23 |
| ‡6CD7/EM34 | 1.48 |
| ‡6DA5/EM81 | 1.23 |
| ‡6FG6/EM84 | 1.48 |
| **KLYSTRONS** | |
| DX122 | ** |
| DX123 | ** |
| DX124 | ** |
| DX151 | ** |
| **KLYSTRON, REFLEX** | |
| 2K25 | $39.50 |

| Type No. | Price |
|---|---|
| **MAGNETRONS** | |
| 2J42 | $160.00 |
| 2J48 | 250.00 |
| 4J47 | ** |
| 4J57 | ** |
| 4J58 | ** |
| 4J59 | ** |
| 5586 | 417.00 |
| 5657 | 417.00 |
| 5780A | ** |
| 6589 | ** |
| 6972 | 325.00 |
| 7091 | ** |
| 7093 | ** |
| **PENTODES** | |
| 16AU6 | $ 1.05 |
| ‡6BQ5/EL84 | 1.30 |
| ‡6CA7/EL34 | 2.88 |
| ‡6CW5/EL86 | 1.43 |
| ‡6EH7/EF183 | 1.45 |
| ‡6EJ7/EF184 | 1.45 |
| ‡8BQ5/XL84 | 1.30 |
| 828 | 27.60 |
| ‡45B5/UL84 | 1.45 |
| 5654/E95F | 2.85 |
| *5847/E182F | 14.90 |
| 6007/5913 | 1.25 |
| 6008/5911 | 1.25 |
| 6083 | 14.25 |
| 6084/E80F | 3.00 |
| 6227/E80L | 3.05 |
| ‡6267/EF86 | 1.38 |
| 6375 | 8.40 |
| 6686/E81L | 4.10 |
| 6687/E91H | 1.30 |
| 6688/E180F | 6.80 |
| *6688A | 6.86 |
| 6689/E83F | 3.60 |
| ‡7189 | 1.80 |
| 7693/E90F | 3.25 |
| E99F | 3.25 |
| EFP60 | 7.50 |
| ‡EL37 | 2.88 |
| **PENTODE, DUO-DIODE** | |
| ‡6DC8/EBF89 | $1.60 |
| **TRIODE-PENTODES** | |
| ‡6BL8/ECF80 | $1.70 |
| ‡6BM8/ECL82 | 1.60 |
| 6U8 | 1.65 |
| ‡50BM8/UCL82 | 1.50 |
| E80CF | 3.60 |
| **PHOTOMULTIPLIERS** | |
| 52AVP | $120.00 |
| 57AVP | 850.00 |
| 58AVP | 850.00 |
| 150AVP | 62.00 |
| 50AVP-SP | 78.00 |
| 150AVP-SP | 76.00 |
| 150CVP | 84.00 |
| 51UVP | 308.00 |
| 53UVP | 462.00 |
| **RECTIFIERS** | |
| ‡1S2A/DY87 | $ 1.38 |
| ‡5AR4/GZ34 | 2.10 |
| ‡5R4G-Y | 1.90 |
| ‡6CA4/EZ81 | 1.05 |
| ‡6V4/EZ80 | .75 |
| 575A | 22.15 |
| 673 | 22.15 |
| 8020AX | 24.00 |
| **RECTIFIERS, MERCURY** | |
| 857B | $235.00 |
| 866AX | 2.65 |
| 869B | 160.00 |
| 869BL | 160.00 |
| 872AX | 9.90 |
| 6508 | 80.00 |
| 6693 | 25.00 |
| 7136 | 25.00 |
| 8008AX | 10.65 |
| **RECTIFIERS, XENON** | |
| 3B28 | $ 6.50 |
| 4B32 | 13.50 |

| Type No. | Price |
|---|---|
| **VOLTAGE REFERENCE TUBES** | |
| OE3/85A1 | $2.25 |
| OG3/85A2 | 2.25 |
| 5651 | 1.78 |
| **VOLTAGE REGULATORS** | |
| OA2 | $1.26 |
| OB2 | 1.32 |
| 90C1 | 2.25 |
| 6354/150B2 | 2.55 |
| **TETRODES** | |
| *‡2ER5 | $ 1.40 |
| *‡3ER5 | 1.40 |
| 4-125A | 36.00 |
| 4-250A | 46.50 |
| 4-400A | 48.00 |
| 4CX250B | 45.00 |
| *‡4ER5 | 1.40 |
| 4X150A | 33.15 |
| 4X150D | 33.15 |
| 4X250B | 42.50 |
| 4X250F | 42.50 |
| 4X500A | 128.50 |
| *‡6ER5/EC95 | 1.40 |
| 6075 | 250.00 |
| 6076 | 305.00 |
| 6079 | 60.00 |
| 6155 | 36.00 |
| 6156 | 46.50 |
| 6883 | 5.00 |
| 6979 | 42.50 |
| 7527 | 48.00 |
| **TETRODES, BEAM** | |
| 813 | $21.10 |
| **TWIN TETRODES** | |
| 829B | $19.00 |
| 832A | 15.90 |
| 5894 | 25.00 |
| 6252 | 25.00 |
| 6360 | 5.15 |
| 6907 | 25.00 |
| 6939 | 12.00 |
| 7377 | 25.00 |
| 7378 | ** |
| **THYRATRONS** | |
| 2D21 | $ 1.22 |
| 3C23 | 11.98 |
| 632B | 36.00 |
| 5632/C3J | 15.50 |
| 5684/C3JA | 19.80 |
| 5685/C6JA | 29.30 |
| 5727/E91N | 2.50 |
| AX260 | 150.00 |
| **THYRATRONS, HYDROGEN** | |
| 6268 | $32.50 |
| 6279 | 45.00 |
| **THYRATRONS, MERCURY** | |
| 5557/FG17/957/1701 | $ 9.50 |
| 5559 | 23.00 |
| 5560/FG95 | 33.00 |
| 5869 | 25.00 |
| 5870 | 100.00 |
| 6786 | 200.00 |
| AX105/FG105 | 53.33 |
| **THYRATRONS, XENON** | |
| 2050 | $ 1.85 |
| 5544 | 30.50 |
| 5545 | 29.30 |
| **TRIODES** | |
| *2FY5 | $ 2.90 |
| *3FY5 | 2.90 |
| *6FY5 | 2.90 |
| ‡6GM8/6GM8 | 2.28 |
| ‡6Q4/EC80 | 3.00 |
| ‡6R4/EC81 | 2.55 |
| 356 | 660.00 |
| 450TH | 77.00 |

| Type No. | Price |
|---|---|
| **TRIODES (Con't)** | |
| 450TL | 77.00 |
| 501R/5759 | 225.00 |
| 502/5760 | 210.00 |
| 502R/5761 | 235.00 |
| 504R | 245.00 |
| 805 | 20.10 |
| 810 | 25.65 |
| 811A | 6.90 |
| 812A | 6.90 |
| 833A | 47.90 |
| 834 | 19.30 |
| 838 | 20.00 |
| 845 | 20.80 |
| 849 | 185.00 |
| 849A | 185.00 |
| 880 | 595.00 |
| 889A | 221.00 |
| 889RA | 317.00 |
| 891 | 275.00 |
| 891R | 430.00 |
| 892 | 270.00 |
| 892R | 425.00 |
| 5604 | 570.00 |
| 5619 | 423.00 |
| 5658 | 565.00 |
| 5666 | 280.00 |
| 5667 | 370.00 |
| 5771 | 660.00 |
| 5823/Z900T | 1.95 |
| *5842 | 14.90 |
| 5866 | 20.00 |
| 5867 | 30.00 |
| 5868 | 55.00 |
| 5923 | 165.00 |
| 5924 | 231.00 |
| 5924A | 275.00 |
| 6333 | 290.00 |
| 6445 | 455.00 |
| 6446 | 305.00 |
| 6447 | 465.00 |
| 6756 | 388.00 |
| 6757 | 535.00 |
| 6758 | 173.00 |
| 6759 | 206.00 |
| 6800 | 350.00 |
| 6801 | 505.00 |
| 6960 | 150.00 |
| 6961 | 210.00 |
| 7092 | 125.00 |
| 7237 | 180.00 |
| 7459 | 230.00 |
| HF200 | 49.50 |
| HF201A/468 | 34.50 |
| HF300 | 40.50 |
| ZB3200 | 395.00 |
| **TRIODE, INDICATOR** | |
| 6977/DM170 | $2.50 |
| **TWIN TRIODES** | |
| *‡4ES8/XCC189 | $2.28 |
| *‡5ES8 | 2.28 |
| ‡6AQ8/ECC85 | 1.45 |
| ‡6DJ8/ECC88 | 2.28 |
| *‡6ES8/ECC189 | 2.28 |
| ‡6J6/ECC91 | 1.40 |
| 9AQ8/PCC85 | 1.55 |
| ‡12AT7/ECC81 | 1.53 |
| ‡12AU7/ECC82 | 1.23 |
| ‡12AX7/ECC83 | 1.28 |
| ‡17EW8/HCC85 | 3.50 |
| 5920/E90CC | 2.40 |
| 6085/E80CC | 3.00 |
| 6201/E81CC | 2.95 |
| 6211 | 2.35 |
| 6463 | 2.95 |
| *6922/E88CC | 4.75 |
| 7062/E180CC | 2.10 |
| 7119/E182CC | 2.95 |
| 7316 | 1.40 |
| E92CC | 2.00 |
| **TRIGGER TUBES COLD CATHODE** | |
| Z50T | $1.75 |
| Z70U/7710 | 1.56 |
| Z300T | 4.00 |
| Z804U/7713 | 3.45 |
| **HEPTODE** | |
| 6687/E91H | $1.30 |
| **BEAM DEFLECTION TUBE** | |
| 6218/E80T | $15.00 |

# semiconductors by Amperex®

for industrial, communications and entertainment applications . . . a complete line, featuring:

**Amperex P.A.D.T. Post Alloy Diffused VHF Transistors for converter, mixer and oscillator applications**

**Amperex P-N-P and N-P-N transistors for audio, computer and switching applications.**

**Amperex germanium and silicon diodes, including silicon reference and power rectifier types**

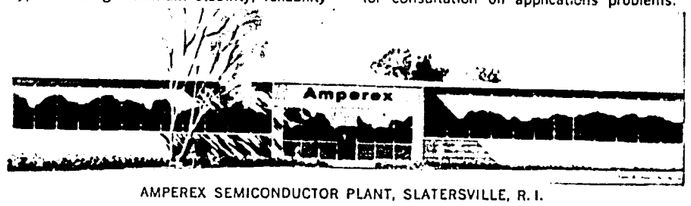
Implemented and fully proven by Amperex, a unique manufacturing technique originating with Philips of the Netherlands now enables Amperex to provide you with production VHF Post Alloy Diffused Transistors of unparalleled laboratory quality at truly reasonable prices.

The new Amperex "Post-Alloy-Diffused" P-N-P Transistors combine the best qualities of both the alloy and the diffusion approaches to transistor construction. As a result of the special "self-jigging" techniques, a maximum degree of uniformity is achieved, thus eliminating the need for "selection."

Correspondingly, special Amperex precision tooling methods and fully automated high volume manufacturing equipment, are the user's guarantee of a complete line of semiconductor diode and UHF transistor types offering maximum stability, reliability and uniformity at minimum cost.

The accelerated development of new Amperex transistor and diode types and the unlimited availability of those presently listed, is further assured by the inauguration of a new Amperex semiconductor plant in Slatersville, Rhode Island.

The facilities of the Amperex applications laboratory and the Amperex R & D laboratory are always available to customers for consultation on applications problems.




AMPEREX SEMICONDUCTOR PLANT, SLATERSVILLE, R. I.

# transistors *representative of the* **Amperex** *line*

| | | Vce (volts) max | Ic (mA) max | Pc (mW) @25°C | $h_{fe}$ | @ Ic (mA) | $f_{\alpha b}$ (Mc/s) |
|---|---|---|---|---|---|---|---|
| RF types | 2N1515 | 20 | 10 | 83 | 60 | 1 | 70 |
| | 2N1516 | 20 | 10 | 83 | 100 | 1 | 180 |
| | 2N1517 | 20 | 5 | 83 | 100 | — | 180 |
| AF types | 2N1314 | 32 | 3500 | 13000 | 33 | 1000 | 0.15 |
| | OC22 | 32 | 1000 | 10000 | 150 | 1000 | 2.5 |
| | OC30 | 32 | 1400 | 3600 | 35 | 100 | 0.3 |
| | OC74 | 20 | 300 | 550 | 65 | 300 | 1.5 |
| INDUSTRIAL SWITCHING and COMPUTER types | OC23 | 40 | 1000 | 10000 | 150 | 1000 | 2.5 |
| | OC28 | 60/80 | 6000 | 13000 | 32 | 1000 | 0.2 |
| | 2N284 | 32 | 250 | 165 | 45 | 250 | 0.9 |
| | OC200 (Si) | 25 | 50 | 250 | 20 | 1 | 1 |
| | OC201 (Si) | 25 | 50 | 250 | 30 | 1 | 4 |

| | | | | | Dark Current (μA) | At | Peak Spectral Response (μ) |
|---|---|---|---|---|---|---|---|
| PHOTO-TRANSISTOR type | OCP70 | 7.5 | 20 | 25 | −325 | $I_B$ = 0, $V_{CE}$ = −4.5V | 1.55 |
| | | | | | Light Current (μA) | At | |
| | | | | | 750 | $V_{CE}$ = −2V, Ill. = 75 ft. c., Temp = 2700°K | |

# diodes *representative of the* **Amperex** *line*

**GERMANIUM GENERAL PURPOSE** types
Full line of EIA point contact and gold bonded types including computer diodes. Packaging for automation.

**SILICON GENERAL PURPOSE** types

| | Max. Continuous Operating Inverse Voltage (Volts) | Maximum Peak Inverse Voltage (Volts) | Maximum Peak Rectified Current (MA) | Maximum Average Rectified Current (MA) | Maximum Inverse Current (Microamps) | Voltage (Volts) |
|---|---|---|---|---|---|---|
| OA200 | 50 | 50 | 150 | 50 | .05 | 50 |
| 1N459 | 175 | 200 | — | 40 | .025 | 175 |

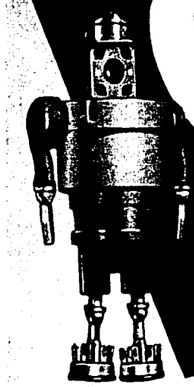
**SILICON REFERENCE** OAZ200 to OAZ207 (40mA, at 4.7 to 9.1V)
**PHOTOCELLS** "ORP" SERIES Cadmium sulphide cells with spectral response in visible and infra-red regions.
**PHOTODIODES** OAP12 (infra-red sensitivity)

**ask Amperex**
for your copy of the condensed semiconductor catalog...for price and delivery information...and for detailed technical specifications.

**AMPEREX ELECTRONIC CORPORATION, 230 Duffy Avenue, Hicksville, L. I., N. Y.**
**In Canada:** Rogers Electronic Tubes & Components, 116 Vanderhoof Avenue, Toronto, Ontario.

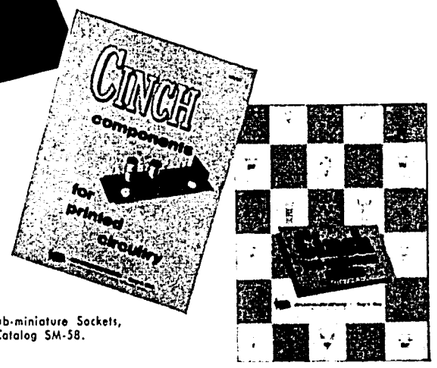


For details, circle #45 on Reader Service Card



# Cinch ELECTRONIC COMPONENTS

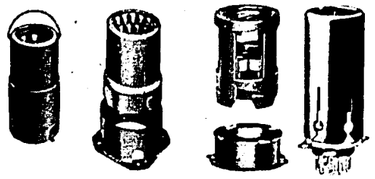
In the more than a quarter of a century of experience in the manufacture of electronic components, sockets, shields, connectors, terminal strips and miscellaneous electronic hardware, Cinch parts by specification and application have earned recognition as "Standard in the industry."




1. Cinch components for printed circuitry, 24 pages, Catalog PC-59.

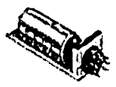
2. Cinch Sub-miniature Sockets, 12 pages, Catalog SM-58.

## HEAT DISSIPATING TUBE SHIELDS



OCTAL and POWER SHIELDS — T5 and T6 — TR5 and TR6

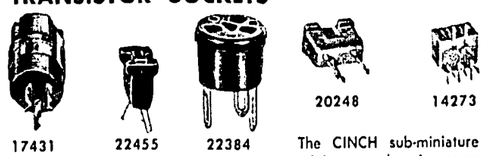
The 7 and 9 pin Miniature Series, T, TR, and NW Series are variously covered by Military Specifications:
**MIL-S-9372B (USAF)**
**MIL-STD-242B (Ships)**
**MIL-S-19786A (Navy) SCL-6307/2 (Signal Corps)**



In the Octal and Power Series, the shields are covered by Redstone Arsenal and Signal Corps approval. Where shields are required blackened, Henderlube is supplied as the Standard finish.

Manufactured under license agreement with International Electronic Research Corporation

## TRANSISTOR SOCKETS



17431 — 22455 — 22384 — 20248 — 14273

The CINCH sub-miniature and miniature sockets insure positive electrical contact, hold transistors and tubes securely in place, permit easy maintenance and replacement, provide maximum insulation resistance and minimum high frequency loss.

## UNIVERSAL TRANSISTOR SOCKETS



STANDOFF TYPE

Standoff type Universal Transistor Socket for use with ten transistor bases and five base types. Casting is mica-filled phenolic (MFE). Contacts are beryllium copper, gold plated. Contacts may be used with either one or two sided 1/16" p.w. boards.

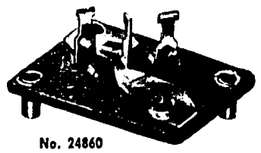


No. 24872

**No. 24872** for use with transistors designed to the triangular base layout .2" x .1" (JETEC-30) contact centers, as well as the three contact in-line (.048 x .192 contact centers). Available in G. P. Black and low loss Mica-filled Phenolic.

## POWER TRANSISTOR SOCKETS

There are three laminated and one molded No. 24246 type sockets; No. 22831 is elongated in shape, No. 24324 is rectangular in shape. Top and bottom plates are of natural XP Bakelite, vacuum wax impregnated. Formed thread for 6 — 20 screw, .104/.110 dia. hole in C R steel plate. Provides easy attachment to a heat sink. No. 24860 is identical with 24324 except it is equipped with integral eyelets for easy assembly to chassis. All contacts are of brass, cadmium plated.



No. 24860
WITH INTEGRAL EYELETS

## PRINTED CIRCUIT SOCKETS



No. 22920

These sockets for the three types of receiving tubes. Miniature, Flat Press and Button.

The contacts are so spaced that they can be mounted in an incremental drill pattern. This fact together with the exact precision and uniformity of Cinch sockets make them ideal for automatic assembly.

**No. 22920** — 7 contact miniature molded vertically mounted socket with JAN type shield base. Mica insulation. Silver plated phosphor bronze contacts drop through .062" dia. clearance holes arranged on a .1" X and Y axis.



No. 22022

**No. 22022**—8 contact button base subminiature molded vertically mounted socket for conventional wiring. Assembled with special shield base to accept a subminiature shield with the "J" lock. Mica insulation. Silver plated beryllium copper contacts.



No. 24257

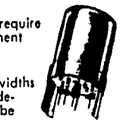
**No. 24257** — 7 contact flat press subminiature molded right angle socket. Mica insulation. Silver plated beryllium copper contacts drop through .046" dia. clearance holes arranged on a .1" X and Y axis.

## SOCKET FOR NUVISTOR TUBE



Low insertion force and contact protection . . . require minimum space . . . fulfilling every requirement for miniaturized equipment.
No. 133 65 10 001

The socket provides two slots of different widths mating with two corresponding legs depending from the metal envelope of the tube to index the tube and socket contacts. As a result the tube can be inserted by feel only and it is impossible to insert the tube incorrectly or damage the contacts. The socket saddle provides spring elements that engage with the depending legs of the tube envelope thus grounding the envelope to the panel.



## ALL MOLDED OCTAL SOCKET

This new all molded Octal socket offers a complete one piece construction. The saddle and body are a single casting.

The standard socket is molded of general purpose Bakelite. Contacts are of brass, cadmium plated. Mica insulation with brass or phosphor bronze contacts can be made available. Two contact layouts can be supplied.



**CINCH MANUFACTURING COMPANY**
1026 South Homan Ave., Chicago 24, Illinois
Division of United-Carr Fastener Corporation, Boston, Mass.

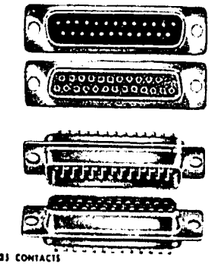
For details, circle #46 on Reader Service Card

## CINCH GOLDEN "D"

MONOBLOC CONNECTOR FEATURES:

• Monobloc insulators • Low engagement/separation forces • Probe-proof closed-entry socket contacts • Golden Iridite finish—per Mil Q Q-P-416A, Type II Class 2 • Type GDI-30 per Mil-M-19833 or MDG per Mil-M-14E insulators • Fully interchangeable with standard "D".

FOUR TYPES AVAILABLE: GOLDEN-D with closed-entry contacts in monobloc insulator.
*GOLDEN-D with snap-in ungrounded coaxial contacts.
*GOLDEN-D with grounded coaxial contacts.
*GOLDEN-D with high voltage contacts.



31 CONTACTS

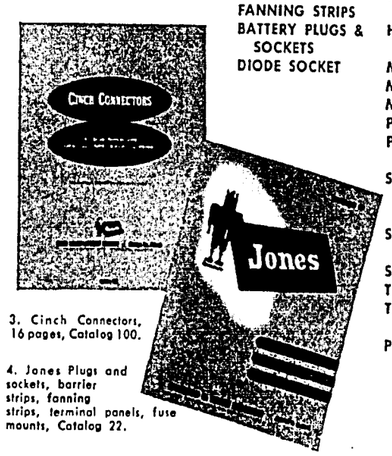
CONTACTS: 9, 15, 25, 37, and 50.

Manufactured by agreement with Cannon Electric Company

## CINCH AND JONES COMPONENTS

The list below comprises the products of both **CINCH** and **JONES**. It is indicative of their wide scope; and also indicates the myriad of variations and redesigning that is possible with this background of production experience.

ANTENNA JACKS
BARRIER TERMINAL STRIPS
FANNING STRIPS
BATTERY PLUGS & SOCKETS
DIODE SOCKET
CONNECTORS, MULTI CONTACT
FUSE STRIPS, BLOCKS & BOARDS
HERMETICALLY SEALED TUBE SOCKETS
METAL STAMPINGS
MICRO-CONNECTORS
MOUNTING DEVICES
PHONO TIP JACKS
PRINTED CIRCUIT CONNECTORS
SHIELDS, TUBE-MINIATURE & NOVAL & BASES
SOLDERING LUGS—200 VARIATIONS
STRAP NUTS
TRANSISTOR SOCKETS
TUBE HOLDERS—SPRING TYPE
PLUGS AND SOCKETS




3. Cinch Connectors, 16 pages, Catalog 100.

4. Jones Plugs and sockets, barrier strips, fanning strips, terminal panels, fuse mounts, Catalog 22.

## JONES PLUGS AND SOCKETS

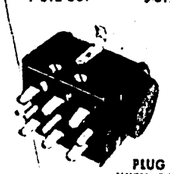


P-312-CCT

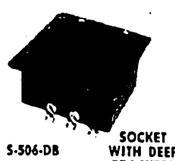


S-312-AB

**"300" SERIES** Plugs and Sockets are designed for light duty service. Two to thirty-three contacts. Plugs and sockets polarized. Phosphor bronze "knife switch" socket contacts engage both sides of heavy brass plug contacts for positive connections. Molded bakelite insulation. Also can be supplied with contact tails that will take standard solderless terminals. UL approved.

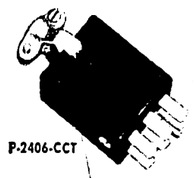


P-506-CE — PLUG WITH CAP

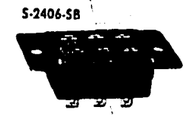


S-506-DB — SOCKET WITH DEEP BRACKETS

**500 SERIES** for heavy duty work, severest electrical services. For 5,000 Volts 25 Amperes per Contact alterable by circuit characteristics. Socket contacts phosphor bronze knife-switch type, cadmium plated. Plug contacts hard brass cadmium plated 2, 4, 6, 8, 10, and 12 contacts. Plugs and sockets polarized. Long leakage path from terminal, and terminal to ground. Caps and brackets, steel parkerized (rustproofed). Plug and socket blocks interchangeable in caps and brackets. Terminal connections most accessible. Cap insulated with canvase bakelite.



P-2406-CCT



S-2406-SB

**2400 SERIES** plugs and sockets . . . improved socket contacts. For highest electrical and mechanical efficiency. 4 individual flexing surfaces. Positive contact over practically their entire length. Cadmium plated plug and socket. Contacts mounted in recessed pockets, greatly increasing leakage distance, increasing voltage rating.

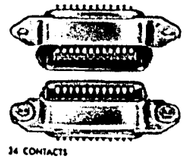
## MINIATURE BLUE RIBBON CONNECTORS

The smooth, easy insertion and extraction action, the self-wiping, self cleaning features and the double-sided, flexing action of both mating contact members make Micro-Ribbons the first miniature connectors to provide reduction in size with added reliability.

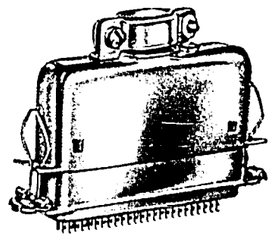
Bodies are molded of an improved diallyl phthalate with extremely high impact strength and excellent dielectric features. Contacts are gold-plated over silver. Shells are cadmium-plated brass with clear chromate treatment.

Receptacle shells have floating bushings allowing a float of .020 in each direction.

The compact housings are equipped with sturdy spring type latches on the receptacles which are guided and held by cut-outs in the plug flanges. The shells are cadmium plated brass with clear chromate treatment. Receptacle shells have floating bushings allowing a float of .020 in each direction.



34 CONTACTS
RACK AND PANEL TYPES



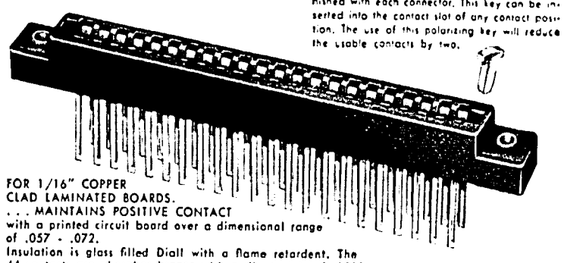
CABLE TO CHASSIS TYPE

CONTACTS: 14, 24, 36 and 50.

Manufactured by agreement with Amphenol-Borg Electronics Corporation

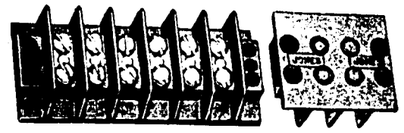
## WRAPOST TERMINATION PRINTED CIRCUIT CONNECTOR

A No. 20H29401-4 plastic polarizing key is furnished with each connector. This key can be inserted into the contact slot of any contact position. The use of this polarizing key will reduce the usable contacts by two.



FOR 1/16" COPPER CLAD LAMINATED BOARDS.
. . . MAINTAINS POSITIVE CONTACT with a printed circuit board over a dimensional range of .057 - .072.
Insulation is glass filled Diall with a flame retardent. The 44 contacts are phosphor bronze with a silver plate of .0002 and .00003 min. gold plate finish. The inventory problem is simplified by providing a single connector that can be polarized in any position.

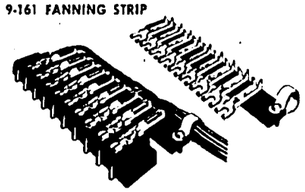
## JONES BARRIER TERMINAL STRIP



**500 SERIES** . . . wider and higher barriers for increased creepage distances. Closed bottoms for complete insulation. Material between barriers at the base adds to the strength and maintains same creepage distance between contact to contact and contact to ground. Can be imprinted here. No insulating or marker strip required.

## JONES FANNING STRIP

9-161 FANNING STRIP



9-141 BARRIER STRIP

Big help in terminal wiring. Connections are made through Fanning Strip, on bench or anywhere apart from barrier strip, and quickly slipped into assembly. Simplifies and facilitates soldering. Insures positive, correct connections. Saves time. Ideal for harness or cable assembly. Strong construction; brass terminals, cadmium plated. Heavy Bakelite mounting.

HOWARD B. JONES DIVISION
CINCH MANUFACTURING COMPANY
1026 SO. HOMAN AVE., CHICAGO 24, ILL.

ELECTRONIC DOT ASSEMBLIES

**CINCH MANUFACTURING COMPANY**
1026 South Homan Ave., Chicago 24, Illinois
Division of United-Carr Fastener Corporation, Boston, Mass.

For details, circle #47 on Reader Service Card

## Microwave Crystal Diodes

| Type | Purpose | Frequency, mc |
|---|---|---|
| 1N25 | Mixer | 1,000 |
| 1N25A | Mixer | 1,000 |
| D4097 | Mixer | 1,000 |
| 1N21B, C, D, E, F* | Mixer | 3,060 |
| 1N21WE | Double-ended mixer | 3,060 |
| 1N831, A | "Micro-min" mixer | 3,060 |
| 1N23B, C, D, E, F** | Mixer | 9,375 |
| 1N23WE | Double-ended mixer | 9,375 |
| 1N149 | Mixer | 9,375 |
| 1N832 | "Micro-min" mixer | 9,375 |
| D4092 | Mixer | 12,400 |
| 1N78, A, B, C, D | Mixer | 16,000 |
| 1N918 | "Micro-min" mixer | 16,000 |
| 1N26, A | Mixer | 24,000 |
| D4089 | Mixer | 24,000 |
| 1N53, A, B, C | Mixer | 35,000 |
| 1N1132 | Tripolar mixer | 3,000 to 12,400 |
| 1N2510 | Coaxial mixer | 10,000 |
| 1N286, A | Coaxial mixer | 10,000 to 22,000 |
| 1N830, A | "Micro-min" detector | 100 to 1,000 |
| 1N32 | Video detector | 3,060 |
| 1N31, A | Video detector | 9,375 |
| 1N1611, A | Video detector | 9,375 |
| 1N833 | "Micro-min" detector | 9,375 |
| 1N76, A | Video detector | 10,000 |
| 1N358, A | Tripolar video detector | 1,000 to 12,400 |
| 1N369 | Tripolar video detector | 3,000 to 12,400 |
| 1N369A | Tripolar video detector | 1,000 to 12,400 |
| 1N630, A | Tripolar video detector | 1,000 to 12,400 |
| 1N1610 | Tripolar video detector | 3,000 to 12,400 |
| 1N2127 | Tripolar video detector | 1,000 to 12,400 |
| 1N2926, A | Coaxial video detector | 10,000 to 20,000 |
| 1N446 | Coaxial video detector | 26,500 to 40,000 |
| D861 | Video detector | 40,000 to 80,000 |
| D4074 | Video detector | 40,000 to 80,000 |
| D4075 | Double-ended varactor | 20,000*** |
| D4075A | Double-ended varactor | 30,000*** |
| D4075B | Double-ended varactor | 40,000*** |
| D4075C | Double-ended varactor | 50,000*** |
| D4075D | Double-ended varactor | 60,000*** |
| D4075E | Double-ended varactor | 70,000*** |
| D4075F | Double-ended varactor | 80,000*** |
| D4075G | Double-ended varactor | 90,000*** |
| D4075H | Double-ended varactor | 100,000*** |
| D4110 | Single-ended varactor | 20,000*** |
| D4110A | Single-ended varactor | 30,000*** |
| D4110B | Single-ended varactor | 40,000*** |
| D4110C | Single-ended varactor | 50,000*** |
| D4110D | Single-ended varactor | 60,000*** |
| D4110E | Single-ended varactor | 70,000*** |
| D4110F | Single-ended varactor | 80,000*** |
| D4110G | Single-ended varactor | 90,000*** |
| D4110H | Single-ended varactor | 100,000*** |

*Double-ended versions: 1N416 series

**Double-ended versions: 1N415 series

***Cut-off frequency

§ Microwave diodes are products of the Sylvania Semiconductor Division, 100 Sylvan Road, Woburn, Mass.

NOTE: Reverse polarity and matched pairs are available for all mixer crystal types except 1N286 and 1N1132

## Counter Tubes

| Type | Rated Speed | Outputs |
|---|---|---|
| 6476 | 4 kc | 10 |
| 6476A | 4 kc | 10 |
| 6802 | 4 kc | 4 |
| 6879 | 5 kc | 3 |
| 6909 | 100 kc | 4 |
| 6910 | 100 kc | 10 |
| 7155 | 100 kc | 3 |

## "Rocket" Planar Triodes

**2C36**—is a pulse-modulated oscillator for frequencies up to 3000 mc.
**2C37**—is designed for use as a CW oscillator up to 3300 mc. Plate disc is flat, grid disc folded.
**5764**—is a CW or pulse-modulated oscillator for use up to 3300 mc.
**5765**—is for use as a CW oscillator without external feedback in the range from 900 to 2900 mc.
**5767**—is a CW oscillator for use up to 3300 mc. Both discs are folded.
**5768**—is intended for use as a CW amplifier-multiplier up to 3000 mc.
**6BA4**—High gain, low noise, UHF television amplifier.
**6481 (RT434)**—CW oscillator for use up to 3300 mc.
**6503**—CW oscillator for use up to 3300 mc.

## TR and ATR Tubes

| | | |
|---|---|---|
| 5790 | Tunable TR | 33,814-35,906 |
| 6545 | Tunable TR | 33,814-35,906 |
| 5791 | ATR | 34,860 |

## Magnetrons

| | | |
|---|---|---|
| M-4163 | 8500-9600 Mc — Tunable | 180 kw |
| M-4164 | 8500-9600 Mc — Tunable; Rugged; High RRV | 180 kw |
| M-4193B | 9000-9600 Mc — Tunable; Rugged; High RRV | 200 kw |
| 7006 | 9000-9600 Mc — Tunable; Rugged; High RRV | 190 kw |
| 7098 | 9300-9500 Beacon Tunable; Rugged | 60 w |
| 7503 | Type 7098 with TNC output | 100 w |
| 2J42 | 9375 Mc — Fixed | 7 kw |
| 2J42H | 9375 Mc — Fixed; High Alt. | 7 kw |
| 6027 | 9375 Mc — Fixed | 18 kw |
| 6027H | 9375 Mc — Fixed; High Alt.; Rugged | 18 kw |
| 7449A (M4154) | 24000 Mc — Fixed; Rugged | 55 kw |
| 5789 | 34800 Mc — Fixed | 32 kw |
| M-4155A | 34800 Mc — Fixed; Rugged | 40 kw |
| M-4064 | 34800 Mc — Fixed; Rugged | 70 kw |
| 6799 | 34800 Mc — Fixed | 100 kw |

## Trigger Tubes

**OA5**—Cold cathode trigger tube capable of dissipating one watt of energy. Designed in T 5½ bulb size.

**6483**—Cold cathode trigger tube capable of dissipating one watt of energy. Designed in T-3 bulb size.

**6873**—Ruggedized cold cathode trigger tube with increased trigger sensitivity and higher operating voltage capabilities. T 5½ bulb.

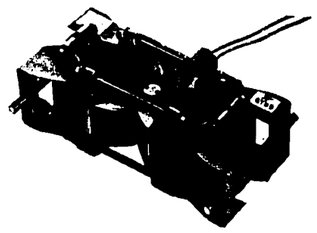
## Broadband Reflex Klystrons

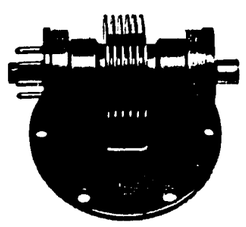
| Type | Frequency (kmc) | Power Output |
|---|---|---|
| 6BM6 | 0.55-3.8 | 50-175 mW |
| 6BM6A* | 0.50-3.8 | 50-175 mW |
| 6BL6 | 1.6-6.5 | 60-250 mW |
| 5836* | 1.6-6.5 | 60-250 mW |
| 5837* | 0.55-3.8 | 50-175 mW |

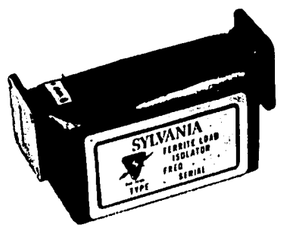
*Pulse or CW type.

## Long-Life Reflex Klystrons for Microwave Relays

| Type | Frequency (kmc) | Power Output | |
|---|---|---|---|
| 6974 | 4.6-5.0 | 2 W | Note 1 |
| K-4008 | 5.3-6.3 | 0.02-1 W | Note 1 |
| K-4009 | 5.3-6.6 | 0.02-1 W | Note 1 |
| K-4010 | 5.8-7.125 | 0.02-1 W | Note 1 |
| SK-220F | 5.925-6.225 | 1 W | Note 2 |
| SK-222F | 5.925-6.225 | 1 W | Note 3 |
| K-841B | 6.125-6.425 | 1 W | Note 1 |
| SK-220E | 6.125-6.425 | 1 W | Note 2 |
| SK-222E | 6.125-6.425 | 1 W | Note 3 |
| 6468 | 6.125-6.425 | 1 W | Note 1 |
| K-4011 | 6.3-7.5 | 0.02-1 W | Note 1 |
| SK-222G | 6.425-6.575 | 1 W | Note 3 |










For details, circle #48 on Reader Service Card



## Long-Life Reflex Klystrons for Microwave Relays (cont'd)

| Type | Frequency (KMC) | Power Output | |
|---|---|---|---|
| SK-220G | 6.425-6.575 | 1 W | Note 2 |
| K-840B | 6.575-6.875 | 1 W | Note 1 |
| SK-220D | 6.575-6.875 | 1 W | Note 2 |
| SK-222D | 6.575-6.875 | 1 W | Note 3 |
| 6469 | 6.575-6.875 | 1 W | Note 1 |
| SK-220C | 6.875-7.125 | 1 W | Note 2 |
| SK-222C | 6.875-7.125 | 1 W | Note 3 |
| K-839B | 7.125-7.425 | 1 W | Note 1 |
| SK-220B | 7.125-7.425 | 1 W | Note 2 |
| SK-222B | 7.125-7.425 | 1 W | Note 3 |
| 6470 | 7.125-7.425 | 1 W | Note 1 |
| SK-220A | 7.425-7.750 | 1 W | Note 2 |
| SK-222A | 7.425-7.750 | 1 W | Note 3 |
| SK-220Z | 7.750-8.100 | 1 W | Note 2 |
| SK-222Z | 7.750-8.100 | 1 W | Note 3 |

Note 1: Internal cavity. Note 2: Integral external cavity.
Note 3: Integral external cavity, conduction cooled.

## Traveling-Wave Amplifiers

Lightweight Permanent Magnet Types

| Type | Frequency (kmc) | Power Output |
|---|---|---|
| TW-4006 | 1-2 | 15 mW |
| TW-4007 | 1-2 | 1 W |
| TW-4002 | 2-4 | 10 mW |
| 7072 | 2-4 | 1 W |
| TW-4002F | 2-4 | 10 mW |
| TW-956H | 2-4 | 1 W |

Compact Solenoid Types*

| | | |
|---|---|---|
| 6753 | 1-2 | 15 mW |
| 6752 | 1-2 | 2 W |
| TW-620A | 1-2 | 2 W |
| TW-538 | 1-2 | 1 kw peak |
| 6493 | 2-4 | 10 mW |
| 6559 | 2-4 | 2 W |
| TW-534B | 2-4 | 2 W |
| 6698 | 2-4 | 1 kw peak |
| TW-591 | 8-10.6 | 1 kw peak |
| TW-613 | 8-11 | 5 mW |
| TW-622 | 8-11 | 2 W |

*Mating Solenoid available.

## Waveguide Windows

| Type No. Solderable Type; Glass | Frequency Range, kmc | Power Ratings, kw |
|---|---|---|
| WG-398 | 2.70-2.95 | 750 |
| WG-4233 | 2.78-2.82 | 750 |
| WG-4234 | 2.81-2.85 | 750 |
| WG-4235 | 5.33-5.37 | 30 |
| WG-512 | 5.45-5.90 | 225 |
| WG-4237 | 5.58-5.66 | 300 |
| WG-4236 | 5.65-5.75 | 225 |
| WG-4215 | 8.4-9.6 | 200 |
| WG-342 | 8.73-9.270 | 300 |
| WG-4238 | 8.95-9.05 | 250 |
| WG-4239 | 9.15-9.25 | 250 |
| WG-390 | 9.15-9.43 | 250 |
| WG-369 | 9.20-9.28 | 300 |
| WG-382 | 9.30-9.35 | 250 |
| WG-416 | 9.36-9.38 | 250 |
| WG-4248 | 23.9-24.1 | 75 |
| WG-4249 | 24.3-24.7 | 75 |

## Waveguide Windows (cont'd)

| Type No. Flange Type; Mica | Frequency Range, kmc | Power Ratings, kw (Note 1) |
|---|---|---|
| WG-4250 | 2.6-3.0 | 1500 |
| WG-4231 | 2.6-4.0 | 2000 |
| WG-4230 | 4.0-5.8 | 1500 |
| WG-4229 | 5.8-8.2 | 700 |
| WG-4232 | 8.0-10.0 | 100 |
| WG-4227 | 8.2-12.4 | 300 |
| WG-586 | 8.49-9.6 | 300 |
| WG-4228 | 8.5-9.6 / 7-10 | 500 |
| WG-4226 | 10-15 | 250 |
| WG-4225 | 12-18 | 160 |
| WG-4224 | 18-26 | 880 |
| WG-4223 | 32-37 | 50 |

## Ferrite Devices

These representative units are shown as an indication of Sylvania's flexible development and production capability. Other units can be designed for a specific application.

| | Type | Frequency (kmc) | Isolation (db) | Insertion Loss (db) |
|---|---|---|---|---|
| Coaxial Isolators | FD-154 | 1.3-2.1 | 10 | 1 |
| | FD-151P | 2-4 | 15 | 1 |
| | FD-153P | 2.0-2.7 | 20 | 1 |
| | FD-1519 | 4-8 | 10 | 1 |
| | FD-1522W | 8-11 | 30 | 1 |
| Broadband Waveguide Isolators | FD-492 | 3.95-5.85 | 18 | 1 |
| | FD-502 | 5.85-8.2 | 20 | 1 |
| | FD-512 | 7.05-10 | 24 | 1 |
| | FD-522 | 8.2-12.4 | 30 | 1 |
| | FD-911 | 12.4-18 | 24 | 1 |
| | FD-531A | 18-26 | 24 | 1 |

| | Type | Frequency (kmc) | Power | Isolation (db) | Insertion Loss (db) |
|---|---|---|---|---|---|
| Special Purpose Waveguide Isolators | FD-483 | 2.3-3.6 | 3 KW, avg | 15 | 0.8 |
| | FD-503A | 5.925-6.425 | 20 W, avg | 60 | 1.0 |
| | FD-504 | 6.575-7.125 | 20 W, avg | 60 | 1.0 |
| | FD-513 | 7.1-8.5 | 20 W, avg | 40 | 1.0 |
| | FD-505 | 7.125-7.75 | 20 W, avg | 60 | 1.0 |
| | FD-525 | 8.2-10.2 | 100 KW, pk | 30 | 1.0 |
| | FD-5213 | 8.5-9.6 | 100 KW, pk | 15 | 0.8 |
| | FD-5213A | 8.5-9.6 | 100 KW, pk | 8 | 0.3 |
| | FD-524 | 8.5-9.6 | 100 KW, pk | 20 | 1.0 |
| | FD-528 | 8.5-9.6 | 100 KW, pk | 20 | 1.0 |
| | FD-527 | 9.275-9.475 | 150 KW, pk | 15 | 0.35 |
| | FD-523 | 9.5-10.5 | 10 W, avg | 15 | 0.7 |

| | Type | Frequency (kmc) | Isolation (db) | Insertion Loss (db) |
|---|---|---|---|---|
| Tee Circulators | FD-TC501 | 5.925-6.425 | 20 | 0.3 |
| | FD-TC522 | 8.8 ± .05 | 20 | 0.2 |
| | FD-TC911 | 13.5 ± .01 | 28 | 0.2 |
| | FD-TC531 | 23.8 ± .05 | 20 | 0.2 |

## Backward-Wave Oscillators

| Type | Frequency (kmc) | Power Output |
|---|---|---|
| 6699* | 1-2 | 20-700 mW |
| 6496* | 2-4 | 20-700 mW |
| 7096 | 2-4 | 100 mW |
| BW-623* | 4-8 | 15-135 mW |
| 6902 | 18-26.5 | 4-50 mW |
| BW-1757 | 26.5-41 | 2-7.5 mW |
| BW-1779 | 62-77 | 5 mW |

*Mating Solenoid available.

Sylvania Electric Products Inc.
Special Tube Operations
500 Evelyn Ave.
Mountain View, Calif.

SYLVANIA
Subsidiary of GENERAL TELEPHONE & ELECTRONICS
GENERAL TELEPHONE SYSTEM

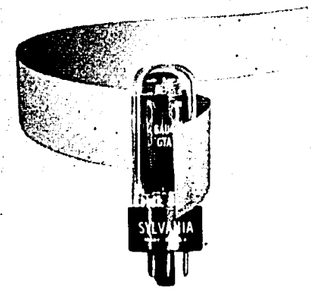


For details, circle #49 on Reader Service Card

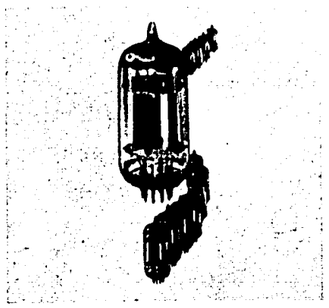
# SPECIFY SYLVANIA

## for reliable entertainment designs

Give your designs the benefits of Sylvania tube reliability . . . reliability that is best enhanced by these notable tube developments.

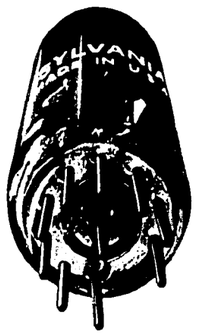



**SARONG CATHODE**—a thin film of cathode material made to precise measurements for uniformity and wrapped on an ultrasonically-cleaned cathode sleeve. Sarong Cathode significantly minimizes plate-to-cathode and heater-to-cathode arcing, eliminates cathode "hot spots," improves life expectancy, provides high uniformity of electrical characteristics from tube to tube.

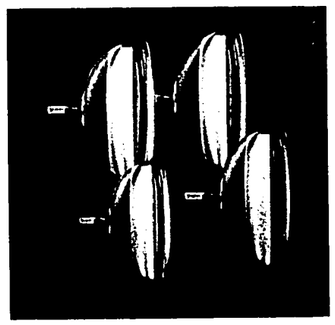


**9-T9 TUBE OUTLINE**—straight-sided bantam envelope with 9-pin miniature pin circle, 9-T9 increases volumetric efficiency of the chassis by eliminating the octal base of the T9 outline. Too, 9-T9 makes possible use of large tube assemblies capable of high plate dissipation in printed circuit applications normally using T-6½ sockets.

**100mA TUBES**—Sylvania 100mA-heater tubes feature low ambient temperatures, allow compact chassis design, reduce the requirement for heat shielding, enable use of inexpensive plastics. Heater design provides for more balanced distribution of the heater voltages in the heater string. Surge voltages across individual tubes are minimized—increasing tube heater life expectancy.




**10-PIN TUBES**—provide new multi-unit combinations in one bulb, enable compact designs, offer important circuit economies and improved performance. Addition of tenth pin to the center of the standard 9-pin miniature circle provides a means of tying elements to individual pins for improved isolation and for the inclusion of a separately connected interstructure shield. 10-pin design can offer tubes with inherently low input capacitance.



**"BONDED SHIELD" PICTURE TUBES**—squared-corner picture tube with integral safety-cap. Available with specially treated cap that can diffuse up to 70% of reflected light without appreciable loss in resolution—eliminating the old problem of mirror images. Bonded Shield eliminates front-of-the-cabinet safety glass, reduces front-to-back cabinet dimensions, offers potential savings in set manufacture.

**LOW POWER HEATER-CATHODE ASSEMBLY**—requires only 140mA at 1.5V, less than 7% of the power normally needed. Low mass of the assembly plus low heater-power requirements make it especially suitable for design into picture tubes for portable, battery-operated TV receivers.



For details, circle #50 on Reader Service Card



# TUBES...

## for reliable military and industrial designs

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- **GOLD BRAND RELIABLE COMMERCIAL AND INDUSTRIAL TUBES**
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- **INDUSTRIAL RECEIVING TUBES**
- **SMALL POWER TUBES**

Sylvania Industrial Tubes provide that extra margin of quality that helps increase the reliability factor of your equipment. Sylvania research and development groups are constantly improving present tube types and providing you with new types for your future designs.

The wide range of Sylvania tube types includes over 150 Cathode Ray Tubes—for radar, Loran, 'scopes, countermeasure devices, analyzers, portable image-display devices . . . to name a few. In addition, the highly reliable Gold Brand premium tubes include types for computers, guided missiles, fixed and mobile communications, navigation equipment, industrial controls and laboratory test equipment.

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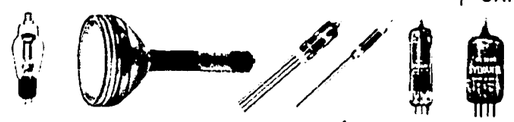
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# SYLVANIA

*Subsidiary of* **GENERAL TELEPHONE & ELECTRONICS**



For details, circle #51 on Reader Service Card

# The complete standard line of DE MORNAY-BONARDI microwave test equipment — *now adding...*

| Size Designation<br>Frequency Band in KMC<br>Waveguide Nomenclature | DBA<br>60-90<br>RG-99/U | DBB<br>50-75<br>RG-98/U | DBC<br>33-50<br>RG-97/U | DBD<br>26.5-40<br>RG-96/U | DBE<br>18-26.5<br>RG-53/U | DBF<br>12.4-18<br>RG-91/U | DBG<br>8.2-12.4<br>RG-52/U | DBH<br>7.05-10.0<br>RG-51/U | DBJ<br>5.85-8.2<br>RG-50/U | DBK<br>3.95-5.85<br>RG-49/U | DBL<br>2.6-3.95<br>RG-48/U |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cat. No. | Cat. No. | Cat. No. | Cat. No. | Cat. No. | Cat. No. | Cat. No. | Cat. No. | Cat. No. | Cat. No. | Cat. No. |
| **Tube Mounts** | | | | | | | | | | | |
| Klystron Tube Mount | | | | | | | | | | | |
| Noise Tube Mount with Tube | | | DBC-140-T | DBD-140T | DBE-140-T | DBF-140-T | DBG-111-1<br>DBG-140-T | DBH-111-1<br>DBH-140T | DBJ-111-1<br>DBJ-140-T | DBK-111-1<br>DBK-140-T | DBL-111-1<br>DBL-140-T |
| **Transmission Line Components** | | | | | | | | | | | |
| Adapters, Choke to Cover | | | | DBD-010 | DBE-010 | DBF-010 | DBG-010 | DBH-010 | DBJ-010 | DBK-010 | DBL-010 |
| Tapered Transitions | | | | DBD-018 | DBEG-018 | DBFG-018 | DBGH-018 | DBHJ-018 | DBJK-018 | DBKL-018 | DBCL-018 |
| Auto Waveguide Transformers | DBAL-018 | DBBL-018 | DBCE-018 | | | DBF-057 | DBG-057 | DBH 057 | DBJ-057 | DBK-057 | DBL-057 |
| Intermediate Sections | DBA-210 | DBB-210 | DBC-210 | DBD-210 | DBE-210 | DBF-210 | DBG-210 | DBH-210 | DBJ-210 | DBK-210 | DBL-210 |
| 90° E-Plane Elbows | DBA-224 | DBB-224 | DBC-224 | DBD-224 | DBE-224 | DBF-224 | DBG-224 | DBH-224 | DBJ-224 | DBK-224 | DBL-224 |
| 90° H-Plane Elbows | DBA-234 | DBB-234 | DBC-234 | DBD-234 | DBE-234 | DBF-234 | DBG-234 | DBH-234 | DBJ-234 | DBK-234 | DBL-234 |
| Rotating Joints (90-95) | | | | DBD-266-1 | DBE-266-1 | DBF-266-1 | DBG-266-1 | DBH-266-1 | DBJ-266-1 | DBK-266-2 | DBL-266-2 |
| Rotating Joints (90-Cat) | | | | DBD-266-2 | DBE-266-2 | DBF-266-2 | DBG-266-2 | DBH-266-2 | DBJ-266-2 | DBK-266-3 | DBL-266-3 |
| Rotating Joints (Cat-95) | | | | DBD-266-3 | DBE-266-3 | DBF-266-3 | DBG-266-3 | DBH-266-3 | DBJ-266-3 | DBK-266-4 | DBL-266-4 |
| Rotating Joints (Cat-Cat) | | | | DBD-266-4 | DBE-266-4 | DBF-266-4 | DBG-266-4 | DBH-266-4 | DBJ-266-4 | DBK-274 | DBL-274 |
| 90° Twist-Sections | DBA-274 | DBB-274 | DBC-274 | DBD-274 | DBE-274 | DBF-274 | DBG-274 | DBH-274 | DBJ-274 | DBK-275 | DBL-275 |
| Bulkhead Flanges | DBA-275 | DBB-275 | DBC-275 | DBD-275 | DBE-275 | DBF-275 | DBG-275 | DBH-275 | DBJ-275 | | |
| Bulkhead Flanges with Seals | DBA-275.1 | DBB-275-1 | DBC-275-1 | DBD-275-1 | DBE-275-1 | DBF-275-1 | DBG-275-1 | | | | |
| Pressurizing Units | DBA-276 | DBB-276 | DBC-276 | DBD-276 | DBE-276 | DBF-276 | DBG-276 | DBH-276 | DBJ-276 | DBK-276 | DBL-276 |
| **Crystal Mounts & Multipliers** | | | | | | | | | | | |
| Crystal Mounts | DBA-319 | DBB-319 | DBC-319 | DBD-319 | DBE-319 | DBF-319 | DBG-319 | DBH-319 | DBJ-319 | DBK-319 | DBL-319 |
| Crystal Mounts, Movable Short | DBA-313 | DBB-313 | DBC-313 | DBD-313 | DBE-313 | DBF-313 | DBG-313 | DBH-313 | DBJ-313 | | |
| Tunable Crystal Mounts | DBA-319 | DBB-319 | DBC-319 | DBD-319 | DBE 319 | DBF-319 | DBG-319 | DBH-319 | DBJ-319 | DBK-319 | DBL-319 |
| Crystal Multipliers | | DBBW-350 | DBCA-350 | DBDB-350 | DBEC-350 | DBFC-350 | DBGE-350 | DBHF-350 | DBJF-350 | DBKG-350 | DBLJ-350 |
| **Power Absorbing Units** | | | | | | | | | | | |
| Precision Attenuators | DBA-410 | DBB-410 | DBC-410 | DBD-410 | DBE-410 | DBF-410 | DBG-410 | DBH-410 | DBJ-410 | DBK-410 | DBL-410 |
| Variable Attenuators, Calibrated | DBA-430-1 | DBB-430-1 | DBC-430-1 | DBD-430-1 | DBE-430-1 | | | | | | |
| Variable Attenuators | DBA-430 | DBB-430 | DBC-430 | DBD-430 | DBE-430 | DBF-430 | DBG-430 | DBH-430 | DBJ-430 | DBK-430 | DBL-430 |
| Fixed Attenuators | DBA-440A | DBB-440A | DBC-440A | DBD-440A | DBE 440A | DBF-440A | DBG-440A | DBH-440A | DBJ-440A | DBK-440A | DBL-440A |
| Low Power Terminations | DBA-450 | DBB-450 | DBC-450 | DBD-450 | DBE-450 | DBF-450 | DBG-450 | DBH-450 | DBJ-450 | DBK-450 | DBL-450 |
| Movable Low Power Terminations | DBA-456A | DBB-456A | DBC-456A | DBD-456A | DBE-456A | DBF-456A | DBG-456A | DBH-456A | DBJ-456 | DBK-456A | DBL-456A |
| Movable Term. with Extension | DBA-456 | DBB-456 | DBC-456 | DBD-456 | DBE-456 | DBF-456 | DBG-456 | DBH 456 | DBJ-456-1 | DBK-456-1 | DBL-456-1 |
| Movable Term. with Ext. & Vernier | DBA-456-1 | DBB-456-1 | DBC-456-1 | DBD-456-1 | DBE-456-1 | DBF-456-1 | DBG-456-1 | DBH-456-1 | DBJ-459 | DBK-459 | DBL-459 |
| Tunable Low Power Terminations | DBA-459 | DBB-459 | DBC-459 | DBD-459 | DBE-459 | DBF-459 | DBG-459 | DBH 459 | DBJ 450 | DBK-460 | DBL-460 |
| High Power Terminations | DBA-460 | DBB-460 | DBC-460 | DBD-460 | DBE-460 | DBF-460 | DBG 460 | DBH 460 | | | |
| **Horns** | | | | | | | | | | | |
| Pickup Horns | DBA-510 | DBB-510 | DBC-510 | DBD-510 | DBE-510 | DBF-510 | DBG-510 | DBH-510 | DBJ-510 | DBK-510 | DBL-510 |
| Standard Gain Horns 15 DB | DBA-520 | DBB-520 | DBC-520 | DBD-520 | DBE-520 | DBF-520 | DBG 520 | DBH-520 | DBJ-520 | DBK-520 | DBL-520 |
| Standard Gain Horns 20 DB | DBA-520 | DBB-520 | DBC-520 | DBD-520 | DBE-520 | DBF-520 | DBG 520 | DBH-520 | DBJ-520 | DBK-520 | DBL-520 |
| **Tees, Junctions and Mixers** | | | | | | | | | | | |
| E-Plane Tees | DBA 610 | DBB-610 | DBC-610 | DBD-610 | DBE-610 | DBF 610 | DBG 610 | DBH-610 | DBJ-610 | DBK-610 | DBL-610 |
| Waveguide Switches, 2 Way | DBA 616 | DBB-616 | DBC 616 | DBD-616 | DBE-616 | DBF-616 | DBG-616 | DBH 616 | DBJ 616 | DBK-616 | DBL-616 |
| Waveguide Switches, 4 Way | DBA 617 | DBB-617 | DBC 617 | DBD-617 | DBE-617 | DBF 617 | DBG 617 | DBH 617 | DBJ 617 | DBK-617 | DBL 617 |
| H Plane Tees | DBA 620 | DBB 620 | DBC 620 | DBD-620 | DBE-620 | DBF-620 | DBG 620 | DBH 620 | DBJ 620 | DBK 620 | DBL 620 |
| Basic Directional Couplers | DBA 630 | DBB 630 | DBC 630 | DBD-630 | DBE-630 | DBF-630 | DBG 630 | DBH 630 | DBJ 630 | DBK 630 | DBL 630 |
| Directional Couplers, Flg. to Term | DBA 631 | DBB-631 | DBC 631 | DBD 631 | DBE-631 | DBF 631 | DBG 631 | DBH 631 | DBJ-631 | DBK 631 | DBL-631 |
| Directional Couplers, Coax. to Term | | | | | | DBF 632 | DBG 632 | DBH 632 | DBJ-632 | DBK 632 | DBL 632 |
| Directional Couplers, Xtal to Flg | DBA 633 | DBB 633 | DBC 633 | DBD 633 | DBE-633 | DBF 633 | DBG 633 | DBH 633 | DBJ 633 | DBK 633 | DBL 633 |
| Directional Couplers, Xtal to Term | DBA 634 | DBB 634 | DBC 634 | DBD 634 | DBE-634 | DBF 634 | DBG 634 | DBH 634 | DBJ-634 | DBK 634 | DBL 634 |
| Magic Tees | DBA 650 | DBB 650 | DBC 650 | DBD 650 | DBE-650 | DBF 650 | DBG 650 | DBH 650 | DBJ-650 | DBK 650 | DBL 650 |
| Balanced Crystal Mixers | DBA-665 | DBB-665 | DBC 665 | DBD-665 | DBE-665 | DBF-665 | DBG 665 | DBH 665 | DBJ-665 | DBK 665 | DBL-665 |
| **Frequency Meters** | | | | | | | | | | | |
| Precision Cavity Wavemeters, | | | | | | | | | | | |
| Reaction Type | DBA-715-1 | DBB-715-1 | DBC-715-1 | DBD-715-1 | DBE-715-1 | DBF-715-1 | DBG-715-1 | DBH-715-1 | DBJ-715-1 | DBK-715-1 | DBL-715-1 |
| Absorption Type | DBA-715-2 | DBB-715-2 | DBC-715-2 | DBD-715-2 | DBE-715-2 | DBF-715-2 | DBG-715-2 | DBH-715-2 | DBJ-715-2 | DBK-715-2 | DBL-715-2 |
| Transmission Type | DBA-715-3 | DBB-715-3 | DBC-715-3 | DBD-715-3 | DBE-715-3 | DBF-715-3 | DBG-715-3 | DBH-715-3 | DBJ-715-3 | DBK-715-3 | DBL-715-3 |
| Reference Cavity, Reaction Type | DBA-715-1A | DBB-715-1A | DBC-715-1A | DBD-715-1A | DBE-715-1A | DBF-715-1A | DBG-715-1A | DBH-715-1A | DBJ-715-1A | DBK-715-1A | DBL-715-1A |
| Reference Cavity, Absorption | DBA-715-2A | DBB-715-2A | DBC-715-2A | DBD-715-2A | DBE-715-2A | DBF-715-2A | DBG-715-2A | DBH-715-2A | DBJ-715-2A | DBK-715-2A | DBL-715-2A |
| Reference Cavity, Transmission | DBA-715-3A | DBB-715-3A | DBC-715-3A | DBD-715-3A | DBE-715-3A | DBF-715-3A | DBG-715-3A | DBH-715-3A | DBJ-715-3A | DBK-715-3A | DBL-715-3A |
| **Impedance Meters** | | | | | | | | | | | |
| Precision Standing Wave | | | | | | | | | | | |
| Detectors, Complete | DBA-825 | DBB-825 | DBC-825 | DBD 825 | DBE-825 | DBF-825 | DBG 825 | DBH-825 | DBJ-825 | | |
| Carriage Units Only | DB 820 | DB-820 | DB 820 | DB-820 | DB-820 | DB-820 | DB-820-1 | DB-820-1 | DB-820-1 | | |
| Waveguide Sections | DBA 821 | DBB-821 | DBC-821 | DBD-821 | DBE-821 | DBF-821 | DBG 821 | DBH-821 | DBJ-821 | | |
| Broadband Probes | DBA 822 | DBB 822 | DBC-822 | DBD-822 | DBE-822 | DBF-822 | DBG 822 | DBH-822 | DBJ-822 | | |
| **Phase Shifters, Tuners & Shorts** | | | | | | | | | | | |
| Phase Shifters | DBA 915 | DBB-915 | DBC-915 | DBD-915 | DBE-915 | DBF-915 | DBG-915 | DBH-915 | DBJ-915 | DBK-915 | DBL-915 |
| Calibrated Phase Shifters | DBA-915-1 | DBB-915-1 | DBC-915-1 | DBD-915-1 | DBE-915-1 | DBF-915-1 | DBG 915-1 | DBH-915-1 | DBJ-915-1 | DBK-915-1 | DBL-915-1 |
| Variable Stub Tuners | DBA-919 | DBB-919 | DBC-919 | DBD-919 | DBE-919 | DBF-919 | DBG-919 | DBH-919 | DBJ-919 | DBK-919 | DBL-919 |
| Fixed Shorts | DBA 960 | DBB-960 | DBC-960 | DBD-960 | DBE-960 | DBF-960 | DBG-960 | DBH-960 | DBJ-960 | DBK-960 | DBL-960 |
| Movable Shorts | DBA-969A | DBB-969A | DBC-969A | DBD-969A | DBE-969A | DBF-969A | DBG 969A | DBH-969A | DBJ-969A | DBK-969A | DBL-969A |
| Movable Shorts with Extension | DBA 969 | DBB-969 | DBC-969 | DBD-969 | DBE 969 | DBF 969 | DBG 969 | DBH-969 | DBJ-969 | DBK-969 | DBL-969 |
| Movable Shorts with Ext. & Vernier | DBA 969-1 | DBB-969-1 | DBC-969-1 | DBD-969-1 | DBE-969-1 | DBF-969-1 | DBG 969-1 | DBH-969-1 | DBJ-969-1 | DBK-969-1 | DBL-969-1 |
| E-H Plane Tuners | DBA 979 | DBB 979 | DBC 979 | DBD 979 | DBE-979 | DBF-979 | DBG-979 | DBH-979 | DBJ-979 | DBK-979 | DBL-979 |
| E-H Plane Tuners with Vernier | DBA-979-1 | DBB-979-1 | DBC-979-1 | DBD-979-1 | DBE-979-1 | DBF-979-1 | DBG-979-1 | DBH-979-1 | DBJ-979-1 | DBK-979-1 | DBL-979-1 |
| **Accessories** | | | | | | | | | | | |
| Standard Plain Flange | DBA-1000 | DBB-1000 | DBC-1000 | DBD-1000 | DBE-1000 | DBF-1000 | DBG-1000 | DBH-1000 | DBJ-1000 | DBK-1000 | DBL-1000 |
| Standard Choke Flange | | | | DBD 1001 | DBE-1001 | DBF-1001 | DBG-1001 | DBH-1001 | DBJ-1001 | DBK-1001 | DBL-1001 |
| Aluminum Plain Flange | | | | | | | DBG-1002 | | | | DBL-1002 |
| Aluminum Choke Flange | | | | DBD-1004 | DBE-1004 | | DBG-1003 | | | | DBL-1003 |
| Special Round Flange | | | | | DBE-1005 | | | | | | |
| Screw Plain Flange | | | | | DBE-1006 | | | | | | |
| Screw Choke Flange | | | | | | | | | | | |
| Adjustable Waveguide Supports, Ultramicrowave | DB-1010 | DB-1010 | DB-1010 | DB-1010 | DB-1010 | DB-1010-1 | DB-1010-1 | DB-1010-1 | DBJ-1012<br>DBJ-1020 | DBK-1012<br>DBK-1020 | DB-1010-2<br>DBL-1012<br>DBL-1020 |
| Adjustable Waveguide Supports, Microwave | DBA-1012<br>DBA-1020<br>DBA-1100 | DBB-1012<br>DBB-1020<br>DBB-1100 | DBC-1012<br>DBC-1020<br>DBC-1100 | DBD-1012<br>DBD-1020<br>DBD-1100 | DBE-1012<br>DBE-1020<br>DBE-1100 | DBF-1012<br>DBF-1020<br>DBF-1100 | DBG-1012<br>DBG-1020<br>DBG-1100 | DBH-1012<br>DBH-1020<br>DBH-1100 | | | |
| Waveguide Chassis Mounting Stands | | | | | | | | | | | |
| Waveguide Fastening Screws, Pr. | | | | | | | | | | | |
| Waveguide Window Seals | | | | | | | | | | | |

New 1960-61 catalog on request. Deliveries: 2 weeks to 30 days on most items.

DE MORNAY-BONARDI ®

DE MORNAY-BONARDI
780 SOUTH ARROYO PARKWAY • PASADENA, CALIF.

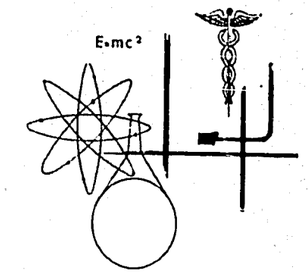


For details, circle #52 on Reader Service Card

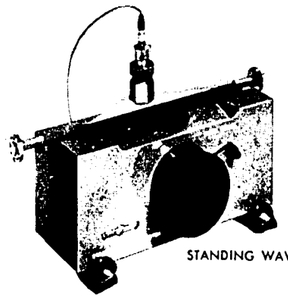


# 140 KMC

## ULTRAMICROWAVE® EQUIPMENT BY DE MORNAY-BONARDI



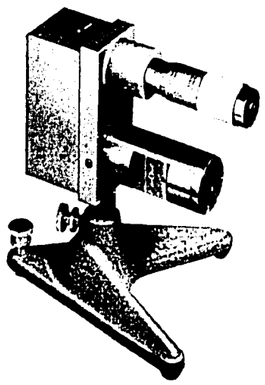

*—it works—it's accurate—it's available*



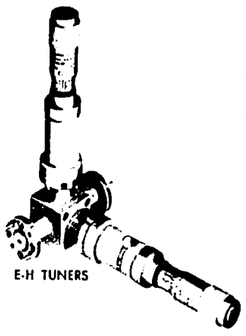
STANDING WAVE DETECTORS



CRYSTAL MOUNTS



CAVITY WAVEMETERS



E-H TUNERS

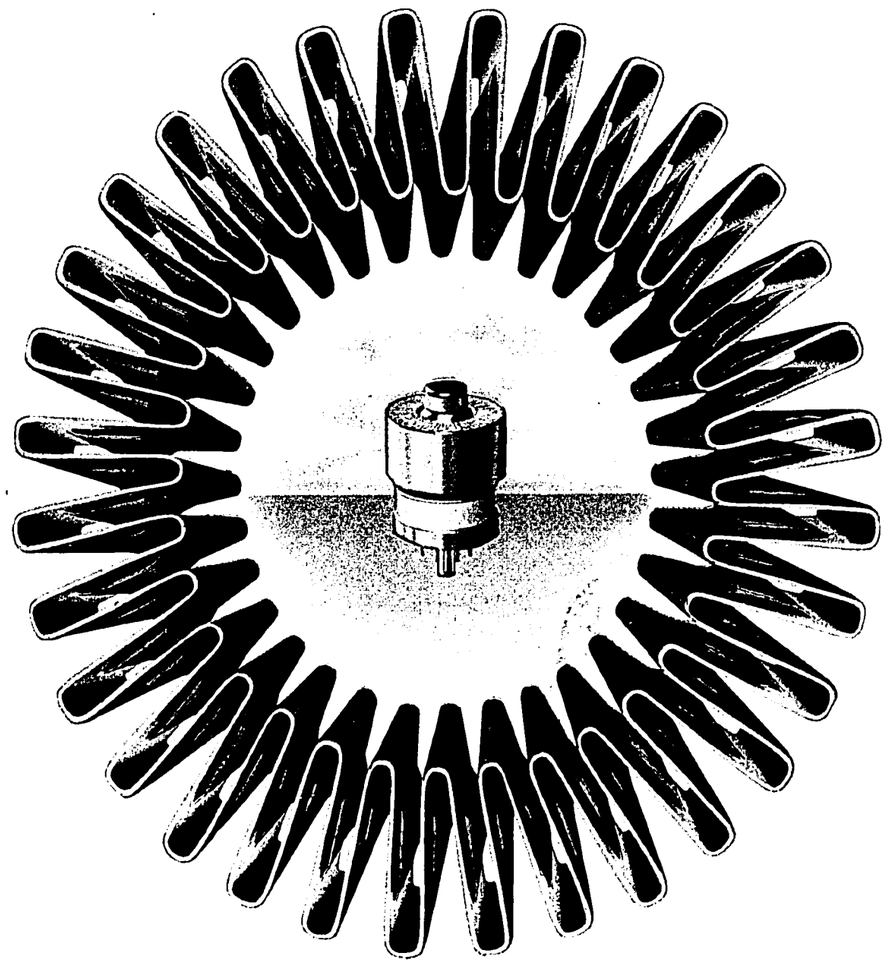
Recent advances in physical research have created an interest in the highest attainable microwave frequencies—an interest which requires the use of millimeter wave components and instruments beyond the scope of those currently available. Just as in 1954, when De Mornay-Bonardi was the first to offer commercially available instruments and components of A and B sizes (50-90 KMC), now for first time D-B offers instruments and components for the W size—90 to 140 KMC. These units truly represent a major breakthru in the microwave art, and can greatly enlarge your scope of microwave activity.

**Request brochure on 140 KMC equipment**

DE MORNAY-BONARDI
780 SOUTH ARROYO PARKWAY • PASADENA, CALIF



For details, circle #53 on Reader Service Card



# RCA radiator efficiency allows you to cut blower horsepower in half

**Resulting space and weight savings permit more compact packaging, greater design versatility**

Recently a leading manufacturer of communications equipment ran a comprehensive series of tests comparing the heat dissipating capabilities of RCA-7203/4CX-250B, with integral radiator, to a standard JAN/4X-250B. The results: the JAN/4X-250B required twice as much blower horsepower.

The integral radiator on RCA-7203 is an exclusive RCA development. It is used on many types of RCA tubes for air-cooled operation. Its remarkably efficient louvered construction is a logical development in radiator design . . . but only RCA has mastered the complex manufacturing problems involved.

This high-efficiency integral radiator is one of the things that makes RCA power tubes so popular in designs where space and weight are critical considerations. For further information about this and other pace-setting features of RCA power tubes, including the new Cermolox* line, write:

The Marketing Manager, RCA Electron Tube Division, Industrial Tube Products Department, Lancaster, Pa.

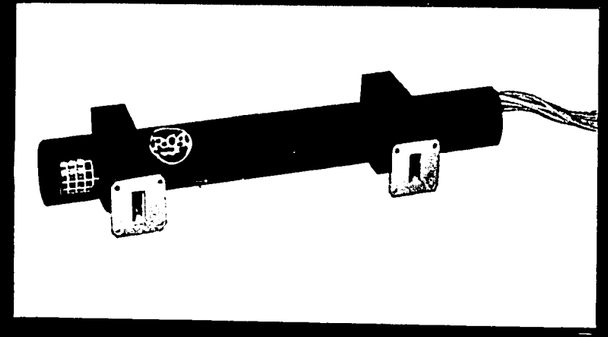
*RCA's line of coaxial, precision-aligned grid, beam power tubes of ceramic and metal construction. See RCA's forthcoming advertisement on this complete line.

**RCA ELECTRON TUBE DIVISION— FIELD OFFICES...** Government Sales: Harrison, N. J., 415 S. 5th Street, HUmboldt 5-3900 • Dayton 2, Ohio, 224 N. Wilkinson St., BAldwin 6-2366 • Washington 7, D.C., 1725 "K" St., N.W., FEderal 7-8500 • Industrial Products Sales: Detroit 2, Michigan, 714 New Center Building, TRinity 5-5600 • Newark 2, N. J., 744 Broad St., HUmboldt 5-3900 • Chicago 54, Illinois, Suite 1154, Merchandise Mart Plaza, WHitehall 4-2900 • Los Angeles 22, Calif., 6355 E. Washington Blvd., RAymond 3-8361 • Burlingame, Calif., 1838 El Camino Real, OXford 7-1620

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RADIO CORPORATION OF AMERICA

For details, circle #54 on Reader Service Card

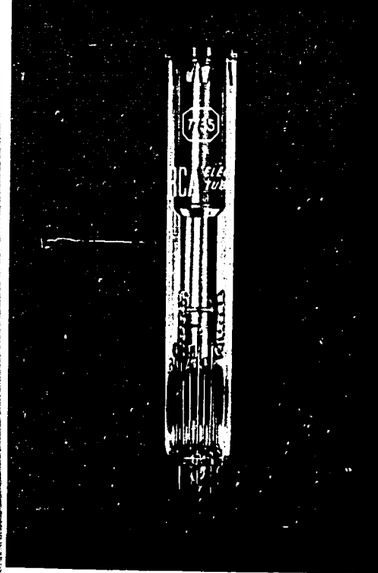


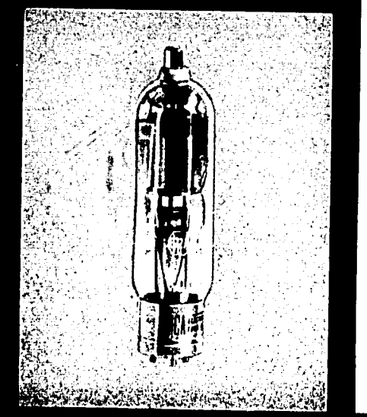





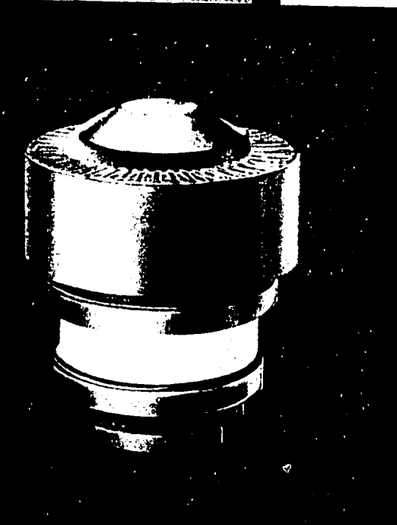
DESIGN FOR DEPENDABILITY...

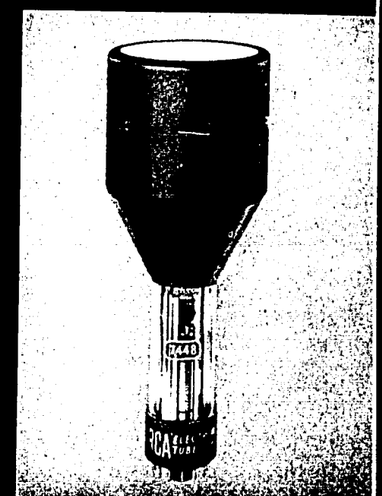
## Specify RCA tubes for industrial and military applications








Whatever your electronic-design problems in military and industrial applications, look to RCA for the tubes you need. RCA's broad line of industrial tube types cover the field—from photoelectronics and microwave propagation to control and communications systems. Every RCA tube type is performance-proved to give you the maximum in dependable operation. And if you're working in advanced areas, RCA's development team will work with you to produce new tube types to meet your specific requirements. Get in touch with your RCA Field Representative today for complete information.

For technical data on specific RCA commercial tube types, write RCA Electron Tube Division, Commercial Engineering, Section 1-22-Q, Harrison, N. J.

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For details, circle #55 on Reader Service Card

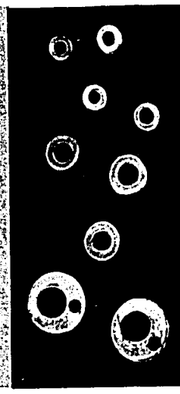
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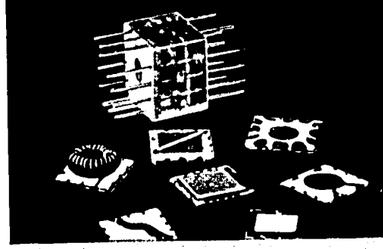
## Whatever your design needs

...INDUSTRIAL ...ENTERTAINMENT
...MILITARY ...COMPUTER

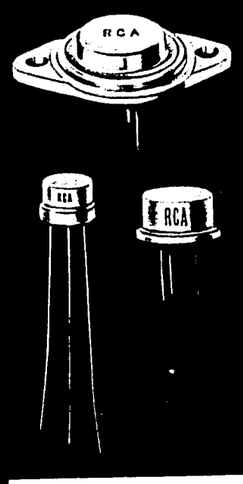
# specify RCA semiconductor products

**RCA FERRITES**
**...a comprehensive line of memory cores, switching cores, transfluxors, memory planes, and aperture plates for computer and data processing equipment. RCA's wide experience in the manufacture and application of ferrite materials can be of valuable help to you in your computer designs.**





**RCA MICROMODULES**
**...an important, new concept in electronic parts packaging makes possible electronic equipment having a parts density of 600,000 parts per cubic foot —resulting in a size reduction to 1/10 that of existing miniature equipment.**




**RCA TRANSISTORS**
**...RCA Transistors cover a wide range of applications from DC to VHF, for RF, IF, AF and switching functions in entertainment, industrial, military and computer applications. They are produced and controlled to meet the most critical performance requirements and have built an enviable record of electrical uniformity and long life.**

**RCA DIFFUSED-JUNCTION SILICON RECTIFIERS**
**...a wide range of types for entertainment, industrial and magnetic-amplifier service featuring rugged design, high-efficiency performance and electrical uniformity. Precision-controlled diffused-junction process provides high reliability. New types are constantly being added to this line.**

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- Burlingame, Calif., 1838 El Camino Real, OXford 7-1620
- Detroit 2, Mich., 714 New Center Bldg., TR 5-5600
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- Dallas 7, Texas, 7905 Empire Freeway, FLeetwood 7-8167

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**AVAILABLE TOO THROUGH YOUR RCA DISTRIBUTOR**

## TECHNICAL DATA AND APPLICATION ASSISTANCE

For technical data on developmental Micromodules, or if you would like to have a specific circuit reduced to Micromodule design, please contact your Field Representative at the RCA Field Office nearest you. He will be glad to pass your design requirements on to our Application Engineers for their recommendations.

For technical data on RCA Semiconductor Products and Ferrite Cores, contact the RCA Field Office nearest you, or write for technical data to Commercial Engineering, Section I-22-NN, Somerville, N. J.

For details, circle #56 on Reader Service Card

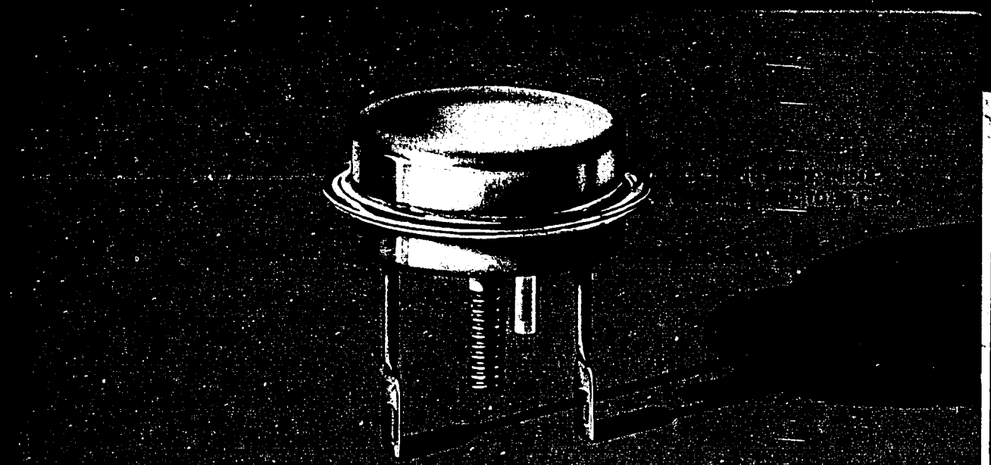
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FIRST SILICON MESA IN THE TO-36 CASE BROADENS THE COVERAGE OF THIS COORDINATED SILICON LINE

Similar to JEDEC TO-3 Case
2N1487
2N1488
2N1489
2N1490

JEDEC TO-8 Case
2N1483
2N1484
2N1485
2N1486

JEDEC TO-5 Case
2N1479
2N1480
2N1481
2N1482



# RCA Announces Four New Silicon Mesa Power Transistors in the Popular TO-36 Case

**Available immediately in quantity...four new NPN Diffused-Junction Types... 2N1511, 2N1512, 2N1513, 2N1514 • electrically equivalent to 2N1487, 1488, 1489, 1490 respectively • utilize the industry-preferred JEDEC TO-36 single ended stud package with cold-weld seal • Designed for a wide variety of military and industrial applications**

With RCA's new Silicon Mesa Power Transistors in the JEDEC TO-36 case, you gain all of these design advantages:

- **More positive heat sink contact** and excellent high-temperature performance up to 175°C plus the greater application flexibility of JEDEC TO-36 stud mounted case.
- **Low saturation-resistance** characteristics with high collector-current and voltage ratings.
- **Wider application** in military and industrial equipment—in power switching circuits, oscillator, regulator and pulse-amplifier circuits.
- **The dependability** of the cold-weld seal, proved by RCA through years of experience.
- **Coordinated line of 16 RCA Silicon Power Transistors.** These four new RCA transistors together with the 12 RCA Silicon Power Transistors shown in the accompanying table provide the designer of Industrial and Military equipment with a comprehensive selection of types to fit his specific needs.

**ELECTRICAL CHARACTERISTICS**
Minimum and Maximum Values at Case Temperature = 25°C

| RCA Type | Min $V_{CEX}$ volts | Min $V_{CEO}$ volts | Max $I_C$ amps | Max $I_{CBO}$ (at) | Max Saturation Resistance ohms | $h_{FE}$ | Max. Dissipation Watts 25°C Case | Max. Dissipation Watts 100°C Case |
|---|---|---|---|---|---|---|---|---|
| | | | | $V_{CB}$ = 30v | $I_C$ = 1.5 amps | $I_C$ = 1.5 amps | | |
| 2N1514 | 100 | 55 | 6 | 25 | 0.67 | 25-75 | 60 | 30 |
| 2N1513 | 60 | 40 | 6 | 25 | 0.67 | 25-75 | 60 | 30 |
| 2N1512 | 100 | 55 | 6 | 25 | 2.00 | 10-50 | 60 | 30 |
| 2N1511 | 60 | 40 | 6 | 25 | 2.00 | 10-50 | 60 | 30 |
| | | | | $V_{CB}$ = 30v | $I_C$ = 1.5 amps | $I_C$ = 1.5 amps | | |
| 2N1490 | 100 | 55 | 6 | 25 | 0.67 | 25-75 | 60 | 30 |
| 2N1489 | 60 | 40 | 6 | 25 | 0.67 | 25-75 | 60 | 30 |
| 2N1488 | 100 | 55 | 6 | 25 | 2.00 | 10-50 | 60 | 30 |
| 2N1487 | 60 | 40 | 6 | 25 | 2.00 | 10-50 | 60 | 30 |
| | | | | $V_{CB}$ = 30v | $I_C$ = 0.75 amps | $I_C$ = 0.75 amps | | |
| 2N1486 | 100 | 55 | 3 | 15 | 1.00 | 35-100 | 15 | 7.5 |
| 2N1485 | 60 | 40 | 3 | 15 | 1.00 | 35-100 | 15 | 7.5 |
| 2N1484 | 100 | 55 | 3 | 15 | 2.67 | 15-75 | 15 | 7.5 |
| 2N1483 | 60 | 40 | 3 | 15 | 2.67 | 15-75 | 15 | 7.5 |
| | | | | $V_{CB}$ = 30v | $I_C$ = 0.2 amps | $I_C$ = 0.2 amps | | |
| 2N1482 | 100 | 55 | 1.5 | 10 | 7 | 35-100 | 4 | 2 |
| 2N1481 | 60 | 40 | 1.5 | 10 | 7 | 35-100 | 4 | 2 |
| 2N1480 | 100 | 55 | 1.5 | 10 | 7 | 15-75 | 4 | 2 |
| 2N1479 | 60 | 40 | 1.5 | 10 | 7 | 15-75 | 4 | 2 |

*sustaining volts

Call your RCA representative today for complete information. For additional technical data write to RCA Semiconductor and Materials Division, Commercial Engineering, Section I-22-NN-2, Somerville, N. J.

**RCA SEMICONDUCTOR & MATERIALS DIVISION FIELD OFFICES**

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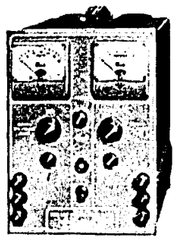
For details, circle #57 on Reader Service Card

*Available through your RCA Distributor*

The Most Trusted Name in Electronics
RADIO CORPORATION OF AMERICA

# HLAB

# regulated transistorized power supplies



800A-2 $580.00

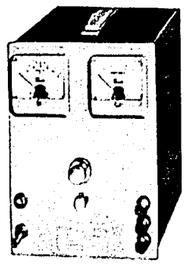
### TWIN SUPPLY — BENCH MODEL

DUAL 0-36 VOLTS @ 0-1.5 AMPS
LOAD REGULATION: Less than 5 millivolts
LINE REGULATION: Less than 5 millivolts
RIPPLE AND NOISE: Less than 200 microvolts
SIZE: 7" W x 9" H x 10½" D

FEATURES: Two sides may be connected in series for 0-72 volts @ 0-1.5 amps. 10½" high panels for rack mounting one or two units available.

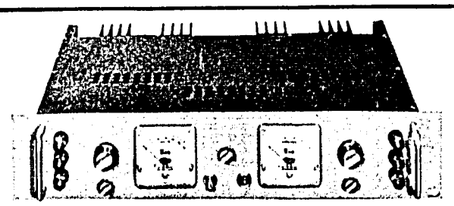
### 2.5 AMP BENCH SUPPLY

0-36 VOLTS @ 0-2.5 AMPS
LOAD REGULATION: Less than 10 millivolts
LINE REGULATION: Less than 5 millivolts
RIPPLE AND NOISE: Less than 250 microvolts
SIZE: 7" W x 9" H x 10½" D



800B-2 $339.00

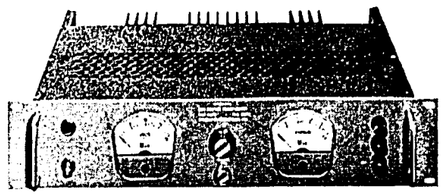
FEATURES: Inexpensive precision laboratory type supply of medium current capability. 10½" panels for rack mounting one or two units available.



802B $580.00

### TWIN SUPPLY — RACK MODEL

DUAL 0-36 VOLTS @ 0-1.5 AMPS
LOAD REGULATION: Less than 5 millivolts
LINE REGULATION: Less than 5 millivolts
RIPPLE AND NOISE: Less than 200 microvolts
SIZE: 3½" H x 15" D x 19" W
FEATURES: Two sides may be connected in series for 0-72 volts @ 0-1.5 amps. Output terminals on both front and rear of supply.



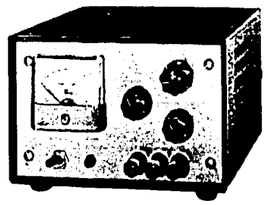
806AM (with meters) $350.00

### PROGRAMMABLE SUPPLY

0-20 VOLTS @ 0-2 AMPS
LOAD REGULATION: Less than 3 millivolts
LINE REGULATION: Less than 3 millivolts
RIPPLE AND NOISE: Less than 200 microvolts
SIZE: 3½" H x 15" D x 19" W
FEATURES: Output terminals on both front and rear of supply. Remote programming. Remote sensing.

### COMPACT BENCH SUPPLIES

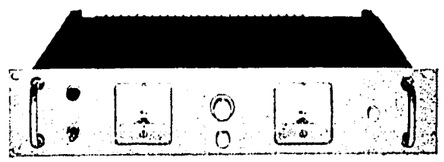
855: 0-18 VOLTS @ 0-1.5 AMPS
865: 0-40 VOLTS @ 0-0.5 AMPS
LOAD REGULATION: Less than 5 millivolts
LINE REGULATION: Less than 5 millivolts
RIPPLE AND NOISE: Less than 500 microvolts
SIZE: 8" W x 5 1/16" H x 8" (mounted in case)



| | |
|---|---|
| 855 (without case) | $163.00 |
| 865 (without case) | $173.00 |
| C-855/865 (case) | $ 12.00 |

FEATURES: Switch enables meter to monitor output voltage or current. Remote programming. 865 overload protection circuit features adjustable current limit. 5¼" high rack mounting panels available.

CAN BE OPERATED IN SERIES OR PARALLEL



808A $425.00

### NEW GENERAL PURPOSE SUPPLY

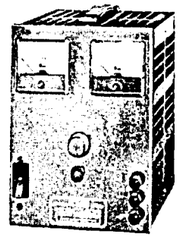
0-36 VOLTS @ 0-5.0 AMPS
LOAD REGULATION: Less than 10 millivolts
LINE REGULATION: Less than 5 millivolts
RIPPLE AND NOISE: Less than 1 millivolt
SIZE: 3½" High x 15" Deep x 19" Wide (Rack Mounting)
FEATURES: Continuously variable output voltage; adjustable current limit set by front panel knob. Output terminals on rear of supply. Remote programming. Remote sensing.



For details, circle #58 on Reader Service Card



- CONSERVATIVELY DESIGNED — BUILT-IN RELIABILITY
- FULL OVERLOAD PROTECTION — SHORT CIRCUIT PROOF
- LOW IMPEDANCE AT ALL FREQUENCIES
- 50-100 MICROSECOND RECOVERY TIME
- ALL SUPPLIES FLOATING — GROUND EITHER SIDE
- ALL TRANSISTORIZED — NO TUBES
- GLASS-EPOXY PRINTED CIRCUIT BOARDS
- COMPUTER-QUALITY ELECTROLYTIC
- 3 WIRE POWER CORD ON ALL UNITS
- ONE YEAR WARRANTY



880 $375.00

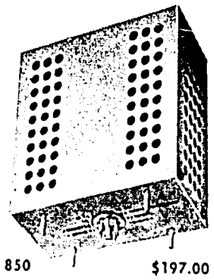
### 0-100 VOLT BENCH SUPPLY

0-100 VOLTS @ 0-1 AMP
LOAD REGULATION: .01% or 5 millivolts
LINE REGULATION: .02% or 5 millivolts
RIPPLE AND NOISE: Less than 1 millivolt
SIZE: 7" W x 9" H x 10½" D

FEATURES: Continuously variable output voltage — no range switching. 10½" high panels for rack mounting one or two units available.

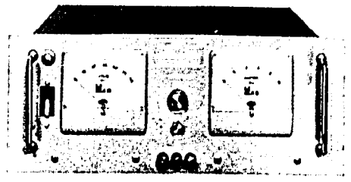
### CHASSIS MOUNTING SUPPLIES

850: 0-15 VOLTS @ 0-1.0 AMPS
860: 0-36 VOLTS @ 0-0.5 AMPS
LOAD REGULATION: Less than 3 millivolts
LINE REGULATION: Less than 3 millivolts
RIPPLE AND NOISE: Less than 500 microvolts
SIZE: 6½" L x 3" W x 6" H



| | |
|---|---|
| 850 | $197.00 |
| 860 | $197.00 |

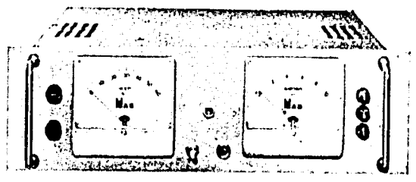
FEATURES: All connections made to octal plug shown in photograph. Remote programming. Remote sensing. 3½" high panels for rack mounting available.



810A $895.00

### VARIABLE HIGH CURRENT SUPPLY

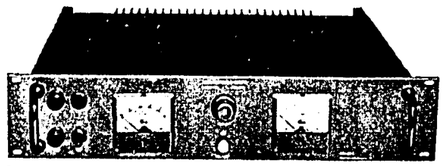
0-50 VOLTS @ 0-7.5 AMPS
LOAD REGULATION: Less than 10 millivolts
LINE REGULATION: Less than 5 millivolts
RIPPLE AND NOISE: Less than 1 millivolt
SIZE: 7" H x 17" D x 19" W
FEATURES: Continuously variable output voltage. Output terminals on both front and rear of supply. Remote sensing.



812C $550.00

### FIXED* VOLTAGE HIGH CURRENT SUPPLY

SELECTABLE 0-32 VOLTS @ 0-10 AMPS
LOAD REGULATION: Less than 0.02 volts
LINE REGULATION: Less than 0.01 volts
RIPPLE AND NOISE: Less than 1 millivolt
SIZE: 5¼" H x 16" D x 19" W
FEATURES: *Output voltage is variable over narrow range about some nominal value; range is easily changed to meet new requirements. Front and rear terminals. Remote sensing. Marginal checking provision available.



890A $595.00

### 300 VOLT TRANSISTORIZED POWER SUPPLY

0-300 VOLTS @ 0-600 MILLIAMPERES
LOAD REGULATION: 0.001% (from no load to full load)
LINE REGULATION: 0.001% (from 105 to 125 VAC)
RIPPLE AND NOISE: 0.005%
SIZE: 3½" High x 15" Deep x 19" Wide (Rack Mounting)
FEATURES: Output voltage continuously variable. All semiconductorized — no tubes. Remote sensing. Remote programming.

(Above data is tentative; production quantities of 890A and other 300 volt transistorized supplies of higher current rating will be available during the fourth quarter of 1960.)




801B $115.00

### STRAIN GAGE POWER SUPPLY

0-15 VOLTS @ 0-200 MILLIAMPERES
LOAD REGULATION: Less than 5 millivolts
LINE REGULATION: Less than 5 millivolts
RIPPLE AND NOISE: Less than 100 microvolts
SIZE: 4 15/16" H x 11½" D x 1 13/16" W
FEATURES: Nine modules can be mounted on a 5¼" high relay rack panel. Insulation resistance greater than 10,000 megohms. Low capacity to ground insured by triple-shielded transformer; one shield surrounding entire supply is brought out for external guard ring connection.

HARRISON LABORATORIES, INC.

45 INDUSTRIAL ROAD • BERKELEY HEIGHTS, NEW JERSEY • CR 3-9123 TWX—SUMMIT, N. J. 977



For details, circle #59 on Reader Service Card

Celco Constantine Engineering Laboratories Co.

*Design, Development*

# Celco DEFLECTION YOKES TRANSFORMERS

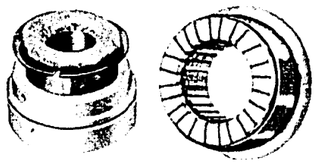
## For...Military and Commercial Avionics

**Leading system manufacturers now depend on CELCO for their difficult and critical applications on many of these components.**

**Our design development, production and quality control experience – combined with CELCO's highly skilled operators, production foremen and engineers – comprises a team that has proven their outstanding performance for quality components.**

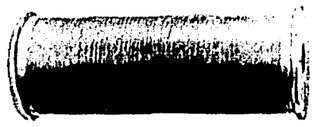
**Apply the CELCO "know-how" to your production requirements!**

**Celco** We specialize in the design and manufacture of **PRECISION DEFLECTION YOKES** for military and commercial applications.
CELCO can give you immediate engineering evaluation on your critical display problems.

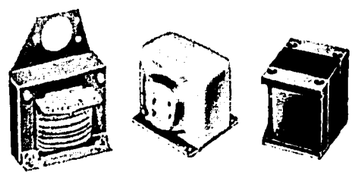


**Celco** **COILS FOR TRAVELING WAVE TUBES –** precision wound for minimum transverse magnetic fields. High temperature windings are a CELCO engineering development –

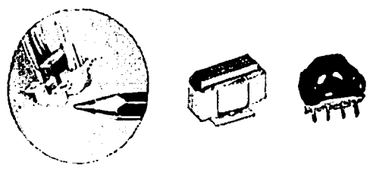
Unit illustrated is 12" long.



**Celco** **HIGH TEMPERATURE TRANSFORMERS–** high temperature windings and impregnations on CELCO TRANSFORMERS permit high operating temperature with reduced size and weight.



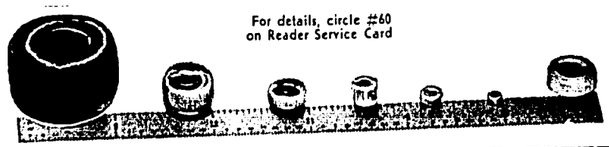
**Celco** **MINIATURE TRANSFORMERS & SATURABLE REACTORS –** specially produced for the Transistor and Plug-in type amplifier assembly. CELCO designs these units wherever reduction in size and weight must be made.



**Celco** **TOROIDAL COILS –** CELCO is equipped to cover an extremely wide range of toroidal windings.

**No. 50 wire on a .062" ID Toroid**
**No. 15 wire on 9" OD Toroid**

For details, circle #60 on Reader Service Card




**Celco** *Constantine Engineering Laboratories Co.*
ISLAND AVE. PHONE: DAvis 7-1123 MAHWAH, N. J.


*and Production of:*

# MAGNETIC AMPLIFIERS AIRCRAFT MOTOR COMPONENTS

## ...Nuclear and Computer Industries

**Celco** **MAGNETIC AMPLIFIERS**–encapsulated with epoxy resins or silicone rubber. CELCO experience with proper treatment of Toroidal Coils assures designed performance.



**Celco** **TOROIDAL COMPONENTS –** for use in system assemblies. Sub-assemblies of chokes, Transformers and Saturable Reactors are manufactured at CELCO for packaging into a single unit.



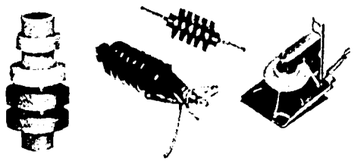
**Celco** **PRECISION TRANSFORMERS –** CELCO develops Precision Transformers for such applications as Computer Components with high accuracy of turns ratio and output voltages.



**Celco** **HERMETICALLY SEALED MAGNETIC AMPLIFIERS & TRANSFORMERS –** with various types of terminations, evacution and inert gas pressurization give CELCO components minimum weight with high-breakdown voltage resistance.

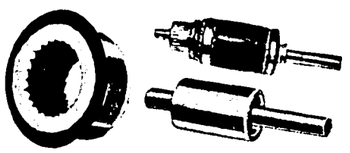


**Celco** **R.F. CHOKES, TRANSFORMERS–** specialized universal winding types of coils and assemblies. These CELCO windings are used when minimum distributed capacitance is required and space does not permit use of mechanical supports.



**Celco** **MOTOR COMPONENTS–**Centrifugally cast squirrel cage rotors for low inertia motors, armatures, stators, field coils and special type rotor coils – are a CELCO production specialty.

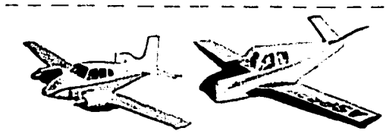
For details, circle #61 on Reader Service Card



**Call DAvis 7-1123 in Mahwah, N.J.**—*for immediate engineering evaluation price and delivery quotations.*

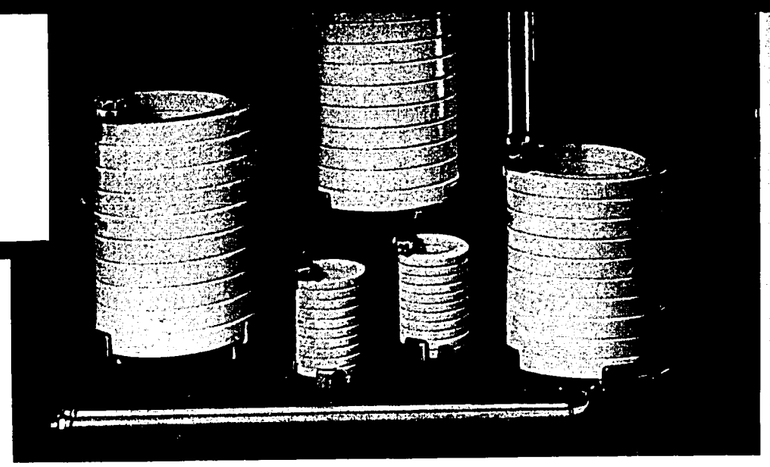
• **Other Plant in: Cucamonga, Calif., YUkon 2-2688**

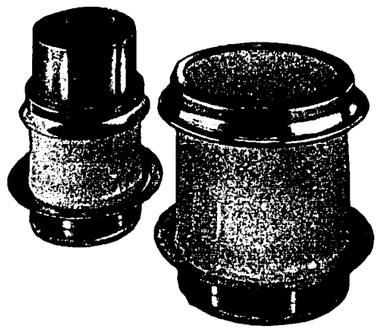
***Your plant is only hours away by the Celco Air Fleet***




**Celco** *Constantine Engineering Laboratories Co.*
ISLAND AVE. PHONE: DAvis 7-1123 MAHWAH, N. J.

# Lapp





## TUBE SUPPORTS
### for air-cooled tubes

No longer is it necessary for equipment manufacturers to design supports for forced-air-cooled tubes. After producing many such special designs, Lapp has engineered and built a complete series of insulating supports for air-cooled tubes. Use of these supports facilitates design of transmitter and other high-power circuits. Simple, compact, efficient and attractive in appearance, in porcelain or steatite, they make for economical production, easy interchangeability, and availability of replacement units. Write for Bulletin 301, with complete description and specification data.

For details, circle #62 on Reader Service Card

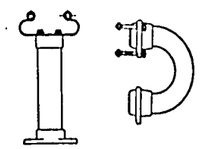
## INSULATION FOR WATER-COOLED SYSTEMS

For carrying cooling water which must undergo a change in potential, use of Lapp porcelain eliminates troubles arising from water contamination and conductivity, sludging and electrolytic attack of fittings. Permanent cleanness and high resistance of cooling water is assured—for positive cooling and long tube life.



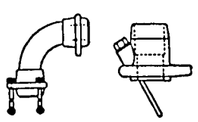
## LAPP PORCELAIN WATER COILS

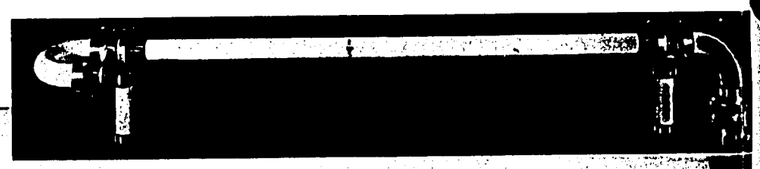
Twin-hole and single-hole models in sizes to provide flow of cooling water from 2 to 90 gallons per minute. Cast aluminum mounting bases, lead pipe or flexible metal hose for attachment.

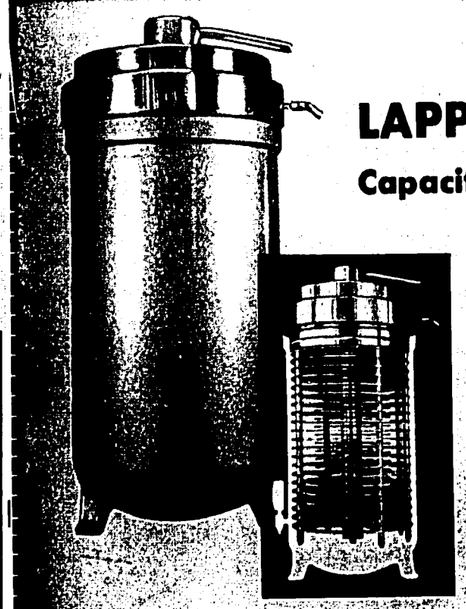


## LAPP PORCELAIN PIPE

Inside diameters ¾" to 3", in straight, 90° and 180° elbows, fittings. Swivel-type connections. Standoff insulators attach directly to fitting bolts. *Write for Bulletin 301 with specifications for Lapp Porcelain Water Coils and Porcelain Pipe.*







## LAPP GAS-FILLED CONDENSERS
### Capacitance for high-voltage, high-current duty

The record of more than 18 years' service, in thousands of installations, proves the reliability of the Lapp Gas-Filled Condenser. For duty at high voltages and high currents, this unit offers the advantages of extreme compactness . . . low loss . . . high safety factor . . . constant capacitance under temperature variation . . . grounded tuning shaft . . . and rugged sturdiness. Units available in four tank diameters, 7" to 18" . . . in fixed or variable capacitance . . . capacitances to 30,000 mmf; current ratings to 390 amps at 1 mc; voltages to 85 Kv peak. Write for Bulletin 302.



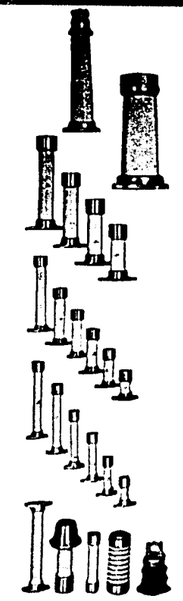
## ENTRANCE INSULATORS

To eliminate losses which occur in ordinary types of bushings at radio frequency, Lapp units use air as major insulation, porcelain path being lengthened by its "bowl" shape. In wide variety of types for most electrical and mechanical requirements.

## STAND-OFF INSULATORS

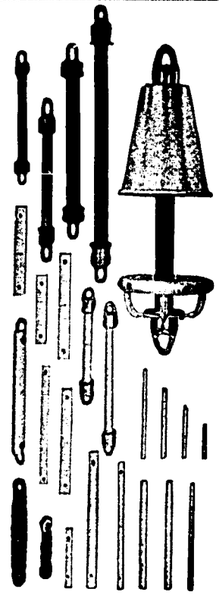
Dependable mechanical and electrical performance—and trim good looks. Hundreds of standard and special types available.

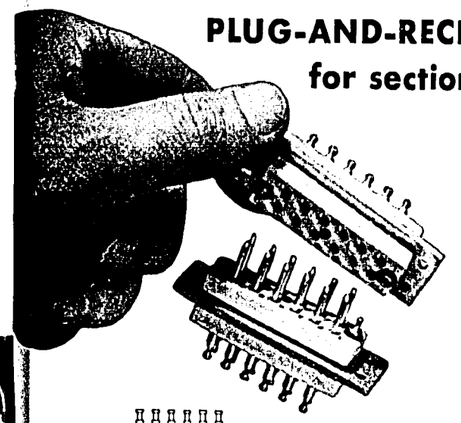
*Write for Bulletin 301, listing entrance and stand-off insulators.*



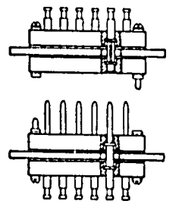
## ANTENNA STRAIN INSULATORS

The largest of the porcelain rod insulators shown develops 12,000 lb. strength. Available, as specified, with rain shield and/or corona rings. Smaller units, in porcelain or steatite, for all strain or spreader use. Engineering and production facilities also available for special performance units See catalog 301.





## PLUG-AND-RECEPTACLE UNITS
### for sectionalizing circuits



For panel-rack or other sectionalized circuits, Lapp offers a variety of plug-and-receptacle units. Any number of contacts can be provided (in multiples of twelve). Male and female contacts are full floating, for easy alignment and positive contact. Contacts silver plated, terminals tinned for soldering. Insulation is steatite, the low-loss ceramic . . . non-carbonizing even under leakage flashover resulting from contamination, moisture or humidity. Write for complete electrical and mechanical specifications and recommendations.

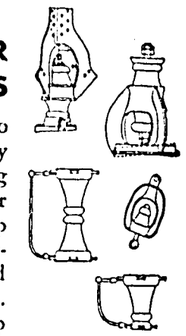
For details, circle #63 on Reader Service Card

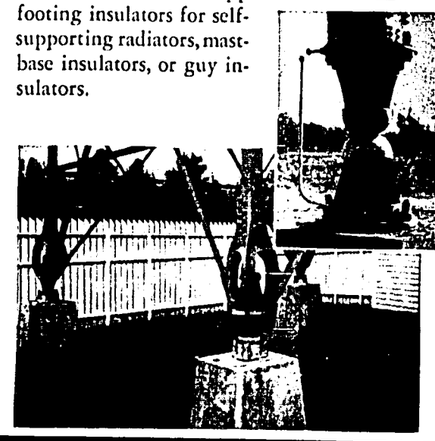
## SPECIAL ASSEMBLIES

Lapp business is electrical porcelain, its application, design, manufacture, and assembly. Our skill is in our knowledge of the capabilities, and limitations, of ceramic insulation . . . in engineering ingenuity to meet specified requirements . . . and in efficient production. If you have need for insulating parts and associated subassemblies, we may be able to show you how they can be made most economically, to perform most efficiently.

## ANTENNA TOWER INSULATORS

Most of the world's radio towers are supported by Lapp insulators, including the tallest guyed mast ever built. Through the Lapp "compression cone," immense loads can be carried by electrical porcelain. Write for data on Lapp footing insulators for self-supporting radiators, mast-base insulators, or guy insulators.



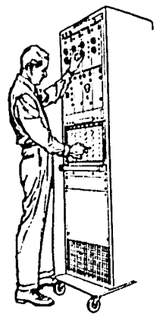


# Lapp

LAPP INSULATOR CO., INC.
RADIO SPECIALTIES DIVISION
150 SUMNER ST., LEROY, N. Y.

# NAME YOUR OSCILLOGRAPHIC RECORDING NEEDS

## SANBORN



**"BUILDING-BLOCK" FLEXIBILITY CAN MEET THEM**

**INPUT CHARACTERISTICS**

**FREQUENCY RESPONSE RANGE ... RECORDING METHOD**

**PACKAGING ... NUMBER OF CHANNELS**

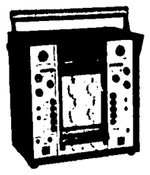
**LARGE-SCREEN VISUAL PRESENTATION**

**TRANSDUCERS**

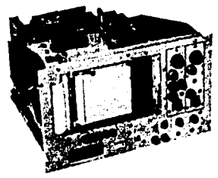
**RELATED INSTRUMENTS, ACCESSORIES**



1-channel, 21 lb. portables — Model 299 for general purpose DC recording, Model 301 for AC strain gage recording.

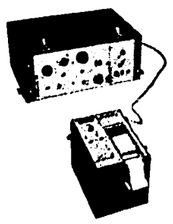


Model 320 2-channel, 4-speed portable ... 50 mm wide channels.



Model 297 2-channel recorder, rack mount in 10½" space or portable housing.

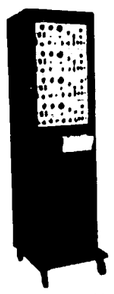
1- to 8-channel "150's", DC to 100 cps.



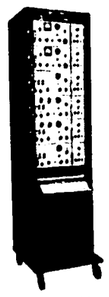
MODEL 151



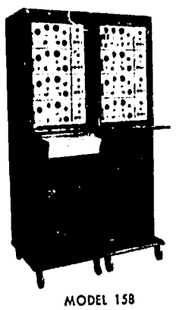
MODEL 152



MODEL 154



MODEL 156

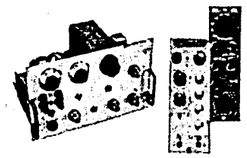


MODEL 158

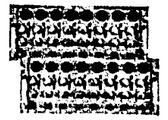


For details, circle #64 on Reader Service Card

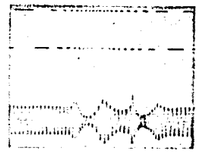


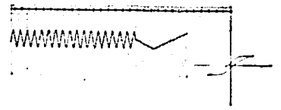


**Interchangeable, plug-in preamps** for "850" systems include Carrier, Phase-Sensitive Demodulator, DC Coupling, Low Level ... for "350" systems, all "850" types plus 400 Cycle Frequency Deviation, Logarithmic types ... for "150" systems, all "350" and "850" types plus AC-DC, AC Wattmeter, RMS Volt/Ammeter, Frequency Meter, Stabilized DC types, and Triplexer 3-channel electronic switch.



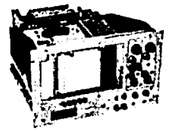
**Single-chassis, 6- and 8-channel amplifiers** for "950" systems include high and low gain general purpose types ... for "650" systems and optical oscillographs of other manufacturers, a 6- or 8-channel medium gain amplifier.





**From DC to 150 cps** with most Sanborn systems which produce inkless, heated stylus recordings in true rectangular coordinates ... *up to* 5000 cps with new optical system using ultraviolet-sensitive paper. *Optical X-Y Recorder* has 2500"/sec. writing speed, immediate readout.





**Sanborn "building block"** units give you extremely wide packaging flexibility: "150" amplifiers and recorders can be separately housed or combined in mobile cabinets ... "350" preamps may be used alone or in a system ... "850" and "950" systems can have up to 16 channels in a single cabinet ... optical 5000 cycle recorder can be housed with X-Y recorder, etc. *All* Sanborn multi-channel recorder assemblies and 350, 650, 850 & 950 amplifier modules fit standard 19" racks.





**Up to 8 brilliant, long-persistence** traces presented simultaneously on the new 17" Sanborn Model 769 scope. Circuit includes individual gating amplifiers for each Y axis.

**SANBORN COMPANY**

**INDUSTRIAL DIVISION**

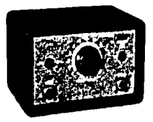
175 Wyman Street, Waltham 54, Mass.



**Measure linear velocity and displacement** with Sanborn LVsyn, Linearsyn and "probe-style" transducers. Strokes from ±0.005" to 10", high sensitivities, 0.5% linearity; special types for high temperatures, pressures ... single-ended or differential pressure measurements at 40 μv/0.1mmHg/volt sensitivities, with 267, 268 Series pressure transducers.

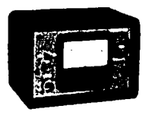








**Complete Sanborn equipment** for your oscillographic recording needs includes a variable speed *Chart Viewer ... Servo Monitor Phase Shifter ...* "150" Series *Wide Band Driver Amplifier ...* a *Monitor Meter ...* 4- to 32- channel *Event Recorders* with *Transistor Driver Amplifiers.*



**See how Sanborn oscillographic recording building-block flexibility can provide the most suitable equipment for *your* needs. Ask your Sanborn Sales-Engineering Representative — offices in principal cities throughout the United States, Canada and foreign countries.**



Economical 8-channel "950" high gain, general purpose system.



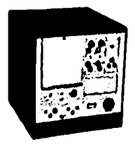
Model 958-16 Complete 16-channel system with amplification ... cabinet or rack mounting.



6- or 8-channel "850's", min. panel space.



Model 650 1- to 24-channel optical system, DC to 5000 cps.



Model 670A High speed (100 cps) optical X-Y recorder.



Simplified 6- or 8-channel system, 5 volts full scale.



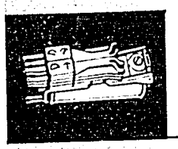
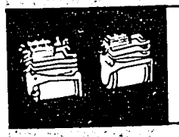
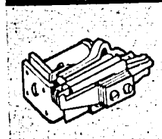
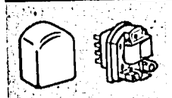
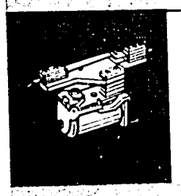
6- or 8-channel "350's", DC to 150 cps.



For details, circle #65 on Reader Service Card

# AUTOMATIC ELECTRIC

## AE RELAYS

| | SERIES | OPERATING TIME, SECONDS | RELEASE TIME, SECONDS |
|---|---|---|---|
|  **CLASS B** When extremely long service and reliable operation are demanded, this relay meets the requirements. Life often exceeds 400 million operations. Ideal for computers, fire control, pulsing or switching functions. | BQA | 0.002-0.030 | 0.005-0.050 |
| | BSO | 0.040-0.120 | 0.025-0.350 |
| | BSR | 0.004-0.035 | 0.035-0.600 |
| | BSA | 0.020-0.055 | 0.035-0.600 |
| | BFA | 0.010-0.025 | 0.008-0.020 |
| | BMS | 0.010-0.030 | 0.015-0.050 |
|  **CLASS E** A new telephone-type relay, designed for long-life industrial service. Based on the rugged Class B design, this is a universal relay, engineered for a variety of uses demanding compact size coupled with our usual high standard of reliability. | EQA | 0.002-0.030 | 0.005-0.025 |
| | ESO | 0.015-0.050 | 0.025-0.125 |
| | ESR | 0.005-0.030 | 0.025-0.125 |
| | ESA | 0.015-0.030 | 0.050-0.125 |
| | EFA | 0.005-0.025 | 0.005-0.025 |
| | EMS | 0.010-0.030 | 0.015-0.030 |
|  **CLASS A** This original telephone-type relay will hold down costs, yet provide dependable operation and long life. A wide variety of coils, contacts, contact spring arrangements and mounting facilities makes this truly the "all-purpose" relay. | AQA | 0.002-0.025 | 0.005-0.025 |
| | ASO | 0.040-0.120 | 0.020-0.250 |
| | ASR | 0.004-0.025 | 0.020-0.350 |
| | ASA | 0.010-0.050 | 0.020-0.350 |
| | AWS | ††Up to 2 | 0.005-0.025 |
| | AVR | 0.002-0.025 | ††1 to 15 |
| | AMC | 0.210-0.280 | 0.300-0.345 |
|  **CLASS C** This compact relay combines unusual dependability and surprisingly long service life in a space about half of the size of the average relay of equal rating. Can be used for high-speed or delayed operation. | CQA | 0.005-0.035 | 0.005-0.025 |
| | CSA | 0.010-0.040 | 0.015-0.200 |
| | CMS | 0.010-0.035 | 0.010-0.050 |
|  **CLASS S** Specify this relay for aircraft use, where a small, light relay is required, resistant to shock and vibration. It features fast pulse response because of its small mass and slight self-inductance. Series SQPC available for printed circuits. | SQA | 0.002-0.016 | 0.005-0.085 |
| | SQD | 0.002-0.030 | 0.005-0.085 |
| | SQPC | 0.002-0.030 | 0.005-0.085 |
| | S-Power | 0.005-0.016 | 0.005-0.010 |
|  **CLASS Z** Choose Class Z relays where a small, light relay is needed but long life or time delay is of greater importance than extremely small size. Similar to Class A relay, but smaller and less sensitive. | ZQA | 0.002-0.025 | 0.005-0.025 |
| | ZSO | 0.010-0.050 | 0.050-0.150 |
| | ZSR | 0.003-0.010 | 0.050-0.200 |
| | ZSA | 0.010-0.040 | 0.050-0.200 |
| | ZMS | 0.010-0.040 | 0.005-0.200 |
| | ZFA | 0.010-0.025 | 0.008-0.020 |
| | Type 18 (Aircraft) | 0.002-0.025 | 0.005-0.025 |
|  **CLASS F** An a.c. relay, for use when the number of relays doesn't justify a rectifier, and when operate and release time delays are not a factor. When operate and release timing is required, an inexpensive rectifier can be used with any of the above d.c. relays. | FQA | 0.002-0.025 | 0.005-0.040 |
| | BFA | 0.010-0.025 | 0.008-0.020 |
| | EFA | 0.005-0.025 | 0.005-0.025 |
| | FMS | 0.002-0.020 | 0.002-0.020 |
| | FMC | 0.298-0.333 | 0.290-0.350 |
| | ZFA | 0.010-0.025 | 0.008-0.020 |
|  **POLARIZED** Series PHD and PLD offer "2-position" or "3-position" operation; Series PTW provides "2-position" only. "2-position" relays "stick" operated until current is reversed; "3-position" have neutral position in absence of current. | PLD | 0.003-0.010 | 0.022-0.047 |
| | PHD | 0.006-0.027 | 0.065-0.075 |
| | PTW**** | 0.007 Minimum | 0.0002 Approx. Travel Time |
|  **SPECIAL PURPOSE**—We can usually make assemblies of Automatic Electric relays with modifications to suit your special applications. The Class E Video relay, illustrated here, is an example. Others are designed for power applications, electro-mechanical interlocking, marginal operation, mechanical locking, micrometer adjusting, and the simultaneous closing of up to 35 circuits (BAR relay). | | | |

## AE STEPPING SWITCHES

### FAST STEPPING, SMOOTH RUNNING, POSITIVE STOPPING

**TYPE 44**

The Type 44 is a small switch with a large, flexible capacity. Use this switch in almost any d.c. application—for impulse controlled response or self-interrupted operation. Though it's only slightly larger than a pack of king-size cigarettes, the Type 44 rotary stepping switch accommodates up to six 10-point bank levels.

**TYPE 45**

In every feature of its design, the Type 45 rotary stepping switch provides for adaptation to varied requirements, including a.c. operation. The one-piece, open-type flat frame occupies only one side of this switch, so the 25-point contact banks can be built up level by level as needed, up to twelve.

**SERIES OCS RELAY**

Here's a shock-resistant relay which can be used for cam-switching...for alternate on-off operations...or as a "stepper." When you order Automatic Electric's OCS relay, you specify the programming. This compact unit simplifies engineering and wiring—cuts space, weight and maintenance costs.





AUTOMATIC ELECTRIC

| SERIES, | MAXIMUM COIL VOLTAGE | MAX. NO. OF STANDARD CONTACTS | TYPE OF CONTACTS††† | WEIGHT | DIMENSIONS (MAX.) IN. |
|---|---|---|---|---|---|
| BQA | 250 dc | 24 Spgs. | Code 0—18 ga. Twin | 8-12 oz. | 4-3/32x2-5/16x1 |
| BSO | 135 dc | **24 Spgs. | | 8-14 oz. | 4-3/32x2-5/16x1 |
| BSR | 135 dc | *6 Spgs. | | 8-14 oz. | 4-3/32x1-7/8x1 |
| BSA | 250 dc | *6 Spgs. | | 8-14 oz. | 4-3/32x1-7/8x1 |
| BFA | 230 ac | 24 Spgs. | | 8-14 oz. | 4-3/32x2-5/16x1 |
| BMS | 250 dc | ***2 Form C | Snap-action | 7-11 oz. | 4-3/32x2-17/32x1-23/32 |
| EQA | 220 dc | 26 Spgs. | Code 0—18 ga. Twin | 2-3 oz. | 2-1/4x1-23/32x1-1/8 |
| ESO | 115 dc | 26 Spgs. | | | |
| ESR | 115 dc | *6 Spgs. | | | |
| ESA | 220 dc | *6 Spgs. | | | |
| EFA | 220 ac | 12 Spgs. | | | |
| EMS | 220 dc | 2 Form C | Snap-action | | 2-1/4x1-23/32x2-3/16 |
| AQA | 250 dc | 26 Spgs. | Code 4—18 ga. | 8-12 oz. | 4-3/32x2-3/16x1-7/16 |
| ASO | 135 dc | 26 Spgs. | | 8-14 oz. | 4-3/32x2-3/16x1-7/16 |
| ASR | 135 dc | *6 Spgs. | | 8-12 oz. | 4-3/32x2x1-7/16 |
| ASA | 250 dc | *6 Spgs. | | 8-12 oz. | 4-3/32x2x1-7/16 |
| AWS | 250 dc | 1 Form A | | 7-11 oz. | 4-3/32x2-3/4x1-7/16 |
| AVR | 250 dc | Special | | 8-12 oz. | 4-1/4x2x1 |
| AMC | 250 dc | 2 | Mercury | 12-16 oz. | 4-3/4x3-1/16x3 |
| CQA | 150 dc | 12 Spgs. | Code 0—18 ga. Twin | 4-oz. | 4-1/32x2-3/16x21/32 |
| CSA | 150 dc | 12 Spgs. | Code 0—18 ga. Twin | 4-oz. | 4-1/32x2-3/16x21/32 |
| CMS | 150 dc | 1 Form C | Snap-action | 6-oz. | 3-13/16x2-7/16x1 |
| SQA | †115 dc | 9 Spgs. | Code 0—20 ga. Twin | 2-oz. | 1-17/32x2x11/16 |
| SQD | †115 dc | 18 Spgs. | | 2- 3 oz. | 1-17/32x2x1 |
| SQPC | †115 dc | 18 Spgs. | | 2- 3 oz. | 1-17/32x2x1 |
| S-Power | 115 dc | 1 Make | Silver-Tungsten | 12 oz. | 1-1/2x1-1/2x1-1/4 |
| ZQA | 135 dc | 13 Spgs. | Code 4—18 ga. | 4- 6 oz. | 2-1/2x2-3/4x1-1/2 |
| ZSO | 115 dc | 13 Spgs. | | 4- 6 oz. | 2-1/2x2-3/4x1-1/2 |
| ZSR | 115 dc | *6 Spgs. | | 4- 6 oz. | 2-1/2x2-3/4x1-1/2 |
| ZSA | 135 dc | *6 Spgs. | | 4- 6 oz. | 2-1/2x2-3/4x1-1/2 |
| ZMS | 135 dc | ***2 Form C | Snap-action | 8-10 oz. | 2-1/2x2-5/8x2-1/4 |
| ZFA | 115 ac | 13 Spgs. | Code 4—18 ga. | 4- 6 oz. | 2-1/2x2-3/4x1-5/16 |
| Type 18 (Aircraft) | 135 dc | 13 Spgs. | Code 4—18 ga. | 4- 6 oz. | 2-1/2x2-1/4x1-1/4 |
| FQA | To 230 (16-66 cycles) | 12 Spgs. | Code 4—18 ga. | 9-13 oz. | 4x1-15/16x1-1/4 |
| BFA | To 230 (20-60 cycles) | 24 Spgs. | Code 0—18 ga. | 8-14 oz. | 4-3/32x2-5/16x1 |
| EFA | To 220 ac | 12 Spgs. | Code 0—18 ga. | 2- 3 oz. | 2-1/4x1-23/32x1-1/8 |
| FMS | To 240 (16-66 cycles) | 2 Form C | Snap-action | 10-14 oz. | 3-1/2x2-3/8x2-3/8 |
| FMC | To 240 (16-66 cycles) | 2 | Merc.-Glass | 14-18 oz. | 4-5/8x2-3/4x2-3/4 |
| ZFA | To 115 (20-60 cycles) | 13 Spgs. | Code 4—18 ga. | 4- 6 oz. | 2-1/2x2-7/8x1-11/32 |
| PLD | 350 dc | 6 each side | Code 4—18 ga. | 28 oz. | 4x3-1/4x2 |
| PHD | 350 dc | 6 each side | Code 4—14 ga. | 27-37 oz. | 4-13/16x2-3/4x3 |
| PTW**** | | 1 Form C | TungstenCarbide or Palladium | 14 oz. | 2-7/8x2-1/4x3-5/16 |

*More contacts can be used at a sacrifice of speed.
**Up to 0.600 sec. release time on BSO relay with 6 springs max.
***With 1 snap-action switch and 1 contact assembly (8 springs max.)
****Octal or pin-type plug (to fit WE Co. 255 applications) available.
†Higher wattage obtainable with oversize coils.
††Timing value in conjunction with a Series ASO relay.
†††Most relays can be furnished with special heavy-duty contacts.

Automatic Electric, pioneer in the use of telephone-type relays for industry, has the experience, reputation, manufacturing facilities, research staff, and down-to-earth, practical "know how" to solve your knottiest control problem. We specialize in the hermetic sealing of relays and switches, as well as in the design, circuitry and assembly of industrial control "packages" and systems. Our representative and facilities are at your command.

**SALESMEN**

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UPPER DARBY, PA. (Philadelphia suburb)

*District Office

**Check the Yellow Pages** of your telephone directory to get in touch with our representative in your area. Address all Home Office inquiries to: Director, Industrial Control and Equipment Sales.

We will be happy to send additional literature on request. You may be interested in some of the following:

Rotary Stepping Switches.....#1698-H
Relays for Industry.....#1702-E
Relay Terms.....#1884
Basic Circuits.....#1927
AE Enclosures.....#4083
Key Switches and Other Electrical Control Components.....#4018-E

Address requests to:
**Director, Industrial Control and Equipment Sales, Northlake, Illinois**

# AUTOMATIC ELECTRIC

GENERAL TELEPHONE SYSTEM

Subsidiary of
**GENERAL TELEPHONE & ELECTRONICS**

Distributors in U.S. and Possessions:
**AUTOMATIC ELECTRIC SALES CORPORATION**
Northlake, Illinois • FIllmore 5-7111 • Chicago Telephone: EStebrook 9-4300

*Sales Offices in Principal Cities*

In Canada: Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16, Ontario.

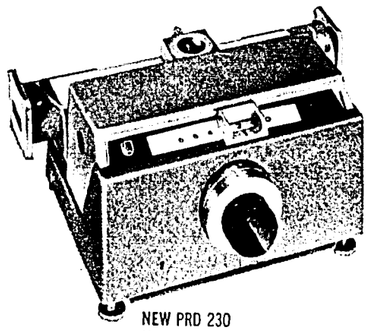
Export Distributor: Automatic Electric International, Incorporated, Northlake, Illinois.

10 mc/s 100 mc/s 1000 mc/s

10,000 mc/s 30,000 mc/s

50,000 mc/s 75,000 mc/s

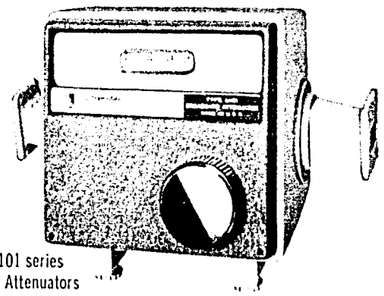
# for every band... the most complete line of precision microwave test instruments



NEW PRD 230
Universal Probe Carriage



NEW PRD 277-B Standing Wave Amplifier



NEW PRD 101 series
Broadband Attenuators

| Band | S | | G | | C | | H | | X | |
|---|---|---|---|---|---|---|---|---|---|---|
| ATTENUATORS | | | | | | | | | | |
| Broadband | | | G101 | $490 | C101 | $ 340 | H101 | $ 340 | X101 | $ 265 |
| Variable | | | | | 1156 | $ 75 | | | 154-A | $61.50 |
| Precision gauge | 175-B† | $375 | 170-B | $325 | 178-B | $ 300 | 185-B | $ 275 | 195-B | $ 215 |
| Precision dial | 174-B† | $290 | 169-B | $235 | 177-B | $ 230 | 184-B | $ 200 | 196-C | $ 165 |
| Fixed waveguide | 137 | $ 75 | 120 | $ 65 | 119† | $ 65 | 118 | $ 60 | 140 | $ 55 |
| Level set | 171-B | $115 | 162-B | $105 | 156-B | $ 100 | 160-B | $ 90 | 159-B | $ 70 |
| | 171-A | $105 | 162-A | $ 95 | 156-A | $ 90 | 160-A | $ 80 | 159-A | $ 60 |
| TERMINATIONS | | | | | | | | | | |
| Fixed | 129-A | $ 45 | 115-A | $ 35 | 121-A | $ 30 | 114-A | $ 25 | 116-A | $ 25 |
| Sliding | 1129 | $100 | 1115 | $ 75 | 1121 | $ 70 | 1114 | $ 60 | 1116 | $ 50 |
| FERRITE ISOLATORS | | | 1205 | $270 | 1204 | $ 245 | 1206 | $ 230 | 1203 | $ 220 |
| SLIDING SHORTS | 315 | $150 | 316 | $140 | 317 | $ 130 | 318 | $ 120 | 319 | $ 110 |
| PRECISION MISMATCHES | 1404 | $300 | 1401 | $225 | 1403 | $ 175 | 1400 | $ 150 | 1402 | $ 125 |
| SLOTTED SECTIONS | 209-A | $590 | 201-A | $390 | 204-B | $ 340 | 202-B | $ 340 | 203-D | $ 280 |
| SLOTTED LINES* | | | | | | | | | X231 | $ 90 |
| TUNERS: Slide screw | 309-A | $150 | 300-A | $140 | 305-A | $ 135 | 302-B | $ 130 | 303-A | $ 125 |
| E-H | | | | | | | | | | |
| ADAPTER: Waveguide to coaxial | 365-A | $ 50 | 357 | $ 40 | 356-A | $ 35 | 355-A | $ 30 | 354-B | $ 25 |
| DIRECTIONAL COUPLERS | | | | | | | | | | |
| (40 db) | 409 | $350 | 410 | $240 | 411 | $ 140 | 412 | $ 120 | 408 | $ 100 |
| (20 db) | | | 400 | $250 | 404 | $ 200 | 401 | $ 175 | 402 | $ 130 |
| BENDS AND TEES | | | | | | | | | | |
| E Bend | | | 450 | $ 70 | 454 | $ 50 | 458 | $ 35 | 462 | $ 30 |
| E Tee | | | 452 | $ 85 | 456 | $ 65 | 460 | $ 50 | 464 | $ 37 |
| H Bend | | | 451 | $ 70 | 455 | $ 50 | 459 | $ 35 | 463 | $ 30 |
| H Tee | | | 453 | $ 85 | 457 | $ 65 | 461 | $ 50 | 465 | $ 37 |
| E-H Tee | | | 478 | $100 | 479 | $ 85 | 480 | $ 70 | 481 | $ 50 |
| CRYSTAL MOUNTS | | | | | | | | | 601 | $ 55 |
| Fixed | | | | | | | | | | |
| Tunable | | | | | | | | | | |
| BOLOMETER MOUNTS | | | | | | | | | | |
| Tunable | | | | | | | | | | |
| Fixed | | | | | | | | | | |
| THERMISTOR MOUNTS | 644 | $125 | 645 | $ 95 | 646 | $ 90 | 647 | $ 90 | 643-A | $ 85 |
| WAVEGUIDE STANDS | | | | | | 370 | | | | $7.50 |
| BROADBAND PROBES | | | 250-A | | | | | $145 | | |
| WAVEGUIDE ADAPTERS | | | | | | | | | | |
| FREQUENCY METERS | | | | | | | | | | |
| Broadband direct reading | | | 532 | $380 | 533 | $ 295 | 534 | $ 290 | 535 | $ 175 |
| Precision direct reading | | | | | 555† | $1500 | 557† | $1500 | 559† | $1200 |
| | | | | | 556† | $1500 | 558† | $1500 | 565† | $1500 |
| Direct reading | | | 590-A† | $350 | 588-A† | $ 250 | 586† | $ 150 | 585† | $ 150 |
| FLANGE BOLT ASSEMBLY | 369-A | $4/dz. | 369-B | $4/dz. | 369-B | $4/dz. | 369-C | $4/dz. | 369-D | $4/dz. |
| CALORIMETER | | | | | | | | | | |
| TUBE MOUNTS | | | 704† | $200 | | | 702† | $ 200 | 703† | $ 130 |

| Band | U | | K | | A | | Q | |
|---|---|---|---|---|---|---|---|---|
| ATTENUATORS | | | | | | | | |
| Broadband | U101 | $ 265 | K101 | $ 425 | A101 | $ 425 | | |
| Variable | | | | | | | | |
| Precision gauge | 188-B | $ 275 | 153-B | $ 325 | 192-A | $ 350 | 193 | $ 370 |
| Precision dial | 187-B | $ 200 | | | | | | |
| Fixed waveguide | 138 | $ 60 | | | | | | |
| Level set | 158-B | $ 85 | 155 | $ 110 | 157 | $ 125 | | |
| | 158-A | $ 75 | | | | | | |
| TERMINATIONS | | | | | | | | |
| Fixed | 131-A | $ 25 | 132-A | $ 30 | 133-A | $ 35 | 1103 | $ 65 |
| Sliding | 1131 | $ 55 | 1132 | $ 65 | 1133 | $ 75 | | |
| FERRITE ISOLATORS | 1208 | $ 220 | 1209 | $ 270 | | | | |
| SLIDING SHORTS | 320-A | $ 125 | 312 | $ 170 | 322 | $ 140 | 326 | $ 150 |
| PRECISION MISMATCHES | 1405 | $ 150 | 1406 | $ 330 | 1407 | $ 340 | | |
| SLOTTED SECTIONS | 210-B | $ 425 | 211-B | $ 425 | 212-B | 425 | 216-A | $1250 |
| SLOTTED LINES* | U231 | $ 110 | K231 | $ 235 | A231 | $ 235 | | |
| TUNERS: Slide screw | 311-A | $ 130 | | | | | | |
| E-H | 314-A | $ 135 | 313-A | $ 155 | 312-A | $ 170 | 323 | $ 280 |
| ADAPTER: Waveguide to coaxial | | | | | | | | |
| DIRECTIONAL COUPLERS | | | | | | | | |
| (40 db) | 413 | $ 100 | | | | | | |
| (20 db) | 405 | $ 200 | | | | | | |
| BENDS AND TEES | | | | | | | | |
| E Bend | 466 | $ 35 | 470 | $ 40 | 474 | $ 45 | 490 | $ 50 |
| E Tee | 468 | $ 45 | 472 | $ 50 | 476 | $ 60 | 488 | $ 60 |
| H Bend | 467 | $ 35 | 471 | $ 40 | 475 | $ 45 | 486 | $ 50 |
| H Tee | 469 | $ 40 | 473 | $ 50 | 477 | $ 60 | 487 | $ 60 |
| E-H Tee | 482 | $ 55 | 483 | $ 70 | 484 | $ 85 | 489 | $ 80 |
| CRYSTAL MOUNTS | | | | | | | | |
| Fixed | 6604 | $ 140 | 6605 | $ 140 | 6606 | $ 140 | | |
| Tunable | 616-A | $ 170 | 621-A | $ 185 | | | | |
| BOLOMETER MOUNTS | | | | | | | | |
| Tunable | 616-A | $ 170 | 621-A | $ 185 | | | 632 | $ 125 |
| Fixed | 6604 | $ 140 | 620 | $ 115 | 618 | $ 115 | | |
| THERMISTOR MOUNTS | 648 | $ 105 | 607 | $ 150 | | | | |
| WAVEGUIDE STANDS | | | | | | | | |
| BROADBAND PROBES | | | 253 | | $135 | | | |
| WAVEGUIDE ADAPTERS | | | 3360 | $ 38 | 3362 | $ 38 | | |
| | | | 3361 | $ 38 | 3363 | $ 38 | | |
| FREQUENCY METERS | | | | | | | | |
| Broadband direct reading | 536 | $ 285 | 537 | $ 290 | 538 | $ 300 | | |
| Precision direct reading | 566† | $1500 | 568† | $1500 | 570† | $1500 | | |
| | 567† | $1500 | 569† | $1500 | 571† | $1500 | | |
| FLANGE BOLT ASSEMBLY | 369-E | $4/dz. | | | | | | |
| CALORIMETER | | | | 666 | | $975 | | |
| TUBE MOUNTS | | | | | | | | |

## COAXIAL TEST EQUIPMENT

| INSTRUMENT | MODEL NUMBER | FREQUENCY kmc/sec | PRICE |
|---|---|---|---|
| Adapters "N" to 7/8 inch | 389 to 392 | 0 - 5.0 | $ 53 |
| "C" to 7/8 inch | 3350 to 3353 | 0 - 5.0 | $ 55 |
| VHF-UHF Detector | 641-A | 0.01 -10.0 | $ 25 |
| Bolometers | 631 Series | 0.5 -10.0 | $ 25 |
| Ferrite Isolator | 1211 | 2.0 - 4.0 | $ 295 |
| Slotted Sections | 200-C | 1.0 - 5.0 | $ 475 |
| | 215-A | 1.0 - 4.0 | $ 475 |
| | 205-A | 4.0 -10.0 | $ 475 |
| Slotted Line* | N231 | 4.0 -10.0 | $ 195 |
| Standing Wave Detector | 219 | 0.1 - 1.0 | $ 525 |
| Tuners: E-H | 327 | 0.95 - 5.0 | $ 125 |
| Double Stub | 306-A | 2.0 -10.0 | $ 90 |
| E-H | 328 | 2.7 -10.0 | $ 129 |
| Bolometer and Crystal Mounts | 612 Series | 1.0 -10.0 | $ 145 |
| | 613 | 1.0 -12.0 | $ 50 |
| | 622 | 1.0 -12.0 | $ 55 |
| Terminations | 139 | 0 - 1.0 | $ 35 |
| | 145-A | 0 - 4.0 | $ 95 |
| | 1107 | 2.0 -10.0 | $ 53 |
| Broadband Thermistor and Bolometer Mounts | 627-A | 0.5 -10.0 | $ 95 |
| | 628-A | 0.5 -10.0 | $ 95 |
| Fixed Attenuators | 130 | 2.0 -10.0 | $ 40 |
| | 136 | 1.0 - 4.0 | $ 120 |
| | 1100 | 0 - 4.0 | $ 55 |
| Variable Cutoff Attenuators | 180-A | 8.2 -10.0 | $ 200 |
| | 181 | 1.0 - 4.0 | $ 125 |
| | 198 | 1.0 - 4.0 | $ 150 |
| Oscillators | 701 | 2.4 - 3.6 | $ 300 |
| | 707 | 0.95 - 2.3 | $1500 |
| | 706 | 3.6 - 7.3 | $ 950 |
| | 705 | 7.0 -11.0 | $ 950 |
| Frequency Meters | 500 | 0.042-10.0 | $3500 |
| | 504 | 0.1 -10.0 | $ 695 |
| | 560 | 2.4 - 3.4 | $1300 |
| | 560-S1 | 2.7 - 3.7 | $1300 |
| | 578 | 0.925- 1.65 | $1500 |
| | 579 | 1.60 - 2.60 | $1500 |
| | 583-D | 2.7 - 3.7 | $ 650 |
| | 587-A | 0.250- 1.0 | $ 275 |

In addition to single catalog items, PRD will provide complete standards laboratories with full services... complete benches for measuring VSWR, impedance, attenuation, or power. For more information, or for your copy of the giant PRD catalog, contact:

**PRD ELECTRONICS, INC.**
A Subsidiary of Harris-Intertype Corporation
Formerly Polytechnic Research & Development Co., Inc.
202 Tillary St., Brooklyn 1, New York, ULster 2-6800
1608 Centinela Ave., Inglewood, Calif., ORegon 8-6922

HARRIS INTERTYPE CORPORATION

For details, circle #69 on Reader Service Card

**ADDITIONAL MICROWAVE INSTRUMENTATION:**

| | | |
|---|---|---|
| STANDING WAVE AMPLIFIER | 277-B | $ 195 |
| KLYSTRON POWER SUPPLY | 809 | $ 350 |
| UNIVERSAL KLYSTRON POWER SUPPLY | 812 | $1495 |
| UNIVERSAL BWO/TWT POWER SUPPLY | 813 | $2900 |
| UNIVERSAL POWER BRIDGE | 650-B | $ 320 |
| VHF-UHF NOISE GENERATOR | 904 | $ 490 |

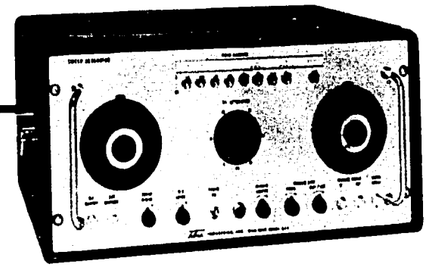
*For PRD 230 UNIVERSAL PROBE CARRIAGE — $160
†not full band coverage

For details, circle #68 on Reader Service Card

TERMS: ½%, 10 days date of invoice. Net 30 days. F.O.B. Brooklyn, N.Y.
DATA AND PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

# SWEEP GENERATORS

Telonic INDUSTRIES INC.



The ultimate check on RF circuit quality is frequency response. Telonic Sweep Generators permit accurate, rapid measurements of frequency response under both laboratory and production-line conditions.

A Telonic Sweep Generator scans the entire frequency range in a 60th of a second, replacing the tedious point-to-point testing normally required. At the same time, the amplitude of the swept signal is precisely controlled to produce a constant voltage input to the circuit under test.

The circuit output is normally demodulated and presented as a continuous oscilloscope trace. Precision attenuators allow quantitative measurements of the results. Internal and external markers provide automatic frequency calibration. Telonic Sweep Generators may be used to perform rapid frequency-response tests on filters, mixers, amplifiers, and a wide variety of other RF circuits.

## GENERAL SPECIFICATIONS

Flatness.....5%
Zero Base Line.....Oscillator off during return sweep
Sweep Rate.....Line frequency (50-60 cps)
Horizontal Sweep.....20 volts
Vernier Attenuation.....0-10 db.
Physical Description.....Panel—7/8" x 8¾" x 19"
Chassis — 2" x 14½" x 17"

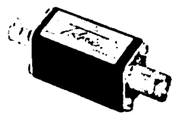
Power.....115 v. 50/60 cycle, approx. 120 watts
Display Linearity.....Better than 1.2:1
Radiation.....Less than 10 microvolts
Source VSWR.....Below 1.3:1
Markers.....Birdy-By-Pass Marker System
Variable Markers.....Available on LD, LR, SD & ED Models

| Model | Center Frequency | Sweep Width | Range | Attenuation (db) (T) Turret (S) Toggle Switch | Output (into 50 ohms) | Remarks | Bulletin Number | Price List |
|---|---|---|---|---|---|---|---|---|
| HD-1A | 1-400 mc<br>400-900 mc | 200kc-200 mc<br>0-10% | 1-910 mc | T-0, 10, 20, 30, 40, 50 | .75, p to p<br>2V, p to p | Lo band heterodyne<br>HI band fundamental | T-209 | $ 995.00 |
| HD-3 | 1-200 mc | 200kc-200 mc | 1-300 mc | T-0, 10, 20, 30, 40, 50 | .75, p to p | Heterodyne type — wide sweep width and tunable center frequency | T-210 | 835.00 |
| HD-4 | 10kc-10 mc | 25kc-10 mc | 10kc-15 mc | S-20, 20, 20, 10, 6, 3 | 1V, p to p | Video sweep — wide or narrow applications | T-213 | 695.00 |
| HD-7 | 100kc-75 mc | 250kc-50 mc | 100kc-100 mc | S-20, 20, 20, 10, 6, 3 | 1V, p to p | Video and IF frequencies<br>Higher video and IF frequencies | | |
| LD-3 | 4-15 mc | .05-40% of CF | 3.5-17.5 mc | S-20, 20, 20, 20, 20, 10, 5, 3, 2, 1 | 1uV-1V, RMS | Electronically swept • Fundamental frequency type • Wide range of output levels • Exceptionally stable, flat and free from spurious content | T-214 | 695.00 |
| LD-4 | 10-35 mc | .05-40% of CF | 9-40 mc | | | | | |
| LD-5 | 20-75 mc | .05-40% of CF | 16-90 mc | | | | | |
| LD-6 | 50-125 mc | .05-30% of CF | 45-140 mc | | | | | |
| SD-1 | 100-220 mc | .05-30% of CF | 85-235 mc | T-0, 10, 20, 30, 40, 50 | .75V, RMS | Capacitive sweep<br>Center frequency tuning<br>Exceptionally flat<br>VHF — UHF — low microwave applications | T-207 | 745.00 |
| SD-2 | 215-450 mc | .02-10% of CF | 200-460 mc | T-0, 10, 20, 30, 40, 50 | .75V, RMS | | | |
| SD-3 | 440-920 mc | .01-6% of CF | 425-930 mc | T-0, 10, 20, 30, 40, 50 | .75V, RMS | | | |
| SD-4 | 950-1250 mc | .01-4% of CF | 925-1260 mc | T-0, 10, 20, 30, 40, 50 | .75V, RMS | | | |
| ED-1A | 1000-1700 mc | .25-100 mc | 975-1515 mc | Vernier 0-10db | .25VRMS | Output is result of 2nd harmonic generation and filtering — and thus these ranges are obtained from the highly reliable SD type of oscillator | T-216 | 1495.00 |
| ED-4A | 1700-2500 mc | .25-100 mc | 1675-2320 mc | | | | | |
| PD-1 | 5-50 mc | 0-20% | 4.2-53 mc | Vernier 0-10db | 2 watts into 50 ohms | HI POWER SWEEP Generator excellent for FILTER and RF transmission line and antenna testing | T-217 | 2450.00 |
| PD-2 | 20-100 mc | 0-20% | 17-105 mc | | | | | |
| PD-3 | 100-250 mc | 0-20% | 85-260 mc | | | | | |
| PD-4 | 250-500 mc | 0-20% | 210-520 mc | | | | | |
| PD-5 | 300-600 mc | 0-20% | 250-625 mc | | | | | |
| PD-6 | 500-1000 mc | 0-15% | 450-1010 mc | | | | | |
| SV-6 Series | VHF Channels | Television Production | VHF and UHF TV PRODUCTION SWEEP GENERATORS — Telonic Sweep Generators are used universally by almost every television manufacturer in the United States and overseas. Numerous models with unique features and special accessories are available. | | | | T-203A | 695.00 |



Model TA-50—$65.00

THE TELONIC MODEL TA-50 TURRET ATTENUATOR is a highly accurate, six-position unit providing 0, 10, 20, 30, 40 and 50 db attenuation of RF signals from DC to 900 mc and above.
Other Telonic Turret Attenuators are available that provide accurate attenuation in the 0-5, 0-10 and 0-25 db ranges.
BULLETIN No. T-212



Model XD-3—$35.00
Model XD-8—$45.00

Telonic RF Detectors are used whenever the circuit under test lacks "built-in" demodulation or "look" points. The Telonic RF Detectors are available in a wide range of impedance values. Model XD-3 is a 1-1250 mc detector generally recommended for use with the HD-1, HD-3 and SD Telonic Sweep Generators. Model XD-8 is recommended for use with the HD-4, HD-7 and LD Telonic Sweep Generators.
BULLETIN No. T-204

Telonic INDUSTRIES, INC. BEECH GROVE, INDIANA



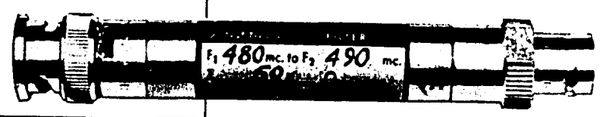
For details, circle #70 on Reader Service Card



# RF FILTERS

Telonic ENGINEERING CORPORATION

MINIATURE LOW PASS — TLP Series
MINIATURE BAND PASS — TBP Series




TELONIC TLP-4 Miniature Low Pass Filters are available at any cut-off frequency from 200 to 2000 mc. in 5 mc increments. The filters feature an exceptionally rugged mechanical design, making them ideally suited to missile and other military applications. At the same time, the inherent simplicity of the units makes them appropriate for general laboratory and commercial uses where low-cost, dependable performance is a prerequisite.

**TYPICAL SPECIFICATIONS FOR A 4-SECTION LOW PASS FILTER**

CUTOFF FREQUENCY.....200-2000 mc., measured at point where insertion loss equals 1.5 db.
PASS BAND ATTENUATION.....Less than 1.5 db
STOP BAND ATTENUATION.....Over 50 db. at 1.65 xFco. and above; over 30 db. at 1.4xFco.
PASS BAND VSWR.....Less than 1.5:1
IMPEDENCE.....50 ohms
MAXIMUM POWER INPUT.....Over 15 watts
CONNECTORS.....Type BNC (Standard
MATERIAL.....German Silver
WEIGHT.....Approximate 5 ounces

**HOW TO SPECIFY TELONIC FILTER**

Filter model numbers indicate type of filters, cut-off frequency, number of sections, and type of connectors.

EXAMPLE:

TLP — Telonic Low-Pass Filter
275 — 275 mc cut-off frequency
4 AB — Connectors; Number of sections

TLP low pass filters $75.00 down to $22.00 depending on type and quantity

BULLETIN NO. T 211A

TELONIC TBP BAND PASS FILTERS cover the frequency range from 200 mc to 2000 mc. Bandpass may be set at any value between 2.5% and 25%. The number of sections may be varied from 2 to 4, depending upon the bandpass and rejection requirements. The electrical performance of the filters corresponds to resonant cavities or tank circuits having unloaded Q's of over 200. The D.C. resistance of the filters is essentially infinite both to ground and from input to output.

**TYPICAL SPECIFICATIONS FOR A 4-SECTION BAND PASS FILTER**

CENTER FREQUENCY.....200-2000 mc.
PASS BAND WIDTH.....2.5-25%
PASS BAND ATTENUATION.....0.5DB ±.2 db per section at 3% B.W. — 0.2 ±.1 per section at 12.5% B.W.
PASS BAND VSWR.....Less than 1.5:1
IMPEDANCE.....50 ohms
NOMINAL POWER INPUT.....Over 15 watts
CONNECTORS.....Type BNC, TNC or N
MATERIAL.....18% Silver Nickel
WEIGHT.....Approximately 5 ounces

**HOW TO SPECIFY TELONIC FILTER**

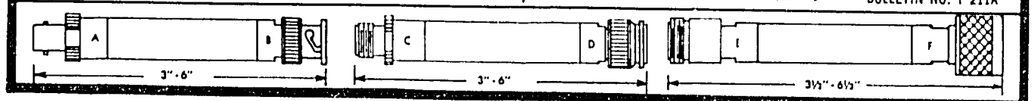
Filter model numbers indicate type of filters, center frequency, bandwidth, number of sections, and type of connectors.

EXAMPLE:

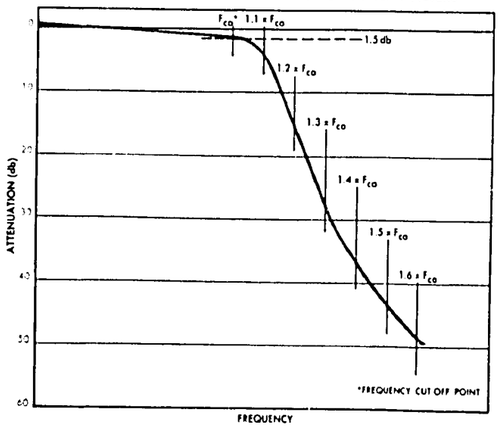
TBP — Telonic Band Pass Filter
275 — Center Frequency — 275 mc
10 — Bandwidth
4 AB — Connectors; Number of Sections

TBP band pass filters $125.00 down to $30.00 depending on type and quantity

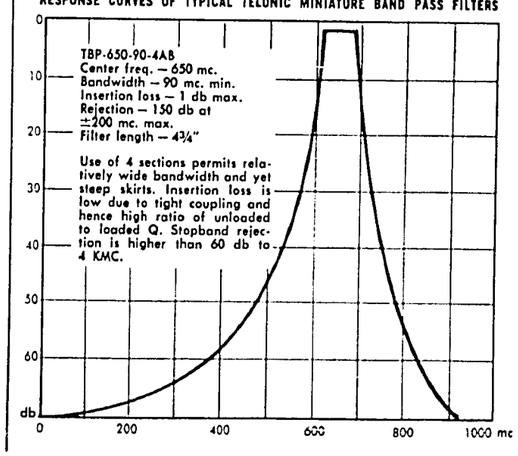
BULLETIN NO. T 211A




**CHARACTERISTIC PERFORMANCE CURVE FOR TLP-4 FILTERS**




**RESPONSE CURVES OF TYPICAL TELONIC MINIATURE BAND PASS FILTERS**



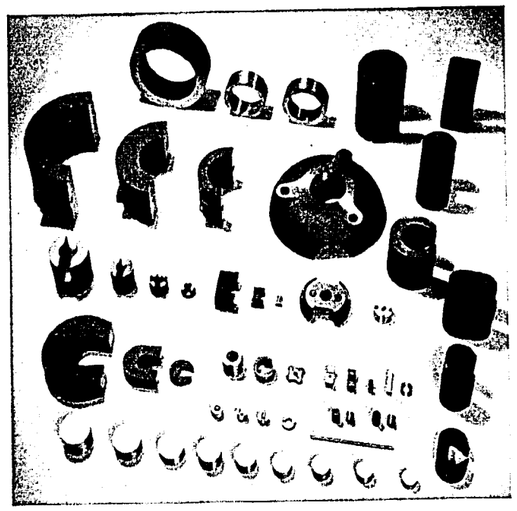

Telonic ENGINEERING CORPORATION, LAGUNA BEACH, CALIFORNIA



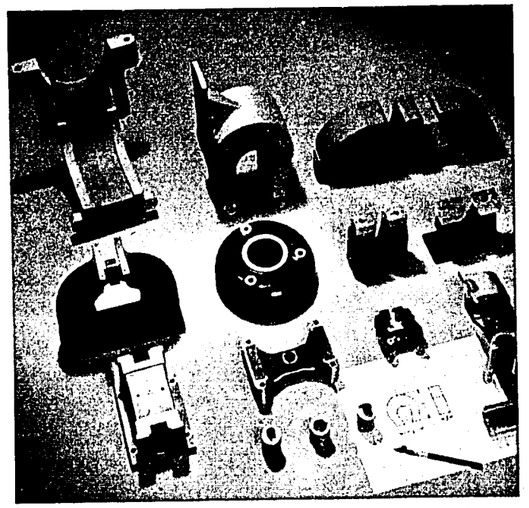
For details, circle #71 on Reader Service Card

# Specify "ARNOLD"

## for your PERMANENT MAGNET requirements



Typical group of Arnold permanent magnets, both cast and sintered types.



Typical group of permanent magnet assemblies, aluminum jacketed.

## ALNICO MAGNETS

Arnold permanent magnets are available in all types of Alnico material, in sizes ranging from large castings weighing over 80 pounds to very small sintered parts weighing less than one gram.

Alnico V can usually be depended upon to deliver the greatest energy product to the magnetic circuit per unit weight of magnet material. It is therefore generally the first choice for a magnetic material except where special physical considerations are paramount.

Special assemblies such as rotors, traveling wave tube magnets, magnetron magnets, etc. may be supplied in an aluminum jacket to facilitate mounting and supply an added protection to the magnet.

Large magnet assemblies may also be supplied for mass spectrometer and other measuring applications where a high degree of stability and uniformity of field is required.

Many sizes and types of Alnico magnets are carried in stock for immediate delivery. For more information, *write for Bulletin GC-106C.*

## SPECIAL PERMANENT MAGNET MATERIALS

### ARNOX III

Arnox III is a molded-type magnet having high coercive force and moderately low residual induction and energy product. Principal uses are for magnetic requirements which are not stringent, and for a relatively short magnet of reasonable cross section. Accurate dimensions and close tolerances can be economically obtained. These magnets can be premagnetized before assembly, and have very high resistance to demagnetization. Slightly better magnetic properties are obtained in the pressing direction than in other directions.

### ARNOX V

Arnox V is a ceramic permanent magnet material composed of highly oriented barium ferrite. It has many times the energy product of Arnox III and is comparable in many applications to Alnico V. Because of its high coercive force, its use is recommended in applications where a short magnetic length is desirable or where extremely high demagnetizing forces may be encountered. In many applications, it may be magnetized prior to assembly.

### VICALLOY

Vicalloy is a carbon-free permanent magnet alloy containing about 10% vanadium, 50% cobalt and the balance iron.

Vicalloy may be fabricated in the form of castings, hot rolled bars and forgings, or cold rolled strip, wire and tubing. After suitable heat treatment, the material is quite readily machinable. Vicalloy is available on special order in bar, strip and thin tape for recording purposes. *For more information, write for "The Magneteer," Vol. 2, No. 1.*

### CUNIFE

Cunife is a permanent magnet alloy of copper, nickel and iron which is malleable, ductile and machinable, after final heat treatment. The magnetic properties of Cunife are developed by cold working and are directional, with the best magnetic properties found only in the smaller sizes of rods or wires.

7806

**ARNOLD**

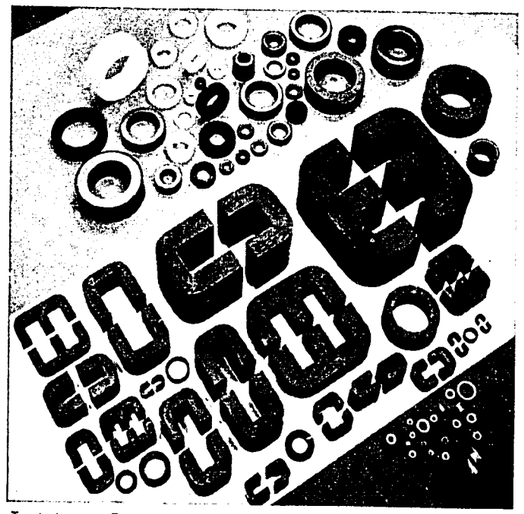
**SPECIALISTS in MAGNETIC MATERIALS**

THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

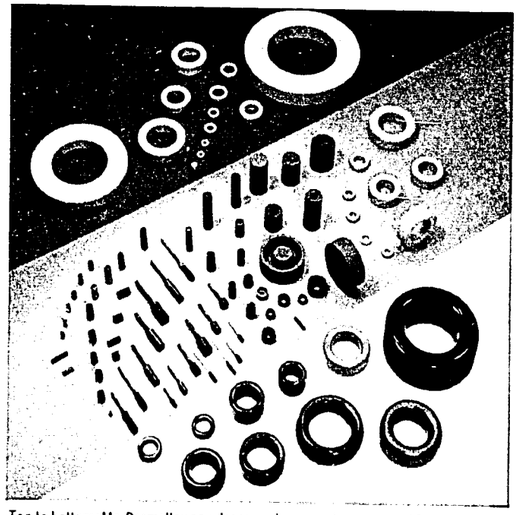


# Specify "ARNOLD"

## for your MAGNETIC CORE requirements



Top to bottom: Tape wound cores, Silectron C, E and O cores, and bobbin cores.



Top to bottom: Mo-Permalloy powder cores, iron powder cores, and Sendust cores.

**SILECTRON C-CORES, E-CORES and TOROIDS** Arnold C and E cores are made from precision-rolled Silectron strip in 1, 2, 4 and 12 mil thicknesses.

They are supplied in a wide variety of shapes, and in sizes from a fraction of an ounce to several hundred pounds. In addition to standard transformer applications, they may also be supplied for special applications such as saturable reactors, instrument transformers and pulse transformers.

Over 1,000 stock cores are listed in the Arnold Silectron catalog. A wide selection of preferred sizes are carried in stock for immediate shipment. For complete data on C and E cores and Silectron toroids, *write for Bulletin SC-107A.*

**TAPE WOUND CORES of High Permeability Materials** Arnold tape wound cores are available made of Deltamax, 4-79 Mo-Permalloy, Supermalloy, Mumetal, 4750 Electrical Metal, Silectron, or the new rectangular-loop material, Supermendur. All except Supermendur cores are available in standard tape thicknesses of 1, 2 and 4 mils; also in special tape thicknesses of ½ mil, 12 mil or other, as required or feasible. Supermendur is presently available in 4 mil cores.

Toroidal cores are made in 30 standard sizes with protective nylon or aluminum cases. Special sizes of toroidal cores are produced to individual requirements. *Write for Bulletin TC-101A.* (*TC-113A for Supermendur Cores.*)

**BOBBIN CORES** Arnold bobbin cores are available in a wide range of sizes, tape thicknesses, widths and number of wraps to suit the ultimate use of the core in electronic computer assemblies. Magnetic materials usually employed are Deltamax and Square Permalloy in standard thicknesses of 1, ½, ¼ and ⅛ mil. Bobbins are supplied in ceramic or stainless steel. *Write for Bulletin TC-108A.*

**MO-PERMALLOY POWDER CORES** Available in a wide range of sizes, from .260" OD to 5.218" OD. They are given various types of enamel and varnish finishes, some of which permit winding with heavy Formex insulated wire without supplementary insulation over the core.

These powder cores are supplied in four standard permeabilities: 125, 60, 26 and 14 Mu. They provide constant permeability over a wide range of flux density, and in many cases may be furnished stabilized to provide essentially constant permeability over a specific temperature range. Large warehouse stocks of preferred sizes are carried for immediate shipment. *Write for Bulletin PC-104C.*

**IRON POWDER CORES** A wide selection of cores is available, from simple cylinders to special cores of complicated design. The line includes all standard types of threaded cores, cup, sleeve, slug and cylindrical insert cores: for use in antenna and RF coils, oscillator coils, IF coils, perm tuning, FM coils, television coils, noise filter coils, induction heating and bombarder coils, and other low frequency applications. Preferred sizes are carried in warehouse stock for quick shipment. A standard series of iron powder toroids is also manufactured, conforming to the standard sizes proposed by the Metal Powder Industries. *Write for Bulletin PC-109.*

**SENDUST POWDER CORES** Available in a wide selection of sizes, ranging from .800" OD to 3.346" OD, and in permeabilities of 10, 13, 25, 30, 50 and 80, although not all sizes are available in all permeabilities. They possess magnetic properties generally superior to iron powder cores, but inferior to Mo-Permalloy powder cores in the audio and carrier frequency range. *Write for Bulletin SDC-110.*

## SPECIAL MATERIALS

**2V PERMENDUR** . . . a ferromagnetic alloy of cobalt, vanadium and iron that possesses high flux density saturation properties. Its magnetostrictive properties are useful in many transducer applications. *Write for Bulletin EM-23.*

**VIBRALLOY** . . . a ferromagnetic alloy of nickel, molybdenum and iron whose temperature coefficient of elastic modulus is controllable over a wide range. It has high ferromagnetic permeability, and a rather high coefficient of magnetostriction. Used in applications where a zero or controlled thermo-elastic coefficient is desired.

**BARIUM TITANATE** . . . A piezoelectric ceramic widely used in accelerometers, phono pickups, microphones, ultrasonic grinding and cleaning devices and underwater signaling devices. For more information, *write for Bulletin CM-116.*

7807 C

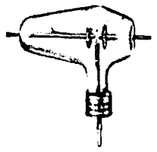
**ARNOLD**

**SPECIALISTS in MAGNETIC MATERIALS**

THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

# TUNG-SOL

## TUNG-SOL/CHATHAM SPECIAL-PURPOSE TUBES



**VACUUM SWITCH**

Used in high-voltage test equipment and airborne radar units.

**Types available:** 1S22



**RECTIFIERS**

Used throughout industrial electronic equipment and broadcasting operations—AM, FM and TV.

**Types available:** 1Z2, 3B25, 3B28, 4B32, 5AT4, 5R4GY, 5R4WGA, 5R4WGB, 6H6WGT, 6X4W, 25Z6WGT, 26Z5W, 83, 583, 5517, 5726/6AL5W, 5726/6AL5W/6097, 5829WA, 3B29, 576A.



**VOLTAGE REFERENCE TUBES**

Used in radios and other electronic gear with regulated power supplies. Especially in high-accuracy units.

**Types available:** 5651, 5651WA. 5783, 5783WA, 5783WB.



**TELEPHONE TUBES**

Used in hand sets and carrier equipment.

**Types available:** 313C, 338A, 407A, 426A, 5842/417A, 5847/404A, 6028/408A.



**TWIN TRIODES**

Used widely in equipment handling frequencies from the audio level through the frequency band.

**Types available:** 5670, 5670WA, 6SU7GTY, 12AT7WA, 12AY7, 53, 6SC7GTY, 5687, 5687WA, 2C51, 6188/6SU7WGT, 5814, 5814WA, 5751, 5751WA, 6SN7WGTA, 6021.



**HYDROGEN THYRATRONS**

Used in radar modulators and missile tracking beacons. Miniatures in airborne units.

**Types available:** 1258, 5948, 5949, 7190, 7191, VC1257, 7192, 7240, 7454, 5948A, 5949A.



**VOLTAGE REGULATORS**

Used in Radio and other electronic equipment with regulated power supplies.

**Types available:** OB2WA, OB2, OC3W, OD3W, 6542, 6627/OB2WA, 6074, 7099.



**POWER PENTODES**

Used in public address systems, hi-fi amplifiers, radio transmitters and receivers.

**Types available:** 2E22, 3A4, 5A6, 6AR6, 6L6WGB, 5881, 26E6WGB, 6098/6AR6WA, 6146, 6550, 6883.



**THYRATRONS**

Used in power supplies, radio transmitters, motor controllers and spot welders.

**Types available:** 2A4G, 2D21W, 3C23, 6D4, 323B, 393A, 394A, 395A, 885, 2050W, 5594, 5696, 2D21, 2050, 5727/2D21W, 5643, 6012, 6901.

## * SPECIAL-PURPOSE TUBES
## * SEMICONDUCTORS
## * ENTERTAINMENT TUBES
## * LAMPS



**PENTODES**

Used in military and other communications equipment.

**Types available:** 1AD4, 6AJ5, 6AK5WB, 6AS6, 6AU6WA, 5636, 5636A, 5639, 5654/6AK5W, 5654/6AK5W/6096, 5672, 5678, 5725/6AS6W, 5725/6AS6W/6187, 5749/6BA6W, 5875.



**VHF TRIODES**

Used in military VHF radio and test equipment.

**Types available:** 5676



**POWER TRIODES**

Used in high current regulated power supplies and radio and industrial gear with built-in power supplies.

**Types available:** 6AS7G, 5998, 6080, 6080WA, 6082, 6336, 6336A, 6394A, 6520, 7105, 6528, 7241, 7242.

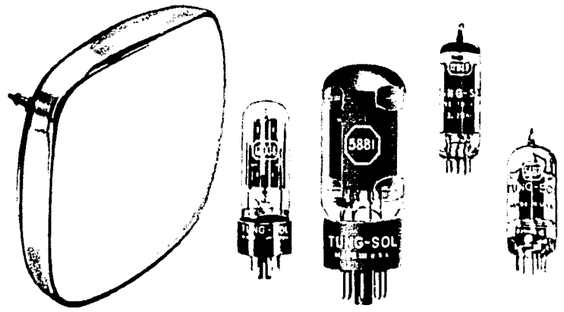


**INDICATOR THYRATRONS**

Used in relay service wherever a small, lightweight, self-indicating tube is needed.

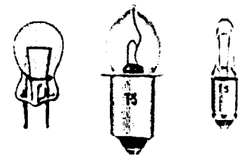
**Types available:** 7400, 7401, 7323.

## ENTERTAINMENT TUBES



**Tung-Sol Blue Chip** quality tubes are available for virtually every entertainment need — cathode ray, series-string, hybrid auto radio, TV, radio and hi-fi.

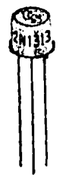
## LAMPS



Miniature incandescent lamps for all instrumentation applications up to 40 volts. Available in a wide variety of base configurations.

## SEMICONDUCTORS

### GERMANIUM TRANSISTORS



TO-5 Inverted Header Design Brings you these Benefits . . .

- Improved thermal properties for longer life.
- superior mechanical characteristics for increased reliability.

**MEDIUM POWER, MEDIUM FREQUENCY**

| TYPE | $P_C$ mw | $V_{CE}$ volts | $V_{CB}$ volts | $I_C$ ma | $T_J$ °C | Max. $I_{CBO}$ μa | $h_{FE}$ | fab mc |
|---|---|---|---|---|---|---|---|---|
| 2N381 | 200 | −25 | −50 | 400 | 100 | 10 | 50 | 3 |
| 2N382 | 200 | −25 | −50 | 400 | 100 | 10 | 80 | 4 |
| 2N383 | 200 | −25 | −50 | 400 | 100 | 10 | 100 | 5 |
| INDUSTRIAL TYPES | | | | | | | | |
| 2N460 | 200 | — | −45 | 400 | 100 | 15 | 25 | 1.2 |
| 2N461* | 200 | — | −45 | 400 | 100 | 15 | 50 | 1.2 |

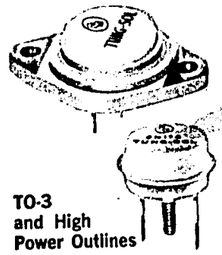
*Designed to meet MIL-T-19500/45

**MEDIUM POWER, HIGH FREQUENCY**

| | MAXIMUM RATINGS (25° C) | | | | | TYPICAL VALUES (25° C) | | |
|---|---|---|---|---|---|---|---|---|
| TYPE | $P_C$ mw | $V_{CE}$ volts | $V_{CB}$ volts | $I_C$ ma | $T_J$ °C | Max. $I_{CBO}$ μa | $h_{FE}$ | fab mc |
| COMPUTER TYPES | | | | | | | | |
| 2N404* | 120 | −24 | −25 | 100 | 85 | 5 | 30 | 12 |
| 2N425 | 120 | −20 | −30 | 400 | 85 | 5 | 30 | 4 |
| 2N426 | 120 | −18 | −30 | 400 | 85 | 5 | 40 | 6 |
| 2N427 | 120 | −15 | −30 | 400 | 85 | 5 | 55 | 11 |
| 2N428† | 120 | −12 | −30 | 400 | 85 | 5 | 80 | 17 |
| 2N578 | 120 | −14 | −20 | 400 | 85 | 5 | 15 | 5 |
| 2N579 | 120 | −14 | −20 | 400 | 85 | 5 | 30 | 8 |
| 2N580 | 120 | −14 | −20 | 400 | 85 | 5 | 45 | 15 |
| 2N581 | 120 | −14 | −18 | 100 | 85 | 5 | 30 | 8 |
| 2N582 | 120 | −14 | −25 | 100 | 85 | 5 | 60 | 18 |
| 2N1313 | 180 | −15 | −30 | 400 | 100 | 3.5 | 70 | 12 |
| GENERAL PURPOSE TYPES | | | | | | | | |
| 2N413 | 120 | −18 | −30 | 200 | 85 | 5 | 30▲ | 2.5 |
| 2N414 | 120 | −15 | −30 | 200 | 85 | 5 | 60▲ | .5 |
| 2N416 | 120 | −12 | −30 | 200 | 85 | 5 | 80▲ | 10 |
| 2N417 | 120 | −10 | −30 | 200 | 85 | 5 | 140▲ | 20 |

▲$h_{fe}$

*Designed to meet MIL-T-19500/20
†Designed to meet MIL-T-19500/44



**TO-3 and High Power Outlines Feature Exclusive Tung-Sol Cold Weld Seal . . .**

- True hermetic, copper-to-copper seal improves thermal characteristics.
- Elimination of heat-damage, heat-caused moisture and "splash" increase reliability.
- Vacuum-tight, moisture-proof cold-weld seal lasts even through "breathing" over long-life.

**POWER, MEDIUM FREQUENCY**

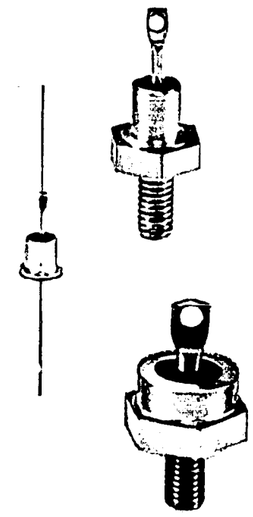
| | MAXIMUM RATINGS (25° C) | | | | | TYPICAL VALUES (25° C) | | |
|---|---|---|---|---|---|---|---|---|
| TYPE | $P_C$ w | $V_{CE}$ volts | $V_{CB}$ volts | $I_C$ A | $T_J$ °C | Max. $I_{CBO}$ ma | $h_{FE}$ | fab mc |
| AUDIO TYPES | | | | | | | | |
| 2N242 | 15 | −45 | — | 2 | 85 | 1.0 | 50 | 0.4 |
| POWER SWITCH TYPES | | | | | | | | |
| 2N378 | 50 | −20 | −40 | 5 | 100 | 0.5 | 30 | 0.3 |
| 2N379 | 50 | −40 | −80 | 5 | 100 | 0.5 | 30 | 0.3 |
| 2N380 | 50 | −30 | −60 | 5 | 100 | 0.5 | 50 | 0.4 |
| 2N459 | 50 | −60 | −105 | 5 | 100 | 0.5 | 30 | 0.3 |

**HIGH POWER, MEDIUM FREQUENCY**

| | MAXIMUM RATINGS (25° C) | | | | TYPICAL VALUES (25° C) | | |
|---|---|---|---|---|---|---|---|
| TYPE | $V_{CE}$ volts | $V_{CB}$ volts | $I_C$ A | $T_J$ °C | Max. $I_{CBO}$ ma | $h_{FE}$ | fae Kc |
| MILITARY TYPE | | | | | | | |
| TS 748 | Designed to meet MIL-T-19500/13A dated 8 January 1958 | | | | | | |
| INDUSTRIAL TYPES | | | | | | | |
| 2N173 | −50 | −60 | 15 | 95 | 8 | 52 | 10 |
| 2N174 | −70 | −80 | 15 | 95 | 8 | 37 | 10 |
| 2N174A | −70 | −80 | 15 | 95 | 8 | 37 | 10 |
| 2N277 | −40 | −40 | 15 | 95 | 8 | 52 | 10 |
| 2N278 | −45 | −50 | 15 | 95 | 8 | 52 | 10 |
| 2N441 | −40 | −40 | 15 | 95 | 8 | 30 | 10 |
| 2N442 | −45 | −50 | 15 | 95 | 8 | 30 | 10 |
| 2N443 | −50 | −60 | 15 | 95 | 8 | 30 | 10 |

## SILICON RECTIFIERS

Tung-Sol's select line assures the utmost in uniformity and electrical and mechanical stability. Ranging from 250 ma to 100 amps, these outstanding units operate with undiminished reliability over a −65 to +150°C case temperature range. Tung-Sol silicon rectifiers feature low forward voltage drop . . . low reverse leakage . . . low thermal resistance . . . and high surge handling ability. They are built with extra heavy ruggedness for rough-and-tough industrial and military applications . . . and are designed to meet the most rigorous military specifications.



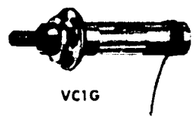
*For further information*

TUNG-SOL®

# WHEN THE CIRCUIT CALLS FOR



# SPECIFY JFD AND SEE!


VC1G


VC9GW


## VARIABLE TRIMMER AND L-C TUNER COMPARISON CHART

| MODEL | CAPACITANCE RANGE MMF MEASURED PER JFD #5177 MIN. | CAPACITANCE RANGE MMF MEASURED PER JFD #5177 MAX. | D.C. WORKING VOLTS | DIELECTRIC STRENGTH MEASURED FOR 5 SECONDS AT 50% R.H AT MAX. RATED CAP. | INSULATION RESISTANCE MEASURED AFTER ONE MINUTE AT 500 V.D.C. AND 50% R.H. | Q FACTOR MEASURED PER JFD #5178 | TEMPERATURE COEFFICENT OF CAPACITANCE MEASURED AT 0.1 MC. P.P.M./°C 25° to 125°C | MATERIAL (DIELECTRIC-PISTON) | LENGTH (FRONT OF PANEL) |
|---|---|---|---|---|---|---|---|---|---|
| **STANDARD PANEL MOUNT SERIES** | | | | | | | | | |
| VC1G | 0.7 | 9.0 | 1500 | 2500 VDC | $10^{9}$ Meg. Min. | 500 | −60 to +10 | GLASS - INVAR | 21/32 |
| VC3G | 0.7 | 9.0 | 1500 | " | " | 650 | +350 to +500 | GLASS - BRASS | 21/32 |
| VC3GI | 0.7 | 9.0 | " | " | " | 650 | +0 to −150 | GLASS - INVAR | 21/32 |
| VC4G | 0.8 | 18.0 | 1000 | 1500 | " | 500 | +350 to +450 | GLASS - BRASS | 1 |
| VC5G | 0.8 | 18.0 | " | " | " | 500 | −20 to +40 | GLASS - INVAR | 1 |
| VC6GA | 0.7 | 17.0 | " | " | " | 750 | +400 to +600 | GLASS - BRASS | 1-1/32 |
| VC6GC | 0.8 | 17.0 | " | " | " | 650 | −100 to +100 | GLASS - INVAR | 1-1/32 |
| VC6GI | 0.8 | 17.0 | " | " | " | 600 | −100 to +100 | " | 1-1/32 |
| VC7G | 2.0 | 30.0 | " | " | " | 600 | −100 to +100 | " | 1-5/8 |
| VC11G | 0.6 | 14.0 | " | " | " | 500 | −30 to +40 | " | 1 |
| VC11GRA | 0.6 | 14.0 | " | " | " | " | −40 to +50 | " | 1 |
| VC11GRB | 0.6 | 14.0 | " | " | " | " | +450 to +600 | GLASS - BRASS | 1 |
| VC11GRC | 0.8 | 18.0 | " | " | " | " | +20 to +100 | GLASS - INVAR | 1 |
| VC13GA | 0.8 | 13.0 | 3000 | 5000 | " | " | +225 to +375 | GLASS - PH. BRONZE | 1-1/4 |
| VC30G | 0.8 | 30.0 | 1000 | 1500 | " | " | −10 to +50 | GLASS - INVAR | 1-19/32 |
| VC50C | 5.0 | 50.0 | 1250 | 2500 | $10^{7}$ MEG. MIN. | 450 | +250 to +450 | CERAMIC PHOSP. BRONZE | 1 |
| VC60G | 3.0 | 46.0 | 1000 | 1500 | $10^{8}$ MEG. MIN. | 200 | −40 to +40 | GLASS - INVAR | 2-9/16 |
| VC2 | 0.7 | 4.5 | " | " | " | 2000 | APPROX. ZERO | QUARTZ - INVAR | 7/16 |
| VC5 | 0.6 | 6.0 | " | " | " | " | " | " | 5/8 |
| VC11 | 0.8 | 10.0 | " | " | " | " | " | " | 1 |
| VC11A | 1.0 | 10.0 | " | 2000 | " | " | " | " | 1-1/32 |
| VC12 | 9.0 | 21.0 | " | 1500 | " | " | " | " | 1-19/32 |
| VC99 | 0.8 | 10.0 | 3000 | 5000 | " | " | " | " | 1-7/32 |
| **MINIATURE SERIES** | | | | | | | | | |
| VC20G | 0.8 | 8.5 | 1000 | 1500 VDC | $10^{9}$ Megohms Min. | 500 | ± 50 | GLASS - INVAR | 9/16 |
| VC21G | 0.8 | 4.5 | " | " | " | " | " | " | 5/16 |
| VC22G | 0.7 | 12 | " | " | " | " | ± 75 | " | 49/64 |
| VC23G | 0.8 | 18 | " | " | " | " | ± 100 | " | 1 |
| VC24G | 1.0 | 30 | " | " | " | " | " | " | 1-5/8 |
| VC9G, VC9GW | 0.8 | 8.5 | 1000 | 1500 VDC | " | " | ± 50 | " | 9/16 |
| VC10G, VC10GW | 0.8 | 4.5 | " | " | " | " | " | " | 21/64 |
| VC31G, VC31GW | 0.8 | 12.0 | " | " | " | " | ± 75 | " | 3/4 |
| VC32G, VC32GW | 0.8 | 18.0 | " | " | " | " | ± 100 | " | 1-1/32 |
| VC42G & VC42GW | 1.0 | 21.0 | " | " | " | " | " | " | 1-1/8 |
| VC43G, VC43GW | 0.8 | 30.0 | " | " | " | " | " | " | 1-5/8 |
| MQ101, 111 & 121 | 0.6 | 1.8 | 1000 | 1500 VDC | " | 1500 | APPROX. ZERO | QUARTZ - INVAR | 5/16 |
| MQ103, 113 & 123 | 0.6 | 5.5 | " | " | " | " | " | " | 9/16 |
| MQ106, 116 & 126 | 0.6 | 9.5 | " | " | " | " | " | " | 1 |
| MQ109, 119 & 129 | 0.8 | 16.0 | " | " | " | " | " | " | 1-5/8 |

U.S. Patent No. 2,922,093


Here is your ready reference to JFD Variable Trimmers and LC Tuners.
Detailed data sheets on any of these components selected from the extensive JFD line are yours for the asking. Our engineering staff is at your service for consultation on your particular application.

Write for samples, specifications and prices or complete file-size catalog.

Whether it is miniature variable trimmer piston capacitors . . . LC Tuners . . . Delay Lines . . . or Pulse Forming Networks . . . it pays to specify JFD Filters, or Diplexers.

Pioneers in electronics since 1929

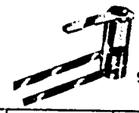
**JFD ELECTRONICS CORPORATION**
6101 Sixteenth Ave., Brooklyn 4, N. Y.

**WESTERN REGIONAL DIVISION** 7311 Van Nuys Boulevard, Van Nuys, California
**JFD CANADA LTD.** 51 McCormack Street, Toronto, Ontario, Canada
**JFD INTERNATIONAL** 15 Moore Street, New York, N. Y.





SPS226G


SP206G


VC16G

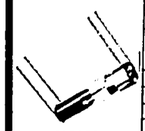

SC131


VC8GA


DC401


DS441


MC601


MC621


LC303

| MODEL | CAPACITANCE RANGE MMF MEASURED PER JFD #5177 MIN. | CAPACITANCE RANGE MMF MEASURED PER JFD #5177 MAX. | D.C WORKING VOLTS | DIELECTRIC STRENGTH MEASURED FOR 5 SECONDS AT 50% R.H AT MAX RATED CAP. | INSULATION RESISTANCE MEASURED AFTER ONE MINUTE AT 500 V.D.C. AND 50% R.H. | Q FACTOR MEASURED PER JFD #5178 | TEMPERATURE COEFFICENT OF CAPACITANCE MEASURED AT 0.1 MC. P.P.M./°C 25° to 125°C | MATERIAL | LENGTH (FRONT OF PANEL) |
|---|---|---|---|---|---|---|---|---|---|
| **MINIATURE SEALCAP SERIES•** | | | | | | | | | |
| SC131, 141 & 151 | 0.8 | 4.5 | 750 | 1500 VDC | $2\times10^{8}$ Megohms | 500 | ± 50 | GLASS - INVAR | 13/32 † |
| SC133, 143 & 153 | 0.8 | 8.5 | 1250 | 2500 VDC | $10\times10^{8}$ Megohms | " | " | " | 21/32 † |
| SC134 | 0.7 | 12.0 | " | " | " | " | ± 75 | " | 7/8 |
| SC144 & 154 | 0.8 | 12.0 | " | " | " | " | " | " | 1.055 |
| SC136, 146 & 156 | 0.8 | 18.0 | " | " | " | " | ± 100 | " | 1-3/32 † |
| SC139 | 1.0 | 30.0 | " | " | " | " | " | " | 1-3/4 |
| SC149 & 159 | 0.8 | 30.0 | " | " | " | " | " | " | 1.928 |
| QS171, 181 & 191 | 0.6 | 1.8 | 1000 | 1500 VDC | $2\times10^{8}$ Megohms | 1500 | APPROX. ZERO | QUARTZ - INVAR | 13/32 † |
| QS173, 183 & 193 | 0.6 | 5.5 | 1250 | 2500 VDC | $10\times10^{8}$ Megohms | " | " | " | 21/32 † |
| QS176, 186 & 196 | 0.6 | 9.5 | " | " | " | " | " | " | 1-3/32 † |
| QS179, 189 & 199 | 0.8 | 16.0 | " | " | " | " | " | " | 1-3/4 † |
| **STANDARD SPLIT-STATOR PANEL MOUNT SERIES** | | | | | | | | | |
| VC16G | (A) 0.5 (B) 0.8 | 5.0 2.5 | 500 | 1000 VDC | $10^{4}$ Megohms | 700 | ± 50 | GLASS - INVAR | 11/16 |
| VC17G | (A) 0.6 (B) 1.1 | 8.5 4.5 | " | " | " | " | " | " | 1-1/32 |
| VC18G | (A) 0.7 (B) 1.8 | 14.0 7.5 | " | " | " | " | " | " | 1-19/32 |
| VC80 | (A) 0.3 (B) 0.4 | 2.0 1.0 | 1000 | 1500 VDC | " | 1000 | APPROX. ZERO | QUARTZ - INVAR | 17/32 |
| VC81 | (A) 0.4 (B) 0.6 | 3.2 1.6 | " | " | " | " | " | " | 5/8 |
| VC82 | (A) 0.5 (B) 0.85 | 5.5 2.8 | " | " | " | " | " | " | 1-1/32 |
| VC83 | (A) 4.8 (B) 3.0 | 11.0 6.0 | " | " | " | " | " | " | 1-9/16 |
| **MINIATURE SPLIT-STATOR SERIES•** | | | | | | | | | |
| SP86G, 206G & 216G | (A) 0.8 (B) 0.8 | 4.2 2.0 | 750 | 1500 VDC | $10^{7}$ Megohms | 500 | ± 50 | GLASS - INVAR | 17/32 † |
| SP87G, 207G & 217G | (A) 0.8 (B) 1.5 | 9.0 4.5 | " | " | " | " | ± 100 | " | 1 † |
| SP88G, 208G & 218G | (A) 1.0 (B) 2.0 | 14.0 7.0 | " | " | " | " | " | " | 1-19/32 † |
| **MINIATURE SPLIT-STATOR SEALCAP SERIES•** | | | | | | | | | |
| SPS226G, 236G & 246G | (A) 0.8 (B) 0.8 | 4.2 2.0 | 750 | 1500 VDC | $10^{7}$ Megohms | 500 | ± 50 | " | 11/16 † |
| SPS227G, 237G & 247G | (A) 0.8 (B) 1.5 | 9.0 4.5 | " | " | " | " | ± 100 | " | 1-1/8 † |
| SPS228G, 238G & 248G | (A) 1.0 (B) 2.0 | 14.0 7.0 | " | " | " | " | " | " | 1-25/32 † |
| **MINIATURE DIFFERENTIAL SERIES•** | | | | | | | | | |
| VC8GA | (1) 1.0 (2) 2.0 | 7.5 7.5 | 500 | 1000 VDC | $10^{6}$ Megohms | 500 | −60 to +60 | GLASS - INVAR | 21/32 |
| DC401, 411, 421 & 431 | (1) 0.7 (2) 2.0 | 3.0 3.0 | " | " | $10^{7}$ Megohms | " | ± 100 | " | 5/16 † |
| DC403, 413, 423 & 433 | (1) 0.8 (2) 2.5 | 8.0 8.5 | " | " | " | " | " | " | 35/64 † |
| DC404, 414, 424 & 434 | (1) 0.8 (2) 3.0 | 12.0 12.0 | " | " | " | " | " | " | 3/4 † |
| DC406, 416, 426 & 436 | (1) 0.9 (2) 3.0 | 16.0 16.0 | " | " | " | " | " | " | 15/16 † |
| DC409, 419, 429 & 439 | (1) 1.0 (2) 4.0 | 28.0 28.0 | " | " | " | " | " | " | 1-7/16 † |
| **MINIATURE DIFFERENTIAL SEALCAP SERIES•** | | | | | | | | | |
| DS441, 451 & 461 | (1) 0.7 (2) 2.0 | 3.0 3.0 | 500 | 1000 VDC | $10^{6}$ Megohms | 500 | ± 100 | GLASS - INVAR | 7/16 † |
| DS443, 453 & 463 | (1) 0.8 (2) 2.5 | 8.0 8.5 | " | " | " | " | " | " | 43/64 † |
| DS444, 454 & 464 | (1) 0.8 (2) 3.0 | 12.0 12.0 | " | " | " | " | " | " | 7/8 † |
| DS446, 456 & 466 | (1) 0.9 (2) 3.0 | 16.0 16.0 | " | " | " | " | " | " | 1-1/16 † |
| DS449, 459 & 469 | (1) 1.0 (2) 4.0 | 28.0 28.0 | " | " | " | " | " | " | 1-9/16 † |
| **MAX-C SEALCAP SERIES •** | | | | | | | | | |
| MC601, 611 & 621 | 1.0 | 14.0 | 1000 | 2000 VDC | $10^{8}$ Megohms | 500 | ± 50 | GLASS - INVAR | 29/64 † |
| MC603, 613 & 623 | 1.0 | 28.0 | " | " | " | " | " | " | 11/16 † |
| MC604, 614 & 624 | 1.0 | 42.0 | " | " | " | " | " | " | 29/32 † |
| MC606, 616 & 626 | 1.0 | 60.0 | " | " | " | " | " | " | 1-5/32 † |
| MC609, 619 & 629 | 1.0 | 90.0 | " | " | " | " | " | " | 1-3/4 † |

| LC TUNERS• | SELF-RESONATING FREQUENCY(MC) | | NOMINAL INDUCT (MICROHENRIES) | | NOMINAL CAPACITANCE (MMF) | | Q FACTOR | TEMPERATURE COEFFICENT OF CAPACITANCE | MATERIAL | |
|---|---|---|---|---|---|---|---|---|---|---|
| LC303, 313, 323 & 333 | 450 MIN | 700MAX | .0314 MIN | .0357 MAX | 1.5 MIN | 9.0 MAX | 170-200 | NOT | GLASS - INVAR | 43/64 |
| LC304, 314, 324 & 334 | 300 " | 500 " | .0419 " | .0463 " | 1.6 " | 12.0 " | 150-175 | AVAILABLE | " | 57/64 |
| LC306, 316, 326 & 336 | 200 " | 450 " | .0631 " | .0680 " | 1.9 " | 16.7 " | 135-170 | AT THIS | " | 1-9/64 |
| LC309, 319, 329 & 339 | 125 " | 200 " | .0759 " | .0774 | 4.4 | 25.7 " | 145-155 | PRINTING | " | 1-47/64 |

NOTE: (A) PLATE TO BUSHING, (B) PLATE TO PLATE
(1) SECT 1 - LUG TO UPPER BAND
(2) SECT 2 - LUG TO MIDDLE BAND

**JFD ELECTRONICS CORPORATION**
BROOKLYN 4, NEW YORK

• MINIATURE SERIES AVAILABLE IN PANEL MOUNT, PRINTED CKT-LUG OR 4 WIRE TYPES.

† LENGTH APPLICABLE FOR PANEL MOUNT TYPES ONLY.

U.S. Patent No. 2,922,093

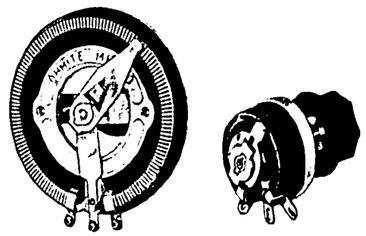
# OHMITE® THE QUALITY LINE OF

## write for

# INDUSTRY-PREFERRED COMPONENTS

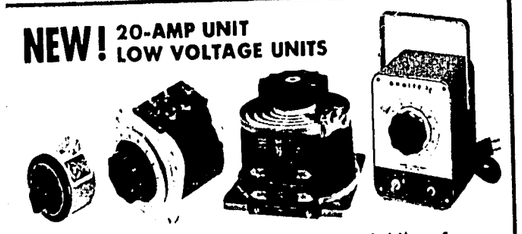
## catalog and engineering manual 58

Long life and dependability are synonymous with the name Ohmite. When you specify Ohmite components . . . you build reliability into your product. This reliability is backed by Ohmite's continuing research programs which explore new product ideas, improve present products, and develop more efficient manufacturing processes. All this plus the fact that Ohmite is the world's leading specialist in the manufacture of power-type resistance components—high quality rheostats and wire-wound resistors in the most complete range of sizes and types available to industry. Reliability is also characteristic of Ohmite tap switches, precision wire-wound resistors, metal film resistors, general-purpose relays, variable transformers, subminiature tantalum capacitors, and R. F. chokes.



**RHEOSTATS** Complete range of vitreous-enameled, close control, power rheostats from 12½ to 1000 watts. Single or tandem. Many additional features. Also available to meet MIL-R-22A requirements. All sizes from stock in a wide range of resistance values including an enclosed 12½-watt rheostat.

**NEW! 20-AMP UNIT LOW VOLTAGE UNITS**



**VARIABLE TRANSFORMERS** Newly expanded line of seven basic models with current ratings that meet a large percentage of industrial applications. Includes *enclosed units and tandem assemblies.* A sizeable "bonus" in current is given in all sizes when the overvoltage feature is not required ("N" suffix, see below).

**Advanced Features**— Positive current transfer achieved with direct brush to slip-ring, pigtail connection; table or panel mounting on Models VT4, VT8, and VT20 (adjustable shaft moves to brush or base side); interchangeable with other popular types both electrically and "mounting-wise"; rhodium plating on brush track for longer life.

**Specials**— Various shaft lengths, auxiliary switches, taps on transformer winding, and motor drives.

**NEW Low Voltage Units** (no overvoltage)—Input, 36 volts or less. Output: VT2LN, 5 amp; VT4LN, 12 amp; VT8LN, 22 amp.

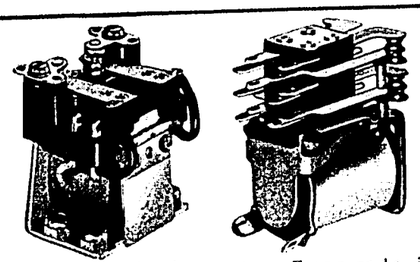
**Basic Models** with *Overvoltage*, 120 VAC input*

| OUTPUT | Model VT2 | Model VT4 | Model VT8 | Model VT20 |
|---|---|---|---|---|
| Volts | 0-120/132 | 0-120/140 | 0-120/140 | 0-120/140 |
| Amp | 1.5 | 3.5 | 7.5 | 20 |

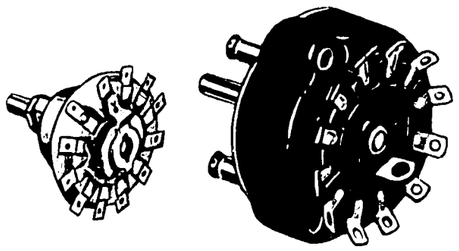
**Basic Models** *without* Overvoltage, 120 VAC input

| | | | | |
|---|---|---|---|---|
| Volts | 0-120 | 0-120 | 0-120 | ..... |
| Amp | 1.8 | 4.75 | 10.0 | ..... |

*Units supplied for 240-volt input also



**RELAYS** Compact relays in many types. For a.c. or d.c., in a wide range of contact combinations and coil voltages. Four stock models in 65 types. Also nine standard types promptly made to order. Available in hermetically sealed or dust-protective enclosures. Models TT and TS relays, with "molded module" contact springs, are designed to meet MIL-R-5757C and MIL-R-6106C respectively.

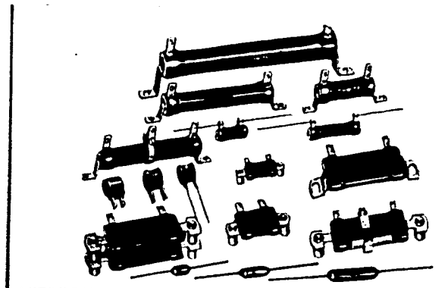


**TAP SWITCHES** Ceramic insulated, rotary selector switches for a-c use. High-current, silver-to-silver contacts. Single or tandem. Five sizes: 100, 50, 25, 15, and 10 amperes available from stock.

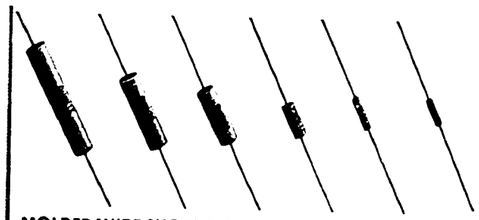
For details, circle #78 on Reader Service Card

**RHEOSTATS • RESISTORS • RELAYS**
**TAP SWITCHES • R. F. CHOKES**
**VARIABLE TRANSFORMERS**
**TANTALUM CAPACITORS**
**GERMANIUM DIODES**

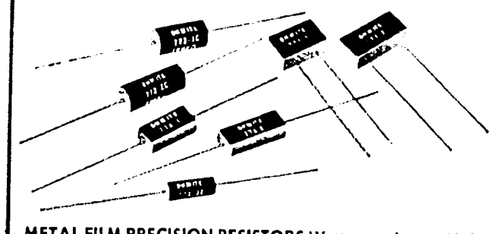
OHMITE® QUALITY Components



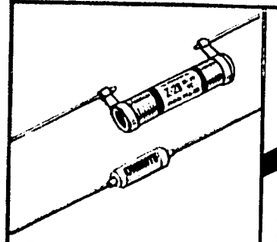
**VITREOUS-ENAMELED RESISTORS** Tremendous variety of types and sizes. Fixed, adjustable, tapped, noninductive, and precision resistors available in a wide range of wattages and resistances. Complete range of sizes and resistance values available from stock. Also available to meet MIL-R-26C requirements.



**MOLDED WIRE-WOUND PRECISION POWER RESISTORS** Insulated units with "Ohmicone" silicone-ceramic molded covering. Now available in 1-watt (2 physical sizes), 3, 5, 7, and 10-watt sizes. Tolerances: 0.1%, 0.25%, 0.5%, 1%, 3%. Maximum resistance: 1-watt, 4500 or 6500 ohms; 3-watt, 10,000 ohms; 5-watt, 25,000 ohms; 7-watt, 30,000 ohms; 10-watt, 51,100 ohms. Many 1% stock values selected from MIL Standard MS90169, MIL-R-10509 and Bell Telephone Laboratories.



**METAL FILM PRECISION RESISTORS** Wattage ratings at 125°C and 150°C ambient; excellent high frequency characteristics; low temperature coefficient of resistance. Long-term load and shelf stability. Styles to meet MIL-R-10509C and MIL-R-19074B (Ships). Many 1% stock values selected from MIL Standard MS90169, MIL-R-10509 and Bell Tel. Labs.

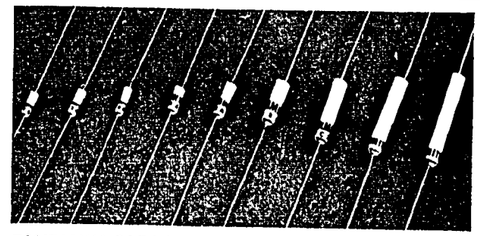


**R. F. CHOKES** Radio-frequency chokes in seven stock sizes for 3 to 520 megacycle applications. Single-layer wound. Other single-layer chokes and vitreous-enameled chokes can be made to order.



**GERMANIUM DIODES** Gold whisker wire welded to Germanium pellet. General-purpose and computer types (1 to 4 characteristics). Special computer type (10 characteristics). Hermetically sealed in glass. Stock and made-to-order.

For details, circle #79 on Reader Service Card

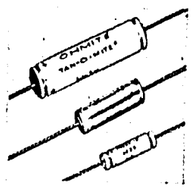


**TANTALUM CAPACITORS Series TW** (tantalum wire capacitors) available in thirteen subminiature sizes; .01 to 80 mfd. over-all capacitance range. Smallest size .060 x .150 inch; largest .134 x .812 inch. Insulated units standard. Working voltages to 150 volts. Wide range of stock sizes, capacitance values, and voltage ratings.

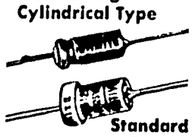
**Series TF** (tantalum foil capacitors) available in five sizes; .25 to 580 mfd. over-all capacitance range. Working voltage to 150 volts. For —55°C to +85°C operation. Available in polar and nonpolar units. Available for vibration ranges 0-55 and 0-2000 cps. Meets MIL-C-3965B. Styles CL-24, CL-34 and CL-25, CL-35. Wide range of stock units in polar type.

**Series TS** (tantalum, porous, slug type capacitors) available in three sizes; 1.75 to 330 mfd. over-all capacitance range. Working voltage to 125 volts. For —55°C to +85°C or —55°C to +125°C operation. Meet MIL-C-3965B, Grade 3 and Styles CL44, CL45. *New Style SUB, straight side type,* available for —55°C to +85°C operation. Many stock values.

**Etched and Plain Foil Types**



**New! Straight Cylindrical Type**



**Standard Type**

**OHMITE MANUFACTURING COMPANY**
**3692 Howard Street, Skokie, Illinois**

# *Eimac First* for Reliability in Power Electron Tubes

## DIODES AND RECTIFIERS

| | U.S.A. Price | Filament Voltage Volts | Filament Current Amps | Peak Inverse Voltage Volts | Peak Plate Current Amps | Average Plate Current ma | Plate Dissipation Watts |
|---|---|---|---|---|---|---|---|
| | | | 0.35 | 1,000 | ..... | 1 | 0.1 |
| 2-01C | $ 18.50 | 5.0 | 3.0 | 25,000 | 1.0 | 50 | 15 |
| 2-25A | 16.45 | 6.3 | 4.0 | 30,000 | 1.0 | 75 | 30 |
| 2-50A | 17.70 | 5.0 | 12.5 | 30,000 | 3.0 | 250 | 90 |
| 2-150D | 38.55 | 5.0 | 11.7 | 25,000 | 4.0 | 500 | 150 |
| 2-240A | 42.85 | 7.5 | 26.5 | 30,000 | 8.0 | 1000 | 450 |
| 2-450A | 100.75 | 7.5 | 23.5 | 75,000 | 12.0 | 750 | 1200 |
| 2-7000A | 228.00 | 10.0 | 10.5 | 60,000 | 2.5 | 250 | 150 |
| 250R | 32.15 | 5.0 | 6.5 | 40,000 | 1.5 | 100 | 60 |
| 8020(100R) | 12.85 | 5.0 | 2.1 | 25,000 | 25.0[6] | 1250[6] | 1000 |
| 2X1000A | 127.50 | 26.5 | 51.0 | 25,000 | 20.0 | 3000 | 3000 |
| 2X3000F | 149.00 | 7.5 | | | | | |
| KY21A | 26.75 | 2.5 | 10.0 | 11,000 | 3.0 | 750 | ..... |
| RX21A | 25.75 | 2.5 | 10.0 | 11,000 | 3.0 | 750 | ..... |

## PREFORMED CONTACT FINGER STOCK

A prepared strip of silver-plated spring material, slotted and formed into a series of fingers designed to make sliding contact.

| Single Edge | Width | U.S.A. Price per Pc. |
|---|---|---|
| CF-100 | 1/32" | $4.95 |
| CF-300 | 3/32" | 5.40 |
| CF-500 | 1 3/8" | 6.00 |
| CF-900 | 31/64" | 4.95 |
| **Double Edge** | **Width** | **U.S.A. Price per Ft.** |
| CF-200 | 13/64" | $6.30 |
| CF-400 | 1 17/32" | 7.65 |
| CF-600 | 2 1/4" | 8.85 |
| **Klystron Types** | **Width** | **U.S.A. Price per Ft.** |
| CF-700 | 17/32" | $5.70 |
| CF-800 | 13/32" x 7/16" | 5.55 |

Used as contact between klystrons and externally-tuned cavities. Available in 3-foot lengths only.

## PULSE MODULATORS

| | U.S.A. Price | Plate Dissipation Watts | Plate Voltage Volts | Plate Current ma | Grid Dissipation Watts | Screen Voltage Volts | Screen Dissipation Watts | Filament Voltage Volts | Filament Current Amps | Amplification Factor |
|---|---|---|---|---|---|---|---|---|---|---|
| 4PR60A | $100.00 | 60 | 20,000 | 18,000[3] | .... | 1500 | 8 | 26.0 | 2.1 | .... |
| 4PR400A | 60.00 | 400 | 20,000 | 4,000[3] | 10 | 2500 | 35 | 5.0 | 14.0 | .... |
| 4PR1000A | 145.00 | 1000 | 30,000 | 8,000[3] | 25 | 2500 | 75 | 7.5 | 21.3 | .... |
| 6C21 | 82.50 | 300 | 30,000 | 15,000[3] | 50 | ..... | .... | 8.2 | 17.06 | 30 |

## HEAT DISSIPATING CONNECTORS

| Type | Hole Diameter | U.S.A. Price |
|---|---|---|
| HR-1 | .052 | $ .60 |
| HR-2 | .062 | .77 |
| HR-3 | .072 | .77 |
| HR-4 | .102 | .80 |
| HR-5 | .127 | .80 |
| HR-6 | .367 | .80 |
| HR-7 | .127 | 1.60 |
| HR-8 | .575 | 1.60 |
| HR-9 | .569 | 3.00 |
| HR-10 | .510 | 1.60 |

## TUBE EXTRACTOR

A spring-steel extractor for use with the 4X150 series, 4X250 series and 2C39 series tubes. SK-604 U.S.A. Price $ .57

## VACUUM SWITCHES

Single-pole double-throw switch within a high vacuum adaptable for high-voltage switching. Contact spacing .015". Switch will handle R-F potentials as high as 20 Kv. In D-C switching will handle approximately 1.5 Amps. at 5 Kv.

| Type | U.S.A. Price | Coils | U.S.A. Price |
|---|---|---|---|
| VS-2 | $23.93 | 12V | $10.29 |
| VS-4 | 29.00 | 24V | 10.29 |
| VS-5 | 38.55 | | |
| VS-6 | 34.25 | | |

## 100 IG IONIZATION GAUGE

For measuring pressures from $10^{-3}$ to less than $10^{-8}$ mm of mercury. U.S.A. Price $71.45

## HV-1 DIFFUSION PUMP

Triple-jet, air-cooled vacuum pump of the oil-diffusion type. Capable of reaching an ultimate vacuum of $4 \times 10^{-7}$ mm of mercury when used with suitable forepump. U.S.A. Price $292.50

## AIR SYSTEM SOCKETS

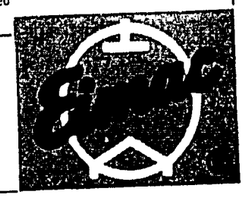
| | U.S.A. Price | Tube | Screen By-Pass Capacitor uuf | Special Characteristics |
|---|---|---|---|---|
| SK-300 | $107.15 | 4CX5000A; 4CW10,000A | none | |
| SK-400 | 17.65 | 4-400A; 4-250A; 4-125A | none | |
| SK-500 | 20.70 | 4-1000A | 2700 | No terminals grounded. |
| SK-600 | 11.90 | 4X150A; 4X150D; 4X250B; 7580; 4CX250F; 4CX250B; 4W300B | 2700 | No terminals grounded. (Special SK-600) |
| SK-602 | 11.90 | 4X150A; 4X150D; 4X250B; 7580; 4CX250F; 4CX250B; 4W300B | 2700 | Cathode terminals grounded. |
| SK-610 | 12.65 | 4X150A; 4X150D; 4X250B; 7580; 4CX250F; 4CX250B; 4W300B | 1100 | No terminals grounded. Screen by-pass capacitor plastic sealed. |
| SK-620 | 16.80 | 4X150A; 4X150D; 4X250B; 7580; 4CX250F; 4CX250B; 4W300B | 1100 | Cathode terminals grounded. Screen by-pass capacitor plastic sealed. |
| SK-630 | 18.85 | 4X150A; 4X150D; 4X250B; 7580; 4CX250F; 4CX250B; 4W300B | none | No terminals grounded. |
| SK-640 | 5.35 | 4X150A; 4X150D; 4X250B; 7580; 4CX250F; 4CX250B; 4W300B | none | |
| SK-650 | 8.60 | 4X150A; 4X150D; 4X250B; 7580; 4CX250F; 4CX250B; 4W300B | 1100 | Plastic sealed. |
| SK-655 | 5.86 | (Screen by-pass capacitor for use with SK-650) | 1100 | 1 heater grounded. |
| SK-700 | 21.45 | 4CX300A; 4CN15A; 4CX125C | 1100 | 1 heater and cathode grounded. |
| SK-710 | 21.45 | 4CX300A; 4CN15A; 4CX125C | none | No terminals grounded. |
| SK-740 | 9.80 | 4CX300A; 4CN15A; 4CX125C | none | Integral chimney. No terminals grounded. |
| SK-760 | 9.80 | 4CX300A; 4CN15A | none | Integral chimney. screen terminals grounded. |
| SK-770 | 9.80 | 4CX300A; 4CN15A | 1500 | No terminals grounded. |
| SK-800A | 55.70 | 4CX1000A; 4CW2000A | 1500 | 1 heater and cathode grounded |
| SK-810 | 55.70 | 4CX1000A; 4CW2000A | 650 | |
| SK-900 | 68.55 | 4X500A | | |

## CHIMNEYS

| | U.S.A. Price |
|---|---|
| SK-306 | $ 6.45 |
| SK-406 | 8.60 |
| SK-506 | 12.85 |
| SK-606 | .65 |
| SK-626 | .80 |
| SK-636 | 6.45 |
| SK-806 | 8.55 |
| SK-906 | 10.70 |

[1] Waveguide Output Fitting
[2] Coaxial Output Fitting
[3] Pulse
[4] Convection liquid cooled
[5] Cathode Current
[6] Clipper diode service only
[7] TV Peak-Synchronizing Level
[8] Plus 2250 watts bombarder power
[10] 15 Mc Bandwidth, 3 db points.

All prices subject to change without notice



**EITEL-McCULLOUGH, INC.**
SAN CARLOS • CALIFORNIA
SAN BRUNO • CALIFORNIA

For details, circle #80 on Reader Service Card





## POWER AMPLIFIER KLYSTRONS

| | U.S.A. Price | TYPICAL OPERATION Output Power, Watts CW | Pulse | Power Gain db | Frequency Range Mc | MAXIMUM RATINGS Beam Voltage Volts | Beam Current Amps |
|---|---|---|---|---|---|---|---|
| 3K2500LX | $ 2,360.00 | 1,320 | ..... | 25 | 980-1200 | 7,000 | 0.6 |
| 3K2500SG | 2,950.00 | 1,300 | ..... | 25 | 1700-2400 | 7,000 | 0.6 |
| 3K3000LQ | 2,360.00 | 2,400 | ..... | 25 | 610-985 | 10,000 | 0.75 |
| 3K50,000LA | 4,200.00 | 10,000 | 12,000[7] | 25 | 400-600 | 20,000 | 2.5 |
| 3K50,000LF | 4,200.00 | 10,000 | 12,000[7] | 25 | 570-720 | 20,000 | 2.5 |
| 3K50,000LQ | 4,200.00 | 10,000 | 12,000[7] | 25 | 720-985 | 20,000 | 2.5 |
| 3KM3000LA | 2,470.00 | 2,300 | ..... | 30 | 385-585 | 10,000 | 0.75 |
| 3KM4000LT | 1,880.00 | ..... | 38,200 | 30 | 960-1215 | 28,000[3] | 6.0[3] |
| 3KM50,000PA | 11,000.00 | 20,000 | 50,000 | 35 | 225-400 | 30,000[3] | 2.5 |
| 4K50,000LQ | 4,560.00 | 11,200 | ..... | 55 | 600-985 | 20,000 | 2.5 |
| 4KM3000LQ | 3,750.00 | 2,000 | ..... | 30 | 710-985 | 10,000 | 0.75 |
| 4KM3000LR | 2,420.00 | 2,000 | ..... | 45 | 610-985 | 10,000 | 0.75 |
| 4KM50,000LA | 4,230.00 | 10,000 | ..... | 55 | 400-610 | 20,000 | 2.5 |
| 4KM50,000LQ | 3,760.00 | 10,000 | ..... | 55 | 610-985 | 20,000 | 2.5 |
| 4KM50,000SG | 10,000.00 | 11,400 | ..... | 40 | 1700-2400 | 18,000 | 2.0 |
| 4KM170,000LA | 23,500.00 | 75,000 | ..... | 45 | 300-500 | 35,000 | 5.0 |
| 4KMP10,000LF | 10,800.00 | ..... | 400,000 | 55 | 570-630 | 70,000[3] | 16.5[3] |
| 6K50,000LQ | 8,250.00 | 9,000 | ..... | 30 | 720-980 | 20,000 | 2.5 |
| X-626 | | ..... | 1,250,000 | 26 | 400-450 | 110,000[3] | 36.5[3] |

## REFLEX KLYSTRON OSCILLATORS

| | U.S.A. Price | MAXIMUM RATINGS Resonator Voltage Volts | Resonator Dissipation Watts | Cathode Current ma | Reflector Voltage Volts (Typical) | ELECTRICAL CHARACTERISTICS Heater Voltage Volts | Heater Current Amps | Frequency Range Mc | Power Output Watts |
|---|---|---|---|---|---|---|---|---|---|
| 1K015CA[2] | $618.00 | 350 | 20 | 55 | —250 | 6.3 | 0.8 | 5,350 to 5,950 | 0.070 |
| 1K015CG[1] | 618.00 | 350 | 20 | 55 | —250 | 6.3 | 0.8 | 5,350 to 5,950 | 0.070 |
| 1K20XD[1] | 475.00 | 350 | 20 | 55 | —175 | 6.3 | 0.8 | 10,000 to 10,700 | 0.075 |
| 1K20XK[1] | 475.00 | 350 | 20 | 55 | —160 | 6.3 | 0.8 | 9,200 to 10,000 | 0.075 |
| 1K20XS[1] | 475.00 | 350 | 20 | 55 | —140 | 6.3 | 0.8 | 8,500 to 9,200 | 0.075 |
| 1K75CH[2] | 810.00 | 850 | 75 | 100 | —350 | 6.3 | 1.1 | 4,300 ± 50 | 1.0 |
| 1K75CK[1] | 810.00 | 850 | 75 | 100 | —350 | 6.3 | 1.1 | 4,300 ± 50 | 1.0 |
| 1K125CA[1] | 298.00 | 1,000 | 125 | 110 | —285 | 6.3 | 1.2 | 3,700 to 4,400 | 1.25 |
| 1K125CB[1] | 298.00 | 1,000 | 125 | 110 | —335 | 6.3 | 1.2 | 4,400 to 5,000 | 1.8 |
| 1K125CC[1] | 730.00 | 1,000 | 125 | 110 | —335 | 6.3 | 1.2 | 4,400 to 5,000 | 2.0 |

## TETRODES

| | U.S.A. Price | MAXIMUM RATINGS Plate Dissipation Watts | Plate Voltage Volts | Plate Current ma | Grid Dissipation Watts | Screen Voltage Volts | Screen Dissipation Watts | ELECTRICAL CHARACTERISTICS Filament Voltage Volts | Filament Current Amps | Amplification Factor |
|---|---|---|---|---|---|---|---|---|---|---|
| 4-65A | $ 26.75 | 65 | 3,000 | 150 | 5 | 600 | 10 | 6.0 | 3.5 | ..... |
| 4-125A | 36.00 | 125 | 3,000 | 225 | 5 | 600 | 20 | 5.0 | 6.5 | ..... |
| 4-250A | 46.50 | 250 | 4,000 | 350 | 10 | 600 | 35 | 5.0 | 14.0 | ..... |
| 4-400A | 48.00 | 400 | 4,000 | 350 | 10 | 800 | 35 | 5.0 | 14.0 | ..... |
| 4-1000A | 132.00 | 1,000 | 6,000 | 700 | 25 | 1,000 | 75 | 7.5 | 21.0 | ..... |
| 4CN15A | 55.00 | 15 | 2,500 | 250 | 2 | 400 | 12 | 6.0 | 2.7 | ..... |
| 4CW2000A | 210.00 | 2,000 | 3,000 | 1,000 | .... | 400 | 12 | 6.0 | 10.5 | ..... |
| 4CW10,000A | 625.00 | 10,000 | 7,500 | 4,000 | 75 | 1,500 | 250 | 7.5 | 75.0 | ..... |
| 4CX125C | 55.00 | 125 | 2,500 | 250 | 2 | 400 | 12 | 6.0 | 3.0 | ..... |
| 4CX250BA (7580) | 45.00 | 250 | 2,000 | 250 | 2 | 500 | 12 | 6.0 | 2.6 | ..... |
| 4CX250B | 45.00 | 250 | 2,000 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | ..... |
| 4CX250F | 45.00 | 250 | 2,000 | 250 | 2 | 400 | 12 | 26.5 | .56 | ..... |
| 4CX250K | 64.25 | 250 | 2,000 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | ..... |
| 4CX250M | 72.15 | 250 | 2,000 | 250 | 2 | 400 | 12 | 26.5 | .60 | ..... |
| 4CX300A | 55.00 | 300 | 2,500 | 250 | 2 | 400 | 12 | 6.0 | 3.0 | ..... |
| 4CX1000A | 156.00 | 1,000 | 3,000 | 1,000 | .... | 400 | 12 | 6.0 | 10.5 | ..... |
| 4CX5000A | 495.00 | 5,000 | 7,500 | 4,000 | 75 | 1,500 | 250 | 7.5 | 75.0 | ..... |
| 4W300B | 52.86 | 300 | 2,000 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | ..... |
| 4W20,000A | 1,850.00 | 20,000 | 8,000 | 15,000 | 60 | 1,500 | 200 | 10.0 | 30.0[9] | ..... |
| 4X150A | 29.35 | 250 | 2,000 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | ..... |
| 4X150D | 29.35 | 250 | 2,000 | 250 | 2 | 400 | 12 | 26.5 | 0.57 | ..... |
| 4X150G | 58.00 | 150 | 1,250 | 250 | 2 | 400 | 12 | 2.5 | 6.8 | ..... |
| 4X250B | 42.50 | 250 | 2,000 | 250 | 2 | 400 | 12 | 6.0 | 2.6 | ..... |
| 4X500A | 128.50 | 500 | 4,000 | 350 | 10 | 500 | 30 | 5.0 | 13.0 | ..... |

## PENTODE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 4E27A/5-125B | $ 42.85 | 125 | 4,000 | 200 | 5 | 750 | 20 | 5.0 | 7.56 | ..... |

## TRIODES

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 2C39A | $ 22.50 | 100 | 1,000 | 125[5] | 2 | ..... | ..... | 6.3 | 1.0 | 100 |
| 2C39WA | 30.00 | 100 | 1,000 | 125[5] | 2 | ..... | ..... | 6.3 | 1.0 | 100 |
| 3C24 | 16.05 | 25 | 2,000 | 75 | 7 | ..... | ..... | 6.3 | 3.0 | 24 |
| 3CPN10A5 | 32.15 | 10 | 3,500[3] | 3.0[3] | 2 | ..... | ..... | 6.0 | 1.0 | 100 |
| 3CX100A5 | 32.15 | 100 | 1,000 | 125[5] | 2 | ..... | ..... | 6.0 | 1.0 | 100 |
| 3W5000A1 | 210.00 | 5,000 | 6,000 | 2,500 | 50 | ..... | ..... | 7.5 | 51.0 | 5 |
| 3W5000A3 | 198.00 | 5,000 | 6,000 | 2,500 | 150 | ..... | ..... | 7.5 | 51.0 | 20 |
| 3W5000F1 | 210.00 | 5,000 | 6,000 | 2,500 | 50 | ..... | ..... | 7.5 | 51.0 | 5 |
| 3W5000F3 | 198.00 | 5,000 | 6,000 | 2,500 | 150 | ..... | ..... | 7.5 | 51.0 | 20 |
| 3X100A5 | 25.00 | 100 | 1,000 | 125[5] | 2 | ..... | ..... | 6.3 | 1.0 | 100 |
| 3X2500A3 | 198.00 | 2,500 | 6,000 | 2,500 | 150 | ..... | ..... | 7.5 | 51.0 | 22 |
| 3X2500F3 | 198.00 | 2,500 | 6,000 | 2,500 | 150 | ..... | ..... | 7.5 | 51.0 | 22 |
| 3X3000A1 | 198.00 | 3,000 | 6,000 | 2,500 | 50 | ..... | ..... | 7.5 | 51.0 | 5 |
| 3X3000F1 | 198.00 | 3,000 | 6,000 | 2,500 | 50 | ..... | ..... | 7.5 | 51.0 | 5 |
| 25T | 16.10 | 25 | 2,000 | 75 | 7 | ..... | ..... | 6.3 | 3.0 | 24 |
| 35T | 21.40 | 50 | 2,000 | 150 | 15 | ..... | ..... | 5.0 | 4.0 | 39 |
| 75TH | 28.00 | 75 | 3,000 | 225 | 16 | ..... | ..... | 5.0 | 6.2 | 20 |
| 75TL | 28.00 | 75 | 3,000 | 225 | 13 | ..... | ..... | 5.0 | 6.2 | 12 |
| 100TH | 23.60 | 100 | 3,000 | 225 | 20 | ..... | ..... | 5.0 | 6.2 | 38 |
| 100TL | 23.60 | 100 | 3,000 | 225 | 15 | ..... | ..... | 5.0 | 6.2 | 14 |
| 250TH | 35.40 | 250 | 4,000 | 350 | 40 | ..... | ..... | 5.0 | 10.5 | 37 |
| 250TL | 35.40 | 250 | 4,000 | 350 | 35 | ..... | ..... | 5.0 | 10.5 | 14 |
| 304TH | 60.50 | 300 | 3,000 | 900 | 60 | ..... | ..... | 5 or 10 | 25 or 12.5 | 20 |
| 304TL | 60.50 | 300 | 3,000 | 900 | 50 | ..... | ..... | 5 or 10 | 25 or 12.5 | 12 |
| 450TH | 77.00 | 450 | 6,000 | 600 | 80 | ..... | ..... | 7.5 | 12.0 | 38 |
| 450TL | 77.00 | 450 | 6,000 | 600 | 65 | ..... | ..... | 7.5 | 12.0 | 18 |
| 592/3-200A3 | 42.50 | 200 | 3,500 | 250 | 25 | ..... | ..... | 10.0 | 5.0 | 25 |
| 750TL | 137.50 | 750 | 10,000 | 1,000 | 100 | ..... | ..... | 7.5 | 21.0 | 15 |
| 1000T | 137.50 | 1,000 | 7,500 | 750 | 80 | ..... | ..... | 7.5 | 15.5 | 35 |
| 1500T | 261.00 | 1,500 | 8,000 | 1,250 | 125 | ..... | ..... | 7.5 | 23.5 | 24 |
| 2000T | 340.00 | 2,000 | 8,000 | 1,750 | 150 | ..... | ..... | 10.0 | 23.5 | 23 |

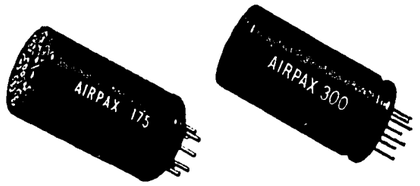
## RF DUMMY LOAD

| | Frequency Range Mc | Maximum Input Power Watts | Maximum VSWR | Coolant | RF Connector |
|---|---|---|---|---|---|
| WL-110 | 450 to 1200 | 15,000 | 1.3 to 1 | Liquid | 3⅛" Coaxial Line |
| WL-120 | 600 to 1200 | 20,000 | 1.1 to 1 | Liquid | 3⅛" Coaxial Line |
| WL-130 | 400 to 1200 | 20,000 | 1.1 to 1 | Liquid | 3⅛" Coaxial Line |
| WL-140 | 200 to 1200 | 20,000 | 1.2 to 1 | Liquid | 3⅛" Coaxial Line |
| WL-200 | 1700 to 2400 | 24,000 | 1.1 to 1 | Liquid | RG-104/U Waveguide |

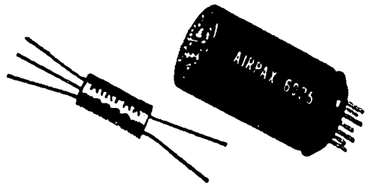


For details, circle #81 on Reader Service Card

# AIRPAX ELECTRONICS
INCORPORATED




**Types 175 and 300.** The miniature choppers which set the standards for the chopper industry. Type 175 uses a 6.3 volt, 60 CPS drive; Type 300 requires a 6.3 volt, 400 CPS drive. Both are hermetically sealed, stable, long-life choppers.




**Types 6010 and 6025.** Transistor choppers. Type 6025 includes the drive transformer. It is encased in a miniature can with a 7 pin header. Drive for the 6010 may be as high as 100 KC; the type 6025 drive is 6.3 volts at 50 to 5000 CPS.

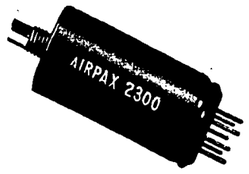
## Airpax produces CHOPPERS for every purpose



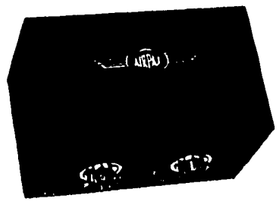

**Type 371.** For reliability under extreme conditions of shock and vibration Airpax provides a center pivoted type which functions during vibrations of 15 G amplitude, over a frequency range of 10 to 2500 CPS.




**Type 5600.** Designed for transistor drive. Drive coil is tapped at its electrical center and requires only 8.5 milliamperes of drive current from a 9 volt, 400 CPS source. Eliminates drive transformer.




**Type 2300.** This low noise chopper is ideal for use in null seeking servo systems, instrument amplifiers and applications where noise must be less than four microvolts, average. Drive is 6.3 volts, RMS at 400 CPS.



CUSTOM TRANSFORMERS. Airpax designs and manufactures custom transformers. The Fosterite facility at Cambridge is the largest in the country. Small size or large, bring your transformer requirements to Airpax.

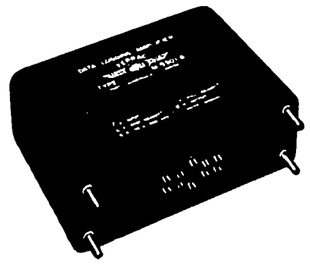



Magnetic inverse time delay CIRCUIT BREAKER. Only slightly larger than an "ON-OFF" switch, this circuit breaker provides power control and positive circuit protection. Available in ratings from 50 ma. to 10 amps.

AIRPAX ELECTRONICS INCORPORATED
CAMBRIDGE, MARYLAND FORT LAUDERDALE, FLA.



CAMBRIDGE, MARYLAND — AIRPAX ELECTRONICS INCORPORATED — FORT LAUDERDALE, FLA.



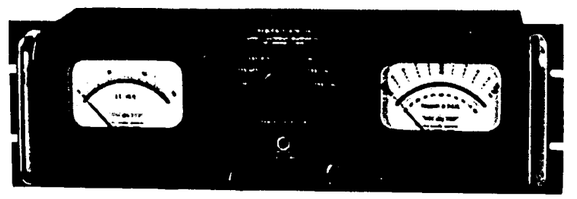
DATA LOGGING AMPLIFIER. A three-stage high accuracy, molded magnetic amplifier designed to deliver ± 5 volts at a linearity better than 0.1%. Voltage gains from 100 to 10,000 are obtainable in this differential type magnetic amplifier.




TACH-PAK. The Airpax TACH-PAK is a completely self-contained, highly sensitive unit which makes possible the accurate measurement (0.25%) of the speed of any rotating, reciprocating or oscillating shaft. Also available with AN plug type connector.

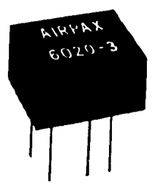



MAGMETER. Frequency to voltage converter. Output current is linear with input frequency. Operates servo and similar type recorders.

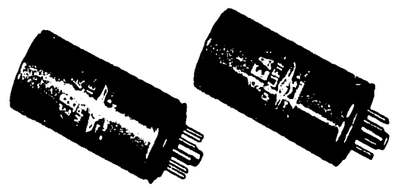


FREQUENCY MONITOR. For the precise measurement of 400 CPS power frequencies. Uses the frequency detecting characteristics of the Airpax MAGMETER.




PRINTED CIRCUIT COMPONENTS. Airpax meets the latest developments in advanced circuitry with miniature units. T–1968 is a miniature drive transformer for use with transistor choppers. Type 6020-3 is a transistor chopper.



FERRAC Magnetic Amplifiers. Available in plug-in or molded types. Faster response—wider dynamic range—higher gains.

PREAC. Airpax PREAC amplifiers, for 60 or 400 CPS operation, have power gains of over 50 db. Unit is hermetically sealed.

# AIRPAX ELECTRONICS
INCORPORATED

AB21

....LEADING SPECIALISTS

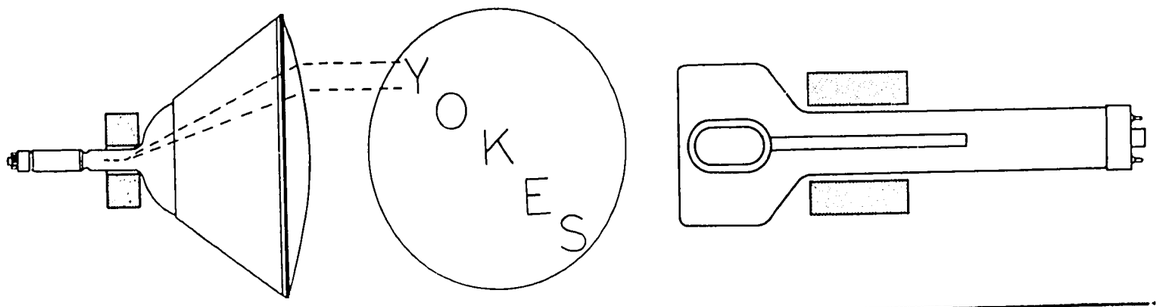
# Celco

IN PRECISION DISPLAYS

# YOKES

## YEARS AHEAD IN DESIGN PERFORMANCE!

### Celco YOKES FOR CHARACTER DISPLAYS & HIGH RESOLUTION APPLICATIONS




Deflection yokes for difficult character display and high resolution problems are another achievement in advanced design and engineering at Celco.

Celco Deflection Yokes permit rapid presentation of random character and alpha numeric displays. Low hysteresis, high accuracy and fast Recovery time with emphasis on spot approach to absolute zero, assures highest performance of magnetic deflection character displays.

Celco High Sensitivity Yokes minimize the deflecting currents required from the deflection drivers, resulting in high efficiency for your system.

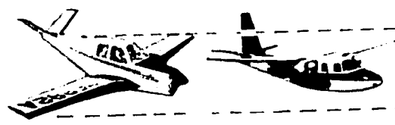
For best utilization of the New High Resolution CRT's CELCO YOKES assure minimum defocusing at large deflections.

The construction of our yokes makes it possible to achieve **sensitivities, linearities, responses and distortion-free deflecting fields** not possible with the usual types of yoke.

*For critical applications, many of our customers have saved years of trial and error in YOKE selection by specifying CELCO YOKES.*

Write for CELCO DEFLECTION YOKE Catalogue & Design Sheets or for assistance Call your nearest CELCO Plant listed below.

For details, circle #84 on Reader Service Card



Your plant is only hours away by the Celco Air Fleet

Celco **Constantine Engineering Laboratories Company**

**Main Plant: Mahwah, N.J. DAvis 7-1123** • Pacific Division - Cucamonga, Calif. - YUkon 2-2688

### Celco FOR STANDARD, COMMERCIAL & MILITARY APPLICATIONS

For details, circle #85 on Reader Service Card

Single units or production quantities immediately available in wide range of inductance–resistance–Recovery time–pin cushion corrected or optimum focus as required. Also available 2-1/8" and 2-1/2" neck CRT yokes.



**TYPE BY**
Transistorized encapsulated yokes for 0 7/8" neck CRT and 1" neck image storage tubes.



**TYPE AY**
Push pull or single ended yokes for 52, 70 and 90 deflections for 17 16" neck CRT.



**TYPE RY**
Rotating deflection yokes for PPI displays. Gears, bearings, slip rings and contact assembly included.

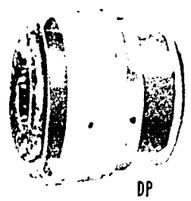


**TYPE CF**
Electromagnetic focusing coil for 7/8", 1" and 17 16" neck CRT



**TYPE MY**
Miniature light weight deflection yoke coils or assemblies for incorporation into customer housings.

### Celco ENGINEERED YOKES FOR PRECISION DISPLAYS



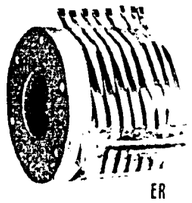
**DP**
Dual purpose yoke custom designed. Deflection system plus axial off centering coils.



**HS**
Special high sensitivity deflection yoke with critical damping provisions.



**PI**
Plug in type encapsulated deflection yoke for rapid insertion.



**ER**
Encapsulated rotating, 4 axis slip ring precision deflection yoke



**MS**
Miniature deflection yoke for rotating or fixed coil radar system

**For engineering information on your special display problems call your nearest Celco Plant.**

Celco **Constantine Engineering Laboratories Company**

**Main Plant: Mahwah, N.J. DAvis 7-1123** • Pacific Division - Cucamonga, Calif. - YUkon 2-2688

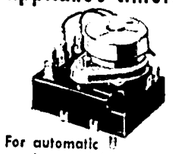
# before you freeze your design...call on OAK engineers!



**OAK "EARLY-BIRD" ENGINEERING HELPS YOU GET BETTER COMPONENTS . . . FASTER!**

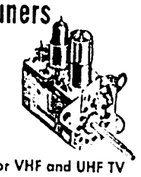
By calling on Oak engineers early, you take full advantage of their 25 years of specialization in electro-mechanical devices. This intensive background enables them to save you costly re-engineering time. Even on seemingly simple components, Oak engineers have been able to make valuable suggestions that resulted in better performance and lower costs. Combine this thorough engineering with Oak's manufacturing skills and facilities, and you can feel assured of getting the *exact* component you need . . . and in a lot less time.

**appliance timers**



For automatic washers and dryers

**tuners**



For VHF and UHF TV receivers and radios

## ELECTRO-MECHANICAL COMPONENTS ENGINEERED AND MANUFACTURED TO YOUR EXACT REQUIREMENTS!

### low-current switches



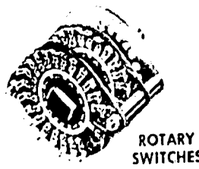
MINIATURE ROTARY TYPE A

Mounts in a 1" diameter circle

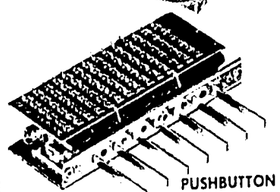
**NEW THUMBWHEEL SWITCH**

Provides in-line read-out of switch positions in a space-saving size





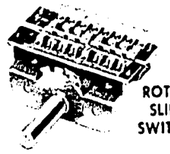
ROTARY SWITCHES



PUSHBUTTON SWITCHES



PRINTED CIRCUIT SWITCHES



ROTARY SLIDER SWITCHES



LEVER OPERATED SWITCHES



MULTIPLE SHAFT SWITCHES

***NEW!***
**STOCK ROTARY SWITCHES**

- 124 Sizes and Types
- Fully Assembled or as Subassemblies
- Phenolic and Steatite Grade Insulations
- 1 to 4 Sections, 2 to 23 Positions




*Write for Catalog 399 Today!*

### choppers

*smallest...lightest in its class*

**Series M**
DC-AC
Low Level Inverter

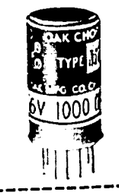
Withstands 30 G vibrations from 0-500 cps and −55° to +100°C temperatures. Custom-built in an unusual variety of packages.

**Type 605 Chopper Eliminates Phase-Shift Circuit**

Has 0° (or 180°) phase-lag "designed-in." Available with side or vertical flange mounts, flattened pierced pins, solder loops, or standard socket pins.

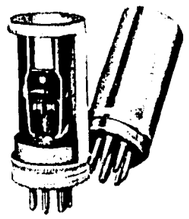
**NC 600 Series of Oak Choppers**

Available for frequencies from 15 to 600 cycles. Operates up to 125°C. High contact rating. Exceptional stability. Low voltage starting.







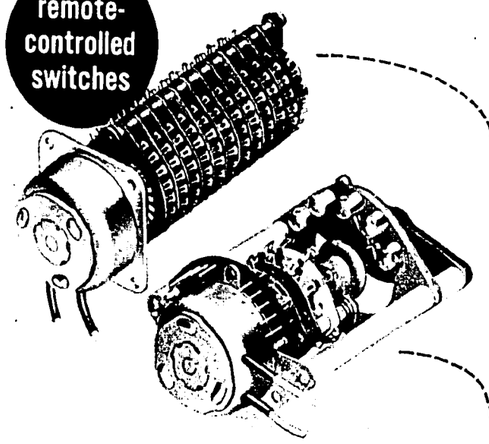


### VIBRATORS

**Custom-Designed and Custom-Built**

Basic Oak designs cover practically any application. The V6000 Series is a versatile, general purpose vibrator. Type 94 is designed primarily for auto radios. Type 95 is a small, medium power shunt drive interrupter. The MV Series is designed for portable radios and similar applications. All can be supplied for military needs.

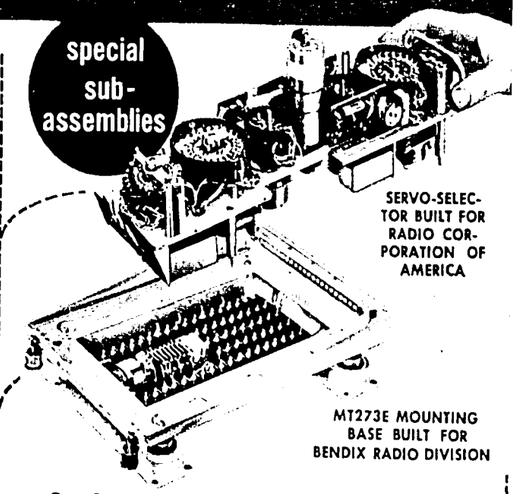
### remote-controlled switches



**Thousands of Combinations**

Oak remote-controlled switches are custom combinations of Oak rotary solenoids* and the many types of Oak rotary switches. They are unusually reliable, giving a positive stepping action even under conditions of shock and vibration. Ideal for mobile and military equipment.

### special sub-assemblies



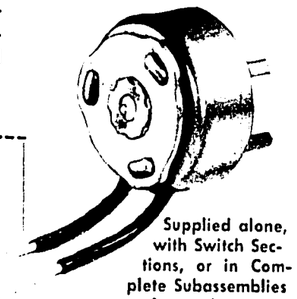
SERVO-SELECTOR BUILT FOR RADIO CORPORATION OF AMERICA

MT273E MOUNTING BASE BUILT FOR BENDIX RADIO DIVISION

*One Responsibility . . . One Source*

Turn your prototype over to Oak engineers. They will analyze it, test it, redesign for optimum performance, and convert it into a manufacturable device. Oak's modern production facilities then build your subassembly, and run any life and environment tests which may be required.

### rotary solenoids*



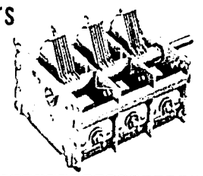
Supplied alone, with Switch Sections, or in Complete Subassemblies as shown above.

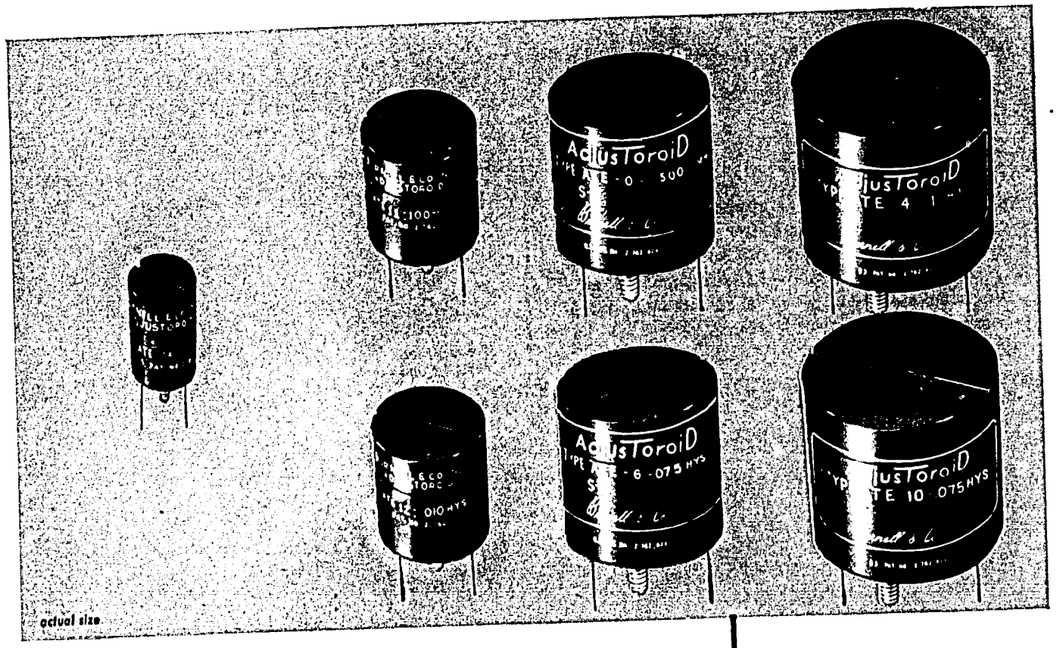
Oak rotary solenoids are ideal actuators for remote control of complex circuits under the severe conditions of MIL-S-4040A and similar specifications. They are compact, rugged and extremely adaptable.

OAK MFG. CO.
1260 Clybourn Ave., Dept. R, Chicago 10, Illinois
Phone: MOhawk 4-2222
West Coast: Oak Electronics Corp., 11252 Playa Court
Culver City, California Phone: EXmont 1-6367

### quality variable capacitors

- Custom-built
- Up to 603 MMF max. capacity per section
- Five models including band spread and split stator units
- Meet MIL specifications






# NOW—Two important contributions to printed circuit design—

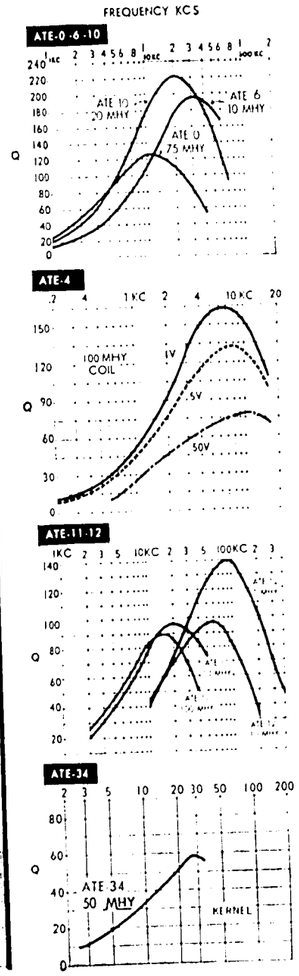
## The Microminiature Kernel ATE-34 Adjustoroid® and a New Line of Miniature Encapsulated Adjustoroids

Newest addition to the Burnell Adjustoroid line is the microminiature Kernel® ATE-34 and the miniature ATE-11, ATE-0 and ATE-4. One of the unique features of these new Adjustoroids is a flush slotted head providing for ease of adjustment and economy in height.

The new microminiature Kernel ATE-34 Adjustoroid and the miniature ATE-11, ATE-0 and ATE-4 are variable over a 10% range of their inductance. Fully encapsulated, they will withstand high acceleration, shock and vibration environments. All of the above meet MIL-T specifications, 27 Grade 4 Class R and MIL-E 15305 A. Write for Stock Sheet AT-34.

| | Length/ Dia. | Hgt. | Wt. | Useful Freq. Range | Max. Q | Max. L in hys |
|---|---|---|---|---|---|---|
| ATE-0 | 1 1/16" | 1" | 1 1/2 oz. | 1 kc to 20 kc | 10 kc | 5 hys |
| ATE-4 | 1 1/16" | 1 3/16" | 3.5 oz. | 1 kc to 16 kc | 6 kc | 15 hys |
| ATE-6 | 1 1/16" | 1" | 1 1/2 oz. | 10 kc to 100 kc | 30 kc | .75 hys |
| ATE-10 | 1 1/16" | 1 3/16" | .1 oz. | 3 kc to 50 kc | 20 kc | .75 hys |
| ATE-11 | 3/4" | 13/16" | .75 oz. | 2 kc to 25 kc | 15 kc | 5 hys |
| ATE-12 | 3/4" | 13/16" | .75 oz. | 15 kc to 150 kc | 60 kc | 1 hy |
| ATE-34 | 27/64" | 21/32" | .1 oz. | 3 kc to 30 kc | 55 kc | 1 hy |

PAT. 2,762,020



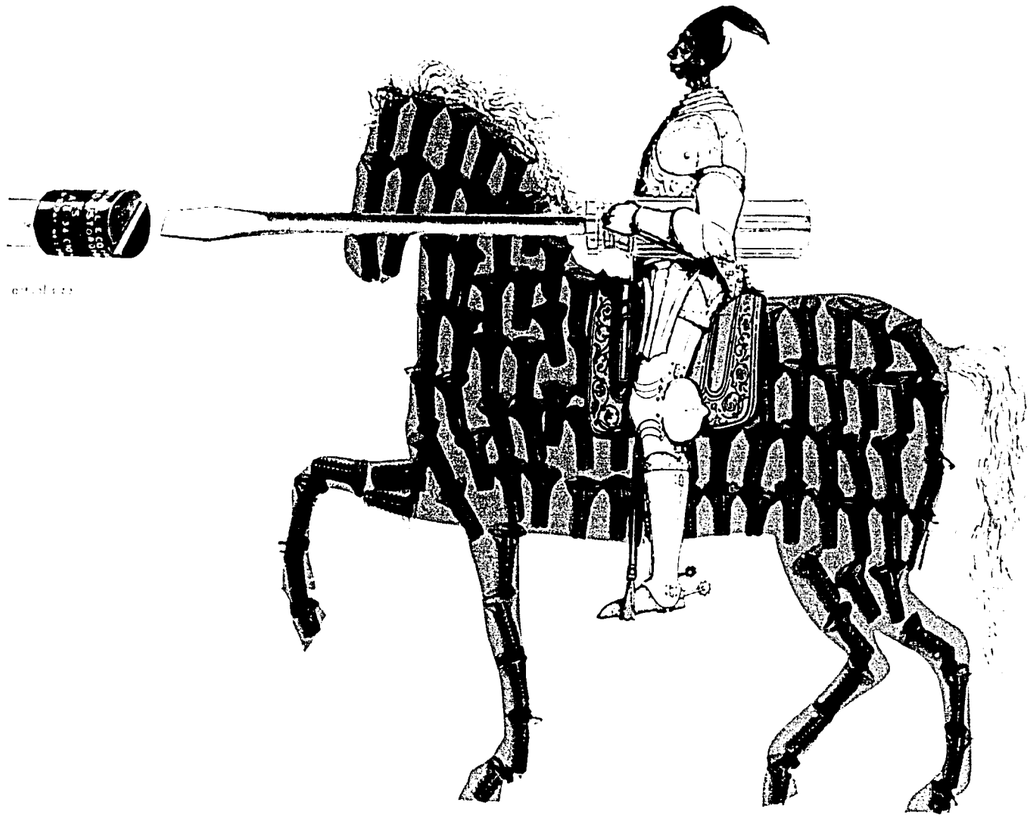

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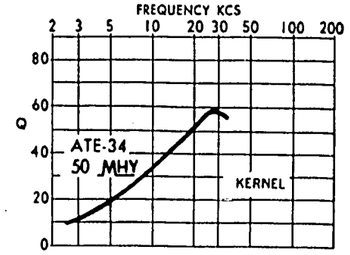


# TAMING OF THE SCREW

Newest additions to the Burnell Adjustoroid® line, the microminiaturized Kernel ATE 34 and the miniatures ATE 11, ATE 0, ATE 4, represent an important contribution to printed circuit design.

These new Adjustoroids possess the exclusive advantage of flush-slotted heads which serve to eliminate adjusting screws – provide maximum economy of height – insure ease of adjustment. Besides high Q, they also offer high stability of inductance versus dc.

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## Partial List of Standard Items

| EQUIPMENT | | MODEL | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | .320 - .490 KMC (WR 2300) | | | | | | | | | | | | | | | | | | | | |
| | | .350 - .530 KMC (WR 2100) | | | | | | | | | | | | | | | | | | | | |
| | | .410 - .625 KMC (WR 1800) | | | | | | | | | | | | | | | | | | | | |
| | | .490 - .750 KMC (WR 1500) | | | | | | | | | | | | | | | | | | | | |
| | | .640 - .960 KMC (WR 1150) | | | | | | | | | | | | | | | | | | | | |
| | | .750 - 1.12 KMC (WR 975) | | | | | | | | | | | | | | | | | | | | |
| | | .950 - 1.5 KMC (WR 77) | | | | | | | | | | | | | | | | | | | | |
| | | 1.12 - 1.70 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 1.7 - 2.31 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 2.6 - 3.95 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 3.95 - 5.85 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 5.85 - 8.20 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 7.05 - 10 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 8.2 - 12.4 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 12.4 - 18 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 18 - 26.5 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 26.5 - 40 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 33 - 50 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 50 - 75 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 60 - 90 KMC | | | | | | | | | | | | | | | | | | | | |
| **ADAPTER—COAX. TO W.G.** | 101 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | | | | | | |
| Choke to Choke | 102 | | | | | | | | | L | M | S | C | A | B | X | G | K | T | | | |
| Cover to Cover | 103 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| 7/8" to RG 48/U | 104 | | | | | | | | | | | S | | | | | | | | | | |
| Flexible | 105 | | | | | | | | | | | | | | | X | | | | | | |
| **ANTENNA**—Horn | 110 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| **ATTENUATOR—WAVEGUIDE** Fixed - High Power | 119 | | | | | | | | | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Fixed - Low Power | 120 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Flap | 121 | | | | | | | | | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Semi-Prec. | 122 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Precision | 123 | | | | | | | | | L | M | S | C | A | B | X | G | K | T | | | |
| Var. Coax. Hi-Power | 124 | (Continuous 100 - 10,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Fixed - Coaxial | 125 | (2,000 - 10,000 mcs.) Low & Hi-Power | | | | | | | | | | | | | | | | | | | | |
| Fixed - Coaxial | 126 | (0 - 4,000 mcs.) Low & Hi-Power | | | | | | | | | | | | | | | | | | | | |
| Variable Coaxial | 127 | (Continuous) (500 - 10,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Fixed Coax. - Very Hi-Power | 128 | (1,000 - 3,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Variable Coax. Pad | 129 | (Continuous 1,000 - 4,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| **BEND**—E Plane | 130 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| H Plane | 131 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Coaxial (7/8") Right Angle | 135 | | | | | | | | | L | | S | | | | | | | | | | |
| **CAVITY**—Filter | 140 | | | | | | | | | L | M | S | C | | | | | | | | | |
| LHT Transmitter | 141 | | | | | | | | | L | | S | | | | | | | | | | |
| Reference | 142 | | | | | | | | | L | M | S | C | | | | | | | | | |
| **COUPLER**—Signal Sampler Coaxial | 148 | (100 - 6,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Waveguide | 149 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | | | | | | |
| **CRYSTAL DETECTOR MTS. COAXIAL** Broadband | 150 | (900 - 12,400 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Tunable | 151 | (900 - 12,400 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Matched | 152 | (500 - 3,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| **CRYSTAL DETECTOR MTS. W.G.** Broadband | 160 | | P | N | J | H | F | E | D | | | | S | C | A | B | X | G | K | | | |
| Tunable | 161 | | | | | | | | | | | | S | C | A | B | X | G | K | T | V | W | Z |
| **DIRECT'L CPLERS.** Coax. 3/8" | 165 | (100 - 3,500 mcs.) HIGH DIRECTIVITY | | | | | | | | | | | | | | | | | | | | |
| Coax. Hi-Power | 166 | (100 - 10,000 mcs.) HIGH DIRECTIVITY | | | | | | | | | | | | | | | | | | | | |
| Coax. - 7/8" | 167 | (100 - 3,000 mcs.) HIGH DIRECTIVITY | | | | | | | | | | | | | | | | | | | | |
| Coax. - 1 5/8" | 168 | (100 - 1,500 mcs.) HIGH DIRECTIVITY | | | | | | | | | | | | | | | | | | | | |
| Coax. - 3 1/8" | 169 | (100 - 1,000 mcs.) HIGH DIRECTIVITY | | | | | | | | | | | | | | | | | | | | |
| Waveguide Uni-Directional | 170 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Bi-Directional | 171 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Uni-Reflectometer | 172 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Bi-Reflectometer | 173 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Broadband | 174 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| **FILTER—LOW PASS** Coax. | 175 | Cut off frequency 100 to 3,000 mcs. | | | | | | | | | | | | | | | | | | | | |
| **LINE STRETCHER** Coax. - 3/8" | 180 | (900 - 12,400 mcs.) | | | | | | | | | | | | | | | | | | | | |
| **LOAD—COAX.** Low Power | 190 | (0 - 4,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Medium Power 7/8" Line | 191 | | | | | | | | | L | | S | | | | | | | | | | |
| Medium Power 1 5/8" Line | 192 | | | | | | | | | L | | | | | | | | | | | | |
| High Power 7/8" Line | 193 | | | | | | | | | L | | S | | | | | | | | | | |
| High Power 1 5/8" Line | 194 | | | | | | | | | L | | | | | | | | | | | | |
| **LOADS**—W.G. Low Power | 200 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Medium Power | 201 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| High Power | 202 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Water | 210 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | | | | | | |
| **MIXER—CRYSTAL** Coaxial | 220 | | | | | | | | | L | | S | C | | | | | | | | | |
| Waveguide | 230 | | | | | | | | | | | S | C | A | B | X | G | K | T | | | |
| Balanced Waveguide | 235 | | | | | | | | | | | S | | | X | | K | | | | | |
| **NUT & BOLT** | 240 | | | | | | | | | L | | S | C | A | B | X | G | K | T | | | |
| **POWER DIVIDER**—Coax.-Fixed | 245 | | | | | | | | | L | | S | | | | | | | | | | |
| Adjustable | 246 | | | | | | | | | L | | S | | | | | | | | | | |
| **MULTIPLIER—(FREQ.)** Waveguide - Coax. Input | 248 | Any input or output freq. 1 - 90 kmc. | | | | | | | | | | | | | | | | | | | | |

| EQUIPMENT | | MODEL | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | .320 - .490 KMC (WR 2300) | | | | | | | | | | | | | | | | | | | | |
| | | .350 - .530 KMC (WR 2100) | | | | | | | | | | | | | | | | | | | | |
| | | .410 - .625 KMC (WR 1800) | | | | | | | | | | | | | | | | | | | | |
| | | .490 - .750 KMC (WR 1500) | | | | | | | | | | | | | | | | | | | | |
| | | .640 - .960 KMC (WR 1150) | | | | | | | | | | | | | | | | | | | | |
| | | .750 - 1.12 KMC (WR 975) | | | | | | | | | | | | | | | | | | | | |
| | | .950 - 1.5 KMC (WR 77) | | | | | | | | | | | | | | | | | | | | |
| | | 1.12 - 1.70 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 1.7 - 2.31 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 2.6 - 3.95 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 3.95 - 5.85 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 5.85 - 8.20 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 7.05 - 10 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 8.2 - 12.4 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 12.4 - 18 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 18 - 26.5 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 26.5 - 40 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 33 - 50 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 50 - 75 KMC | | | | | | | | | | | | | | | | | | | | |
| | | 60 - 90 KMC | | | | | | | | | | | | | | | | | | | | |
| Waveguide Input | 249 | Any input or output freq. from 1 - 90 kmc. | | | | | | | | | | | | | | | | | | | | |
| **PROBE**—Tunable | 250 | (900 - 12,400 mcs.) | | | | | | | | | | | | | | | | | | | | |
| **REFLECTION**—Stand. W.G. | 256 | | | | | | | | | | | | S | C | A | B | X | G | K | T | | |
| **ROTARY JOINT—COAXIAL** Med. Speed 7/8" | 260 | (2,700 - 2,900 mcs.) | | | | | | | | | | | | | | | | | | | | |
| High Speed 7/8" | 261 | (2,700 - 2,900 mcs.) | | | | | | | | | | | | | | | | | | | | |
| Inline L.T. | 262 | (10 - 3,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| **ROTARY JOINT W.G.** Doorknob Transition | 270 | | | | | | | | | | | | S | | | | X | | | | | |
| Circular Transition | 271 | | | | | | | | | | | | | | | B | X | | K | | | |
| Crossbar Transition | 272 | | | | | | | | | | | | | | | B | X | | | | | |
| **SHIFTER—PHASE W.G.** | 275 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | | | |
| **SHORT—MOVABLE** Waveguide - (Unhoused) | 283 | | | | | | | | | L | M | S | C | A | B | X | G | K | T | V | W | |
| **SHORTS—MOVABLE** 3/8" Coax. (Housed) | 290 | | | | | | | | | L | M | S | C | A | B | X | | | | | | |
| 5/8" Coaxial | 291 | | | | | | | | | L | | S | C | | | | | | | | | |
| 7/8" Coaxial | 292 | | | | | | | | | L | | S | | | | | | | | | | |
| Waveguide | 293 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Waveguide Precision | 294 | | | | | | | | | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| **SLOTTED LINE—COAXIAL** | 300 | | | | | | | | | L | M | S | | | | | | | | | | |
| Waveguide | 310 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| **STAND** | 330 | | | | | | | | | L | M | S | C | A | B | X | G | K | T | | | |
| **SWITCH**—Coax. | 334 | | | | | | | | | L | | | | | | | | | | | | |
| W.G. Rotary Type | 335 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| W.G. Multiple Type | 336 | | | | | | | | | | | S | | | | X | | K | | | | |
| **TEE**—Coaxial 7/8" Line | 340 | | | | | | | | | L | | S | | | | | | | | | | |
| W.G. Series TEE | 350 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| W.G. Shunt | 351 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| W.G. E/H (Hybrid) | 352 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| **TRANSITIONS—COAXIAL** 3/8" - 7/8" Line | 370 | (0 - 4,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| 7/8" to 1 5/8" | 371 | (0 - 4,000 mcs.) | | | | | | | | | | | | | | | | | | | | |
| W.G. Taper | 380 | Any Combination of waveguide, sizes P to T inclusive. | | | | | | | | | | | | | | | | | | | | |
| W.G. Step | 381 | | | | | | | | | | | | | | | B | X | | | | | |
| W.G. Elbow | 382 | | | | | | | | | | | | | | | B | X | | | | | |
| **TUBE MOUNT—KLYS.** | 390 | | | | | | | | | | | | | C | A | B | X | | | | | |
| **TUNER**—Coaxial 3/8" Single Stub | 400 | | | | | | | | | L | | S | C | A | B | X | | | | | | |
| 7/8" Single Stub | 401 | | | | | | | | | L | | S | | | | | | | | | | |
| 3/8" Double Stub | 402 | (1,000 - 10,000 mcs.) | | | | | | | | L | | S | | | | | | | | | | |
| 7/8" Double Stub | 403 | | | | | | | | | L | | S | | | | | | | | | | |
| 3/8" Triple Stub | 404 | (1,000 - 10,000 mcs.) | | | | | | | | L | | S | | | | | | | | | | |
| 7/8" Triple Stub | 405 | | | | | | | | | L | | S | | | | | | | | | | |
| 7/8" Slug | 407 | | | | | | | | | L | | S | | | | | | | | | | |
| **TUNER—WAVEGUIDE** Single Stub | 409 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Double Stub | 410 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Triple Stub | 411 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| E/H | 412 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Glide Screw | 413 | | P | N | J | H | F | E | D | L | M | S | C | A | B | X | G | K | T | V | W | Z |
| Double Slug | 414 | | | | | | | | | | | | S | C | A | B | X | G | K | T | V | W | Z |
| **TWISTS** Standard | 420 | | | | | | | | | | | | S | C | A | B | X | G | K | T | V | W | Z |
| Step | 421 | | P | N | J | H | F | E | D | | | | | | | | | | | | | |
| **WAVEMETER—COAXIAL** Micrometer | 430 | | | | | | | | | L | M | S | C | | | | | | | | | |
| In Case | 440 | | | | | | | | | L | M | S | C | | | | | | | | | |
| Waveguide MICROMETER Absorbtion | 450 | | | | | | | | | | | | | C | A | B | X | G | K | T | | |
| Transmission | 451 | | | | | | | | | | | | | C | A | B | X | G | K | T | | |
| Direct Reading | 460 | | | | | | | | | | | | | | | B | X | | | | | |

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TRADE MARK

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which include the following:

| | | | | |
|---|---|---|---|---|
| adapters | signal samplers | terminations | phase shifters | transitions |
| test horns | crystal detector mounts | loads | slotted lines | tuners |
| attenuators | | tees | switches | wave meters |
| bends | twists | | | |

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# MICROWAVE

252 EAST THIRD STREET,
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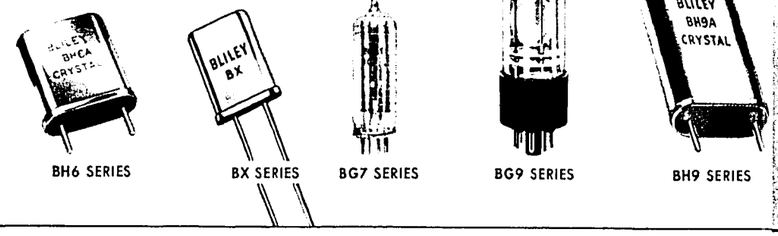


For details, circle #91 on Reader Service Card

# Bliley

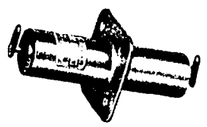
## THE STANDARD OF QUALITY FOR OVER 30 YEARS

## QUARTZ CRYSTALS



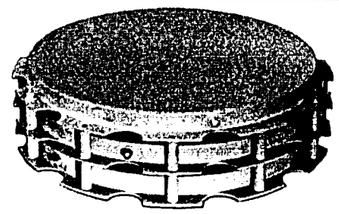

BH6 SERIES — BX SERIES — BG7 SERIES — BG9 SERIES — BH9 SERIES

## ULTRASONIC DELAY LINES

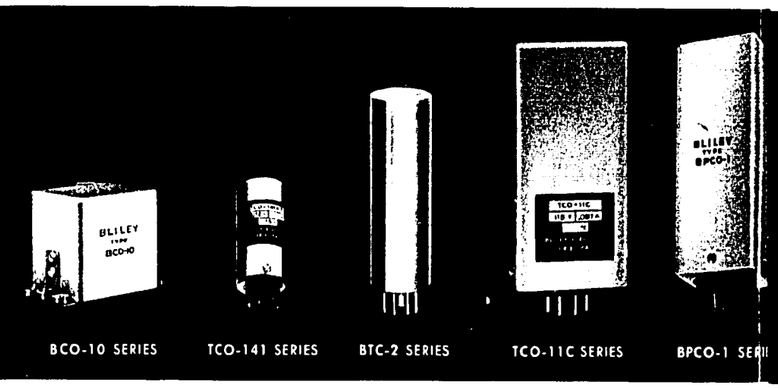


DOUBLE ENDED RINGING LINE

SET OF THREE MATCHED DELAY LINES



## OVENS

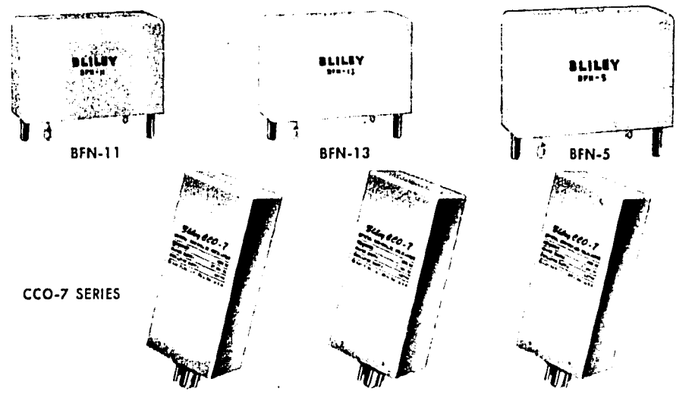



BCO-10 SERIES — TCO-141 SERIES — BTC-2 SERIES — TCO-11C SERIES — BPCO-1 SERIES

For details, circle #92 on Reader Service Card

## CRYSTAL FILTERS

## PACKAGED OSCILLATORS




BFN-11 — BFN-13 — BFN-5

CCO-7 SERIES

**BLILEY ELECTRIC CO.** UNION STATION BUILDING **ERIE, PA.**

## CRYSTALS

| SERIES | FREQUENCY RANGE | DESCRIPTION | BULLETIN |
|---|---|---|---|
| BH6 | 200 kc to 150 mc | Holder is equivalent to MIL Type HC-6 U. Can be supplied with all MIL Type crystal units, and for commercial requirements. Special models for high shock, temperature and vibration applications. Also available with wire leads. | No. 493 |
| BX | 5 mc to 125 mc | Holder is equivalent to MIL Type HC-18 U. Can be supplied with all MIL Type crystal units and for commercial requirements. Also available with plug-in pins. | No. 502 |
| BH9 | 2 kc to 200 kc | Holder is equivalent to MIL Type HC-13 U. Can be supplied with all MIL Type crystal units. Also available with wire leads. Special models for high shock, vibration and temperature applications. | No. 501 |
| BG6 | 3 mc to 100 mc | Glass mounted crystal unit has minimum ageing and high reliability. Also supplied with wire leads when part of BTC-2 crystal oven assembly. Special model BG61A-5 at 5 mc has maximum stability for time standards. | No. 496A<br>No. 505A<br>No. 519 |
| BG7 | 4 kc to 3 mc | Advanced design in all glass mounting for plug-in or with wire leads in Bliley TCO-11C oven assembly. Exceptional stability with low ageing and low resistance. | No. 503A |
| BG9 | 100 kc or 1000 kc | Glass mounted crystal unit developed for secondary standards. Has minimum ageing and high Q for stability. | 100kc-No. 492<br>1000kc-No. 491 |
| BG12 | 100 kc | Glass mounting for GT-cut crystals at 100 KC. Supplied with wire leads in TC97 oven assembly for primary standards. | No. 498 |

## ULTRASONIC DELAY LINES

Bliley ultrasonic delay lines for the range 2 to 4500 microseconds are custom engineered for each application. Exceptional performance characteristics such as low loss and attenuation of spurious responses result from a complete appreciation of the critical factors involved.

A new series of low loss short delay lines (2 to 50 microseconds) for carrier frequencies up to 30 mc utilizes barium titanate transducers. Loss levels of these lines, into terminations of 100 ohms, range from 6 db to 10 db compared to 35 db for quartz transducers. Bliley is completely equipped to design, produce and test ultrasonic delay lines for your application. Request Bulletins No. 48 and No. 513

## OVENS

| SERIES | HEATER VOLTAGE | DESCRIPTION | BULLETIN |
|---|---|---|---|
| TCO-14 | 6.3, 12.0, 26.5 or 115 | High stability (±1°C.) oven for use with Bliley crystal series BH6 or BH9 (MIL-Holders HC-6 U or HC-13 U) | No. 514 |
| TCO-141 | 6.3, 12.0 or 26.5 | Crystal and component oven with stability ±1.5°C. features snap-action thermostat for reliable performance and low circuit interference. For use with Bliley crystal series BH6 or BH9 (MIL-Holders HC-6 U or HC-13 U) | No. 515 |
| TC90 | 6.3, 18 or 115 | Precision crystal ovens for frequency standards. Single stage models hold ±1°C.; Dual stage models hold ±.25°C. | No. 500 |
| BTC-1 | 6.3 | An hermetically sealed crystal and oven subminiature plug-in package which maintains frequency ±3 ppm with ambient temperature variation from −55°C. to +70°C. Freq. range: 5 mc to 125 mc. | No. 494 |
| BTC-2 | 6.3 or 26.5 | An hermetically sealed plug-in package consisting of oven and glass mounted crystal for high reliability, high stability and low ageing. Freq. range: 4 kc to 125 mc. | No. 497 |
| BCO-10 | 12.6, 26.5 or 115 | A compact component oven providing temperature control for up to 10 diodes. Stability ±1°C. with ambient temperature −10° to +50°C. | No. 517 |
| BPCO-1 | 26.5 | High stability transistorized proportional controlled plug-in oven for crystals and components. Stability ±.01°C. from +10°C. to +50°C. For use with Bliley crystal series BG6, BG7 and BG9. | No. 518 |
| TCO-11C | 115 | Precision oven designed for use with Bliley BG6 and BG7 series glass mounted crystals. Temperature stability ±.1°C. | No. 508 |

## CRYSTAL FILTERS

Bliley filter networks are available in three standard designs with characteristics selected for general application as shown in the following tabulation:

| MODEL | FREQ. | BW-6db | BW-60db | FORM FACTOR | IMPEDANCE |
|---|---|---|---|---|---|
| BFN-5 | 5.0 mc | 3.5 kc | 12 kc | 3.5 | 1600 ohms |
| BFN-11 | 10.7 mc | 30.0 kc | 55 kc | 1.8 | 2700 ohms |
| BFN-13 | 13.0 mc | 30.0 kc | 55 kc | 1.8 | 1500 ohms |

### CUSTOM ENGINEERED FILTERS

Bliley facilities are available for analysis, design and production of crystal filter networks for specialized applications over the range from 100 kc to 40 mc. Depending upon functional requirements, bandwidths from 50 cycles to 100 kc are attainable. With an unsurpassed background in the development and manufacture of quartz crystal resonators, Bliley is in a unique position to utilize modern crystal filter synthesis techniques in combination with special quartz resonators having low spurious response characteristics. Request Bulletin No. 509.

For details, circle #93 on Reader Service Card

## PACKAGED OSCILLATORS

The Bliley Model CCO-7 is an ultra-stable, packaged oscillator combining transistorized circuitry, temperature control and a precision quartz crystal at 1 mc, mounted in glass, for stability of 4 parts in 10 million.

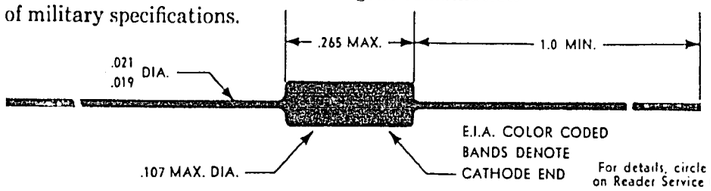
For other frequencies, Bliley is prepared to quote on custom engineered designs necessary to meet application requirements. Bliley has extensive experience in packaged oscillators providing high stability performance in range 2 kc to 100 mc.

Request Bulletin 516 for detailed specifications on the 1 mc packaged oscillator.

**BLILEY ELECTRIC CO.** UNION STATION BUILDING **ERIE, PA.**

# RUGGEDIZED SILICON DIODES

All Rheem diodes are tested per MARK X master test specification for ruggedized silicon diodes.
MARK X tests exceed the most stringent combination of military specifications.




For details, circle #94 on Reader Service Card

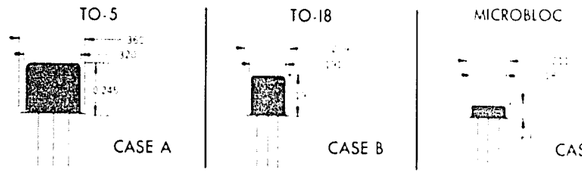
## SILICON DIODES (selected list)

| | TYPE | PIV | $I_F$ @ $V_f$ mA @ VOLTS (Max.) | MAXIMUM REVERSE CURRENT AT SPECIFIED VOLTAGE 25° | 100°C | 150°C | MAXIMUM AVERAGE RECTIFIED CURRENT 25°C | 150°C | MAXIMUM RECOVERY TIME μsec. | RECOVERY CURRENT mA |
|---|---|---|---|---|---|---|---|---|---|---|
| SILICON MILLIMICROSECOND SWITCHING DIODES | RD2266 | 20 | 10 @ 1.5 | 1.0 @ −6 | -- | | | | 0.004 | 3.0** |
| | 1N251 | 30 | 5 @ 1.0 | 0.1 @ −10 | 10 @ −10† | | 75 | | 0.15 | 0.5* |
| | | | | 20.0 @ −20 | | | | | | |
| | 1N252 | 20 | 10 @ 1.0 | 0.1 @ −5 | 10 @ −5† | | 100 | | 0.15 | 0.25* |
| | | | | 20.0 @ −12 | | | | | | |
| | 1N907 | 30 | 10 @ 1.0 | 1.0 @ −30 | 10 @ −30 | | | | 0.004 | 1.0*** |
| | 1N908 | 40 | 10 @ 1.0 | 1.0 @ −40 | 10 @ −40 | | | | 0.004 | 1.0*** |
| SILICON LOW LEAKAGE DIODES | RD1358 | 150 | 100 @ 1.0 | .005 @ 125 | | 5 @ 125 | 200 | 70 | | |
| | ★1N457 | 70 | 20 @ 1.0 | .025 @ 60 | | 5 @ 60 | 75 | | | |
| | ★1N458 | 150 | 7 @ 1.0 | .025 @ 125 | | 5 @ 125 | 55 | | | |
| | ★1N459 | 200 | 3 @ 1.0 | .025 @ 175 | | 5 @ 175 | 40 | | | |
| | 1N459A | 200 | 100 @ 1.0 | .025 @ 175 | | 5 @ 175 | 200 | 70 | | |
| | 1N482B | 36 | 100 @ 1.0 | 0.025 @ 30 | | 5 @ 30 | 200 | 50 | | |
| SILICON HIGH CONDUCTANCE DIODES | 1N484B | 130 | 100 @ 1.0 | 0.025 @ 125 | | 5 @ 125 | 200 | 50 | | |
| | 1N485 | 180 | 100 @ 1.1 | 0.25 @ 175 | | 30 @ 175 | 100 | 25 | | |
| | 1N486A | 225 | 100 @ 1.0 | 0.050 @ 225 | | 25 @ 225 | 200 | 50 | | |
| | 1N488A | 380 | 100 @ 1.0 | 0.1 @ 380 | | 25 @ 380 | 200 | 50 | | |
| SILICON COMPUTER DIODES | RD2124 | 225 | 50 @ 1.0 | 0.5 @ −200 | 30 @ −200 | | 60 | | 0.2 | 0.2†† |
| | 1N627 | 100 | 4 @ 1.5 | 1.0 @ −75 | 30 @ −75 | | 20 | | 1.0 | 0.1‡‡ |
| | ★★1N643 | 200 | 10 @ 1.0 | 0.025 @ −10 | 5 @ −10 | | 40 | | 0.3 | 0.2†† |
| | ★★1N658 | 120 | 100 @ 1.0 | 0.05 @ −50 | 25 @ −50‡ | | 200 | | 0.3 | 0.5†† |
| | ★★1N662 | 100 | 10 @ 1.0 | 1.0 @ −10 | 20 @ −10 | | 40 | | 0.5 | .4†† |
| | ★★1N663 | 100 | 100 @ 1.0 | 5.0 @ −75 | 50 @ −75 | | 60 | | 0.5 | .2†† |
| | 1N692 | 150 | 400 @ 1.0 | 0.25 @ −120 | | | | | 0.5 | .4†† |
| | 1N779 | 200 | 10 @ 1.0 | 0.5 @ −175 | 30 @ −175† | | 50 | | 0.3 | .1††† |
| | 1N795 | 60 | 50 @ 1.0 | 5.0 @ −50 | 30 @ −50 | | 160 | | 0.5 | .2†† |
| | 1N803 | 200 | 10 @ 1.0 | 5.0 @ −175 | 50 @ −175 | | 120 | | 0.5 | .2†† |
| | 1N809 | 220 | 100 @ 1.0 | 1.0 @ −200 | 50 @ −200 | | 100 | | 0.3 | .35††† |
| | 1N839 | 200 | 150 @ 1.0 | 0.1 @ −175 | 15 @ −175 | | | | 0.5 | .0875††† |
| | 1N845 | 200 | 200 @ 1.0 | 0.1 @ −160 | 15 @ −160 | | | | 0.5 | .0875††† |
| | 1N892 | 120 | 50 @ 1.0 | 0.1 @ −100 | 25 @ −100 | | 200 | | 0.3 | 0.5†† |
| | 1N922 | 120 | 500 @ 1.0 | 0.25 @ −90 | 50 @ −90 | | | | 0.3 | 5.0**** |
| SILICON ALL-PURPOSE DIODES | 1N659A | 50 | 10 @ 1.0 | .025 @ 50 | 1.0 @ 50 | 5.0 @ 50 | 100 | 30 | 0.3 | .0875††† |
| | 1N660A | 100 | 10 @ 1.0 | .025 @ 100 | 1.0 @ 100 | 5.0 @ 100 | 100 | 30 | 0.3 | .0875††† |
| | 1N661A | 200 | 10 @ 1.0 | .025 @ 200 | 1.0 @ 200 | 5.0 @ 200 | 100 | 30 | 0.3 | .0875††† |
| SILICON SUBMINIATURE GLASS RECTIFIERS | 1N684 | 400 | 400 @ 1.0 | | | 0.200 @ 280 | 400 | 150 | | |
| | 1N687 | 600 | 200 @ 1.0 | | | 0.200 @ 420 | 200 | 75 | | |
| | 1N645 | 225 | | 0.2 @ 225 | 15 @ 225 | | 400 | 150 | | |
| | 1N646 | 300 | | 0.2 @ 300 | 15 @ 300 | | 400 | 150 | | |

★ JAN Types
★★ Signal Corps Types
* Measured in 256 JAN circuit switched from +5mA to −10V
** Measured in Rheem millimicrosecond recovery circuit switched from +10mA to −6V
*** Measured in Rheem millimicrosecond recovery circuit switched from +10mA to −5V
**** Measured in Rheem high current recovery circuit switched from +500mA to −50 V
† Tested at 125°C
†† Measured in 256 JAN circuit switched from +5mA to −40V
††† Measured in 256 JAN circuit switched from +30mA to −35V
‡ Tested at 150°C
‡‡ Measured in modified IBM "Y" circuit switched from +30mA to −35V

# SILICON MESA TRANSISTORS

Rheem transistors are tested to exceed the requirements of MIL-S-19500B. All are stabilized by storage at 300° C and by three temperature cycles from -65° C to 200° C.




For details, circle #95 on Reader Service Card

## SILICON MESA TRANSISTORS (selected list)

| | TYPE | CASE | DISSIPATION AT 25°C CASE (watts) | COLLECTOR VOLTAGE MAX. volts | COLLECTOR CURRENT MAX. mA | DC CURRENT GAIN $h_{FE}$ TYPICAL | TYPICAL COLLECTOR-BASE REVERSE CURRENT μA @ $V_{CB}$ | $h_{fe}$ @ 20 mc TYPICAL | SATURATION VOLTAGE @ $I_c = 10 I_b$ TYPICAL $V_{ce}$ (volts) | $I_c$ (mA) | RISE TIME @ $I_b = 10 I_b$ TYPICAL m μsec | $I_c$ (mA) | TYPICAL SMALL SIGNAL PARAMETERS $I_E$ 1 mA $V_c$ 6V f 1Kc $h_{ib}$ ohms | $h_{rb}$ X10⁻⁶ | $h_{fb}$ | $h_{ob}$ μmhos |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MICROBLOC | RT697-M | C | 3 | 60 | 500 | 75 | .005 30 V | 4 | .7 | 150 | 70 | 150 | 26 | 75 | 100 | .2 |
| VERY HIGH CURRENT FAST SWITCHING | RT5001 | A | 3 | 60 | 1000 | 40 | .01 30 V | 4 | 1.3 | 500 | 100 | 350 | | | | |
| | RT5002 | A | 3 | 60 | 1000 | 75 | .01 30 V | 5 | 1.3 | 500 | 80 | 350 | | | | |
| | RT5003 | A | 3 | 100 | 1000 | 40 | .01 30 V | 4 | 1.5 | 500 | 100 | 350 | | | | |
| | RT5004 | A | 3 | 100 | 1000 | 75 | .01 30 V | 5 | 1.5 | 500 | 80 | 350 | | | | |
| HIGH CURRENT FAST SWITCHING • *PER MIL-S-19500/99A(Sig C)* | ● 2N696 | A | 2 | 60 | 500 | 40 | .003 30 V | 4 | .7 | 150 | 70 | 150 | | | | |
| | ● 2N697 | A | 2 | 60 | 500 | 70 | .003 30 V | 5 | .7 | 150 | 85 | 150 | | | | |
| | 2N698 | A | 2 | 120 | 500 | 40 | .01 60 V | 4 | 2.0 | 150 | 70 | 150 | 26 | 40 | 75 | .2 |
| | 2N699 | A | 2 | 120 | 500 | 65 | .01 60 V | 5 | 2.0 | 150 | 85 | 150 | 26 | 75 | 100 | 2 |
| | 2N717 | B | 1.5 | 60 | 500 | 40 | .003 30 V | 4 | .7 | 150 | 70 | 150 | | | | |
| | 2N718 | B | 1.5 | 60 | 500 | 70 | .003 30 V | 5 | .7 | 150 | 85 | 150 | | | | |
| | 2N1420 | A | 2 | 60 | 500 | 175 | .003 30 V | 6.5 | .7 | 150 | 80 | 150 | | | | |
| | 2N1613 | A | 3 | 75 | 500 | 45 | .001 60 V | 5 | .7 | 150 | 80 | 150 | | | | |
| MEDIUM POWER GENERAL PURPOSE •• *Certified to meet MIL-T-19500 74 (USN)* | ●● 2N497 | A | 4 | 60 | 500 | 20 | .1 30 V | 2.5 | 2.0 | 200 | 100 | 150 | | | | |
| | ●● 2N498 | A | 4 | 100 | 500 | 20 | .1 30 V | 2.5 | 2.0 | 200 | 100 | 150 | | | | |
| | ●● 2N656 | A | 4 | 60 | 500 | 60 | .1 30 V | 3 | 2.0 | 200 | 60 | 150 | | | | |
| | ●● 2N657 | A | 4 | 100 | 500 | 60 | .1 30 V | 3 | 2.0 | 200 | 60 | 150 | | | | |
| MEDIUM POWER LOW STORAGE | 2N1252 | A | 2 | 30 | 500 | 35 | .1 20 V | 4 | .6 | 150 | 100 | 150 | | | | |
| | 2N1253 | A | 2 | 30 | 500 | 60 | .1 20 V | 5.5 | .6 | 150 | 100 | 150 | | | | |
| VERY FAST SWITCHING | 2N706 | B | 1 | 25 | 100 | 30 | .01 15 V | 4 @ 100mc | .3 | 10 | 20 | 10 | | | | |

**SPECIAL ASSEMBLIES:** Series and parallel combinations – leads connected and encapsulated to customer specifications.


## RHEEM SEMICONDUCTOR CORPORATION

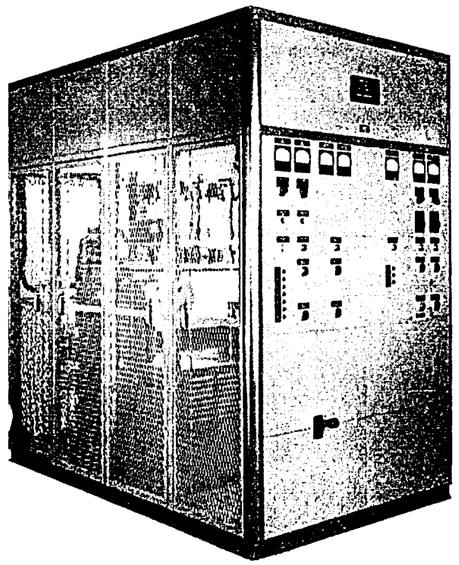
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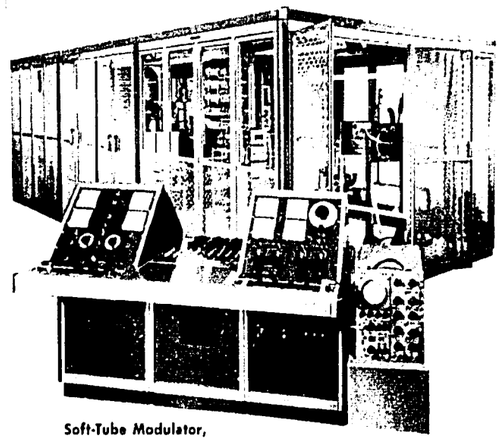
# MANSON SYSTEMS ENGINEERING IN MICRO-WAVE & POWER

Power Supply: 0-20 KV @ 4 amps Model #214



- **OUTPUT:** 0 to 20 kilovolts DC @ 4 amps
- **REGULATION:** 15% maximum from no load to full load
- **RIPPLE:** Less than 1% of full output voltage
- **DUTY:** Continuous
- **METERS:** DC output voltage and current; AC line voltage and current; HV transformer primary-coil voltage and current; rectifier filament voltage; elapsed time
- **CONTROLS:** Main power switch; overload trip control; control and filament power ON and OFF buttons; high voltage ON, OFF, RAISE and LOWER buttons; surge test standby and surge test buttons
- **FEATURES:** Overload relay removes high voltage when load exceeds any preset value from 200 to 5000 ma, continuously adjustable; over-voltage circuit removes high voltage when voltage exceeds any preset value from 10 to 25 kv, continuously adjustable; solenoid-operated automatic shorting circuit discharges high voltage to ground after equipment is de-energized; voltage control motor automatically re-cycles output voltage to zero on overload; interlock on HV control requires control to be at the minimum output position before high voltage can be applied; all switches may be operated from a remote control unit; design and layout of internal circuitry permits easy checking and servicing of all parts; easy access to inside from three sides; rugged console construction, welded angle-iron frame with ⅛" thick sheet screening and panels

**Power pulse applications from kilo- to megawatts...**
**according to your specifications, to suit your needs!**



Soft-Tube Modulator,
30-Megawatt Unit #237

- **POWER (peak):** 30 megawatts
- **VOLTAGE (peak):** 200 kilovolts into 1300 ohms
- **CURRENT (peak):** 150 amps.
- **PULSE WIDTHS:** ½, 1, 2, 4, 6 and 8 microseconds, measured at 90% voltage points
- **PULSE REPETITION FREQUENCY:** 50 to 1800 pps, continuously variable with higher PRFs at reduced power
- **MAXIMUM AVERAGE POWER:** 60 kilowatts
- **MONITORING:** Current-viewing resistor for T.U.T. primary; capacitance voltage dividers for viewing (1) primary of auxiliary pulse transformer, (2) primary of T.U.T., (3) secondary of T.U.T. and (4) grid drivers to thyratrons

*Specialists in Tube-Testing Equipment*

**MANSON LABORATORIES, INC.**

**375 FAIRFIELD AVENUE, STAMFORD, CONNECTICUT • DAvis 5-1391**



For details, circle #96 on Reader Service Card

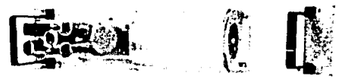


# MANSON CUSTOM ENGINEERING IN PRECISION COMMUNICATIONS INSTRUMENTATION

**MINIATURIZED HIGH STABILITY OSCILLATOR, MODEL RD-149**

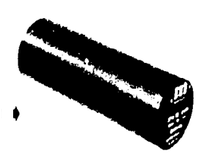
**OUTPUT FREQUENCY:** 100 kilocycles and 1 Mc, adjustable +6 cycles. (Other frequencies available when specified: 80 kc to 600 kc and 800 kc to 1.2 Mc)
**OUTPUT:** Sine wave 1 volt rms into 20 K ohms for 1 Mc output; 5 K ohms for 100 kc output.
**POWER REQUIREMENTS:** 200-250 volts DC @ 20 ma; 6.3 volts AC @ 1.1 amps, or DC when specified
**OPERATING AMBIENT TEMPERATURE RANGE:** −20°C to 55°C
**OVERALL DIMENSIONS:** 3¼" x 3¼" x 5¾" (Also available: 1 Mc only, Model RD-145)





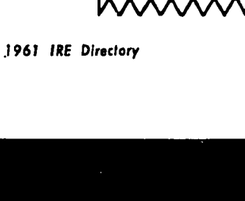
**PROPORTIONAL CONTROLLED OVEN MODEL RD-130**

**ULTRA-ACCURATE CRYSTAL OVEN MODEL RD-134**



**HIGH STABILITY OSCILLATOR MODEL RD-140A**

**OUTPUT FREQUENCY:** 1 Mc, adjustable 6.5 cycles. Requirements for frequencies from 0.8 to 1.2 Mc can be met on special order.
**FREQUENCY STABILITY:** Short Term (circuit noise) — ±5 parts in $10^{10}$. Vibration and Shock — 2 parts in $10^9$ per MIL-T-17113. Ambient Temperature Change — ±2 parts in $10^9$ from 0°C to 50°C. Change in B+ or Filament Voltage — ±2 parts in $10^9$ for ±20% B+ change or ±5 parts in $10^9$ for ±10% filament voltage change.
**OUTPUT:** Sine wave, 1 volt rms into 10 K ohms.
**TUBE COMPLEMENT:** Two 12AT7, two 6AQ5, one 6AH6.
**POWER REQUIREMENTS:** 250 volts dc @ 60 ma; 6.3 volts ac @ 1.8 amps; 115 volts ac @ 5 watts.
**MOUNTING:** Complete assembly mounted on a 3½" high standard 19" relay-rack panel, with handles.



**CRYSTAL FREQUENCY SYNTHESIZER, MODEL N-317**

**ZERO ERROR READABILITY AND RESETTABILITY**
**OUTPUT FREQUENCY RANGE:** 2 Mc to 34 Mc in 4 bands
**TUNING INCREMENTS:** 125 cps from 2-4 Mc; 250 cps from 4-8 Mc; 500 cps from 8-16 Mc; 1000 cps from 16-34 Mc
**FREQUENCY STABILITY:** 1 part in $10^8$ per day, with higher stability available using external reference
**SPURIOUS SIGNALS:** down 80 db, except harmonics of the output
**100 MILLIWATTS MINIMUM INPUT** across 50 ohms
**NEW DISCRIMINATOR*** gives automatic and equal pull-in and hold-in without moving parts
**ALL-ELECTRONIC SYSTEM** eliminates mechanical servos

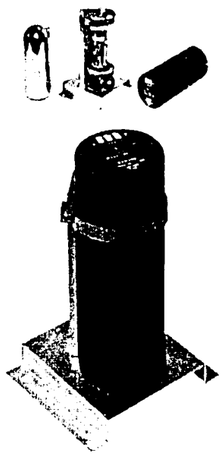


*Pat. No. 2,871,349

**Masters in the art of frequency synthesization, Manson engineers can build to your specifications... or research your problems... to supply your needs in this field!**

**TRANSISTORIZED OSCILLATOR MODEL RD-144**

**FREQUENCY:** 1 Mc, adjustable 5 cycles (also available at any frequency from 800 kc to 1.2 Mc on special request)
**STABILITY:** Drift rate less than 1 part in $10^8$ per day
**OUTPUT:** .05 volt rms into 500 ohms (minimum)
**INPUT POWER REQUIREMENTS:** 24 volts DC ± 10%; approx. 1.8 watts maximum; 0.9 watts average power consumption @ 25°C ambient (available for other voltages on request)
**OPERATING AMBIENT TEMPERATURE RANGE:** 0°C to +50°C
**VIBRATION & SHOCK:** Meets MIL-T-945A specifications

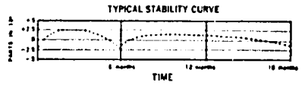


**NEW...** stability 5 parts in $10^8$ or less per annum!

**ULTRA LOW-DRIFT OSCILLATOR, MODEL RD-147**

**OUTPUT FREQUENCY:** 1 Mc, adjustable for 6.5 cycles (requirements for frequencies from 0.8 to 1.2 Mc can be met on special order)
**FREQUENCY STABILITY:** Long term — 5 parts in $10^8$ or less per annum (see Stability Curve). Short term (circuit noise) — ±5 parts in $10^{10}$
**OUTPUT:** Sine wave, 1 volt rms into 10 K ohms
**POWER REQUIREMENTS:** 250 volts DC @ 60 ma; 6.3 volts AC @ 1.8 amps; 115 volts AC @ 5 watts
**MOUNTING:** Complete assembly mounted on a 3½" high standard 19" relay-rack panel, with handles

TYPICAL STABILITY CURVE




**MANSON LABORATORIES, INC.**

**375 FAIRFIELD AVENUE, STAMFORD, CONNECTICUT • DAvis 5-1391**



For details, circle #97 on Reader Service Card

# TANTALUM

**Quality Features for Maximum Reliability of Solid Electrolyte Tantalum Electrolyte Capacitors — Type STP**

1. 100% stabilized by 250 hour "burn-in"
2. at full voltage
3. and high test temperature
4. with low series impedence

**OTHER ADVANTAGES;**

• −55°C to +125°C operation • ±10%, ±20% tolerance • Polar Operation • Positive Hermetic Seal • Meets or exceeds MIL-C-26655A electrically and mechanically • Minimum size, long life and stable operation.

**PRINCIPAL PARAMETERS:**

**DC LEAKAGE LIMITS***

+ 25°C – 0.02 μA/MFV
+ 85°C – 0.2 μA/MFV
+125°C – 0.25 μA/MFV

*Initial limit and prior to 250 hour stabilization. For fully stabilized capacitor Type STP this limit is increased by 25%.

**DISSAPATION FACTOR (DF)**

− 55°C – 8%
+ 25°C – 6%
+ 85°C – 8%
+125°C – 9%

**VOLTAGE RATINGS — VOLTS**

| +25°C | | +85°C | | +125°C | |
|---|---|---|---|---|---|
| WVDC | Surge | WVDC | Surge | WVDC | Surge |
| 6 | 8 | 6 | 8 | 4 | 5 |
| 10 | 12 | 10 | 12 | 7 | 9 |
| 15 | 17 | 15 | 17 | 10 | 12 |
| 20 | 23 | 20 | 23 | 13 | 16 |
| 35 | 41 | 35 | 41 | 23 | 28 |

**CAPACITY CHANGE FROM 25°C**

−55°C – −12%
+85°C – +12%
+125°C – +15%

**LIFE TEST:**

Capacitors will withstand a life test of 2000 hours when tested per MIL-C-26655A, as amended March 10-11, 1960 with not more than 1 failure in each 24 units tested.

**STANDARD RATINGS AND CASE SIZE TABLE:**

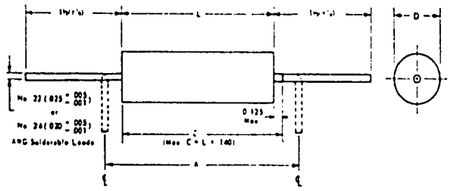
| DC Working Voltage-Volts | 6 Volts | | 10 Volts | | 15 Volts | | 20 Volts | | 35 Volts | |
|---|---|---|---|---|---|---|---|---|---|---|
| Capacity Microfarads | Tolerance | | Tolerance | | Tolerance | | Tolerance | | Tolerance | |
| | 20% Case | 10% Size | 20% Case | 10% Size | 20% Case | 10% Size | 20% Case | 10% Size | 20% Case | 10% Size |
| 1.0 | A | A | A | A | A | A | A | A | A | A |
| 1.2 | | A | | A | | A | | A | | B |
| 1.5 | A | A | A | A | A | A | A | A | B | B |
| 1.8 | | A | | A | | A | | A | | B |
| 2.2 | A | A | A | A | A | A | A | A | B | B |
| 2.7 | | A | | A | | A | | B | | B |
| 3.3 | A | A | A | A | A | A | B | B | B | B |
| 3.9 | | A | | A | | B | | B | | B |
| 4.7 | A | A | A | A | B | B | B | B | B | B |
| 5.6 | | A | | B | | B | | B | | B |
| 6.8 | A | A | B | B | B | B | B | B | B | B |
| 8.2 | | B | | B | | B | | B | | C |
| 10 | B | B | B | B | B | B | B | B | C | C |
| 12 | | B | | B | | B | | B | | C |
| 15 | B | B | B | B | B | B | B | B | C | C |
| 18 | | B | | B | | B | | C | | C |
| 22 | B | B | B | B | B | B | C | C | C | C |
| 27 | | B | | B | | C | | C | | D |
| 33 | B | B | B | B | C | C | C | C | D | D |
| 39 | | B | | B | | C | | C | | D |
| 47 | B | B | C | C | C | C | C | C | D | D |
| 56 | | B | | C | | C | | D | | |
| 68 | C | C | C | C | C | C | D | D | | |
| 82 | | C | | C | | D | | D | | |
| 100 | C | C | C | C | D | D | D | D | | |
| 120 | | C | | C | | D | | D | | |
| 150 | C | C | D | D | D | D | | | | |
| 180 | | C | | D | | | | | | |
| 220 | D | D | D | D | | | | | | |
| 270 | | D | | | | | | | | |
| 330 | D | D | | | | | | | | |

**CATALOGUE NUMBER EXPLANATION**

S T P 22 6 M 06 B 1

- Basic type
- Characteristic
- Polarity Symbol
- Capacity in mmf
- No. of zeros for cap.
- Tolerance (M = ±20%; K = ±10%)
- WVDC — direct reading volts
- Case Size Code (Dim. & Rating Table)
- Style Number (1 = Uninsulated; 2 = rigid Mylar sleeve; 3 = flexible vinyl sleeve)

**DIMENSIONS AND WEIGHT**




| case size | D +0.016 −0.010 | L ±0.031 | *A ±0.031 | wire size AWG | avg. wt. gms. | with rigid Mylar or flexible vinyl insulating sleeve: D ±0.010 | L ±0.031 | avg. wt. gms. |
|---|---|---|---|---|---|---|---|---|
| A | 0.125 | 0.250 | 0.482 | 24 | 0.4 | 0.135 | 0.322 | 0.4 |
| B | 0.175 | 0.438 | 0.688 | 24 | 1.1 | 0.185 | 0.510 | 1.2 |
| C | 0.279 | 0.650 | 0.888 | 22 | 2.7 | 0.289 | 0.722 | 2.8 |
| D | 0.341 | 0.750 | 0.988 | 22 | 3.3 | 0.351 | 0.822 | 3.4 |

*Dimension "A" determined by suspending a one-pound weight from one lead and rotating the case from the vertical position to the horizontal position, and then repeating the procedure for the other lead.

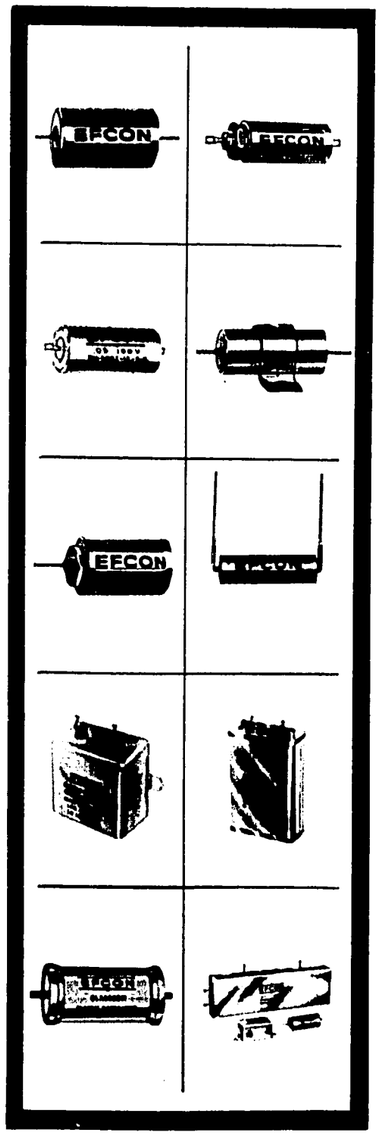

EFCON Patterson Place • Roosevelt Field Garden City • L. I., New York




# FILM CAPACITORS

## for industrial, military and commercial applications

**A complete line of quality capacitors is now available from EFCON in tolerances of ±20%, ±10%, ±5%, ±2%, ±1% and closer upon request. Strict quality controls and material selection ensure you of reliable maximum performance.**




### Mylar® Miniature Capacitors

Type MH — hermetically sealed metal case, −60°C to +85°C
Type MHH — hermetically sealed metal case, −60°C to +125°C
Type MC — cardboard tubular, −60°C to +85°C Type MW — tubular construction, Mylar tape wrap, epoxy-resin end-seals, −60°C to +85°C

### High Temperature Teflon Dielectric Capacitor

Type TH — hermetically sealed, −55°C to +200°C. These high reliability capacitors meet MIL-C-26086/4 (USAF) and MIL-C-19978A (NAVY). Type TH features unusually high insulation resistance, excellent humidity resistance, low dielectric absorption, low dissipation factor and small capacitance change with temperature.

### Polystyrene Miniature Capacitors

Type PH — hermetically sealed metal case, −65°C to +85°C
Type PC — cardboard tubular, −65°C to +85°C Efcon Polystyrene Capacitors were developed for use where high insulation resistance, low power factor and low dielectric absorption are necessary.

### Polystyrene High Stability Capacitor

Type RH — Hermetically sealed metal case −65°C to +70°C Polystyrene construction, for applications requiring high stability, high insulation resistance, close retrace, greater dependability . . . Standard tolerance is ±5%. Tolerances of ±2%, ±1%, ±0.5% or closer are available.

### Glasscon® Acetate Capacitors

Type AG — glass-to-metal or type AE — ceramic to metal cased, high voltage, −60°C to +125°C. Voltage range from 600 to 60,000 volts D.C. Standard Tolerance ±10%. Tolerance of ±5%, ±2% and ±1% are available upon request.

**POPULAR STYLES**

**MYLAR AND POLYSTRENE**

**STYLE A** — Grounded, uninsulated case.
**STYLE B** — Grounded construction, case with insulating sleeve.
**STYLE C** — Screw neck mounting, grounded, uninsulated case.
**STYLE D** — With tangential mounting bracket, grounded case.
**STYLE K** — Two 6-32 studs (radial), grounded case.
**STYLE M** — Single 6-32 stud (axial), grounded case.
**STYLE Q** — Two 6-32 studs (radial), both leads insulated.
**STYLE V** — Both leads insulated, with tangential mounting bracket.
**STYLE W** — Both leads insulated, with screw neck mounting.
**STYLE Y** — Both leads insulated, case with insulating sleeve.
**STYLE Z** — Both leads insulated, uninsulated case.


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# Sperry Microline® NEWLY DESIGNED IN 1960

Sperry has created new designs for its entire line of Microwave Instruments to make this the most complete and up-to-date inventory in the industry.

## WAVEGUIDE INSTRUMENTS

| FREQUENCY BAND CODE LETTER | S | C | G | H | X | U | K | V |
|---|---|---|---|---|---|---|---|---|
| INSTRUMENT | 3x1½ 2.6-3.95 KMC | 2x1 3.95-5.85 KMC | 1½x¾ 5.85-8.2* KMC | 1¼x⅝ 7.05-10.0 KMC | 1x½ 8.2-12.4 KMC | .702x.391 12.4-18.0 KMC | .500x.250 18.0-26.5 KMC | .360x.220 26.5-40.0 KMC |
| Frequency Meter, Direct Reading | 12S1 $450 | 12C1 $250 | | | 12X1 $150 | 12U1 $210 | 12K1 $230 | |
| Frequency Meter, Precision | 14S1 $850 | 14C1 $565 | 14G1 $450 | | 14X1 $450 | | | |
| Waveguide Slotted Line† | **21S1 $450 | *21C1 $110 | | | *21X1 $50 | *21U1 $110 | | |
| Universal Carriage | | 21A1 $160 | | | 21A1 $160 | 21A1 $160 | | |
| Adjustable Shorts | 23S1 $100 | 23C1 $70 | 23G1 $60 | 23H1 $50 | 23X1 $40 | 23U1 $90 | 23K1 $130 | 23V1 $140 |
| Reflectometer Coupler | 24S1 $600 | 24C1 $350 | | | 24X1 $175 | | | |
| Barretter Mount, Fixed | 33S2 $150 | 33C2 $140 | 33G2 $130 | | 33X2 $70 | | | |
| Tunable Detector Mount | 34S1 $180 | 34C1 $95 | 34G1 $80 | 34H1 $85 | 34X1 $75 | 34U1 $160 | 34K1 $170 | 34V1 $180 |
| Termination, Low Power | 42S1 $50 | 42C1 $40 | 42G1 $35 | 42H1 $30 | 42X1 $25 | 42U1 $30 | 42K1 $30 | 42V1 $35 |
| Termination, High Power | 43S1 $150 | 43C1 $140 | | 43H1 $100 | 43X1 $85 | | | |
| Crossguide Coupler, 20 to 50 db | 44S2 $150 | 44C2 $130 | 44G2 $80 | 44H2 $80 | 44X2 $60 | 44U2 $80 | 44K2 $100 | 44V2 $110 |
| Level Set Attenuator | | | | | 47X1 $45 | 47U1 $50 | | |
| Adapter | 54S1 $70 | 54C1 $40 | | | 54X1 $35 | | 54K2 $25 | 54V2 $25 |
| Standard Gain Horns | 56S1 $175 | 56C1 $150 | 56G1 $125 | 56H1 $120 | 56X1 $50 | 56U1 $110 | 56K1 $110 | 56V1 $110 |

* Mounts in 21A1 Universal Carriage
** Complete Assembly includes carriage
† 21L1 Slotted line in 6.660"x3.410" Waveguide also available—complete assembly including carriage.
• Certain Instruments cover range 5.2-8.2 KMC.

## ELECTRONIC INSTRUMENTS

| INSTRUMENT | APPLICATION | FREQUENCY RANGE | FEATURES | PRICE |
|---|---|---|---|---|
| Model 29A1 Standing Wave Indicator | SWR Indicator Null Detector, TAA | 300-5000 Cycles | Adjustable Bandwidth Bolo Current Readout | $200 |
| Model 29A2 Input Switch | Used with 29A1 SWR Indicator | — | Convenient for Comparison Measurement | $30 |
| Model 31A1 Average Power Meter | R-F Power Measurement | Per Bolometer Mount | ± 3% Accuracy, .02 to 10 MW | $240 |
| Model 31A2 Peak Power Meter | R-F Peak Power Measurement | Per Bolometer Mount | ± 10% Accuracy, Direct Reading | $1200 |
| Model 62A1 Universal Klystron Power Suppl | Universal Power Source for Klystrons | — | 200-4000 Beam Volts @ 150 MA .01% Regulation 0-1000 Reflector Volts 3 MV Max. Ripple | $1300 |
| Model 62A2 D. C. Klystron Filament Supply | D. C. Filaments for high stability operation | — | Adjustable Output Voltage Low Ripple | $190 |

## COAXIAL INSTRUMENTS

| INSTRUMENT | APPLICATION | FREQUENCY RANGE | FEATURES | PRICE |
|---|---|---|---|---|
| Model 72L2, 72S2, 72C2, 72H2 Isolators, Low Power | Source Component Isolators for Laboratory Measurement | 1-2 2-4 4-7 7-11 KMC | High Isolation Low VSWR | $250 ($180 for H-Band) |
| Model 12L1 Broadband Frequency Meter | Frequency Measurement | 660 to 3000 MC | Transmission type measurements including meter with sensitivity control Direct Reading | $550 |
| Model 21B1 Tunable Broadband Probe | Detector for Slotted Line Measurements | 1-18 KMC | Ultimate in Tuning Ease | $125 |
| Model 33B2 Coaxial Thermistor Mount | R-F Power Measurements | 10 MC to 10 KMC | Fixed Tuned, Low VSWR | $75 |
| Model 34B1 Tunable Coaxial Detector Mount | R-F Detector | 1.0 to 12.4 KMC | Convenient Broadband Operation | $125 |
| Model 54B1, 54B2, 54B3, and 54B4 Coaxial Adapters | Transition from ⅞ to ⅜ Coax. ⅞ to ⅞ Coax. | 0 to 10 KMC | Low VSWR | $40 |

SPERRY

**SPERRY MICROWAVE ELECTRONICS COMPANY,** *CLEARWATER, FLORIDA · DIVISION OF SPERRY RAND CORPORATION*



# ...also from the SPERRY MICROWAVE ELECTRONICS COMPANY

## FERRITE ISOLATORS

A complete line of ferrite isolators, circulators, and other solid state devices—for research and production—from the industry's foremost ferrite and solid state laboratory.

### TYPICAL SOLID STATE ISOLATORS AND CIRCULATORS

| | To 500 mc J | .5-1 kmc P | 1-2.6 kmc L | 2.6-3.95 kmc S | 3.95-5.85 kmc C | 8.2-12.4 kmc X |
|---|---|---|---|---|---|---|
| High Power Coaxial Isolators | D44J6 | D44P6 | D44L6 | D44S2 | | |
| High Power Waveguide Isolators | | | D41L1 | D41S1 | D41C1 | D41X1 |
| High Power Ridge Waveguide | | | | D42S2 | D42C2 | D42X2 |
| High Power Duplexers | D51J1 | D51P1 | D51L1 | D51S1 | D51C1 | D51X1 |
| Broadband Laboratory Isolators | | | 72L2 | 72S2 | 72C2 | 72X2 |
| Miniaturized Isolators | | | D44L7 | D44S7 | D44C7 | |
| Miniaturized Tee Circulators | D52J1 | D52P1 | D52L1 | D52S1 | D52C1 | |

## MICROWAVE ANTENNAS, SUBSYSTEMS, AND COMPONENTS

Sperry has been developing and producing microwave antennas, subsystems, and components for numerous radars and other such equipments covering the entire microwave spectrum.

## TEST SETS AND SYSTEMS INSTRUMENTATION

From small portable field test equipment to large complex automatic checkout equipment, Sperry has pioneered in combination test sets, performance monitors and evaluators, RACE™, and simulators.

**Combination Test Sets**

| | | |
|---|---|---|
| Model 670 | — | 400-450 mc |
| Model 590 | UPM-44C | 2.7-3.5 kmc |
| Model 552 | SPM-5 | 5.4-5.9 kmc |
| Model 570 | UPM-32 | 8.5-10.5 kmc |
| Model 557 | UPM-42 | 23.5-24.5 kmc |
| Model 580A | UPM-14 | 34.0-35.6 kmc |

**Range Calibrators**

| | | |
|---|---|---|
| — | UPM-11 | 8.5-9.6 kmc |
| Model 551A | SPM-6 | 5.4-5.9 kmc |
| Model 619 | — | 15.7-17.0 kmc |
| Model 610 | UPM-40 | 23.5-24.5 kmc |

**FM Test Sets**

| | | |
|---|---|---|
| Model 38A | TS-147B | 8.5-9.6 kmc |
| Model 729 | UPM-29A | 15.7-17.0 kmc |

**VSWR Test Sets**

| | | |
|---|---|---|
| Model 539A | UPM-12A | 8.5-9.6 kmc |
| Model 727 | UPM-27A | 15.7-17.0 kmc |

**Spectrum Analyzer**

| | | |
|---|---|---|
| Model 728 | UPM-28A | 15.7-17.0 kmc |

**Radar Performance Monitors In X- and C-Bands**

SPERRY

**SPERRY MICROWAVE ELECTRONICS COMPANY,** *CLEARWATER, FLORIDA · DIVISION OF SPERRY RAND CORPORATION*

## Vital to your design orbit!

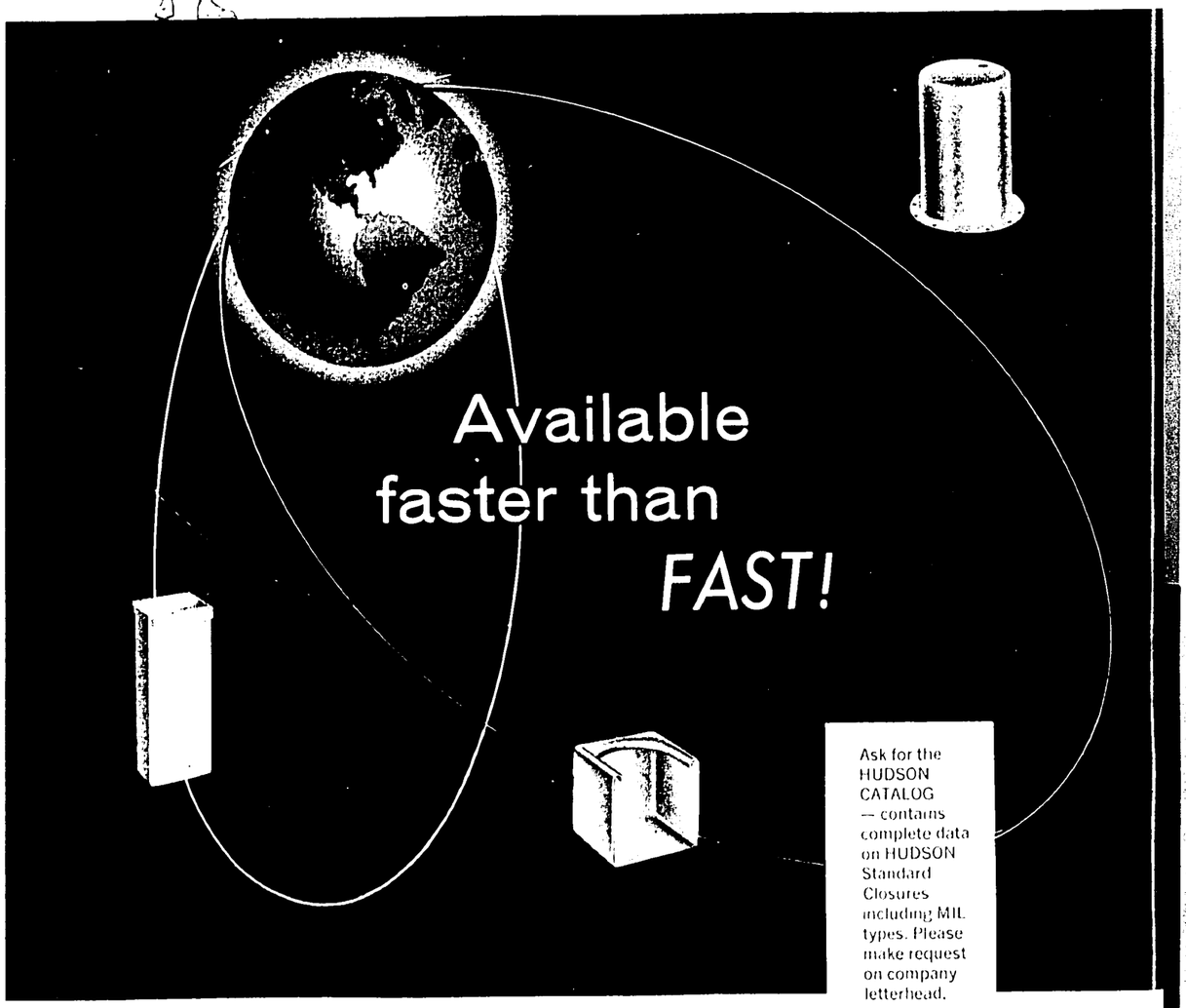


For data circle #20 on Reader Service Card

*PRECISION-DRAWN*

# CLOSURES

**Precision Standard Tooling makes the Difference** — The HUDSON line provides complete versatility for the designer engineer. The industry's widest range of round, square and rectangular closures supplied with dozens of modifications to meet unusual applications. Standardized designs assure fast delivery and precision quality — every time! All finishes available on components of mu metal, nickel-silver, aluminum, brass, copper, stainless steel and steel. Call or write for quotations.




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*Precision Metal Components for Electronics, Nucleonics, Avionics and Rocketry*

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**Bendix**

This is a general introduction to Eclipse-Pioneer's extensive line of precision components for servomechanism and computing equipment. Specific mechanical and electrical characteristics, schematics, installation instructions, and detailed descriptions are included in individual specification sheets available on request.

## PRECISION COMPONENTS FOR SERVOMECHANISM AND COMPUTING EQUIPMENT

AUTOSYN* SYNCHROS COMPONENT PACKAGING PRECISION GYROS RADAR ANTENNA DEVICES MOTORS AND GENERATORS

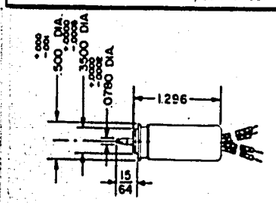
SYMBOL: ● CORROSION RESISTANT ▲ STANDARD CONSTRUCTION ■ HIGH TEMPERATURE

## AUTOSYN* SYNCHROS

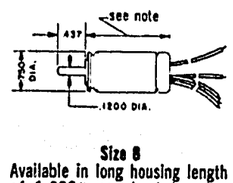
Checkmarks indicate the units already designed and tooled for a wide range of application. Other production units, incorporating design variations, are under development. Eclipse-Pioneer facilities are available to design, tool, and produce specialized units for your specific requirements.
*Registered Trademark of Bendix Aviation Corporation

| | SIZE 5 AY-700 SERIES | SIZE 8 AY-300 SERIES | SIZE 10 AY-500 SERIES | SIZE 11 AY-190 AY-600 SERIES | SIZE 15 AY-200 | SIZE 22 AY-400 SERIES |
|---|---|---|---|---|---|---|
| | ● ▲ ■ | ● ▲ ■ | ● ▲ ■ | ● ▲ ■ | ● ▲ ■ | ● ▲ ■ |
| TORQUE TRANSMITTER (Single Power) | | ● | ● ▲ ■ | ● ▲ ■ | ● ▲ ■ | |
| TORQUE TRANSMITTER (Multi-Power) | | | ● | ● ▲ ■ | ● ▲ ■ | |
| CONTROL TRANSMITTER (Single Power) | ● | ● | ● ▲ ■ | ● ▲ ■ | ● ▲ | ● ▲ |
| CONTROL TRANSMITTER (Multi-Power) | | ● | ● | ● | ● ▲ | ● ▲ |
| TORQUE RECEIVER (Standard) | | ● | ● ▲ | ▲ | ▲ | |
| TORQUE RECEIVER (Hi-Power) | | | ● | ▲ | | |
| CONTROL TRANSFORMER (Medium-Z) | ● | ● | ● ▲ ■ | ● ▲ ■ | ● ▲ | |
| CONTROL TRANSFORMER (High-Z) | | ● | ● ▲ | ● | ● ▲ | |
| DIFFERENTIAL (Synchronous Application) | | | | ● | ● ▲ | |
| DIFFERENTIAL (Servo Application) | ● | ● | ● ▲ | ● | ● ▲ | ● |
| RESOLVER — Synchro (Transmitter) | | ● | ● ▲ | ● | ● ▲ | ● |
| RESOLVER — Synchro (Control Transformer) | | ● | ● ▲ | ● | ● ▲ | |
| RESOLVER — Computing (Omni-Application) | | | ● ▲ | ● | ● ▲ | |
| RESOLVER - Computing (High Frequency) | | | ● ▲ | ● | ● ▲ | |
| RESOLVER — Computing (High Accuracy ERROR 4' OR LESS) | | | ● | ● | ● | ● |
| RESOLVER-Computing (Avg Accuracy ERROR 10' OR BETTER) | ● | ● | ● ▲ | | ● ▲ | ● |
| RESOLVER — Compensating Windings | | | ● | | ● | |
| LINEAR SYNCHRO (± 60 ) Range | | | ● | | ● | |
| LINEAR SYNCHRO (± 30 ) Range | | | ● | | ● | |
| VARIABLE TRANSFORMER | | | ▲ | | ▲ | ● |

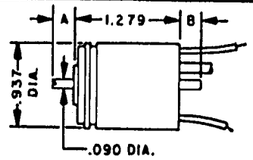
Eclipse-Pioneer also manufactures size 18, Corrosion resistant, two speed Transmitters and Control Transformers.



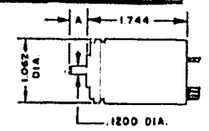

**Size 5**
For detailed electrical characteristics, consult individual specification sheets.



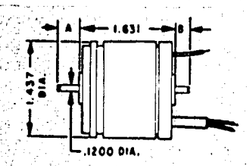

**Size 8**
Available in long housing length of 1.692" or short housing length of 1.241".
All are corrosion resistant.
Available with 0.090" or 0.120" dia shaft.



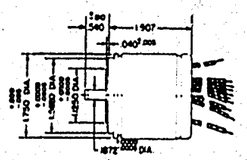

**Size 10**
Available with loose leads or terminal lugs.
For dimensions not shown, consult individual specification sheets.



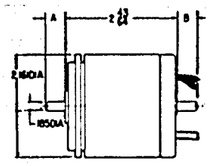

**Size 11**
Receiver not normally furnished in corrosion resistant construction.
For dimensions not shown, consult individual specification sheets.
Available with leads or terminal boards.




**Size 15**
Available with leads or terminal boards.
For dimensions not shown, consult individual specification sheets.




**Size 18**
For detailed electrical characteristics, consult individual specification sheets.



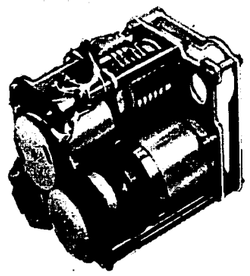

**Size 22**
Available with leads or terminal boards.
For dimensions not shown, consult individual specification sheets.

**ALL UNITS EXCEPT SIZE 5 ARE AVAILABLE WITH DOUBLE-ENDED SHAFTS.**

For details, circle #103 on Reader Service Card

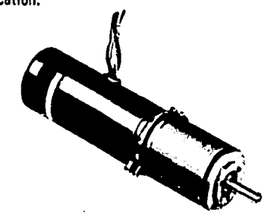
# COMPONENT PACKAGING

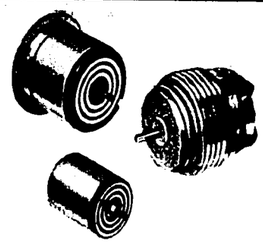
Whatever the component packaging requirements, Eclipse-Pioneer probably has the solution in its extensive line by adapting past and current production packages to meet specific systems requirements.
Should the problem be entirely new, Eclipse-Pioneer will design, develop, and produce a component or a complete system to solve the most intricate of problems.



**FOLLOW-UP MECHANISM WITH CAM COMPENSATOR,** basically designed for use in compass systems, has broad use in applications requiring a mechanical means of compensating or correcting the output data shaft in relation to either servo-loop errors, sensing errors, or known environmental factors. Adjustable from 0° to 9°, it eliminates adjustment of remotely placed or inaccessible units.

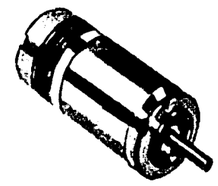
**GEARHEAD MOTORS,** comprised of a gearhead and a standard low inertia motor or motor damping tachometer combination, provide speed reduction and torque amplification with minimum space requirements and maximum flexibility. Quick connect and disconnect coupling features provide broad interchangeability of separately available gearheads and motors for desired combinations of reduction ratios, torques, and electrical characteristics. Gearheads are available in reduction ratios from approximately 5:1 to 80,000:1, in sizes 5, 8, 10, 11, and 15. Motors are described on the last page of this publication.





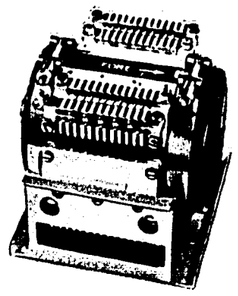
**EXTERNAL SLIP-RING AUTOSYN* SYNCHROS** permit rotation of the housing (stator) in addition to or instead of rotation of the shaft (rotor), to provide for the introduction of an additional variable into a system. The location and configuration of the slip rings depends upon the requirements of a particular application. Any of the Eclipse-Pioneer standard winding configurations and impedances can be provided in slip-ring configuration.
*Registered Trademark of Bendix Aviation Corporation

**RESOLVER CHAINS** developed by Eclipse-Pioneer utilize size 10 and smaller resolvers to solve coordinate transformation problems, with performance exceeding that of resolver chains utilizing size 23 resolvers and feedback buffer amplifiers. Eclipse-Pioneer's design philosophy is based on twenty years of resolver experience and upon the premise that all component parameters fluctuate with predictable variations in excitation, voltage, frequency, and ambient conditions, so that the resultant signal variations can be closely predicted through analysis.

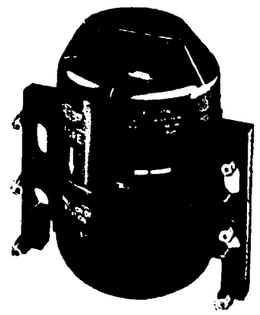


# PRECISION GYROS

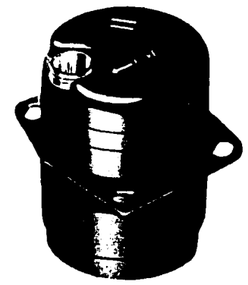
Still pacing the accelerating air age, and already launched into the widening space age, Eclipse-Pioneer produces a variety of gyros to meet all applications — basic vertical, rate, free, and directional — as reference components in complete navigation, radar, compass, automatic flight control, and guidance systems for aircraft and missiles.



**MINIATURE VERTICAL GYRO TRANSMITTER** is a two-degree-of-freedom gyro for accurate vertical reference in stabilization or control systems. It consists essentially of an electrically-driven, torque-erected, vertical-seeking gyro, with synchro-type pickoffs on the roll and pitch axes. — Electrolytic switch detectors — Hysteresis synchronous motor — Needs no erection amplifier — Hermetically sealed — Completely self-contained



**CAGEABLE ROLL FREE GYRO** is a two-degree-of-freedom gyro designed specifically for missile application. Its 350° F operating temperature permits location near the missile skin. — Solenoid-link, jam-proof caging mechanism — Caging at high roll rates — Operating temperature range from —55° F to +350° F



**DIRECTIONAL GYRO TRANSMITTER** is a miniature directional gyro that provides an output signal proportionate to the displacement of the outer gimbal with respect to the instrument case. — Roll brake prevents damage to gimbals during run-down — Clutching arrangement permits null reference heading without repositioning outer gimbal with respect to frame.

# RADAR ANTENNA DEVICES

Eclipse-Pioneer has integrated years of experience in servomechanisms and packaging techniques with specialized facilities to produce military and commercial radar antenna devices for a wide range of exacting requirements. The use of magnesium castings, an Eclipse-Pioneer exclusive, results in precise radar antenna devices, substantially lighter in weight, yet strong and durable to meet rugged environmental conditions. Eclipse-Pioneer will supply radar antenna devices to include only the mechanical drive, or to include the complete reflector assemblies and feed systems. These are manufactured in three general categories:
—Airborne weather and navigational radar, gyro-stabilized, and available with a variety of reflector sizes and scanning patterns for military and civilian aircraft.
—Ground or trailer types for mortar and aircraft tracking, missile ranging, and countermeasures.
—Specialized devices and pedestals for specific applications.

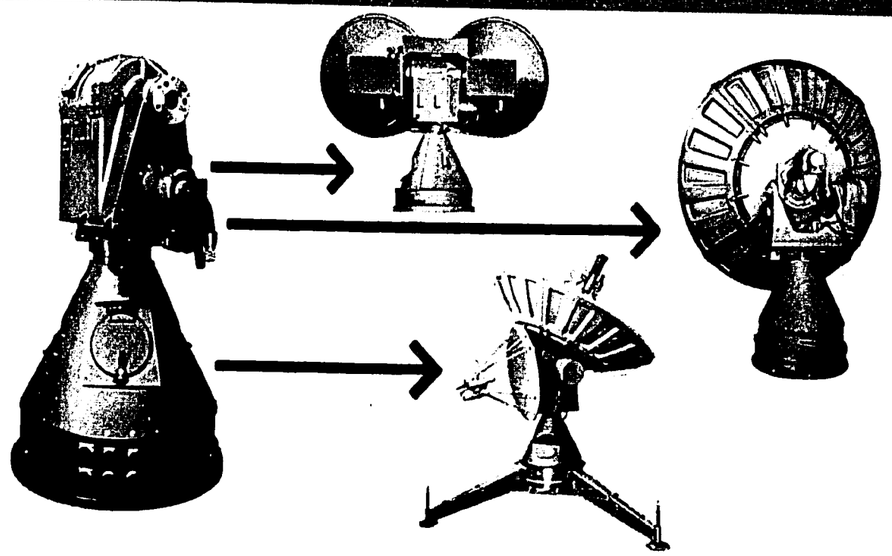


**AIRBORNE WEATHER RADAR ANTENNA** is gyro-controlled for line-of-sight stabilization of the roll and pitch axes. Pilot can switch from pencil-beam storm detection operation to a cosecant squared ground mapping pattern for navigation. Available for operation in both C and X bands.

For details, circle #104 on Reader Service Card

**GROUND ANTENNA PEDESTAL** is easily modified to a variety of radar antenna applications. Weighing only 700 pounds, it is readily transportable by air or land. With an accuracy better than 0.5 mils, it is already designed, tooled, and available for immediate needs. Basic pedestal design permits maximum flexibility in interchangeability of antenna configurations and mountings.

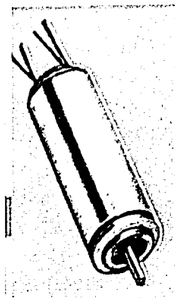
For details, circle #105 on Reader Service Card



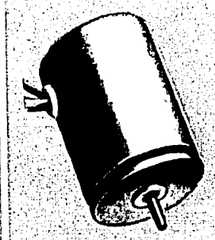
## MOTORS AND GENERATORS

The general characteristics that follow cover each category collectively. Full information about specific types within each category is available on individual specification sheets. Eclipse-Pioneer will modify or design components to customers requirements.

| | FRAME SIZE | | | | | | |
|---|---|---|---|---|---|---|---|
| | 5 | 8 | 10 | 11 | 15 | 20 | 28 |
| LOW INERTIA SERVO MOTORS | ● | ● | ● | ● | ● | ● | ● |
| STEPPER MOTORS | | ● | ● | ● | ● | | |
| SERVO AND STEPPER MOTOR COMBINATION | | ● | ● | ● | | | |
| MOTORS — CENTER-TAPPED AND SPLIT PHASE WINDINGS | ● | ● | ● | ● | ● | ● | ● |
| TACHOMETER GENERATORS — DAMPING | | ● | ● | | | | |
| MOTOR TACHOMETERS — TEMPERATURE COMPENSATED AND INTEGRATING | | ● | ● | ● | ● | ● | ◐ |
| TACHOMETER GEN. — TEMPERATURE COMPENSATED AND INTEGRATING | | | ● | ● | ● | ● | |
| MOTOR DAMPING TACHOMETER | | ● | ● | ● | | ● | ● |



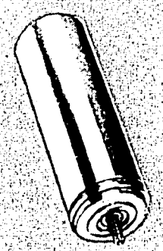
**LOW INERTIA SERVO MOTORS**
- Fixed Phase: 18 to 115 volts
- Control Phase: 18 to 230 volts
- Maximum Power Input: 3 to 70 watts
- No-load Speed: 3600 to 10,000 RPM
- Maximum Torque: 20 oz-in.
- All types are corrosion resistant
- Specific types are provided with drag cups, various types of shaft configuration, and extended ranges of temperature operation.



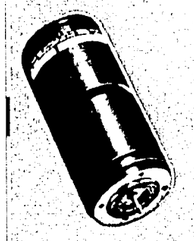
**TACHOMETER GENERATORS — DAMPING**
- Excitation: 18 to 115 volts
- Output per 1000 RPM: 0.34 to 0.55 volts
- Linearity: 0.5% to 4000 RPM
- Temperature Range: —55°C to +125°C



**STEPPER MOTORS**
- Operation Range: 10 to 50 volts
- Pulse Rates: up to 120 pulses per second
- Center-tapped control windings
- Specific types are reversible, permit half- or full-voltage operation, and provide various torque outputs.
- Permanent magnet pickups



**MOTOR TACHOMETERS — TEMPERATURE COMPENSATED AND INTEGRATING**
- Motor Rated Voltages (Phases 1 and 2): 26 to 115 volts
- Motor No-load Speed (Gen. Excited): 4000 to 9500
- Generator Excitation: 26 to 115 volts
- Generator Output per 1000 RPM: 0.3 to 3 volts
- Generator Input Power: 1.5 to 6.5 watts
- Frequency Range: 60 to 2000 cps
- All types are corrosion resistant
- Specific types are temperature compensated within ranges of —55°C to +125°C
- Specific types are provided with permanent magnet generator or pulse generator for speed measurement



**SERVO AND STEPPER MOTOR COMBINATION**
- Motor section is 115-volt unit with center-tapped control phase and a no-load speed of 4000 RPM.
- Step voltage of 26 volts advances stepper motor in increments of 45 degrees at maximum pulse rate of 30 pulses per second.
- Induction motor section slews to proper quadrant; stepper section provides for exact positioning of rotor.



**TACHOMETER GENERATORS — TEMPERATURE COMPENSATED AND INTEGRATING**
- Generator Excitation: 26 to 115 volts
- Generator Output per 1000 RPM: 0.3 to 3 volts
- Power Input: 1.5 to 6.5 watts
- Linearity: 0.1% to 3600 RPM
- Frequency Range: 60 to 2000 RPM
- Specific types operate in temperature ranges within —55°C to +125°C



**MOTORS — CENTER-TAPPED AND SPLIT-PHASE WINDINGS**
- Control Phase: 26 to 115 volts
- Fixed Phase: 26 to 115 volts
- No-load Speed: 6000 to 10,000 RPM



**MOTOR DAMPING TACHOMETERS**
- Fixed Phase: 18 to 115 volts
- Control Phase: 18 to 230 volts
- Maximum Power Input: 3 to 70 watts
- No-load Speed: 3700 to 20,000 RPM
- Generator Excitation: 18 to 115 volts
- Generator Output per 1000 RPM: 0.25 to 0.5 volts
- Maximum Torque: 20 oz-in.
- High temperature characteristics
- All types are corrosion resistant
- Specific types are provided with permanent magnet generator or pulse generator for speed measurement

ECLIPSE-PIONEER DIVISION • Bendix AVIATION CORPORATION • TETERBORO • NEW JERSEY

For details, circle #106 on Reader Service Card

POLARAD

# MICROWAVE · ELECTRONICS

## FOR MICROWAVE SIGNAL GENERATION
## 500 to 50,000 mc

500 to 21,000 mc. Polarad generators in this range feature • continuously variable attenuators calibrated directly in dbm • internal pulse, FM and square wave modulation, external pulse and multi-pulse modulation • Delayed and undelayed sync outputs • UNI-DIAL tuning • direct-reading frequency dials accurate to 1% • high stability non-contacting klystron cavity chokes for noiseless tuning and accurate calibration.

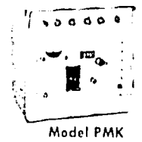
**UHF SIGNAL GENERATOR**



Model PMR

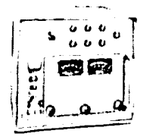
500 to 1,000 mc
Single unit covers entire frequency range.
Internal pulse and square wave modulation from 10-10,000 pps.
Internal FM with separate modulator.
Calibrated output 0 dbm .1 mw to —127 dbm.

**MICROWAVE SIGNAL GENERATOR**



Model PMK

10,000 to 21,000 mc
Two interchangeable generator units.
Internal pulse and square wave.
10-10,000 pps. Output to 10 mw. DIGITAL frequency indicator.



Model PMX

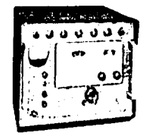
**MICROWAVE SIGNAL GENERATOR**
4,450 to 11,000 mc
Two interchangeable generator units.
Internal pulse and square wave.
10-10,000 pps. 0 to —127 dbm output.



Model MSG-34

**ULTRA-BROADBAND MICROWAVE SIGNAL GENERATOR**
4,000 to 11,000 mc in one instrument.
Internal pulse and square wave.
10-10,000 pps.
0 to —127 dbm.
DIGITAL frequency indicator.

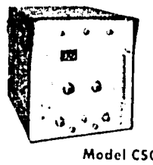
**MICROWAVE SIGNAL GENERATOR**



Models MSG-1, MSG-2A, MSG-2P

MSG-1 650-2,000 mc
MSG-2A 2,000-4,150 mc
1 mw min. power output
MSG-2P 2,150-4,000 mc
10 mw min. power output
MSG-1 & MSG-2A with 40-4,000 pps internal pulse and square wave modulation.
MSG-2P with 10-10,000 pps range.

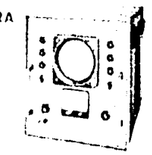
**FOR INSTANTANEOUS MICROWAVE ANALYSIS** At single frequency or over a wide range



Model CSG

Model CSG Electronic Sweep Generator. 1,000 to 10,000 mc in 5 tuning units. Provides high power microwave signal adjustable from single frequency to 2:1 frequency range. 100 to 1,000 cps sweep rate. Int. AM 1,000 cps & 45% square wave.

Model VS-2A



Model VS-2A Rapid Scan Ratio Scope. Displays ratio of two input signals as a function of frequency, or as a function of time at a single frequency, or over an entire sweep range. Calibrated 7" CRT. For use with Model CSG Sweeper.

12,400 to 50,000 mc. Units in this range can be cascaded. 1,000 cps internal square wave, external modulation, and [illegible]

EHF SIGNAL GENERATOR [illegible] to 50,000 mc. [illegible] High power output.

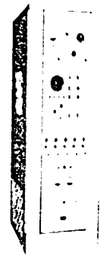
| EHF Signal Generators Basic Unit Model HU-2A Tuning Unit Model No. | Frequency Range | EHF SIGNAL SOURCES Basic Unit Model HU-1 Tuning Unit Model No. |
|---|---|---|
| G1822 | [illegible] | S1822 |
| G2225 | [illegible] | S2225 |
| G2427 | [illegible] | S2427 |
| G2730 | [illegible] | S2730 |
| G3033 | [illegible] | S3333 |
| G3336 | [illegible] | S3336 |
| G3540 | 35.0-50.0 kmc | S3540 |
| | [illegible] | S3946 |
| | [illegible] | S4650 |

MODELS SG-1218 GENERATOR and SS-1218 SOURCE
12,400 to 17,500 mc

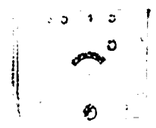


EHF Signal Generator

**MICROWAVE SIGNAL SOURCE**



Model B



Model KSS

**CODE MODULATED MULTI PULSE MICROWAVE SIGNAL GENERATOR**
950 to 10,750 mc in 4 interchangeable tuning units. [illegible]
Pulse code modulator section, Model MP-1A, is available separately. [illegible]

## FOR MICROWAVE RECEPTION

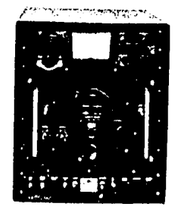


Model R

**EXTENDED RANGE MICROWAVE RECEIVER**
400 to 46,700 mc in 8 tuning units

Four instruments in one:
- AM-FM receiver
- Field intensity receiver
- Pulse, pulse-time or pulse-position demodulator
- Sensitive power meter

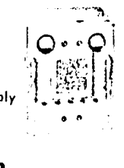
Receives AM, FM, cw, mcw and pulse signals. Direct-reading frequency dial accurate to 1%. AFC and AGC. Audio, video, recorder and trigger outputs. Sensitivity —90 to —55 dbm depending on frequency.
For all monitoring and quantitative analysis of microwave signals.



Model RW-T

**MICROWAVE ANTENNA PATTERN RECEIVER** 2,000 to 75,000 mc in a single unit

AM, FM, cw and pulse reception. External mixer may be located up to 75 feet from receiver unit; eliminates need for cumbersome rigid waveguide. Operates into any standard antenna pattern recorder. Linear response over 40 db dynamic range. Sensitivity —85 to —70 dbm, depending on frequency.



Power Supply



Monitor and Tuning Unit



Calibrated Antenna (Supplied with Model FIM)

**CALIBRATED MICROWAVE FIELD INTENSITY RECEIVER SYSTEM**

1,000 to 10,000 mc in 4 tuning units — Model FIM

For accurate measurements of frequency and absolute power level of conducted or radiated microwave energy. Combines calibrated receiver, internal calibrated signal generator and calibrated antenna system. First single test system to measure both r-f interference and susceptibility to interference. Approved Class A MIL SPEC under MIL-I-26600 and Ramo-Wooldridge Weapons System Specification WDD-M-PRO-2.

Features UNI-DIAL control: single knob tunes both receiver and internal signal generator. Direct-reading frequency dial. Calibrated meter indicates average, peak or quasi-peak value of r-f signals. Signal generator (1 mw calibrated power output) can be externally modulated. Audio, video, recorder outputs. Sensitive and extremely rugged. Supplied with 5 calibrated antennas.

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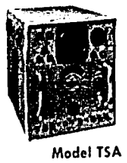
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## FOR MICROWAVE SPECTRUM ANALYSIS
## 10 to 44,000 mc

### DIRECT READING SPECTRUM ANALYZER

**10 to 44,000 mc in 5 tuning units**



Model TSA

To test missiles, radar, microwave components, telemetering and multi-pulse transmission. Features:

- Dispersion, 400 kc to 25 mc
- Resolution, 25 kc
- R-F and I-F attenuation
- Sensitivity —95 to —50 dbm depending on frequency

**ALL POLARAD ANALYZERS FEATURE:**

1 to 30 cps sweep rate
Direct reading UNI-DIAL tuning
Frequency accuracy ±1%
Stable accurate internal frequency marker
High accuracy and sensitivity
Flat-face 5" CRT

### COMBINATION SYNCHROSCOPE-SPECTRUM ANALYZER

**10 to 44,000 mc in 5 tuning units**

**PROVIDES TIME AND FREQUENCY DISPLAY**



**Time display:** Shows signal wavetorm



**Frequency display:** Shows power-frequency spectrum



Model TSA-S

Bandwidth 5 kc, 50 kc, 500 kc, 5 mc. Synchroscope sweep rate: 2, 10, 100, 1,000, 10,000 and 100,000 μsec per screen diameter.

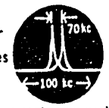
### WIDE DISPERSION SPECTRUM ANALYZER

**10 to 44,000 mc in 5 tuning units**

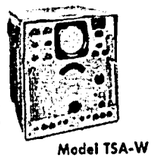
**FOR NARROW AND WIDE PULSE ANALYSIS**




**Wide Dispersion Band:** 70 mc dispersion, 50 kc resolution, displays pulses as narrow as 0.1 μsec.




**High Resolution Band:** 100 kc dispersion, 7 kc resolution, ideal for wide pulse analysis and signal discrimination.



Model TSA-W

Linear or log screen display for measurements over a wide dynamic range.

### UNIVERSAL SPECTRUM ANALYZERS

**10 to 40,880 mc in single self-contained units. No additional tuning units needed.**

Features a choice of wide or narrow dispersion, and linear or log screen display. Dispersion: **wide band,** 1 mc to over 80 mc, fully adjustable, for narrow pulse analysis; **narrow band,** 100 kc to 7 mc, adjustable, for wide pulse analysis. **Resolution:** 7 kc to 50 kc automatically set by dispersion control. Crystal controlled markers throughout range. Accurate I-F attenuator.



Model SA-84W

also MODEL SA-84

**Adjustable dispersion:**
in 10 to 55 mc range: 500 kc to 5 mc,
in 55 to 40,880 mc range: 500 kc to 25 mc.

Resolution: 20 kc. Expanded, direct reading slide rule dial showing only the frequency band in use.

### MULTI-PULSE SPECTRUM SELECTOR

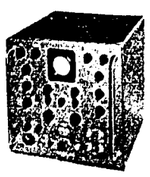


Model SD-1

For use with any Polarad spectrum analyzer. Permits spectrum analysis of individual microwave pulses in a pulse group. Any pulse in a complex coded signal may be isolated and intensified for examination.

## FOR GENERAL LABORATORY USE

### PULSE JITTER TESTER



Model PJ-1

Measures:
**Relative jitter and pulse width jitter:** 5, 10 and 100 millimicroseconds full scale.
**Repetition rate jitter:** 5, 10 and 100 millimicroseconds, and 1, 10 and 100 microseconds full scale. Displays jitter magnitude and waveform.

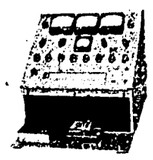
### SERVO ANALYZER



Model SV-1

Tests amplitude, phase and transient response in magnetic and servo amplifiers and all AC and DC servo systems. Feeds test signal through servo or computer circuit, compares response on calibrated CRT. Wide variety of output test signals.

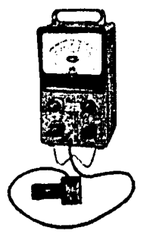
### KLYSTRON TUBE TESTER



Model K-200

Tests all microwave tubes as easily as ordinary vacuum tubes.

### TRANSISTORIZED MICROWAVE POWER METER



Model P-3

**10 to 40,000 mc in 5 thermistor mounts**

Measures absolute r-f power instantly without tuning. Line or internal battery operated. Rugged, only 6 pounds. Meter ranges: 0.1 mw to 10 mw full scale.

### PRECISION NOISE GENERATOR



Model N-1

Provides a stable, accurate noise output simultaneously over a 1,000 cps to 500 mc frequency range. Output level adjustable 1 to 20 db, accurate to ± 0.25 db. For direct noise figure measurements in vacuum-tube and transistor amplifiers and receivers.

### ALL-CERAMIC KLYSTRON TUBES



Maximum shock, vibration and heat resistance. Guaranteed operation up to 250°C with no cooling required. Low noise figure. High frequency accuracy, stability and freedom from microphonics.

| Tube Number | Frequency Range |
|---|---|
| ZV 1012 | 500 to 3,000 mc |
| ZV 1010 | 700 to 3,000 mc |
| ZV 1009 | 1,500 to 6,000 mc |

**POLARAD ELECTRONICS CORPORATION**

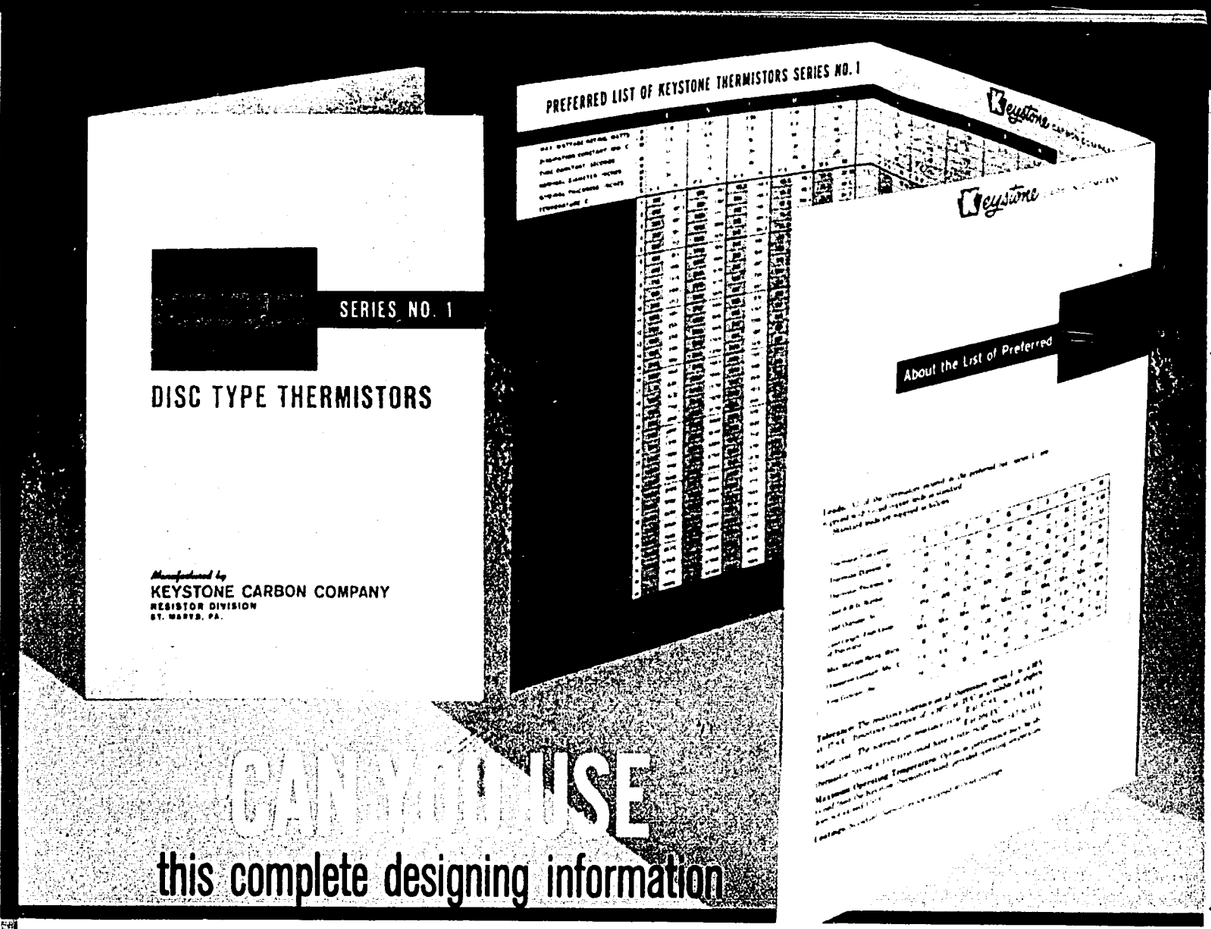
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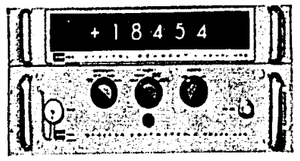
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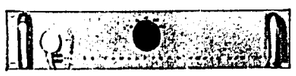
## DIGITAL VOLTMETERS




Model 501 4-Digit, Over-ranging DC Digital Voltmeter

**MEASURE DC WITH 0.01% ACCURACY**

The 501 measures DC from ±0.0001 to ±1000.0 volts with 0.01% ± 1 digit (of reading) accuracy. Ranging and polarity indication are automatic. An extra fifth digit in the left decade indicates "0" or "1" to provide 100% over-ranging and ten times greater resolution at decade (1, 10, 100, 1000) voltage points than standard 4-digit voltmeters. The measured voltage is displayed in direct numerical form on an in-line, single-plane readout – no superimposed outlines of "off" digits. Input impedance is 10 megohms on all ranges at null. Printer drive for ten-line, parallel entry printers is built in. A control permits decreasing sensitivity to allow reading noisy or unstable inputs. Stepping switch drive coils are energized with DC as in telephone-type service to provide long, trouble-free operation. The reference voltage is supplied by a chopper-stabilized supply which is continuously and automatically referenced to an internal standard cell. Price $2995.



Model 452 AC Converter

Added to the basic 501 DC digital voltmeter, the 452 permits 4-digit measurement of 0.001 to 999.9 RMS volts AC from 30 to 10,000 cps. Accuracy is 0.2% of full scale. Ranging is manual (autoranging models available). Price $850.



Model 459 Differential DC Preamplifier

Fixed gain of −100 extends digital voltmeter sensitivity to 1 microvolt DC, provides 0.15% ±5 digits overall system accuracy. Maximum output is 10 volts. Input resistance is 5 megohms. Input may be floated up to ±250 volts. Common-mode rejection is 130 db for 60 cps. Price $1475.



Model 458A AC-DC Preamplifier

Fixed gain of −100 extends voltmeter sensitivity to 1 microvolt DC, 10 microvolts AC (30 to 2000 cps); provides overall system accuracy of 0.1% ±2 microvolts DC, and 0.25% of full scale AC. Additional +1 gain provides >10,000 megohms input impedance with 0.001% gain accuracy. Maximum output ±40 volts DC, 35 volts AC. Price $1225.

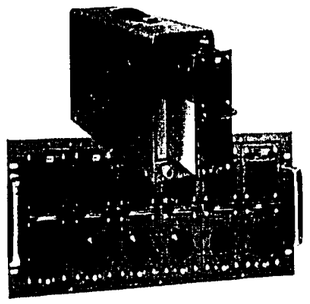



Model 453M Multi-channel Input Scanner/Programmer

Automatically or manually scans up to 400 one-wire, 200 two-wire, 100 four-wire inputs. Slave scanners permit scanning additional inputs. Price $2500.

*Other Digital Instruments include* rugged, militarized AC/DC voltmeters; ratiometers; all-electronic tracking-logic voltmeters; and accessories for driving card punches and other output equipment.

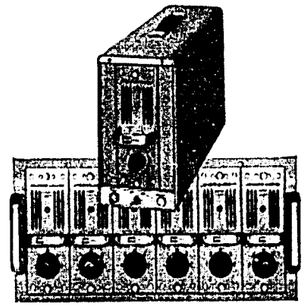
## DC AMPLIFIERS



Model 112A Wideband DC Amplifiers

**AMPLIFY DC TO 40 KC WITH 2 MICROVOLT STABILITY**

Wideband, single-ended DC amplifier permits extremely accurate measurement of strain temperature and other phenomena. Accepts plug-ins to permit use as standard adjustable gain amplifier (unit described), +1 amplifier, filter, etc. Equivalent input drift is less than 2 microvolts for 400 hours. Noise is less than 5 microvolts P-P from 0 to 3 cps, less than 5 microvolts RMS from 0 to 750 cps, less than 12 microvolts RMS 0 to 50 kc. Input impedance is 100,000 ohms, output impedance less than 1 ohm. Gain is in ten steps from 20 to 1000 with continuous 1 to 2 times vernier adjustment of each setting. Gain accuracy is 0.5%. Micro-Gain control permits adjusting individual gain settings to 0.01% gain accuracy. Gain stability and linearity are 0.1%. Frequency response is ±0.1% to 2 kc, ±0.3 db to 10 kc, less than 3 db down at 40 kc. Output capability is 40 ma into 10 to 400 ohms, ±35 volts into 1000 ohms, ±45 volts into 10,000 ohms. Each amplifier contains integral power supply. Six amplifiers mount in 190 rack module, single amplifier mounts in 191A rack module or 195 cabinet. Prices: 112A amplifier with 112A-A adjustable gain plug-in $625; 190 module $295; 191A module $150; 195 cabinet $125.



Model 114A Differential DC Amplifiers

**RESCUE MICROVOLT SIGNALS FROM VOLTS OF NOISE**

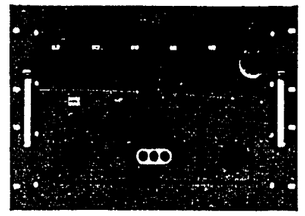
A true differential DC amplifier with input isolated from output and both input and output completely floating and isolated from chassis ground. Ideal for thermocouple systems, virtually eliminates ground loop problems and allows amplification of microvolt level signals in the presence of volts of common-mode noise. Common-mode rejection is 180 db for DC, 130 db for 60 cps with up to 1000 ohms input unbalance. Equivalent input drift is less than 3 microvolts for 40 hours on 300 gain or above, 5 microvolts on gain of 100, 10 microvolts on gain of 30, and 30 microvolts on gain of 10. Gain is 10 to 1000 in five steps. Bandwidth is 100 cps. Input resistance is greater than 5 megohms. Output impedance is less than 2 ohms. Output capability is 10 volts at 10 ma. Gain accuracy is 1.0%. Gain stability is 0.1%, and linearity is 0.1% of full scale 10-volt output into 1000-ohm or greater load. Each amplifier contains an integral power supply. Six amplifiers mount in 190 rack module, single amplifier mounts in 191A rack module or 195 cabinet. Prices: 114A amplifier $775; 190 module $295; 191A module $150; 195 cabinet $125.

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## AC STANDARD

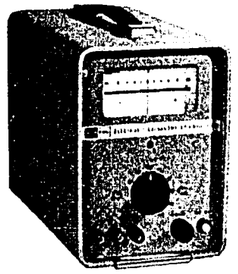


Model 601A AC Voltage Standard

**0.1% ACCURACY AC VOLTAGE SOURCE**

Exceptionally stable and accurate AC calibration source. Output is 1 to 501 volts RMS AC, adjustable in 0.1 volt steps and between steps with a potentiometer. Output frequencies are 60, 400, and 1000 cps. Power output is 5 amps up to 5 volts, 25 watts above 5 volts. Voltage accuracy is 0.1% or 5 millivolts, with 0.01% short-term stability. Frequency accuracy is 1.0%, harmonic distortion less than 0.3%. The output is floating, guarded, and exceptionally well isolated from chassis ground and AC line. Output impedance with a constant resistive load is approximately 0.01 ohm. (Output impedance for a varying load is a function of the frequency of load variation, and the 601A voltage and frequency settings.) Price $1500.

## ELECTRONIC GALVO

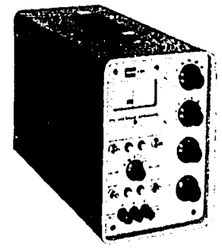


Model 204A Electronic Galvanometer

**RUGGED DC NULL DETECTOR, MICROVOLTMETER, AMPLIFIER**

The 204A is functionally equivalent to the most sensitive suspension galvanometers, but is insensitive to shock, vibration, microphonics, earth's magnetic field and stray pickup. It is all transistorized, does not require leveling, can withstand severe overload with no offset on return to zero, and has rapid response. A built-in Ayrton shunt provides seven decaded ranges which cover from ±10 microvolts to ±10 volts full scale, and from 0.001 microampere to 1 milliampere full scale. Input resistance is 10,000 ohms on all ranges. Power sensitivity is $10^{-14}$ watts. The input is floating. Drift is less than 2 microvolts. Output as an amplifier is ±1 volt at 1 ma for full scale on any range. Price $425.

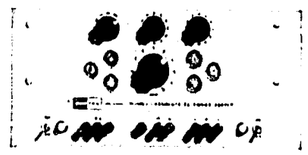
## DC STANDARDS



Model 301 DC Voltage Standard and Null Voltmeter

**MEASURE AND SUPPLY DC VOLTAGE TO 0.02%**

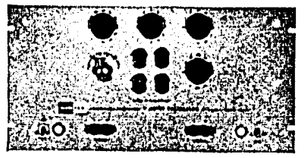
Measures 1 to 501 volts, supplies 1 to 501 volts at up to 20 ma. Output is floating. Output voltage calibration is 0.02% or 2 mv. Long-term stability is 0.01%. Load regulation is 0.002% no load to full load. Line regulation is 0.002% for 10% line voltage change. Output hum and noise are less than 100 microvolts. Less than 0.01 ohm DC output impedance, and 0.2 millisecond response time. Available as rack or cabinet model. Price $795.



Model 50B-25 DC Power Supply

**HIGH-POWERED "STANDARD CELL"**

Above unit supplies 1.02 to 502 volts at up to 250 ma. Others available with same basic performance specifications. Stability 100 ppm long term, 50 ppm short term. Accuracy 0.02% or 5 millivolts. Less than 0.5 mv hum and noise; 0.01% load and 0.002% line regulation. Less than 0.01 ohm DC and 0.5 ohm AC (to 200 kc) output impedance. Response time 0.2 millisecond. Either positive or negative output. Price $895.



Model M10A-10 DC Meter Calibrator

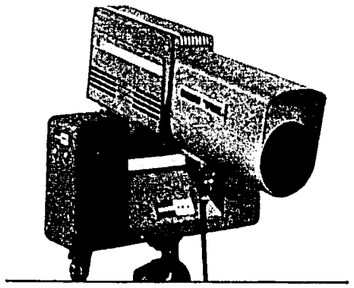
**0.01% STABILITY CURRENT OR VOLTAGE SOURCE**

Above unit supplies 0-100 volts, 0-100 ma as voltage or current source. Model M100A-20 supplies 0-1000 volts, 0-200 ma. Accuracy is 0.05%, line regulation 0.01%, hum and noise less than 2 mv. Other specifications same as power supplies. Price of M10A-10 (control unit illustrated) $1495.

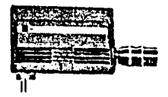
## INDUSTRIAL TV

**VERSATILE, AUTOMATIC, CLOSED-CIRCUIT TV**

Used by hundreds of leading firms for safe observation of missile tests, nuclear reactors, environmental tests...for surveillance of freeways, tunnels, runways, security areas...for transmission of printed data, meter indications, signatures. Operation is fully automatic. The only control the operator has to touch is the on-off switch. Monitor pictures are photo sharp – twice the resolution of the best home TV. Equipment is

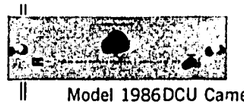


rugged, designed for continuous duty operation in severe environments. Sharp, clear pictures are provided in extremely low-light levels. Installation is simple. The basic system shown below can be easily expanded with additional cameras, monitors, and accessories without obsoleting present equipment.



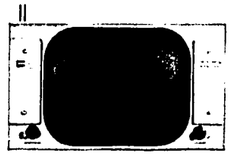
Model 1986C TV Camera

(up to 1500 feet of cable)



Model 1986DCU Camera Control

(up to 3000 feet of cable. More with amplifiers)

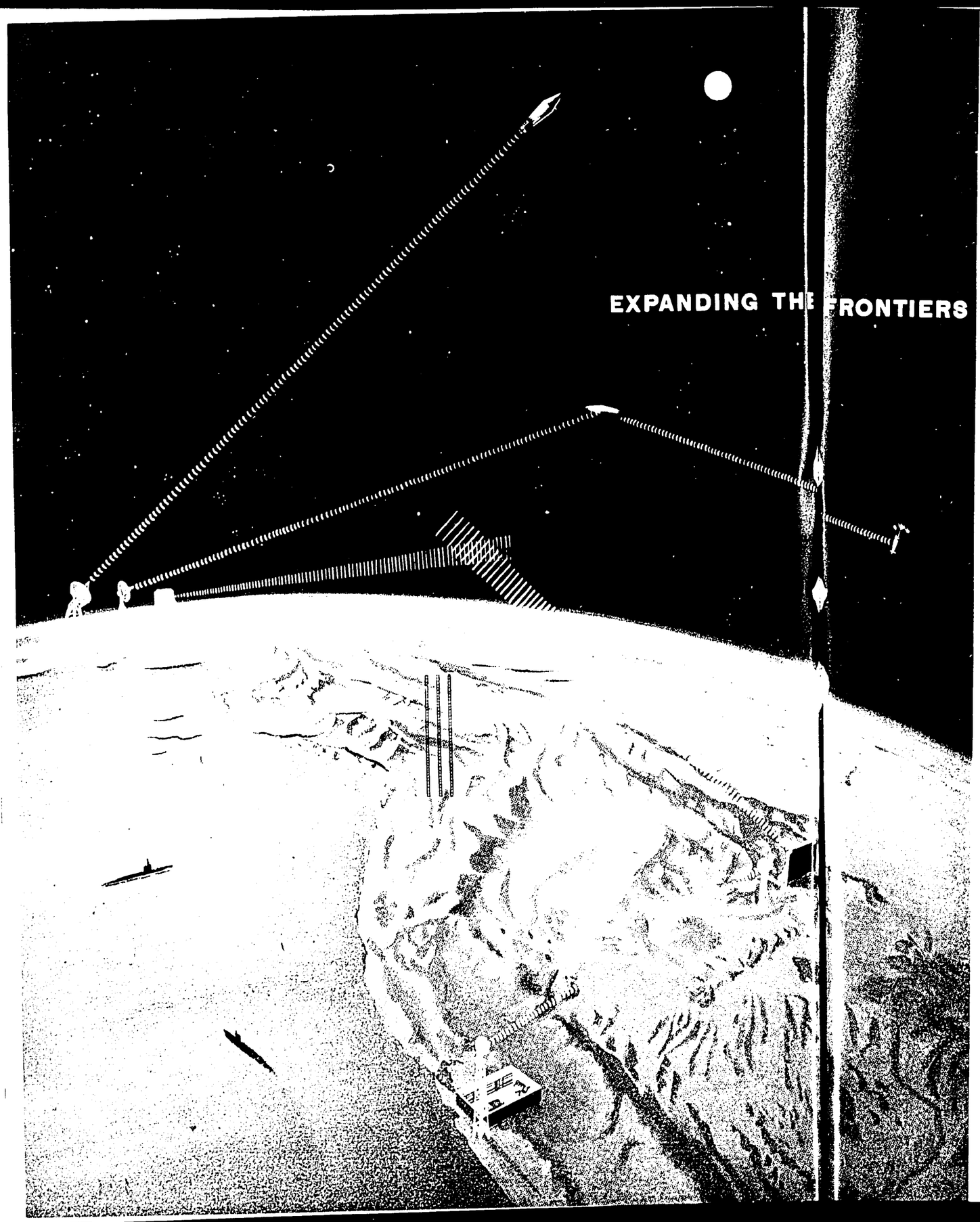


Model DRM-14R Monitor

*TV Accessories include* pan-tilt units, zoom lenses, special housings, many others. A variety of monitors, different cameras and more than a hundred other system components are available.

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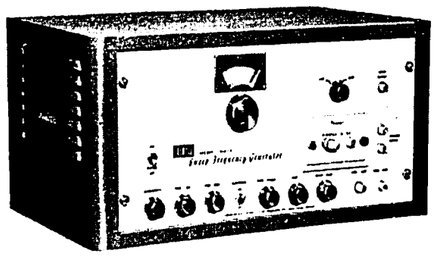
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*MIDAS and SAMOS Programs for the Air Force*

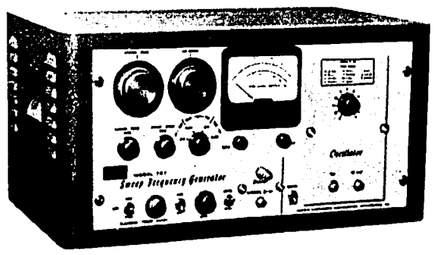
# JERROLD R F Test Equipment

## WIDE BAND SWEEP FREQUENCY GENERATORS



### THE MOST VERSATILE SWEEP GENERATOR MODEL 900-A

**SWEEP WIDTHS**—as wide as 400 mc... from 0.5 mc to 1200 mc. The Jerrold Model 900-A, Wide Band Sweep Frequency Generator is an instrument of unusual versatility. In two ranges—0.5 mc to 400 mc and 275 mc to 1200 mc—the instrument supplies sweep signal with center frequency from 500 kc to 1000 mc and with sweep widths as broad as 400 mc and as narrow as 100 kc. The rf output is flat within ±0.5 db at full sweep width up to 800 mcs and ±1.5 db from 800 mcs to 1200 mcs. The output voltage is 0.5 volts rms across a 50 ohm load at the upper range and 0.25 volts at the lower range. The instrument features provisions for external markers employing "birdie bypass" circuitry, and a plug-in rf detector that can be used in remote applications.....Price **$1260.00**



### THE ULTRA FLAT SWEEP GENERATOR MODEL 707-*

The model 707-* is a precision variable rate sweep generator with an extremely flat rf output (±5/100 db over highest single octave) for use in the laboratory or production test. It is particularly adaptable for use with an X-Y plotter. The 707-* features; plug-in oscillator heads covering the range from 2 to 265 mcs; high output power (+20 dbm below 150 mcs); variable sweep rate (60 per sec. to 1 per 2 min.); and harmonics down 40 db over highest single octave (down 30 db over the entire range).

*Order Model 707-1, 2, or 3 shipped respectively with oscillator heads H-71 (4-100 mcs), H-72 (12-220 mcs), H-73 (2-50 mcs) .....Price **$795.00** each

Model 707-4 shipped with H-74 (any single octave 2-265 mcs) special order.....Price **$845.00** each

*Additional oscillator heads for any model 707*
H-71, H-72 and H-73 .....Price **$250.00** each
H-74 special order.....Price **$275.00** each

### PORTABLE GENERAL PURPOSE SWEEP GENERATORS MODELS 601 and 602



Designed for the test and alignment of if and rf circuitry. The Generators feature an electronic, saturable reactor sweep circuit with a maximum sweep deviation of approximately 120% c.f. Fundamental frequency on all ranges.

**MODEL 601**—12 mc to 225 mc in eleven overlapping ranges. RF output of 1.0 volt rms. Output flat ±½ db over widest sweep width and as flat as 1/5 db at sweep widths of 40 mc or lower.

**MODEL 602**—4 mc to 112 mc in eleven overlapping ranges. RF output of 2.5 volts rms. Output flat within ±½ db. .....Price **$295.00**

Other Generators available on special order to cover any portion of the frequency range from 2 mcs to 265 mcs

## MARKER GENERATORS

### PORTABLE CRYSTAL MARKER GENERATOR

*(not illustrated)* **MODEL CM-6**

The CM-6 provides your choice of any six crystal-controlled marker signals between 2 and 100 mcs. In the higher frequencies, up to the 20th harmonic will be visible and up to the 10th harmonic will be visible in the lower frequencies. Proper choice and proper mixing will provide harmonic, sideband, or "birdie bypass" markers across a wide band width. This portable instrument features individual amplitude control, scope pre-amplifier, and provisions for the addition of external markers.....Price **$285.00**



**MODEL CM-10** is similar to CM-6 but is rack mounted and provides 10 crystal-controlled marker signals. Price **$425.00**

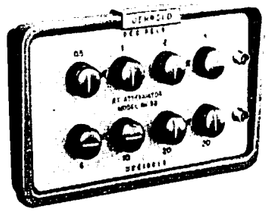


For details, circle #114 on Reader Service Card



# for QUANTITATIVE Measurements Using Sweep Frequency Techniques

## VARIABLE ATTENUATORS



### PRECISION ATTENUATORS—MODELS AV-50—AV-75

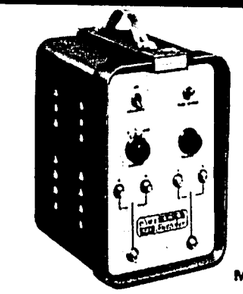
Featuring long life rotary switches with dual wiping silver contacts on "Kel-F" dielectric. Models AV-50 and AV-75 are precision laboratory attenuators covering the frequency range from dc to 500 mcs. Matched to 50 and 75 ohms respectively with VSWR less than 1.15 from dc to 250 mcs and of less than 1.4 at 500 mcs. Provides attenuation settings from 0 to 62.5 db in 0.5 db steps. Insertion loss is 0.25 db at 250 mcs and 0.5 db at 500 mcs.....Price **$150.00**



### STANDARD ATTENUATORS—MODELS A-52—A-72

These economy type units provide attenuation over a frequency range from dc to 250 mc. Matched to 50 and 75 ohms respectively with a VSWR of less than 1.2, each model contains 8 selector switches for attenuation settings from 0 to 82 db in 1 db steps. Insertion loss is 0.5 db.....Price **$55.00**

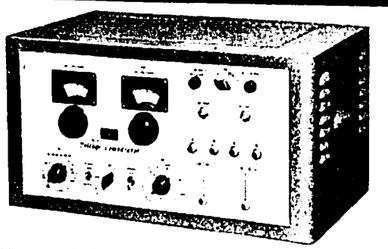
## MEASUREMENT COMPARATORS



**MODEL FD-30**

### HIGH-SPEED COAXIAL SWITCH

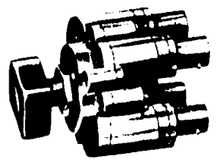
Displays two channels or voltages simultaneously on an oscilloscope. Frequency range of coaxial circuit is from dc to 250 mcs with a VSWR of less than 1.08 at 50 or 75 ohm impedance. Fully-shielded "Clare Mercury-Wetted" switch elements have a life expectancy of over one billion operations. Switch rate is adjustable to 10, 15, or 30 cps.....Price **$250.00**



### PRECISION VOLTAGE COMPARATOR — MODEL VC-12

A 3-section instrument providing simultaneous dc and rf voltage reference traces on a sweep frequency display. The switch section contains two SPDT coaxial mercury relays with a VSWR less than 1.08, dc to 250 mcs. The dc section's positive or negative output is variable from 1 mv to 12 v. The rf section features an accurately-calibrated 2 mc signal variable from 1 mv to 12 v. rms which, compared with the rf output of the device under test, provides a measurement free from errors due to detector square law characteristics, scope calibration or non-linearity.....Price **$375.00**

### RF COAXIAL TRANSFER SWITCHES



**MODEL CS-250** is a manually-operated, rotary, coaxial, rf-transfer switch for switching rf energy. The insertion loss is less than .1 db, the input and output VSWR is less than 1.15, and the isolation is 60 db at 100 mc. The range is from 0 to 1,000 mcs. Equipped with BNC connectors, the CS-250 is matched to 50 ohms.....Price **$19.60**

**MODEL CS-275** is similar to the CS-250 except that it has a range of from 0 to 500 mcs, is equipped with Jerrold F-series fittings, and is matched to 75 ohms.....Price **$18.50**

### DETECTORS

Voltage doubling, feed thru type. Equipped with terminating load. Excellent sensitivity for VSWR measurements as well as other applications.



| Model | Impedance | Range | Connectors | VSWR | Price |
|---|---|---|---|---|---|
| D-50 | 50 ohms | .5-1200 mcs | BNC | 1.1 | $45.00 |
| D-75 | 75 ohms | .5-1200 mcs | "N" | 1.1 | $55.00 |
| D-86 | 50/75 ohms | .5- 250 mcs | BNC/"F" | 1.1 | $30.00 |

All units available with 50 ohm impedance and BNC connectors or 75 ohm impedance and Jerrold "F" connectors. Price and data subject to change without notice. Write for technical data sheets and Newsletter series on measurements using sweep frequency techniques.

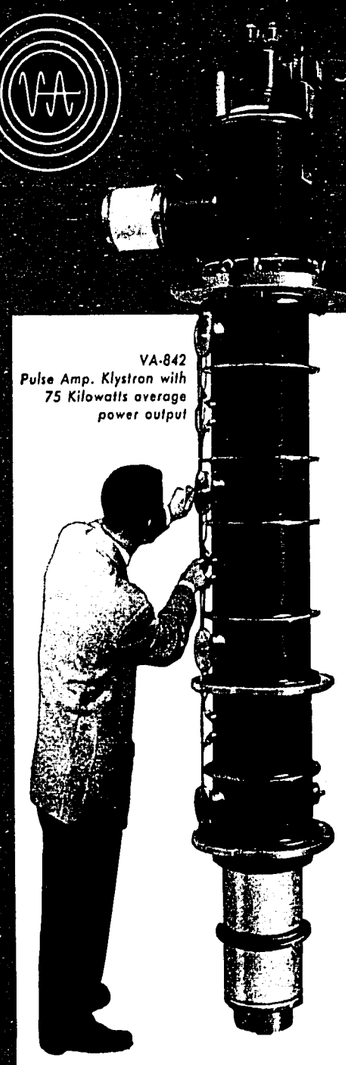
JERROLD **ELECTRONICS CORPORATION**

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VA-842
*Pulse Amp. Klystron with 75 Kilowatts average power output*



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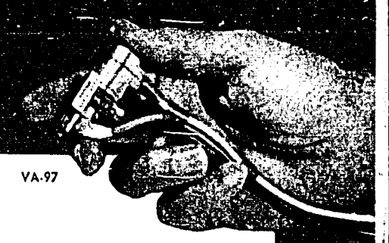
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VARIAN ASSOCIATES
PALO ALTO 2, CALIFORNIA, U.S.A.
• 611 Hansen Way, Phone: DAvenport 6-4000

| NUMBER | PRODUCT | BAND | *POWER OUTPUT |
|---|---|---|---|
| X-12 | Reflex Osc. Kly. | Ku | 100 mW |
| X-13 | Reflex Osc. Kly. | X | 200 mW |
| X-13B | Reflex Osc. Kly. | X | 200 mW |
| V-23 | Oscillator Kly. | X | 5 watts CW |
| V-24B Series | Pulse Amp. Kly. | X | 40 kW |
| X-26 Series | Reflex Osc. Kly. | C | 1 watt |
| V-27 | Amplifier Kly. | X | 6 watts CW |
| V-27B | Amplifier Kly. | X | 6 watts CW |
| VA-28 | Oscillator Kly. | Ku | 14 watts CW |
| V-39B | Reflex Osc. Kly. | Ku | 50 mW |
| V-40B | Reflex Osc. Kly. | Ku | 50 mW |
| V-45 | Multiplier Kly. | L/X | Up to 1 watt |
| V-53B | Reflex Osc. Kly. | X | 50 mW |
| V-54 | Reflex Osc. Kly. | X | 200 mW |
| V-55 | Reflex Osc. Kly. | X | 300 mW |
| V-55B | Reflex Osc. Kly. | X | 300 mW |
| V-58 | Reflex Osc. Kly. | X | 600 mW |
| V-58C | Reflex Osc. Kly. | X | 600 mW |
| V-63 | Oscillator Kly. | X | 5 watts CW |
| VA-64F | Oscillator Kly. | Ku | 15 W |
| VA-64G | Oscillator Kly. | Ku | 15 W |
| VA-67B | Oscillator Kly. | Ku | 1 watt CW |
| V-82 | Pulse Amp. Kly. | X | 5 kW |
| VA-87B, C | Pulse Amp. Kly. | S | 2 Mw |

| NUMBER | PRODUCT | BAND | *POWER OUTPUT |
|---|---|---|---|
| VA-92 | Reflex Osc. Kly. | Ku | 100 mW |
| VA-92B | Reflex Osc. Kly. | Ku | 200 mW |
| VA-92C | Reflex Osc. Kly. | Ku | 200 mW |
| VA-94 | Reflex Osc. Kly. | Ku | 30 mW |
| VA-94B | Reflex Osc. Kly. | Ku | 30 mW |
| VA-96 | Reflex Osc. Kly. | K | 30 mW |
| VA-96B | Reflex Osc. Kly. | K | 30 mW |
| VA-97 | Reflex Osc. Kly. | K | 15 mW |
| VA-97B | Reflex Osc. Kly. | K | 15 mW |
| VA-98 | Reflex Osc. Kly. | K | 50 mW |
| VA-113-14-15 | Reflex Osc. Kly. | C | 50 to 300 mW |
| VA-125A | Pulse Amp. TWT | S | 2 Mw |
| VA-125B | Pulse Amp. TWT | S | 2 Mw |
| VA-128 | Pulse Amp. TWT | S | 5 kW |
| VA-131 | Pulse Amp. TWT | L | 50 kW |
| VA-132 | CW Amp. TWT | UHF | 200 W |
| V-153/6315 | Reflex Osc. Kly. | X | 70 mW |
| V-154 | Reflex Osc. Kly. | X | 200 mW |
| V-157 | Reflex Osc. Kly. | X | 70 mW |
| VA-161 | BWO | X | 80 mW |
| VA-161B | BWO | X | 40 mW |
| VA-162 | BWO | Ku | 40 mW |
| VA-168 | BWO | X | 300 mW |
| VA-169 | BWO | X | 250 mW |

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ARVA, INC.
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VA-203B

VA-221H

VA-225.

| NUMBER | PRODUCT | BAND | *POWER OUTPUT |
|---|---|---|---|
| VA-179 | BWO | C | 50 mW |
| VA-201B | Reflex Osc. Kly. | X | 60 mW |
| VA-203B/6975 | Reflex Osc. Kly. | X | 30 mW |
| VA-210B | Reflex Osc. Kly. | X | 30 mW |
| VA-217C | Reflex Osc. Kly. | X | 25 mW |
| VA-218 | Reflex Osc. Kly. | X | 70 mW |
| VA-218B | Reflex Osc. Kly. | X | 70 mW |
| VA-220A-G | Reflex Osc. Kly. | C | 1 watt |
| VA-220J | Reflex Osc. Kly. | C | 1 watt |
| VA-220Z | Reflex Osc. Kly. | C | 1 watt |
| VA-221B-G | Reflex Osc. Kly. | C | 40 mW |
| VA-221H | Reflex Osc. Kly. | C | 40 mW |
| VA-221K | Reflex Osc. Kly. | C | 40 mW |
| VA-222A-G | Reflex Osc. Kly. | C | 1 watt |
| VA-222Z | Reflex Osc. Kly. | C | 1 watt |
| VA-225A, B | Reflex Osc. Kly. | H | 1 watt |
| VA-225C | Reflex Osc. Kly. | H | 1 watt |
| VA-232 | Reflex Osc. Kly. | X | 200 mW |
| V-260/6310 | Reflex Osc. Kly. | X | 50 mW |
| V-262 | Reflex Osc. Kly. | X | 50 mW |
| V-270/6312 | Reflex Osc. Kly. | X | 50 mW |
| V-290/6314 | Reflex Osc. Kly. | X | 120 mW |
| VA-503 | Oscillator Kly. | Ku | 1 W |
| VA-800 | CW Amp. Kly. | S | 10 kW |

| NUMBER | PRODUCT | BAND | *POWER OUTPUT |
|---|---|---|---|
| VA-800C | CW Amp. Kly. | S | 10 kW |
| VA-802B | CW Amp. Kly. | S | 1 kW |
| VA-804 Series | CW Amp. Kly. | C | 2 kW |
| VA-805 Series | CW Amp. Kly. | C | 2 kW |
| VA-806 Series | CW Amp. Kly. | X | 1 kW |
| VA-808 | Pulse Amp. Kly. | C | 20 kW |
| VA-816J | Pulse Amp. Kly. | S | 2.5 Mw |
| VA-820B | Pulse Amp. Kly. | S | 5 Mw |
| VA-820C | Pulse Amp. Kly. | S | 5 Mw |
| VA-822 Series | CW Amp. Kly. | X | 1 kW |
| VA-823 Series | CW Amp. Kly. | X | 5 kW |
| VA-824B | Amplifier Kly. | X | 2 W |
| VA-832 | Amplifier Kly. | X | 6 W |
| VA-833B | CW Amp. Kly. | UHF | 11.5 kW |
| VA-833C | CW Amp. Kly. | UHF | 11 kW |
| VA-834B | CW Amp. Kly. | C | 1 kW |
| VA-836 | CW Amp. Kly. | X | 1 kW |
| VA-839 | Pulse Amp. Kly. | S | 5 Mw |
| VA-842 | Pulse Amp. Kly. | UHF | 1.25 Mw |
| VA-845 Series | Pulse Amp. Kly. | X | 5 kW |
| VA-846 Series | CW Amp. Kly. | C | 5 kW |
| VA-848 Series | CW Amp. Kly. | X | 2 kW |
| VA-856 Series | CW Amp. Kly. | X | 2 kW |
| VA-6915 | Reflex Osc. Kly. | X | 50 mW |

# YOUR 1961 I.R.E. DIRECTORY TO SEMICONDUCTOR RECTIFIERS FOR ALL DC REQUIREMENTS...FROM MICROWATTS TO MEGAWATTS!

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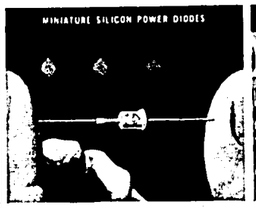
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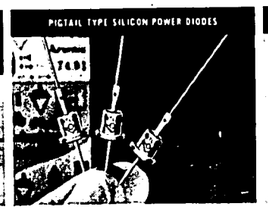
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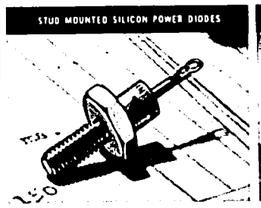
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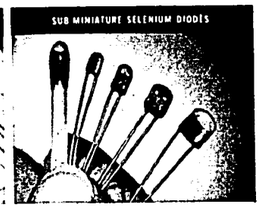

**Ratings: 100 to 600 PIV, Up to 500 ma.**
Specifically designed for missile and airborne equipment applications where miniaturization and reliability are prime factors. Hermetically sealed, all-welded, pigtail lead construction. Manufactured to meet the most rigid military requirements. Request **Bulletin SR-203**




**Ratings: 50 to 600 volts PIV • 250 to 750 ma.**
An extensive line of silicon power diodes for military and industrial applications featuring all-welded, hermetically sealed construction. All designed and manufactured to meet the most rigid military requirements. For complete technical data, write for **Bulletin SR-202.**



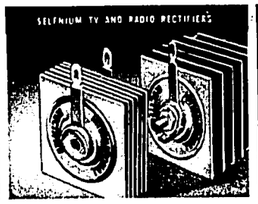

**Ratings: 50 to 600 volts PIV • 400 ma. to 1 amp.**
Industrial and military types including the 1N253, 1N254 and 1N255. Stud mounted, hermetically sealed, all-welded construction. Operating temperature range: –55°C to +150°C. Designed and manufactured to meet most rigid military specifications. **Bulletin SR-135C**



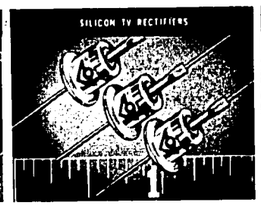

**Ratings: 20 to 160 volts • 100μa to 11 ma.**
Ideal components for bias supplies, sensitive relays, computers etc. High resistance, (10 megohms and higher at —10 volts). Excellent linear forward characteristics. Extremely small, low in cost. Encapsulated to resist adverse environmental extremes. **Bulletin SR-163.**



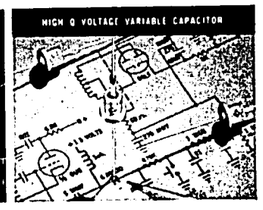

**Ratings: From 100 ma. to 50 Amps.**
Low forward voltage drop and low leakage characteristics make this series ideal for a wide variety of power applications. For details request **Bulletin C-349,** (26 volt cells); **Bulletin SR-160,** (45 to 52 volts per cell) and **Bulletin SR-152,** on high current density cells.




**Ratings: 25 to 156 volts AC, 50 to 1,200 ma. DC**
The widest range in the industry! Designed for Radio, Television, TV booster, UHF converter and experimental applications. Input ratings from 25 to 156 volts AC and up. DC output current 50 to 1,200 MA. Write for application information. **Bulletin ER-178-A**

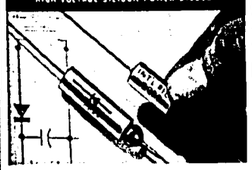



**Ratings: 400 PIV, up to 750 ma.**
SD-500. A hermetically sealed, all-welded silicon junction rectifier offering maximum reliability in the high temperatures encountered in TV applications. Pigtail leads eliminate the need for brackets, blocks, etc., simplify installation. For complete data: **Bulletin SR-201**

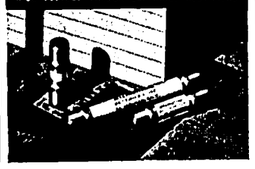



**Ratings: Q of 1000, 200 PIV DC**
*Semicon*'s small size, light weight, high reliability and low power requirements make it ideal for automatic frequency control, frequency modulation oscillators and filter networks. All-welded hermetically sealed, shock-proof housing. Request **Bulletin SR-205.**

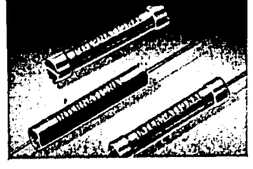
### SILICON AND SELENIUM HIGH VOLTAGE TYPES




**Rating: 600 to 2400 volts PIV • 100 to 125 ma.**
Three types available. Hermetically sealed, pigtail construction. Style J rated at 600 to 1000 volts PIV at 125 ma. **Bulletin SR-138B** Styles K and L with PIV ratings from 600 to 2400 volts at 100 ma. dc output current are described in technical detail—**Bulletin SR-137.**




**Ratings: 1000 to 20,000 volts PIV @ 45 to 440 ma.**
Especially suited for miniaturized military equipment where optimum reliability is a prime factor. Standard types for normal convection cooling and high current types for forced air or oil cooling. Hermetically sealed, metallized ceramic housing. Request **Bulletin SR-225.**



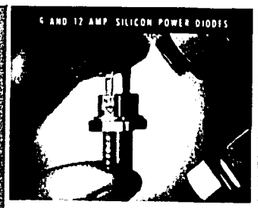

**Ratings: 20 to 20,000 volts • 0.2 to 195 ma.**
Designed for long life and reliability in half-wave, voltage doubler, bridge, center-tap circuits, and 3-phase circuit types. Phenolic cartridges and hermetically sealed types available. Operating temperature range: –65°C to +100°C. For details specify **Bulletin H-2.**



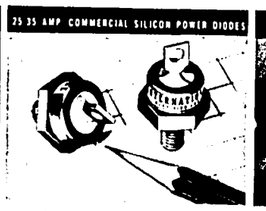

**Ratings: 65 to 600 ma • 1500 to 6000 PIV.**
Highly reliable series of tube replacement rectifiers rated from 1500 to 6400 PIV; 65 to 600 ma (including the ST-7 replacement for the M6 Tube) offer the superior characteristics of silicon on a wide range of high voltage applications.
For complete data: **Bulletin SR-209.**

## POWER TYPES FOR INDUSTRIAL AND MILITARY APPLICATIONS

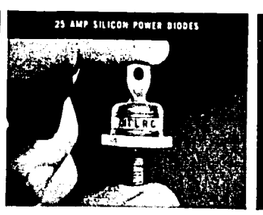
### SILICON AND SELENIUM MEDIUM CURRENT TYPES TO 150 AMPS.



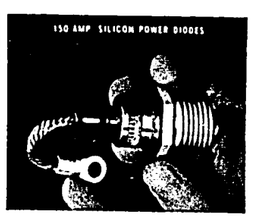

**Ratings: 6 and 12 Amps • 50 to 500 PIV.**
Precision controlled diffusion process insures optimum operation and high uniformity of characteristics over the entire operating temperature range. Full 6 or 12 ampere output current over a PIV range from 50 to 500 volts. Rugged, all-welded construction.
**Bulletin XSR-308.**




**Ratings: 25 to 35 Amps • 50 to 500 PIV.**
50 to 500 PIV Rated "Quad Sealed" power diodes are low in cost yet provide extremely stable operation on a wide range of commercial applications. 4 Layer "Quad-Seal" process assures high resistance to humidity, shock, vibration and temperature extremes.
**Bulletin SR-310.**




**Rating: 50 to 500 volts PIV • 25 to 45 Amps.**
Advanced ceramic techniques assuring excellent thermal characteristics and mechanical stability are used in the production of these highly reliable, hermetically sealed rectifiers for military or industrial applications. For complete technical data, request **Bulletin SR-304**

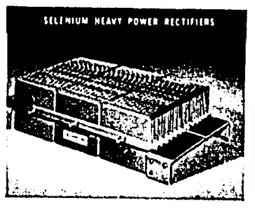



**Ratings: 50 to 800 volts PIV • 45 to 150 Amps.**
An extensive series of standard and reverse polarity types. Optional mounting bases including machine thread and pipe thread types. Machine thread base types: **Bulletin SR-300,** Pipe thread base types. **Bulletin SR-301,** Complete stack assemblies: **Bulletin SR-302**

### SILICON, SELENIUM AND GERMANIUM HIGH CURRENT TYPES TO 670 AMPS. PER JUNCTION



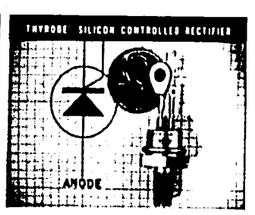

**Ratings: 50 to 500 volts PIV • 75 to 250 Amps.**
Standard and reverse polarity types offered in a series of machine thread and pipe thread mounting styles. Complete assemblies in all circuit configurations also available. Rugged construction and hermetic sealing assure long life and reliability. Ask for **Bulletin SR-305**




**Ratings: 6 to 30,000 volts • 50 to 2,300 Amps.**
Specifically designed for industrial DC power needs. Patented construction features assure long life. Descriptive bulletins available are: **Bulletin C-349,** (26 volt cells); **Bulletin SR-160,** (45 to 52 volts per cell) and **Bulletin SR-152,** on high current density cells.

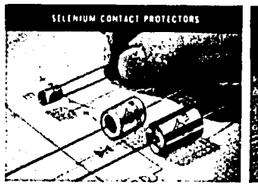



**Ratings: 500 amperes • 26 to 66 volts rms**
High capacity junctions especially designed for high-current, low-voltage electrochemical installations. Air cooled, these hermetically sealed junctions provide efficiency to 98.5%. Cast aluminum airfoil housing effects maximum heat transfer. Request **Bulletin GPR-25A.**

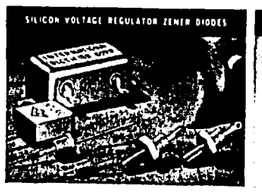



**Ratings. 10 Amps • 20 to 200 PIV.**
A completely new miniature control device capable of replacing the thyratron and similar units that proportionately control power to a load from an ac source. Units currently available with output currents up to 10 amps, PIV ratings from 20 to 200 volts.
**Bulletin SR-350.**

### SPECIAL SEMI-CONDUCTOR DEVICES



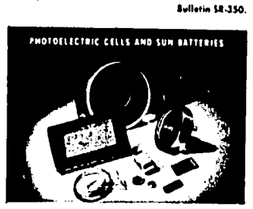

**Complete series of AC and DC types.**
Designed to eliminate arcing and erosion across the contacts of relays, switches, etc. A complete series in each of three basic types: diode type, cartridge type and hermetically sealed types for industrial application. For complete data: **Bulletin SR-150-A**




**Ratings: From 600 milliwatts to 10 watts**
A complete series in 6 types. Miniature single junction types, multiple junction types and double anode units. 750 milliwatt and 1 watt types: **Bulletin SR-251,** 3.5 and 10 watt types: **Bulletin SR-252,** Multiple junction 5 watt types: SR-253, Double anode types: SR-254




**Voltage Regulation: ±0.01%**
Built to withstand environmental extremes, and operable up to 125°C, these miniature, highly stable reference packs provide output voltages of either 8.4 or 16.8 volts dc—are available in 6 distinct types allowing operation from varied power sources.
Request **Bulletin SR-401.**




**(Wide range of silicon and selenium types.)**
Self-generating cells available in standard and custom sizes, mounted or unmounted. For details on wide selection of selenium types, request **Bulletin PC-649A.** Silicon solar cells with efficiencies as high as 10%. Designed to rugged military specifications. **Bulletin SR-275A.**

# International Rectifier Corp.

**EXECUTIVE OFFICES: EL SEGUNDO, CALIF.**

**OREGON 8-6281 • CABLE ADDRESS: RECTUSA**

**Branch Offices:** Fort Lee, New Jersey; Syracuse, New York; Chicago, Illinois; Cambridge, Massachusetts; Ardmore, Pennsylvania; Berkley, Michigan; Los Angeles, California. Representatives and Distributors throughout the world

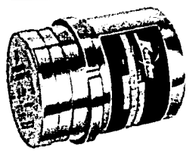
*The World's Largest Supplier of Industrial Metallic Rectifiers • Selenium • Germanium • Silicon*

A WORLD OF DIFFERENCE THROUGH RESEARCH

For details, circle #118 on Reader Service Card

For details, circle #119 on Reader Service Card

BASIC BUILDING BLOCKS FROM KEARFOTT



## FLOATED RATE INTEGRATING GYROS

Specifically designed for missile applications, these Kearfott miniature gyros operate efficiently at unlimited altitudes. Their outstanding accuracy and performance make them superior to any comparably-sized units on the market. Hermetically sealed within a thermal jacket, these gyros are ruggedly designed and completely adaptable to production methods. Performance characteristics that are even more precise can be provided within the same dimensions.

**TYPICAL CHARACTERISTICS**

Mass Unbalance:
- Along Input Axis: 1.0°/ hr maximum untrimmed

Standard Deviation (short term):
- Azimuth Position: 0.05°/hr
- Vertical Position: 0.03°/hr

Drift Rate Due to Anisoelasticity
- Steady Acceleration: .015°/hr./g² maximum

Vibratory Acceleration: .008°/hr./g² maximum

Damping:
- Ratio of input angle to output angle is 0.2

Characteristic Time: .0035 seconds or less

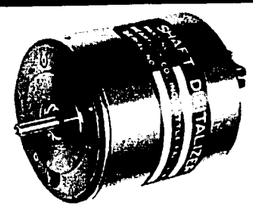
Weight: 0.7 lbs.

Warm-Up Time: 10 minutes from −60°F

Life: 1000 hours minimum

*Write for complete data.*

BASIC BUILDING BLOCKS FROM KEARFOTT



## ANALOG-TO-DIGITAL CONVERTERS

Kearfott's rugged shaft position-to-digital converters are resistant to high shock and vibration and high and low temperature environments. Ideally suited for missile applications, these converters are available for many uses, including latitude, longitude, azimuth or conventional angular shaft displacement conversion and decimal count conversion. Exclusive drum design provides large conversion capacity in smallest size. Combination counter converter assemblies for both visual and electrical readout also available.

**TYPICAL CHARACTERISTICS**

Kearfott Unit No. ..... P1241-11A
Code ..... Cyclic Binary
Range ..... 0-32,768 ($2^{15}$)
Bits per Revolution ..... 16
Revolutions for Total Range ..... 2,048
Volts D.C. ..... 10.5
Current (ma.) ..... 20
Inertia (gm. cm.²) ..... 20
Unit Diameter (in.) ..... 1 7/16
Unit Length (in.) ..... 3
Life 10⁸ Revolutions or $10^3$ hours
Static Torque (in.-oz.) .. 2 (break) 1 (running)
Weight (oz.) ..... 5
Maximum Speed (RPM) ..... 600

*Write for complete data.*

BASIC BUILDING BLOCKS FROM KEARFOTT



## 20 SECOND SYNCHRO

This synchro, just one of a broad line offered by Kearfott, provides the extreme accuracy required in today's data transmission systems. Kearfott synchro resolvers enable system designers to achieve unusual accuracy without the need for 2-speed servos and elaborate electronics. By proper impedance, matches up to 64 resolver control transformers can also operate from one resolver transmitter.

**TYPICAL CHARACTERISTICS — SIZE 25**

| | Transmitter | Control Transformer |
|---|---|---|
| Type Resolver | | |
| Part Number | Z5161-001 | Z5151-003 |
| Excit. Volts (Max.) | 115 | 90 |
| Frequency (cps) | 400 | 400 |
| Primary Imped. | 400/80° | 8500/80° |
| Secondary Imped. | 260/80° | 14000/80° |
| Transform. Ratio | .7826 | 1.278 |
| Max. Error fr. E.Z. | 20 seconds | 20 seconds |
| Primary | Rotor | Stator |

*Write for complete data.*

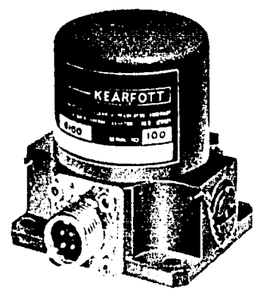
**Kearfott is your most dependable source for a complete line of servo and synchro components, gyros, analog and digital computers and their components, ground support equipment and guidance systems.**



For details, circle #120 on Reader Service Card



BASIC BUILDING BLOCKS FROM KEARFOTT




## ELECTROHYDRAULIC SERVO VALVE

Kearfott's unique approach to electrohydraulic feedback amplification design has resulted in a high-performance miniature servo valve with just two moving parts. Ideally suited to missile, aircraft and industrial applications, these anti-clogging, 2-stage, 4-way selector valves provide high frequency response and proved reliability even with highly contaminated fluids and under conditions of extreme temperature.

**TYPICAL CHARACTERISTICS**

Quiescent Flow ..... 0.15 gpm
Hysteresis .. 3% of rated current
Frequency Response 3 db @ 100 cps
Supply pressure....500 to 3000 psi
Temperature-Fluid & Ambient −65° F to +275° F
Flow Rate Range .... .3 to 10 gpm
Weight ..... 10.5 ounces

*Write for complete data.*

BASIC BUILDING BLOCKS FROM KEARFOTT



## PRECISE ANGLE INDICATOR

Consisting of an angle position indicator, motor and servo amplifier, this small, versatile, rack panel mounted unit provides angular position indications for laboratory, production and field use. Input signals proportional to unknown angular position of synchro device being measured are resolved as an error voltage, which is amplified and used to drive an internal servo loop to null. Counter mechanism then provides direct visual readout of angular position.

**TYPICAL CHARACTERISTICS**

Input Signal: $S_1$, $S_2$, and $S_3$ of external synchro transmitter.

Repeatability: Within 0.6 minute in either a clockwise or counterclockwise direction for any angular position.

Readability: 0.5 minute through full range from zero to 360° Rotation is continuous.

Accuracy: ± 6 minutes in the standard unit. Other accuracies available on request.

Sensitivity: 0.5 minutes maximum.

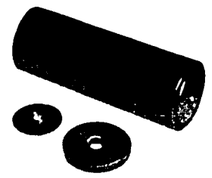
Slewing Speed: Phase sensitive, 180° in 7 seconds.

Input Voltages: 115 volts, single phase, 400 cycles, 23 VA max.

Size: Standard Rack Mounting— 1¾" x 9½" x 8½"

*Write for complete data.*

BASIC BUILDING BLOCKS FROM KEARFOTT



## FERRITES

Kearfott's Solid State Physics Laboratory formulates, fires and machines permanent magnet ferrite materials of various compositions. Typical high-efficiency array utilizes Kearfott PM-3 ferrite material with specially designed pole pieces to produce a design both smaller and lighter than other arrays of equivalent magnetic field strength. Because magnets may be custom engineered to specific requirements, user is not restricted to stock magnet types, thereby providing greater latitude in parameters for focusing arrays. Pole pieces may also be provided according to specification, with the added assurance that, because of special Kearfott design techniques, B axial magnetic fields approximately 10% higher than those generally obtained in standard types may be produced.

**TYPICAL CHARACTERISTICS**

| | |
|---|---|
| Peak Magnetic Field Strength | 1200 gauss |
| Period | 0.560 in. |
| Length | 5.64 in. |
| Inside Diameter of Pole Pieces | 0.400 in. |
| Outside Diameter | 2.0 in. |
| Weight | 3.2 pounds |

*Write for complete data.*

KEARFOTT DIVISION
*Little Falls, New Jersey*

GENERAL PRECISION, INC.
*Other Divisions: GPL, Librascope, Link*



For details, circle #121 on Reader Service Card

# FAIRCHILD DIFFUSED SILICON TRANSISTORS

**Providing an unmatched combination of speed, power and reliability in computer switching and in RF and video amplifiers and oscillators.** Today's widespread preference for diffused silicon transistors in high-performance, high-reliability applications has resulted from their unique combination of characteristics: very high gain-bandwidth product, large power dissipation, low saturation resistance, uniformity of parameters and outstanding reliability (300°C stabilization is standard Fairchild production practice). Their high performance applies over a very wide range of current, frequency and temperature, hence one Fairchild type can replace numerous earlier, more restricted types. Fairchild pioneered large-scale production of diffused silicon transistors and today offers the broadest line.

| Types | Description | JEDEC Outline | $f_T$ Typical | $P_C$ @ 25°C Case Temp. | $P_E$ @ 25°C Free Air Ambient | $h_{FE}$ Min. | $h_{FE}$ Max. | $h_{FE}$ Cond. $I_C$ | $h_{FE}$ Cond. $V_{CE}$ | $V_{CER}$ | $V_{CBO}$ | $V_{EBO}$ | $V_{BE}$SAT (Max.) | $V_{BE}$SAT Cond. ($I_C$) | $V_{BE}$SAT Cond. ($I_B$) | $V_{CE}$SAT (Max.) | $V_{CE}$SAT Cond. ($I_C$) | $V_{CE}$SAT Cond. ($I_B$) | $I_{CBO}$** (Maximum) @25°C | $I_{CBO}$** (Maximum) @150°C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2N696 & 2N697 | General purpose types for switching RF and DC applications over a wide current range | TO-5 | 90 mc<br>120 mc | 2 watts | 0.6 watt | 20<br>40 | 60<br>120 | 150mA<br>150mA | 10V<br>10V | 40V | 60V | 5V | 1.3V | 150mA | 15mA | 1.5V | 150mA | 15mA | 1.0μA | 100μA |
| 2N1420 | High gain general purpose types for switching RF and DC applications over a wide current range | TO-5 | 160 mc | 2 watts | 0.6 watt | 100 | 300 | 150mA | 10V | 30V | 60V | 5V | 1.3V | 150mA | 15mA | 1.5V | 150mA | 15mA | 1.0μA | 100μA |
| 2N698 & 2N699 | High voltage types particularly suited to video amplifiers and RF oscillators | TO-5 | 90 mc<br>120 mc | 2 watts | 0.6 watt | 20<br>40 | ..<br>120 | 150mA<br>150mA | 10V<br>10V | 80V | 120V | 5V | 1.3V | 150mA | 15mA | 5V | 150mA | 15mA | 2.0μA | 200μA |
| 2N706 | Logic transistor for very high speed switching in low current saturated circuits | TO-18 | 400 mc | 1 watt | 0.3 watt | 20 | .. | 10mA | 1.0V | 20V | 25V | 3V | 0.9V | 10mA | 1mA | 0.6V | 10mA | 1mA | 0.5μA | 30μA |
| 2N707 | VHF oscillator type | TO-18 | 45% @ 100 mc* | 1 watt | 0.3 watt | 9 | .. | 10mA | 15V | 28V | 56V | 4V | 0.9V | 10mA | 1mA | 0.6V | 10mA | 1mA | .5μA | |
| 2N1131 & 2N1132 | PNP complements to the 2N696 and 2N697 suitable for identical uses in opposite polarity | TO-5 | 50 mc<br>60 mc | 2 watts | 0.6 watt | 15<br>30 | 45<br>90 | 150mA<br>150mA | 10V<br>10V | −30V | −40V | −5V | −1.5V | 150mA | 15mA | −1.5V | 150mA | 15mA | 1.0μA | 100μA |
| 2N1252 & 2N1253 | Low storage types optimized for high current saturated switching circuitry | TO-5 | 80 mc<br>100 mc | 2 watts | 0.6 watt | 15<br>30 | 45<br>90 | 150mA<br>150mA | 10V<br>10V | 20V | 30V | 5V | 1.3V | 150mA | 15mA | 1.5V | 150mA | 15mA | 10μA | 600μA |
| 2N717 & 2N718 | General purpose types for switching, RF and DC applications over a wide current range. (Small package) | TO-18 | 90 mc<br>120 mc | 1.5 watts | 0.4 watt | 20<br>40 | ...<br>120 | 150mA<br>150mA | 10V<br>10V | 40V | 60V | 5V | 1.3V | 150mA | 15mA | 1.5V | 150mA | 15mA | 1.0μA | 100μA |
| 2N719 & 2N720 | High voltage types particularly suited to video amplifiers and RF oscillators. (Small package) | TO-18 | 90 mc<br>120 mc | 1.5 watts | 0.4 watt | 20<br>40 | ..<br>120 | 150mA<br>150mA | 10V<br>10V | 80V | 120V | 5V | 1.3V | 150mA | 15mA | 5V | 150mA | 15mA | 1.0μA | 200μA |
| 2N1613 | A UNIVERSAL TYPE:<br>Fast switching (logic and high current) Amplifiers (low level, low noise, wideband, VHF power). | TO-5 | 100 mc | .3 watts | 0.8 watt | 40<br>35<br>20<br>20<br>20 | ..<br>..<br>..<br>..<br>.. | 150mA<br>10mA<br>0.1mA<br>500mA<br>10mA<br>(−55°C) | 10V<br>10V<br>10V<br>10V<br>10V | 50V | 75V | 7V | 1.3V | 150mA | 15mA | 1.5V | 150mA | 15mA | 10mμA*** | 10μA |

*Oscillator Efficiency **$I_{CBO}$ measured at 80% of $V_{CBO}$ ***$I_{CBO}$ measured at 60V †For all types R ≦ 10Ω

A number of additional high performance types are scheduled for announcement in the near future.

ADDITIONAL DATA AVAILABLE ON INDIVIDUAL SPECIFICATION SHEETS


FAIRCHILD SEMICONDUCTOR CORPORATION

A wholly owned subsidiary of
Fairchild Camera and Instrument Corporation.

545 WHISMAN ROAD • MOUNTAIN VIEW, CALIF. • YORKSHIRE 8-8161 • TWX: MN VW CAL 853




# FAIRCHILD DIFFUSED SILICON PLANAR DIODES

You can now get volume delivery — in any quantity — on all types in the Fairchild diode catalog. Even the very highest performance types are now immediately available as a result of Fairchild's Planar Structure development and manufacturing breakthroughs. The combination of Fairchild's high-conductance Planar FD200 (100 mA at 1.0V; 50mμsec recovery) and Planar FD100 (2mμsec reverse recovery) will cover advanced switching applications at high and low current levels and speeds. New diffusion techniques developed by Fairchild successfully reconcile high conductance with fast switching, low capacitance and uniformity of parameters. Fairchild's Planar Structure with surface passivation assures you the ultimate in reliability in the entire Fairchild diode line.

## INDUSTRY'S NEWEST, MOST ADVANCED TYPES (FD100 & FD200) PLUS THIS BROAD RANGE OF ESTABLISHED 1N NUMBERS*

| Type | Description | Reverse Recovery Time (Max.) | Reverse Recovery Time (Cond.) | Maximum Power Dissipation | Capacitance at 0 Volts Bias (Max.) | Capacitance at 0 Volts Bias (Cond.) | Breakdown Voltage (Min.) | Breakdown Voltage (Cond.) | Reverse Current (Max.) | Reverse Current (Cond.) | Forward Voltage Drop (Max.) | Forward Voltage Drop (Cond.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FD100 | Ultra-fast computer diode | 2mμsec | @ $I_f = I_r = 10mA$, $V_R = -6V$ | 250 mw | 2.0μμf | @ $V_R = 0V$ | 75V | @ $I_R = 5\mu A$ | 0.1μA<br>100μA | @ $V_R = -50V$, 25°C<br>@ $V_R = -50V$, 150°C | 1.0V | @ $I_F = 10mA$ |
| FD200 | A UNIVERSAL TYPE<br>High conductance, ultra fast | 50mμsec | $I_f = I_r = 30mA$ | 250 mw | 5.0μμf | @ $V_R = 0V$ | 200V | @ $I_R = 100\mu A$ | 0.1μA<br>100μA | @ $V_R = -150V$, 25°C<br>@ $V_R = -150V$, 150°C | 1.0V | @ $I_F = 100mA$ |

### *ALL THESE SILICON PLANAR DIODES AVAILABLE FROM STOCK

**ULTRA-FAST SWITCHING PLANAR DIODES**

| | | | | |
|---|---|---|---|---|
| 1N903 | 1N906 | 1N914 | FD114 | |
| 1N903A | 1N906A | 1N914A | FD115 | Reverse recovery times from 2.0mμsec to 50mμsec |
| 1N904 | 1N907 | 1N916 | FD116 | Forward conductance to 100mA at 1.0V |
| 1N904A | 1N907A | 1N916A | FD117 | Capacitances 0.8μμf to 5.0μμf |
| 1N905 | 1N908 | FD100 | FD200 | Breakdown voltages up to 200V |
| 1N905A | 1N908A | FD101 | | |

**VERY-FAST SWITCHING PLANAR DIODES**

| | | | |
|---|---|---|---|
| 1N251 | 1N927 | | Reverse recovery times from 75mμsec to 150mμsec |
| 1N252 | 1N928 | | Forward conductance to 100mA at 1.0V |
| 1N925 | FD237 | | Breakdown voltages up to 120V |
| 1N926 | | | |

**FAST SWITCHING PLANAR DIODES**

| | | | | | |
|---|---|---|---|---|---|
| 1N643 | 1N792 | 1N808 | 1N843 | FD251 | |
| 1N643A | 1N793 | 1N809 | 1N844 | FD252 | |
| 1N658 | 1N794 | 1N811 | 1N845 | FD253 | |
| 1N659 | 1N795 | 1N812 | 1N891 | FD254 | |
| 1N660 | 1N796 | 1N813 | 1N892 | FD255 | |
| 1N661 | 1N797 | 1N814 | 1N893 | FD256 | Reverse recovery times from 0.2μsec to 0.5μsec |
| 1N662 | 1N798 | 1N815 | FD241 | FD257 | Forward conductance to 200mA at 1.0V |
| 1N662A | 1N799 | 1N818 | FD243 | FD258 | Breakdown voltages up to 240V |
| 1N663 | 1N800 | 1N837 | FD244 | FD259 | |
| 1N663A | 1N801 | 1N837A | FD245 | FD260 | |
| 1N778 | 1N802 | 1N838 | FD246 | FD262 | |
| 1N779 | 1N803 | 1N839 | FD247 | FD263 | |
| 1N789 | 1N804 | 1N840 | FD248 | FD264 | |
| 1N790 | 1N806 | 1N841 | FD249 | FD265 | |
| 1N791 | 1N807 | 1N842 | FD250 | | |

**SWITCHING PLANAR DIODES**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1N625 | 1N934 | FD214 | FD219 | FD228 | FD233 | Reverse recovery times of 1μsec |
| 1N626 | FD112 | FD215 | FD220 | FD229 | FD234 | Forward conductance to 100mA at 1.0V |
| 1N627 | FD113 | FD216 | FD221 | FD230 | FD235 | Breakdown voltages up to 200V |
| 1N628 | FD212 | FD217 | FD222 | FD231 | FD236 | |
| 1N629 | FD213 | FD218 | FD227 | FD232 | FD266 | |
| | | | | | FD267 | |

**GENERAL PURPOSE PLANAR DIODES**

| 1.0 to 50mA | | 51 to 150mA | | | |
|---|---|---|---|---|---|
| 1N456 | 1N890 | 1N456A | 1N482B | 1N486 | FD318 |
| 1N457 | FD322 | 1N457A | 1N483 | 1N486A | FD319 |
| 1N458 | FD323 | 1N458A | 1N483A | 1N486B | FD320 |
| 1N459 | FD324 | 1N459A | 1N483B | FD311 | FD321 |
| 1N461 | FD325 | 1N461A | 1N484 | FD312 | |
| 1N462 | FD326 | 1N462A | 1N484A | FD313 | |
| 1N463 | FD327 | 1N463A | 1N484B | FD314 | |
| 1N464 | FD328 | 1N464A | 1N485 | FD315 | |
| 1N619 | FD329 | 1N482 | 1N485A | FD316 | |
| 1N622 | | 1N482A | 1N485B | FD317 | |

| Over 150mA | | |
|---|---|---|
| 1N676 | FD338 | FD348 |
| 1N678 | FD339 | FD349 |
| FD330 | FD340 | FD350 |
| FD331 | FD341 | FD351 |
| FD332 | FD342 | FD352 |
| FD333 | FD343 | FD357 |
| FD334 | FD344 | FD358 |
| FD335 | FD345 | FD359 |
| FD336 | FD346 | FD360 |
| FD337 | FD347 | FD361 |

Forward conductance to 250mA at 1.0V
Reverse leakage as low as 5mμA
Breakdown voltages up to 250V

In addition to these 200 units, Fairchild silicon diodes are available to particular specifications for special customer requirements.

A number of additional high performance types are scheduled for announcement in the near future.

ADDITIONAL DATA AVAILABLE ON INDIVIDUAL SPECIFICATION SHEETS


FAIRCHILD SEMICONDUCTOR CORPORATION

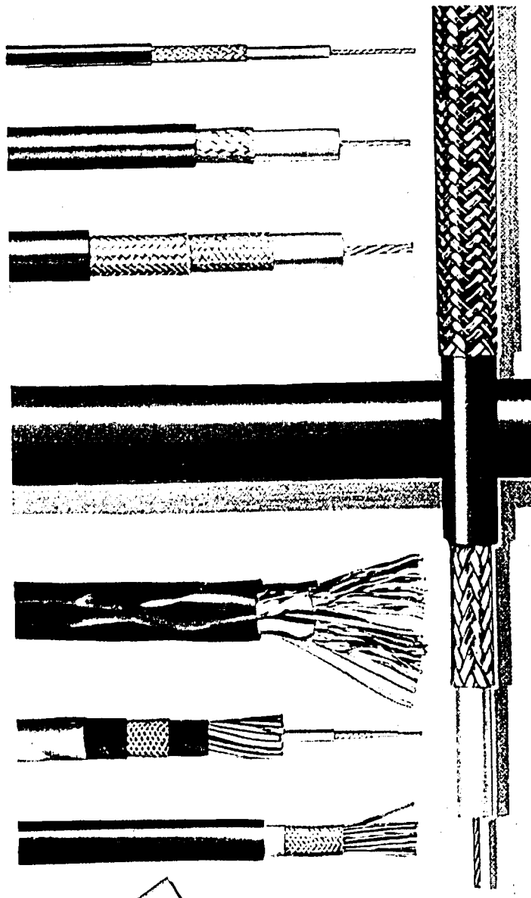
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Chester RG Type Coaxial Cables are made in both military and non-military versions, single or multi-conductor. Miniature designs are available in a choice of foam and solid polyethylene or in Teflon insulations, and in variations which include double shielding with polyethylene separator and jacket for TV systems or other low loss, all weather, signal transmission applications. Military types meet MIL-C-17 and all other applicable government specifications.



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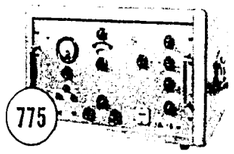
# MICROWAVE ELECTRONIC INSTRUMENTS

By

F X R, Inc.

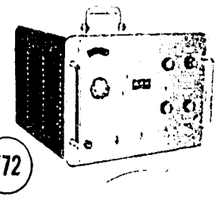
### SWEEP SIGNAL SOURCE

- Frequency Range: 8200 to 12400 Mc.
- Power Output: Adjustable 0 to 10 MW min.
- Sweep Rate: Linear with time —300 Mc to 300 K Mc.
- Sweep Range: Continuously adjustable 0-4.2 K Mc.
- Direct reading dial settings for upper & lower frequencies.
- Modulation: Square wave 800 to 1200 cps.
- Provisions for A.G.C.



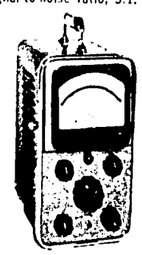

### SIGNAL SOURCES

- Model L771B: 950 to 2000 MC.
- Model S771B: 1900 to 4000 MC.
- Model C772A: 3950 to 8200 MC.
- Model X772A: 7000 to 11,000 MC.
- Power Output: 10-100 MW CW, MAX into matched load. Variable through level-set attenuator.
- Modulation: pulse, square wave both internal and external.




### STANDING WAVE AMPLIFIER

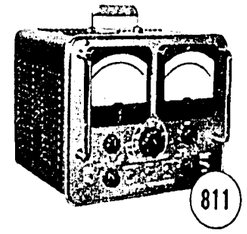
- A 5-inch removable meter with 1% linearity provides high resolution and accuracy.
- A filter, tunable between 950 and 1050 CPS, aligns instrument with output frequency of signal source.
- Range: 70 DB in six decade steps. Normal and expanded scales for VSWR and DB.
- Gain automatically maintained when switching from normal to expanded scales.
- Detectors: crystal or bolometer.
- Full scale sensitivity, 0.1 μV: signal-to-noise ratio, 3:1.




### UNIVERSAL RATIOMETER

RATIO METER AND STANDING WAVE AMPLIFIER IN ONE COMPACT PACKAGE

- Two-cycle Precision Logmeter VSWR reflectometer readings of 1.02 to ∞ on only two scales.
- VSWR, DB and reflection coefficient scales eliminate conversion tables.
- Full 70 DB standing wave amplifier operation, expanded VSWR scales.
- Crystal and bolometer operation.




### TEMPERATURE COMPENSATED POWER METER

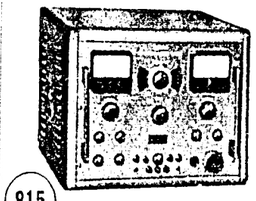
- Power Range, full Scale.
  - —20 DBM or 0.010 MW.
  - —15 DBM or 0.030 MW.
  - —10 DBM or 0.10 MW.
  - — 5 DBM or 0.30 MW.
  - 0 DBM or 1.00 MW.
  - + 5 DBM or 3.00 MW.
- Maximum possible accumulative error ±3%.
- FXR Series 218 Temperature Compensated Thermistor Head a required accessory.

Note: Also available is the B832T, a battery powered transistorized power meter, with similar specifications.




### UNIVERSAL KLYSTRON POWER SUPPLY

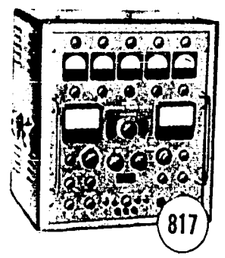
- Beam: 200 to 2000 V at 0 to 125 MA, 1800 to 3600 V, 100 MA, 250 W MAX.
- Control Grid: Pos. 0 to 150 V, Neg. 0 to 300 V.
- Reflector: 0 to 1000 V.
- Regulation: 0.01%.
- Ripple: 1 MV, RMS, MAX.
- Internal Modulation: pulse, sawtooth, square wave, sinewave.




### UNIVERSAL MICROWAVE POWER SUPPLY

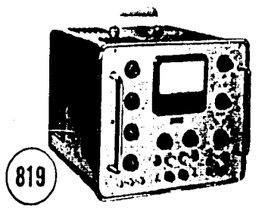
- Helix beam: 0 to 1500 V, 0 to 100 MA, 1700 to 2500 V, 0 to 100 MA, 2500 to 3500 V, 250 W MAX.
- *Grid 1: 0-300 V DC, 0 to 5 MA.
- *Grid 2 (reflector): 0-1200 V DC, 0 to 1 MA.
- *Grid 3 (focusing electrode): 0 to 750 V DC, 0-1 MA.
- *Grid 4 (focusing electrode): 0 to 500 V DC, 0-1 MA.
- Collector: 0-300 V DC, 0-100 MA.
- *Anode: 0-600 V DC, 0-60 MA.
- Filament: 0-15 V DC, 0-3 AMP at 20 W MAX.
- Regulation: 0.005%, Ripple: 3 MV.

*May be internally modulated: pulse, sawtooth, square wave, sinewave.




### KLYSTRON POWER SUPPLY

- Beam: 300-1000 V at 85 MA. Grid: —300 to —150 V at 0 to 5 MA. Built-in limiting resistor.
- Reflector: 0-900 V at 10-20 μA.
- Regulation: 1%.
- Internal Modulation: pulse, sawtooth, square wave.




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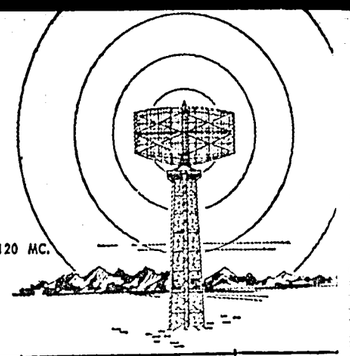
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# SHORT FORM CATALOG

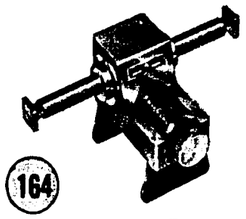
## WR-2100 Components

*DESIGNED FOR OPERATION OVER THE FULL WAVEGUIDE BANDWIDTH FROM 350 TO 530 MC*

WR 975 components also available. Frequency range 750 to 1120 MC.



## Wave Guide Test Equipment



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DIRECT READING PRECISION VARIABLE ATTENUATORS



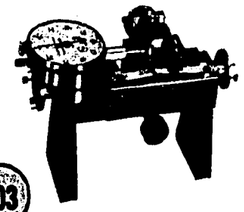
175

FIXED PRECISION ATTENUATORS



410

DIRECT READING FREQUENCY METERS



103

PRECISION SLOTTED SECTIONS



141

WAVE GUIDE SWITCHES

| FXR SERIES PREFIX / WAVEGUIDE SIZE In INCHES (I.D.) | J 21.00x10.50 | L 6½x3¼ | R 4.410x2.310 | S 3x1½ | H 2x1 | C 1½x¾ |
|---|---|---|---|---|---|---|
| FREQUENCY RANGE IN KMC/SEC | 0.35-0.53 | 1.12-1.70 | 1.70-2.60 | 2.60-3.95 | 3.95-5.85 | 5.85x8.20 |
| SLOTTED SECTIONS Fixed W.C. | J104A $2350 | L101A $950 | R101A $1340 | S101A $445 | H101A $385 | S101A $335 |
| Interchangeable W.C. | | | | | H115A $110 | C115A $110 |
| ATTENUATORS Flap | | L150B $170 | R150B $225 | S151A $100 | H151A $ 95 | |
| Semiprecision | | | | S155A $170 | H155A $170 | C155A $ 95 |
| Precision Calibrated | | L160B $575 | R160B $500 | | | |
| Precision Direct Reading | | | | S164A $595 | H164A $500 | C164A $350 |
| Fixed | | L168A-E $215 | | (Models A-3DB, B-6DB, | | C-10DB, D-20DB, E- |
| Fixed Precision | | | | S175A $365 | H175A $240 | C175A $135 |
| 40DB Step | | | | | | |
| FERRITE ISOLATORS | | | | | H157A $270 | C157A $245 |
| CRYSTAL DETECTOR MOUNTS Tuneable | | | | | | |
| Fixed | | | | | | |
| MATCHED BOLOMETER MOUNTS | | | | S207A $145 | H207A $140 | C207A $135 |
| THERMISTOR MOUNTS | | L216A $225 | R216A $250 | S216A $120 | H215A $ 94 | C216A $ 88 |
| THERMISTOR HEADS TEMPERATURE COMPENSATED | | L218A $350 | R218A $350 | S218A $225 | H218A $180 | C218A $170 |
| TUNERS Slide screw | | L310A $250 | R310A $325 | S311A $150 | H311A $140 | C311A $135 |
| E/H | | | | S312A $270 | H312A $210 | C312A $180 |
| PRECISION PHASE SHIFTERS | | | | | | |
| DIRECT READING FREQUENCY METERS Precision | | | | | | C402A $1275 |
| Reaction | | | | | H410B $260 | C410B $160 |
| Reaction, micrometer | | | | | | |
| Transmission | | | | | | |
| TERMINATIONS Fixed | J501A $750 | L501A $210 | R501A $180 | S501B $ 44 | H501B $ 34 | C501B $ 30 |
| Sliding | | L502A $350 | | S502A $ 95 | H502A $ 70 | C502A $ 65 |
| High power | | | | | | C505A † |
| STANDARD MISMATCHES VSWR 1.00 | | | | S510A $500 | H510A $420 | C510A $390 |
| VSWR 1.05 | | | | S510B $350 | H510B $310 | C510B $295 |
| VSWR 1.10 | | | | S510C $290 | H510C $250 | C510C $235 |
| VSWR 1.20 | | | | S510D $250 | H510D $210 | C510D $195 |
| VSWR 1.50 | | | | S510E $350 | H510E $310 | C510E $295 |
| WAVEGUIDE-TO-COAX ADAPTERS | J600BN $200 J600B $170 | L600B $170 | R601B $225 | S601B $ 50 | H601B $ 40 | C601B $ 35 |
| DIRECTIONAL COUPLERS Multihole | | | | S610AD $370 | H610A-D $240 | C610A-D $140 |
| Crossguide | | L612E $300 | R612E $250 | S612D $140 | H612D $120 | C612D $ 85 |
| WAVEGUIDE TEES Series | | L620A $175 | R620A $175 | S620A $ 90 | H620A $ 80 | C620A $ 60 |
| Shunt | | L621A $175 | R621A $175 | S621A $ 90 | H621A $ 80 | C621A $ 60 |
| Hybrid | | L622A $220 | R622A $220 | S622A $110 | H622A $ 95 | C622A $ 75 |
| WAVEGUIDE BENDS 90° E-plane | J623B $420 | L623B $125 | R623B $150 | S623B $ 90 | H623B $ 65 | C623B $ 45 |
| 90° H-plane | J624B $420 | L624B $125 | | S624B $ 90 | H624B $ 65 | C624B $ 45 |
| WAVEGUIDE 90° TWISTS | | | | S625A $175 | H625A $125 | C625A $ 75 |
| PRECISION SLIDING SHORTS | | L630A $275 | | S630A $175 | H630A $165 | C630A $155 |
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| WAVEGUIDE SWITCHES | Manual Electrical | | | | H641A $350 H641AE $400 | C641A $300 C641AE $335 |
| SHIELDED TUBE MOUNTS | | | | | H760A $150 | |
| HARMONIC GENERATORS | | | | | | |
| WAVEGUIDE STANDS | | L911A $ 15 | | Z910A $ 7 | Z910A $ 7 | Z910A $ 7 |

For details, circle #126 on Reader Service Card



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FERRITE ISOLATORS

**NOTE:**

†Price will be furnished on request.

*Specify required flanges when ordering.

BIDIRECTIONAL COUPLERS available on special order.

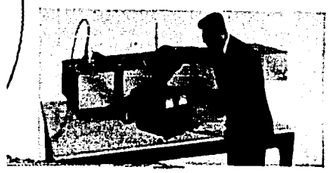
WAVEGUIDE FLANGES and FLANGE SCREWS available.

*Due to continuing product improvement, specifications and prices are subject to change without notice.*

*Prices indicated are domestic.*

0.35 Kmc — 0.75 Kmc — 90 Kmc — 220 Kmc

**METER COMPONENTS** — **MILLIMETER COMPONENTS**



*Expanding both extremes of the microwave spectrum.*

MACRO-MICROWAVE AND MICRO-MICROWAVE COMPONENTS AND INSTRUMENTATION.



## 2mm and 3mm Components

| W 1¼x⅝ | X 1x½ | Y .622x.311 | K* .420x.170 | U* .280x.140 | Q .224x.112 | M .148x.074 | E 122x.061 | F .099x.040 | G .051x.0255 |
|---|---|---|---|---|---|---|---|---|---|
| 7.05-10.00 | 8.20-12.40 | 12.40x18.00 | 18.00-26.50 | 26.50-40.00 | 33.00x50.00 | 50.00-75.00 | 60.00x90.00 | 90.00-140.00 | 140.00x220.00 |
| W101A $300 | X101A $245 | Y102A $545 | K102A $545 | U102A $545 | Q103A $1100 | M103A $995 | E103A $1650 | F105A $1400 | G105A $1400 |
| W115A $110 | X115A $ 90 | Y115A | | | | TYPE Z116A CARRIAGE $160 | | | |
| | | | | | Q151A $110 | M151A $100 | E151A $190 | | |
| W155A $ 85 | X155A $ 75 | Y155A $ 90 | K155A $135 | U155A $170 | | | | | |
| W164A $350 | X164A $270 | Y164A $275 | K164A $425 | U164A $450 | Q164A $825 | M164A $800 | E164A $1200 | F163A $975 | G163A $975 |
| 30DB) | | | | | | | | | |
| W175A $115 | X175A $ 95 | Y175A $115 | K175A $240 | U175A $250 | Q175A $475 | M175A $425 | E175A $675 | (Values to 30DB) | |
| W176A $185 | X176A $165 | | | | | | | | |
| W157A $245 | X157A $220 | Y157A $245 | K157A $270 | | | | | | |
| | | Y205B $175 | K205B $175 | U205B $200 | | M208A $325 | E208A $400 | | |
| | X211A $ 54 | Y212A $ 80 | K212A $ 80 | U206B $200 U212A $ 80 | Q206B $210 | M206B $210 | E206B $350 | F208A $400 | G208A $400 |
| W207A $120 | X207A $ 80 | | | | | | | | |
| W216A $ 79 | X216A $ 74 | Y216A $110 | K216A $150 | U216S $270 | | | | | |
| W218A $150 | X218A $145 | Y218A $210 | K218A $250 | U218S $400 | | | | | |
| W311A $130 | X311A $125 | Y311A $130 | | | | M311A $195 | | | |
| W312A $150 | X312A $130 | Y312B $135 | K312B $155 | U312B $170 | Q312B $235 | M312B $245 | E312B $390 | F313A $775 | G313A $775 |
| | | | | | | | | F314A $950 | G314A $950 |
| | X402A $1275 | | | | | | | | |
| W410B $165 | X410B $150 | Y410A $210 | K410A $230 | U410A $250 | | | | | |
| | | | | | Q410X $325 | M410X $300 | E410X $500 | F412A $750 | G412A $750 G413A $800 |
| | X411A $175 | | | | | | | | |
| W501B $ 25 | X501B $ 24 | Y501A $ 24 | K501A $ 30 | U501A $ 30 | Q501A $ 95 | M501A $ 90 | E501A $150 | F501A $150 | G501A $150 |
| W502A $ 55 | X502A $ 45 | Y502A $ 50 | K502A $ 70 | U502A $ 75 | | | | | |
| W505A $125 | X505A † | | | | | | | | |
| W610A $370 | X610A $360 | Y510A $450 | K510A $480 | U510A $625 | | | | | |
| W510B $285 | X510B $275 | Y510B $325 | K510B $340 | U510B $525 | | | | | |
| W510C $225 | X510C $215 | Y510C $275 | K510C $280 | U510C $450 | | | | | |
| W510D $185 | X510D $175 | Y510D $225 | K510D $240 | U510D $280 | | | | | |
| W510E $285 | X510E $275 | Y510E $325 | K510E $340 | U510E $350 | | | | | |
| W601B $ 30 | X601B $ 28 | | | | | | | | |
| W610A-D $115 | X610A-D $ 95 | Y610A-D $100 (Models A-3DB, B-6DB, C-10DB, D-20DB | K610A-D $165 | U610A-D $185 | | M610A-D $500 | | | |
| W612D $ 70 | X612D $ 50 | Y612D $ 55 | K612D $110 | | | | | Models D-20DB, E-25DB | |
| W620A $ 45 | X620A $ 35 | Y620A $ 40 | K620A $ 45 | U620A $ 55 | Q620A $ 65 | M620A $ 60 | E620A $110 | F620A $275 | G620A $275 |
| W621A $ 45 | X621A $ 35 | Y621A $ 40 | K621A $ 45 | U621A $ 55 | Q621A $ 65 | M621A $ 60 | E621A $110 | F621A $275 | G621A $275 |
| W622A $ 60 | X622A $ 49 | Y622A $ 54 | K622A $ 65 | U622A $ 80 | Q622A $100 | M622A $100 | E622A $170 | F622A $325 | G622A $325 |
| W623B $ 35 | X623B $ 24 | Y623B $ 32 | K623B $ 38 | U623B $ 42 | Q623B $ 55 | M623B $ 50 | E623B $ 90 | F623A $275 | G623A $275 |
| W624B $ 35 | X624B $ 24 | Y624B $ 32 | K624B $ 38 | U624B $ 42 | Q624B $ 55 | M624B $ 50 | E624B $ 90 | F624A $275 | G624A $275 |
| W625A $ 65 | X625A $ 40 | Y625A $ 60 | K625A $ 60 | U625A $ 70 | Q625A $100 | M625A $100 | E625A $100 | F625A $100 | G625A $100 |
| W630A $145 | X630A $130 | Y630B $145 | K630B $155 | U630B $150 | Q630B $155 | M630B $160 | E630B $250 | F631A $275 | G631A $275 |
| W634A $ 35 | X634A $ 30 | Y634A $ 35 | K634A $ 38 | U634A $ 38 | Q634A $ 50 | M634A $ 50 | E634A $ 50 | F634A $ 85 | G634A $ 85 |
| W638A $120 | X638A $100 | Y638A $125 | K638A $150 | U638A $175 | Q638A $120 | M638A $125 | E638A $250 | F638A $200 | G638A $200 |
| W641A $265 | X641A $225 | Y641A $250 | K641A $275 | U641A $300 | | | | | |
| W641AE $290 | X641AE $250 | Y641AE $275 | K641AE $300 | U641AE $325 | | | | | |
| W760A $130 | X760A $130 | | | | | | | | |
| | | | | | Q780A $165 | M780A $160 | E780A $250 | F781A $475 | G781A $475 |
| Z910A $ 7 | Z910A $ 7 | Z910B $ 7 | Z910B $ 7 | Z910B $ 7 | Z910C $ 7 | Z910C $ 7 | Z910C $ 7 | | |

THE MOST COMPLETE MICROWAVE LINE AVAILABLE

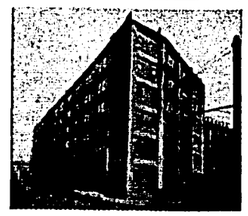
FXR

ANNOUNCES *Another* AFFILIATE

**BUDD-STANLEY CO. INC.**

43-01 22nd Street, Long Island City 1, N. Y.

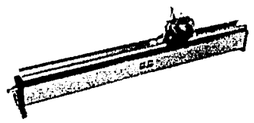
Tel. STillwell 6-1706 • Cable Address "Buddstan"



For details, circle #127 on Reader Service Card

*Budd-Stanley, and FXR's L.I.C. plant facilities.*

## Coaxial Test Equipment



Slotted Section, Model N110A



Frequency Meter Direct Reading, Model N410A



Bi-Directional Coupler, Model N616D

| INSTRUMENT | *MODEL NO. | FREQ. KMC/SEC | PRICE | COMMENT |
|---|---|---|---|---|
| SLOTTED SECTIONS | N101A<br>N101B<br>*V101A<br>*V101B<br>N110A | 1.00- 4.00<br>4.00-10.00<br>1.00- 4.00<br>1.00- 4.00<br>0.20- 4.00 | $470.00<br>$440.00<br>$470.00<br>$470.00<br>$550.00 | Type N or C adapter connector supplied for N101A, B, N110A<br><br>Probe & tuner supplied with N110A |
| FERRITE ISOLATOR | N157A | 2.00- 4.00 | $450.00 | Min isolation 15DB |
| ATTENUATOR<br>Cutoff<br>Fixed | <br>N170A<br>N180A-D | <br>1.00- 4.00<br>1.00-12.40 | <br>$200.00<br>$ 42.00 | <br>A-3DB, B-6DB, C10DB, D-20DB |
| TUNEABLE PROBES | B200A<br>B202A | 1.00-12.40<br>0.35- 1.40 | $145.00<br>$225.00 | IN23B supplied<br>IN21B supplied |
| DETECTOR MOUNTS<br>Tuneable<br>Untuneable | <br>N200A<br>N210A<br>**N210B | <br>1.00-12.40<br>0.10-10.00<br>0.10-10.00 | <br>$145.00<br>$ 50.00<br>$ 55.00 | <br>IN23B supplied<br>IN23B supplied<br>IN23B supplied |
| THERMISTOR MOUNTS<br>Broadband<br>Temp. Compensated | <br>N215A<br>N217A | <br>0.50-10.50<br>0.50-10.50 | <br>$ 75.00<br>$140.00 | <br>Z215L element supplied |
| THERMISTOR HEAD | N218A | 0.01-10.00 | $145.00 | Used with mod. B831A |
| DOUBLE STUB TUNER | N300A | 1.00-10.00 | $ 90.00 | |
| FREQUENCY METERS DIRECT READING | N410A<br>N414A | 1.00- 4.00<br>3.95-11.00 | $495.00<br>$495.00 | Accuracy 0.08%<br>Accuracy 0.10% |
| BI-DIRECTIONAL COUPLERS (20DB) | N616D<br>N617D | 0.25- 1.00<br>1.00- 4.00 | $160.00<br>$150.00 | Minimum directivity 20DB |
| VARIABLE CAPACATIVE TEE | N626A | TO 12.00 | $ 60.00 | |
| KLYSTRON OSCILLATOR CAVITY | N750A | 2.40- 3.70 | $280.00 | |
| KLYSTRON TUBE MOUNT | N761A | | $ 95.00 | Z761P cable not supplied |
| KLYSTRON TUBE MOUNT | Z762B | | $145.00 | Z762P cable supplied |

*Mating coax dim. 7/8" all others 3/8".

**Model N210B has built-in DC return.

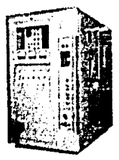
## High Power Electronics

# Development and Systems Applications

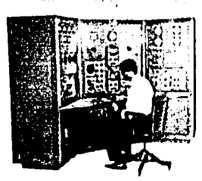
*Shipboard Electronic Applications*

*Experimental Radar Techniques*

*Military Systems Applications*



4 Megawatt Hard Tube Modulator



40 Megawatt Line Modulator



High Power Sub-assemblies

| *High Power Modulator Model No. | Power (peak mega-watts) | Voltage (peak kilovolts) | Current (peak amps) | Duty Cycle | Pulse width ($\mu$ sec) | Rep Rate (PPS) |
|---|---|---|---|---|---|---|
| Z820A | 1.0 | 33 | 33 | 0.001 | 0.5<br>2.5 | 2000<br>400 |
| Z821A | 14.0 | 90 | 160 | 0.001 | 2.0 | 200-500 |
| Z860A | 0.260 | 20 | 13 | 0.008 | 0.25<br>1.0 | 3000<br>800 |
| Z861A | 5.5 | 55 | 100 | 0.0024 | 6 | 400 |
| Z862A | 13 | 10 | 1.3 | 0.375 | 1.13-1.53 | 1-25KC |
| Z863A | 40 | 300 | 132 | 0.0017 | 8.5 | 244 |

*Partial listing of standard units. Custom units developed to specific requirements. Prices and deliveries of all modulators will be furnished upon request.



FXR Model Z851A

## REGULATED HIGH VOLTAGE POWER SUPPLIES

FXR Model Z850A
- **0 to 12 KV**
- **150 MA**
- **Ripple, 4 MV**

FXR Model Z851A
- **0 to 10 KV**
- **250 MA**
- **Ripple, 5 MV**

FXR Model Z852A
- **0 to 18 KV**
- **1 AMP**
- **Ripple, 5 MV**

## Special Microwave Components



**ROTARY JOINT**
Waveguide—Coaxial—Waveguide
5250-5750 Mc
12 Megawatts Pressurized
Provisions For Thru Connection

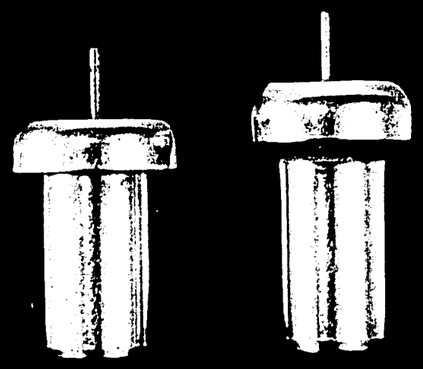
Many organizations have turned to FXR for the solution to their specific problems. Typical custom made components developed by this company include:
- **High Powered Rotary Joints**
- **Wave Guide Switches**
- **Directional Couplers**
- **Direct Reading Frequency Meters**
- **Complete System Plumbing**

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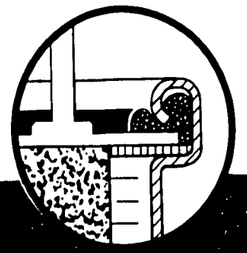
THAT FANSTEEL'S SHOULDER AND CURL DESIGN* PROVIDES THE **BEST** METHOD OF SEALING A TANTALUM ELECTROLYTIC CAPACITOR



BEFORE TEST AFTER TEST

This unretouched photo (twice actual size) shows a Fansteel "PP" type tantalum capacitor before and after being subjected to internal pressures of 600 psi. As shown, the test resulted in a stretching and deformation of the silver case, *but no failure or leakage whatsoever in the seal.*

***What Every Designer and Engineer Should Know About This Seal***



FANSTEEL

FANSTEEL METALLURGICAL CORPORATION North Chicago, Ill., U S A

For details, circle #129 on Reader Service Card




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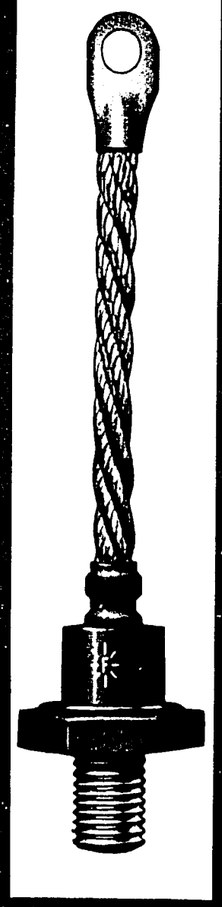




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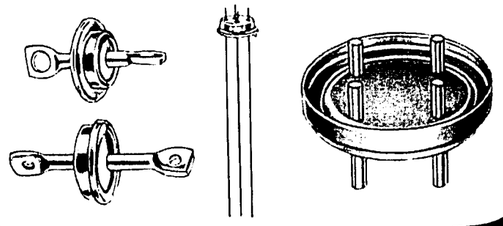


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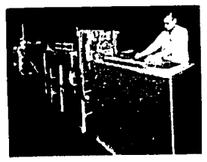
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**DAGE ELECTRIC CO., INC.**
Beech Grove, Indiana

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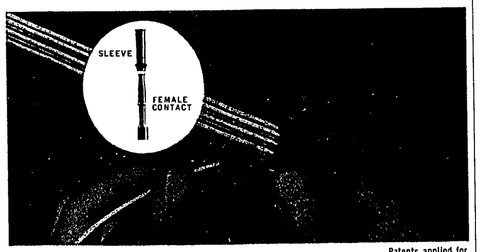
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# HELPFUL HINTS

## for using the IRE DIRECTORY

A few minutes' study of the basic layout of the IRE DIRECTORY will help you to find the information for which you are looking more quickly and more accurately. At first glance, the IRE DIRECTORY may seem to be confusing, but by using the various portions of the book as listed below, you will find your way around easily, and will discover that it is actually a very simple arrangement, and a much more logical one than a purely alphabetical terminology listing.

***PINK SECTION*** at the front of the products and firms section contains a terminology index listing every product, major and minor, for which a list of manufacturers is given. Page numbers refer you to the page on which the listings for that product begin. Following this alphabetical index is a copy of the questionnaire which is sent to the firms who have furnished us with product information. A quick look through this questionnaire will help greatly in understanding the product arrangement. At the top of the first page of the pink section is a small index referring you to the opening page of the complete-data spread section, the alphabetical directory, and each of the three product directories.

***THE COMPLETE DATA SPREAD SECTION*** (pages 1-134) contains product advertisements of great usefulness to the reader. Most of these advertisements are two pages or more, and all of them contain complete information on the products manufactured by the advertising firms—specifications, prices, illustrations, and suggested applications.

***ALPHABETICAL DIRECTORY OF MANUFACTURERS*** (pages 135-240) contains a list of 3,843 firms representing the majority of buying and selling power in the radio-electronic industry. Each firm listing contains the complete mailing address and telephone number for the firm. Following the state name in the firm address, a list of code numbers is given. These numbers refer to the 104 major products listed in the book (for quick reference to the meaning of the codes, use the questionnaire form in the pink section). Following the telephone number is the year in which the firm was founded, the total number of employees, the number of IRE members employed, and the net radio-electronic sales during the last fiscal year.

***THE THREE DIRECTORIES OF PRODUCTS ARE:***

1. Complete Equipment
2. Components
3. Materials and Services

This breakdown into three directories saves you from traveling through many products in which you are not interested at the moment, and helps you to turn immediately to the listings for the type of product you want, following a straight line to your destination. Use the Machol edge index at the top of the first page of the pink section to locate immediately the first page of the appropriate directory, then use the Machol edge index at the beginning of each directory to find the specific product you want. You don't even have to know the page number—the index will find it for you automatically!

***104 MAJOR PRODUCTS*** are listed within these three Directories. Each product listing contains a number of sub-headings so that you may know specifically what each firm makes. To interpret the code numbers shown after each firm's listing, consult the first page of that product class, where the sub-headings are defined. You will note that advertisements are positioned throughout the book in the most appropriate listing section, so that the advertisement for a relay manufacturer will appear in the relay section, to help you with further information on his product. Every advertiser's listing shows you the page number on which his advertisement may be found, and you will derive more value from this book if you consult these advertisements for facts you cannot find in the listings.

***COMPLETE ADDRESS LISTINGS*** are given only for advertisers in this section. If you wish to locate the address and telephone number for any other firm, it will be necessary to use the alphabetical directory.

***THE DISTRIBUTION SECTION*** is class 105, the last class in the book. This section contains a list of 2014 manufacturers representatives, distributors and jobbers, grouped geographically. See page 707 for a more complete explanation of the use of this section.

***ADVERTISER'S INDEX*** appears on pages 129-134 and on pages 766-768.

## How to Use the Machol Edge Index

High speed reference is a major objective of the IRE DIRECTORY. To this end we have adopted the Machol Edge Index system, and these indexes:

Advertisers Index, pages 129-134 and 766-768.

Key to Products, Pink Section.

Index to Spreads, 1.

| | |
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| 1 | COMPLETE DATA SPREADS |
| 135 | ALPHABETICAL DIRECTORY |
| 241 | DIRECTORY I COMPLETE EQUIPMENT |
| 359 | DIRECTORY II COMPONENTS |
| 597 | DIRECTORY III MATERIALS & SERVICES |

Detailed Machol edge indexes will be found on the first page of the alphabetical Directory and each of the three major product Directories, pages 135, 241, 359, and 597. The Machol system will help you find both alphabetical and product sections swiftly.

### HOW TO USE

1. Bend the Directory almost double with the front cover page on the inside.
2. Hold in your right hand with your four fingers near to the bound edge and your right thumb near the middle of the open side of this page.
3. From the heavy or light line symbol adjacent to the subject you seek, run your eyes across the page edges until you reach the horizontally corresponding symbol.
4. OPEN THERE!



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**1961**

Edition prepared by The Advertising Department of the Institute of Radio Engineers, 72 W. 45th St., New York 36, N.Y.
William C. Copp, Mgr.; Lillian Petranek, Asst.; Carl Maier, Production; Hugh Keays, Research.

# Alphabetical Directory

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A A Metal Products, Inc., 151 Elliot St., Brattleboro, Vt., 81, 87, Tel: ALpine 4-4333, Yr: 1950, Emp: 10, $10,000

**ACDC Electronics, Inc., 2979 North Ontario St., Burbank, Calif., 9, 38, 45, 50, 52, 63, 64, 76, Tel: VIctoria 9-2414, Yr: 1952, Emp: 150, ▲3, $1,000,000**

**See ad on page 474**

A C Electronics, Inc., 11725 Mississippi Ave., Los Angeles 25, Calif., 1, 4, 38, 40, 45, 47, 52, 63, 76, 98, Tel: GRanite 8-4288, Yr: 1956, Emp: 52

ACF Electronics Div., ACF Industries, Inc., P.O. Box 5, Riverdale, Md., 4, 9, 14, 17, 20, 27, 30, 36, 38, 52, 63, 64, 83, 89, 91, 96, Tel: WArfield 7-1444

AC Spark Plug, The Electronics Div. of General Motors, Milwaukee 1, Wis., 1, 4, 9, 14, 17, 18, 22, Tel: SOuth 2-7000, Yr: 1910, Emp: 7500, ▲450, $100,000,000

A.C. Transformer Corp., 89 Madison St., Newark 5, N.J., 76, Tel: MItchell 2-7574, Yr: 1950, Emp: 15

**ADC Incorporated, 2863-13th Ave. S., Minneapolis 7, Minn., 45, 52, 55, 63, 73, 76, Tel: PArkway 1-5551, Yr: 1935, Emp: 400, ▲8, $2,500,000**

**See ad on page 564**

A.L.A. Industries, Inc., 151 Crotona Ave., Harrison, N.Y., 39, Tel: TEnnyson 5-0100, Yr: 1951, Emp: 75, $300,000

ALWAC Computer Div., El-Tronics, Inc., 13040 S. Cerise Ave., Hawthorne, Calif., 9, Tel: ORegon 8-5774, Yr: 1952, Emp: 60

AMP Incorporated, Eisenhower Blvd., Harrisburg, Pa., 8, 9, 14, 36, 38, 39, 43, 46, 48, 50, 53, 54, 55, 63, 64, 65, 68, 71, 72, 73, 76, 85, 86, 91, 93, 96, 98, 99, Tel: JOrdan 4-0101, Yr: 1941, Emp: 2300

APC Communication Products, Box 110, Mineral Wells, Texas, 39, 83, 88, 89, 94, 100, Tel: FA 5-3301, Yr: 1948, Emp: 130, ▲4, $1,000,000

**A.P.M. Corporation, 252 Hawthorne Ave., Yonkers 5, N.Y., 46, 54, 55, 89, 91, Tel: YOnkers 8-2010, Yr: 1951, Emp: 40, ▲2**

**See ad on pages 451, 638**

A.P.W. Company, 72 West Main St., Rockaway, N.J., 45, 72, Tel: OAkwood 7-0643, Yr: 1945, Emp: 20, $80,000

A.R.F. Products, Inc., 7627 Lake St., River Forest, Ill., 1, 4, 20, 23, 27, 44, 64, Tel: FO 9-6000, Yr: 1942, Emp: 80, ▲3, $1,600,000

A R & T Electronics, Inc., 1101 McAlmont St., Little Rock, Ark., 9, 36, 38, 76, 89, 94, Tel: FR 5-6411, Yr: 1953, Emp: 130, ▲25

ASCOP, Div. Electro-Mechanical Research, Inc., P.O. Box 44, Princeton, N.J., 3, 4, 9, 36, Tel: SW 9-1000, Yr: 1946, Emp: 360

A-1 Precision Products, 3807 W. Jefferson Blvd., Los Angeles 16, Calif., 46, 72, 73, 89, 91, Tel: REpublic 1-8268, Yr: 1952, Emp: 21

Abalon Precision Mfg. Corp., 540 Casanova St., New York 59, N.Y., 84, 87, 89, 91, 92, Tel: LUdlow 9-5682, Yr: 1930, Emp: 25, $175,000

Abbott & Company, 209 N. Main St., Marion, Ohio, 85, 89, Tel: DU 2-5252, Yr: 1956, Emp: 45

Abbott Products Inc., 14-10 123 St., College Point 56, N.Y., 91

Academic Press, Inc., 111 Fifth Ave., New York 3, N.Y., 100, Tel: ORegon 7-6713

Accessory Controls & Equipment Corp., 805 Bloomfield Ave., Windsor, Conn., 14, 63, 84, 89, 96, Tel: MU 8-4986

Accuracy Incorporated, 4 Gordon St., Waltham 54, Mass., 69, Tel: TWinbrook 4-1126, Yr: 1956, Emp: 15, $120,000

Accurate Electronics Corp., 169 Abbe Rd. South, Elyria, Ohio, 46, 53, 55, 64, 71, 73, 89, 91, 98, Tel: ENdicott 5-1211, Yr: 1952, Emp: 50, ▲1, $320,000

Accurate Instrument Co., 2418 W. Alabama, Houston 6, Tex., 33, 47, 63, Tel: JAckson 6-4917, Yr: 1956, Emp: 21

Accurate Molding Corp., 35-20 48th Ave., Long Island City 1, N.Y., 98, Tel: ST 4-0655, Yr: 1928, Emp: 35

Accurate Paper Tube Co., Inc., 809 N. Peoria St., Chicago 22, Ill., 91, Tel: CHesapeake 3-2166

Accurate Specialities Co., 37-11 57th St., Woodside 77, N.Y., 86, 89, 97, 101, 103, Tel: TW 9-5757, Yr: 1955, Emp: 90, ▲5, $300,000

Accurate Spring Mfg. Co., 3811 W. Lake St., Chicago 24, Ill., 72, 91, 104, Tel: VA 6-5900, Yr: 1930, Emp: 225, $750,000

Ace Coil & Electronics Co., 916 Middlesex Ave., Metuchen, N.J., 45, 69, 76, Tel: LIberty 8-3580, Yr: 1950, Emp: 36, ▲1, $142,000

**Ace Electronics Associates, Inc., Dept. A3, 99 Dover St., Somerville, Mass., 69, Tel. SOmerset 6-5130, Yr: 1952, Emp. 150, ▲12**

**See ad on page 522**

Ace Engineering & Machine Co., Inc., Tomlinson Road, Huntingdon Valley, Pa., 14, 84, 88, 94, 102, Tel: WIlson 7-1900, Yr: 1946, Emp: 35, ▲5, $300,000

Ace Fabricators, Route 2, Highway 45, Lake Villa, Ill.; 89, 93, 99, Tel: BAldwin 3-0011, Yr: 1946, Emp: 5, ▲1, $50,000

Ace Plastic Co., 91-30 Van Wyck Expwy., Jamaica 35, N.Y., 89, 99, Tel: JA 3-5500, Yr: 1933, Emp: 100

Ace Spring Manufacturing Co., Inc., 130 32nd St., Brooklyn 32, N.Y., 91, Tel: STerling 8-0100

Ackerman Engravers, Inc., 458 Broadway, New York 13, N.Y., 84, 89, 91, Tel: BArclay 7-1479

**Ackerman Gould Co., Inc., 10 Neil Court, Oceanside, L.I., N.Y., 92, 96, Tel: ORiole 8-4110, Yr: 1924, Emp: 25**

**See ad on page 667**

**Acme Electric Corp., 44 Water St., Cuba, N.Y., 4, 38, 47, 63, 76, 96, Tel: CUba 4, Yr: 1917, Emp: 800, ▲3**

**See ad on page 476**

Acme Mfg. & Gasket Co., 738-40 N. 41st St., Philadelphia 4, Pa., 89, 91, Tel: EV 6-8622

Acme Wire Company, The, 1255 Dixwell Ave., New Haven 14, Conn., 45, 54, 85, 89, 93, 95, Tel: LOcust 2-2171, Yr: 1904

Acoustica Associates, Inc., Fairchild Court, Plainview, N.Y., 14, 58, 96, Tel: OVerbrook 1-2100, Yr: 1955, Emp: 450, ▲5

Acoustical Mfg. Co. Ltd., St. Peters Rd., Huntingdon, Huntingdon County, England, 6, 38, 56, Tel: HUntingdon 361, Yr: 1936

Acro Div., Robertshaw-Fulton Controls Co., 2010 E. Main St., Columbus 16, Ohio, 58, 68, 72, Tel: CL 3-8531, Yr: 1939, Emp: 650, $500,000

Acro Products Corp., 1410 So. Aberdeen St., Chicago 8, Ill., 42, 84, Tel: CAnal 6-1818, Yr: 1959, Emp: 10, $100,000

Acromag, Incorporated, 22515 Telegraph Road, Southfield, Mich., 14, 38, 45, 76, Tel: ELgin 7-0030, Yr: 1957, Emp: 18, ▲3

Acromark Co., The, 538 Morrell St., Elizabeth 4, N.J., 84, 89, 91, 96, Tel: EL 2-6500, Yr: 1936, $200,000

Actioncraft Products, 2 Yennicock Ave., Port Washington, N.Y., 91 93, 99, Tel: POrt Washington 7-4500, Yr: 1948, Emp: 40

**Acton Laboratories, Inc., 500-B Main St., Acton, Mass., 3, 14, 18, 22, 28, 33, 38, 47, 94, Tel: COlonial 3-7756, Yr: 1954, Emp: 77, ▲10, $650,000**

**See ad on page 346**

**Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 3, 10, 14, 28, 38, 50, 68, 83, Tel: GRegory 2-5622, Yr: 1951, Emp: 40, ▲3, $400,000**

**See ad on page 329**

Adage, Inc., 292 Main St., Cambridge 42, Mass., 9, 35, 38, 47, 64, Tel: UN 4-6620, Yr: 1957, Emp: 85, ▲7, $285,000

Adair Engineering Co., George P., 1610 Eye St., N.W., Washington 6, D.C., 88, Tel: EXecutive 3-1230, Yr: 1947, Emp: 6, ▲2, $80,000

Adams-Russell Co., Inc., 200 Sixth St., Cambridge 42, Mass., 1, 39, 52, 76, 83, Tel: UNiversity 8-8040, Yr; 1958, Emp: 20, ▲4, $170,479

Adams & Westlake Co., The, 1025 No. Michigan St., Elkhart, Ind., 68, Tel: COngress 4-1141, Yr: 1857, Emp: 550





Addison-Wesley Publishing Co., Reading, Mass., 100, Tel: REading 2-3700

Adler Electronics, Inc., 1 Le Fevre Lane, New Rochelle, N.Y., 7, 8, 20, 26, Tel: NE 6-1620, Yr: 1945, Emp: 450, ▲100, $5,000,000

Admiral Corporation, 3800 W. Cortland St., Chicago 47, Ill., 1, 6, 27, 31, 39, 50, 63, Tel: SPaulding 2-0100, Yr: 1934, Emp: 9000, $200,000,000

Adre Company, 8980 W. Hawthorne Lane, Hales Corners, Wisc., 96, Tel: EV 3-5311, Yr: 1954, Emp: 5, $3200

Advance Electronics Co., 8510 North End Ave., Oak Park 37, Mich., 39, 52, 96, Tel: LIncoln 6-0248, Yr: 1946, Emp: 10

Advance Instrument Corp., 1109 6th Ave., Neptune, N.J., 4, 30, 38, 64, 89, Tel: PR 4-3700

Advance Ross Electronics Corp., 2538 Peterson Ave., Chicago 45, Ill., 45, Tel: BR 4-6330, Yr: 1932, Emp: 225, ▲1, $3,000,000

Advanced Electronics Corp., 2 Commercial St., P.O. Box 43, Hicksville, L.I., N.Y., 36, 52, Tel: OVerbrook 1-6100, Yr: 1956, Emp: 25

Advanced Electronics, Inc., 91 Silas Deane Highway, Rocky Hill, Conn., 4, 11, 38, 45, 68, 72, 74, 76, 83, 84, 85, 89, 94, Tel: JAckson 9-6882, Yr: 1953, Emp: 25, ▲1, $260,000

Advanced Instrument Corp., 700 So. Fourth St., Richmond, Calif., 9, 14, 29, 36, Tel: BEacon 5-5133, Yr: 1959, Emp: 15, ▲3, $500,000

Advanced Research Associates, Inc., P.O. Box 68, 4130 Howard Ave., Kensington, Md., 1, 4, 9, 14, 15, 22, 26, 29, 30, 34, 36, 38, 45, 47, 50, 63, 70, 82, 88, Tel: WH 2-4800, Yr: 1957, Emp: 14, $172,000

Advanced Vacuum Products, Inc., 430 Fairfield Ave., Stamford, Conn., 54, Tel: DAvis 4-2148

**Aemco, Inc., 12 State St., Mankato, Minn., 58, 68, 72, Tel: 5153, Yr: 1948, Emp: 350, $2,000,000**

**See ad on page 509**

Aero Mechanism Inc., 13866 Saticoy St., Van Nuys, Calif., 4, 14, 58, 75, Tel: TRiangle 3-4136, Yr: 1956, Emp: 50, $400,000

Aero Research Instrument Co., Inc., 315 No. Aberdeen St., Chicago 7, Ill., 75, Tel: TAylor 9-6100, Yr: 1955, Emp: 60, ▲1

Aeroflex Corp., The, Aeroflex Laboratories Div., 34-06 Skillman Ave., Long Island City 1, N.Y., 4, 9, 14, 16, 30, 38, 47, 76, 96, 102, Tel: ST 4-7000, Yr: 1937, Emp: 290, ▲22, $1,800,000

Aerolab Development Co., 330 W. Holly St., Pasadena, Calif., 47, 63, Tel:SY 5-8771, Yr: 1948, Emp: 120, ▲15, $500,000

Aerolite Electronics Corp., 2207 Summit Ave., Union City, N.J., 45, 46, 53, 54, 55, 62, 71, 73, 85, Tel: UNion 3-2955, Yr: 1944, Emp: 75, ▲2

Aerolux Light Corp., 653 11th Ave., New York 36, N.Y., 14, 17, 62, 67, 78, Tel: CI 6-5324

Aeronautical Communications Equip., Inc., 3090 S.W. 37th Ave., Miami 33, Fla., 1, 26, 35, Tel: HIghland 8-6503, Yr: 1946, Emp: 100

**Aeronautical Electric Co., 5656 Northwest Highway, Chicago 46, Ill., 62, 71, 73, Tel: SPring 4-5200, Yr: 1945, Emp: 50, $300,000**

**See ad on page 471**

Aeronautical Electronics, Inc., P.O. Box 6527, Raleigh, N.C., 1, 22, Tel: TE 4-6209

Aeronutronic, Div. Ford Motor Company, Ford Road, Newport Beach, Calif., 9, 13, 17, 27, 36, 91, Tel: ORiole 5-1234, Yr: 1956, Emp: 1550, $5,000,000

**Code Numbers TELL YOU**

what each company does or makes. The numbers after each address refer you to the 104 product and service classes, in which detailed information on the firm will be found.

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PINK SECTION
gives a guide to the products and services listed in the Product Directories.

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For complete listings of over 900 major and minor products listed in the "Products and Services" sections of this Directory, see the pink section preceding page 1.

Aeroprojects Inc., 310 E. Rosedale Ave., West Chester, Pa., 96, Tel: OWen 6-4710, Yr: 1949, Emp: 120, ▲5, $200,000

Aeroquip Corporation, 300 S. East Ave., Jackson, Mich., 83, 91, 99, Tel: STate 2-0361, Yr: 1940, Emp: 2100, $100,000

Aerotronic Assoc. Inc., P.O. Box 367, Contoocook, N.H., 10, 14, Tel: COntoocook 190-3, Yr: 1958, Emp: 56, $240,000

Aerovox Corp., 740 Belleville Ave., New Bedford, Mass., 11, 14, 43, 64, 69, 71, Tel: WYman 4-9661, Yr: 1922.

Aetna Electronics Corp., Readington Rd., North Branch, N.J., 3, 14, 30, 45, Tel: RAndolph 5-1000, Yr: 1954, Emp: 7, ▲1, $100,000

**See ad on page 277**

Affiliated Manufacturers, Inc., Box 211, Oldwick, N.J., 4, 96, Tel: OLdwick 211, Yr: 1957, Emp: 6, $200,000

Aid Associates, 972 Elsinore Ct., Palo Alto, Calif., 88, 100, Tel: DAvenport 4-0360, Yr. 1954, Emp: 12, ▲2

**Ainslie Corporation, 531 Pond St., South Braintree 85, Mass., 39, 83, 89, Tel: VIctor 8-0850**

**See ad on page 368**

Air Control Installations Limited, Victoria Road, Ruislip, Middlesex, England, 42, Tel: VIking 1222, Yr: 1936, Emp: 600

**Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, N.Y., 42, 60, Tel: AMityville 4-3700, Yr: 1950, Emp: 155, ▲4**

**See ad on page 386**

Air-Maze Corporation, Subsid. Rockwell-Standard Corp., 25000 Miles Road, Cleveland 28, Ohio, 40, 84, 102, Tel: MOntrose 2-8000, Yr: 1925, Emp: 490

Air-O-Tronics Engineering Co., P.O. Box 31, Lancaster, Calif., 55, 71, 96, Tel: WHitehall 3-1651, Yr: 1955, Emp: 14, ▲2

Air-Shields, Inc., Hatboro, Pa., 14, 84, 89, Tel: OSborne 5-5200, Yr: 1938, Emp: 100, ▲2

Airborne Accessories Corporation, 1414 Chestnut Ave., Hillside 5, N.J., 4, 30, 38, 43, 47, 52, 60, 63, Tel: MUrdock 8-0250

Airborne Instruments Laboratory, Div. Cutler-Hammer, Inc., Comac Road, Deer Park, L.I. N.Y., 3, 4, 14, 16, 20, 21, 23, 27, 28, 38, 39, 40, 64, 83, Tel: MYrtle 2-6100, Yr: 1945, Emp: 3000

**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 21, 36, 38, 39, 40, 46, 52, 63, 76, 80, 83, Tel: COpley 7-9115, Yr: 1954, Emp: 25, ▲2**

**See ad on page 309**

Aircraft Armaments, Inc., Cockeysville, Md., 9, 21, 30, 36, 39, 63, 83, 84, 88, 94, Tel: NOrmandy 6-1100, Yr: 1950, Emp: 800, ▲23, $4,500,000

Aircraft Electronics, 6219 South Sears Blvd., Tucson, Ariz., 2, 12, 14, 17, 22, 32, 38, 57, 63, 76, 89, 94, 96, Tel: MA 4-6348, Yr: 1955, Emp: 3, ▲1, $10,000

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Aircraft Radio Corp., Boonton, N.J., 1, 28, 39, 46, 52, 55, 63, 64, Tel: DEerfield 4-1800, Yr: 1928, Emp: 650, ▲50, $15,000,000

Airdesign Corp., 600 W. Washington St., Norristown, Pa., 38, 47, 52, 55, 63, 73, 76, 85, 104, Tel: BRoadway 9-4100, Yr: 1942, Emp: 75, ▲1, $325,000

Aireco, Inc., 2323 Second Ave., Carman, Schenectady 3, N.Y., 14, 88, Tel: ELgin 5-6545, Yr: 1940, Emp: 10, $225,000

**Airflyte Electronics Co., 537 Ave. "A", Bayonne, N.J., 9, 36, 46, 64, 72, 89, 91, Tel: HEmlock 6-2230, Yr: 1949, Emp: 75, $600,000**

**See ad on page 408**

Airmec Limited, High Wycombe, Bucks., England, 2, 3, 4, 9, 14, 24, 25, 28, 33, 38, 63, 72, Tel: HIgh Wycombe 2501, Emp: 300

**Airpax Electronics Incorporated, Cambridge Div., Jacktown Road, Cambridge, Md., 36, 38, 45, 47, 72, 76, Tel: AC 8-4600, Yr: 1948, Emp: 350, ▲20, $4,000,000**

**See ad on pages 82-83**

**Airpax Electronics Incorporated, Seminole Div., Fort Lauderdale, Fla., 3, 4, 9, 23, 30, 38, 45, 47, 58, 60, 63, 72, 76, Tel: LUdlow 3-6160, Yr: 1948, Emp: 300, ▲25**

**See ad on pages 82-83**

**Airtec, Inc., 139 E. First Ave., Roselle, N.J., 21, 38, 39, 40, 46, 52, 63, 72, 76, 80, 83, 88, 102, Tel: CHestnut 5-2990, Yr: 1956, Emp: 28, $650,000**

**See ad on page 589**

Airtron, Inc., Div. Litton Industries, Inc., 200 E. Hanover Ave., Morris Plains, N.J., 20, 21, 38, 39, 40, 46, 52, 63, 72, 76, 80, 83, Tel: JEfferson 9-5500, Yr: 1946, Emp: 750, ▲50

Airtronics International Corp., 6900 West Road 84, P.O. Box 8576, Fort Lauderdale, Fla., 3, 4, 14, 33, 38, 50, 51, 64, 94, 98, Tel: LU 3-4541, Yr: 1958, Emp: 126

Ajax Condenser Co., Inc., 932 West Wrightwood, Chicago 14, Ill., 43, Tel: GRaceland 7-0660

Akro-Mils, Inc., 820 E. Market St., Akron 9, Ohio, 84, Tel: BL 3-7100

Alac, Inc., 375 W. Arden St., Glendale, Calif., 73, 91, Tel: CI 4-7261

Aladdin Electronics, Div. Aladdin Industries Inc., 719 Murfreesboro Rd., Nashville 10, Tenn., 45 52, 76, Tel: CHapel 2-3411, Yr: 1925, Emp: 80, ▲10, $800,000

Albano Co., Inc., 555 W. 54th St., New York 19, N.Y., 84, 87, Tel: PLaza 7-5887, Yr: 1890, Emp: 140

Alcar Instruments, Inc., 411 Robbins Ave., Trenton 8, N.J., 14, 38, 96, Yr: 1953, Emp: 20, ▲3, $125,000

Alcon Metal Products, Inc., 1750 N. Kimball Ave., Chicago 47, Ill., 38, 45, 46, 48, 55, 64, 71, 73, Tel: BElmont 5-5030, Yr: 1945, Emp: 210, $3,000,000

**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 4, 9, 12, 13, 16, 36, 38, 63, Tel: FOrest 6-4467**

**See ad on page 276**

**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 9, 46, 48, 53, 55, 62, 64, 71, 72, 73, 84, 85, 87, 91, 98, 104, Tel: JUniper 3-0160, Yr: 1929**

**See ad on page 496**

Alden Systems Co., 1 Washington St., Westboro, Mass., 13, 16, 53, 62, 84, 96, Tel: FOrest 6-4467

Alfax Paper & Engineering Co., P.O. Box 125, Washington St., Westboro, Mass., 13, 16, Tel: FOrest 6-4467

**Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 16, 21, 39, 40, 52, 72, 80, 83, Tel: HAncock 6-2150, Yr: 1948, Emp: 67, ▲9**

**See ad on page 590**

Alfred Electronics, 897 Commercial St., Palo Alto, Calif., 21, 28, 38, 40, 63, Tel: DAvenport 6-6496, Yr: 1955, Emp: 55, ▲5, $1,000,000

Algo Inc., 251 West St., S. Hackensack, N.J., 89, 91, Tel: HUbbard 7-8619, Yr: 1952, Emp: 40, $300,000

All American Tool & Mfg. Co., 8027 Lawndale, Skokie, Ill., 14, 96, Tel: ORchard 3-7084, Yr: 1941, Emp: 12, $220,000

All Channel Products Corp., 47-39 49th St., Woodside 77, N.Y., 39, Tel: EXeter 2-1336, Yr: 1949, Emp: 80

All Star Products, Inc., Squire Ave., Defiance, Ohio, 80, Tel: 2-1065, Yr: 1904, Emp: 300

All-State Welding Alloys Co., Inc., 249-55 Ferris Ave., White Plains, N.Y., 103, Tel: WHite Plains 8-4646, Yr: 1916, Emp: 68, $250,000

**All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 45, 52, 88, 94, Tel: EDgewood 3-3090, Yr: 1953, Emp: 30, ▲1**

**See ad on page 439**

Allegany Instrument Co., Inc., 1091 Wills Mountain, Cumberland, Md., 9, 14, 25, 38, 58, 63, 75, Tel: PA 4-1200, Yr: 1952, Emp: 229, ▲1, $1,800,000

**Allegheny Electronic Chemicals Co., 207 Hooker-Fulton Bldg., Bradford, Pa., 101, Tel: FOrest 2-3586**

**See ad on page 696**

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa., 48, 54, 97, Tel: COurt 1-5300

Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis., 4, 40, 43, 48, 52, 57, 68, 69, 72, 73, Tel: ORchard 1-2000

Allen Electric & Equip. Co., 2101 No. Pitcher St., Kalamazoo, Mich., 19, 25, 58, 63, 68, 69, 72, 76, 84, 87, 89, 91, 98, Tel: FIreside 5-8531, Yr; 1920, Emp: 250, ▲1, $4,300,000

Allen Hollander Co., Inc., 385 Gerard Ave., New York 51, N.Y., 91, Tel: MOtt Haven 5-1818

Allied Allegri Co., Inc., 141 River Road, Nutley 10, N.J., 38, 64, 73, 85, 89, 91, 94, Tel: NUtley 2-3910, Yr: 1945, Emp: 110, $1,200,000

Allied Chemical Corp., General Chemical Div., 40 Rector St., New York 6, N.Y., 95, 97, 101, Tel: HAnover 2-7300

**Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., 45, 57, 68, 71, 72, 91, Tel: BUtterfield 8-7403, Yr: 1938, Emp: 1,000, ▲5**

**See ad on page 508**

Allied Research Assoc., Inc., Div. Boeing Airplane Co., 43 Leon St., Boston 15, Mass., 4, 14, 15, 24, 81, 88, 96, Tel: GA 7-2434, Yr: 1951, Emp: 260, ▲5, $24,000

Allied Research & Engineering Div., Allied Record Mfg. Co., 6916 Santa Monica Blvd., Hollywood 38, Calif., 39, 83, 89, Tel: HOllywood 2-1251, Yr: 1952, Emp: 22, ▲1, $250,000

Allies' Products Corp., P.O. Box 188, Kendall 56, Fla., 69, Tel: CEdar 5-5424, Yr: 1951

Allis-Chalmers Mfg. Co., Milwaukee 1, Wisc., 4, 43, 47, 63, 72, 76, Tel: SPring 4-3600, Yr: 1901, Emp: 36,000

Allison Laboratories, Inc., 11301 E. Ocean Ave., Whittier, Calif., 3, 16, 52, 94, Tel: OWen 1-0115, Yr: 1950, Emp: 12, ▲2, $216,000

Allmetal Screw Products Co., Inc., 821 Stewart Ave., Garden City, L.I., N.Y., 91, Tel: Ploneer 1-1200, Yr: 1929, Emp: 150

Alloys Unlimited, Inc., 21-01 43rd Ave., Long Island City 1, N.Y., 72, 85, 89, 90, 97, 101, 103, Tel: STillwell 6-4480, Yr: 1957, Emp: 100

Alonge Products, Inc., 163 West 23rd St., New York 11, N.Y., 65, Tel: WAtkins 4-2815, Yr: 1952

Alpar Mfg. Corp., 220 Demeter St., Palo Alto, Calif., 39, Tel: DAvenport 6-8105, Yr: 1953, Emp: 10, $125,000

Alpha Corporation, 820 E. Arapaho Road, Richardson, Tex., 4, 9, 22, 94, Tel: AD 5-2331, Yr: 1959, Emp: 750

Alpha Metals, Inc., 56 Water St., Jersey City 4, N.J., 89, 97, 101, 103, Tel: HEnderson 4-6778, Yr: 1930, Emp: 150

**Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 85, 88, 91, 93, 104, Tel: ALgonquin 5-5400, Yr: 1921, Emp: 100**

**See ad on page 604**

Altec Lansing Corp., 1515 So. Manchester Ave., Anaheim, Calif., 8, 12, 32, 34, 38, 45, 51, 52, 56, 59, 75, 76, 80, Tel: PRospect 4-3900, Yr: 1941, Emp: 356, ▲5, $4,700,000





Altec Service Co., Div. Ling-Temco Electronics, Inc., 161 Sixth Ave., New York 13, N.Y., 32, 34, 89, 94, Tel: ALgonquin 5-3636

Althor Products, 2301 Benson Ave., Brooklyn 14, N.Y., 84, Tel: ESplanade 3-7444, Yr: 1955, Emp: 7, $1200

Alto Scientific Co., Inc., 855 Commercial St., Palo Alto, Calif., 4, 20, 21, 36, 38, 47, 52, 63, 68, 80, Tel: DAvenport 1-3434, Yr: 1955, Emp: 50, ▲5, $700,000

Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa., 84, 85, 86, 91, 97, 103, Tel: ATlantic 1-4545, Yr: 1888, Emp: 45,000

Aluminum Foils, Inc., Jackson, Tenn., 97

Alvo Nut & Bolt Co., Inc., 1601 Grande Vista, Los Angeles 23, Calif., 91, Tel: ANgelus 2-5131, Yr: 1930, Emp: 65

Amatom Electronic Hardware Co., Inc., 88 Drake Ave., New Rochelle, N.Y., 46, 53, 55, 62, 73, 86, 89, 91, Yr: 1956, Emp. 22

Ambroid Company, Inc., Box 30, Weymouth 88, Mass., 95, Tel: EDgewater 5-6658, Yr: 1834, Emp: 150, $3000

**Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 34, 42, 60, 84, 87, 89, Tel: UNderhill 7-8500, Yr: 1943, Emp: 155**

**See ad on page 623**

Amerac Incorporated, Dunham Road, Beverly, Mass., 10, 14, 20, 21, 38, 39, 52, 58, 80, Tel: WAlker 2-8611, Yr: 1946, Emp: 55, ▲2, $100,000

Amerelay Corporation, The, 130 County Courthouse Rd., New Hyde Park, L.I., N.Y., 68, Tel: PI 7-2150, Yr: 1959, Emp: 6

**American Aluminum Co., 230 Sheffield St.—ID, Mountainside, N.J., 84, 87, 89, Tel: ADams 3-3500, Yr: 1911, Emp: 110, $1,000,000**

**See ad on page 631**

American Brasing Alloys Corp., P.O. Box 11, Pelham, N.Y., 85, 92, 97, 103, Tel: MO 4-5858, Yr: 1958, Emp: 12

American Brass Co., The, Fabricated Metal Goods Div., 25 Broadway, New York 4, N.Y., 53, 72, 73, 89, 91, 97, 104

American Communications Corp., 280 Broadway, New York 7, N.Y., 4, 6, 32, 38, 39, 46, 85, Tel: REctor 2-0320, Yr: 1936, Emp: 80, $1,000,000

American Cystoscope Makers, Inc., 8 Pelham Pkwy., Pelham Manor, N.Y., 19, Tel: PE 8-4800, Yr: 1900, Emp: 500, ▲2

American Development Electronics Co., 77 Poinier St., Newark 8, N.J., 1, 3, 11, 12, 17, 18, 22, 24, 28, 32, 38, 39, 46, 55, 58, 63, 83, 89, 91, 98, Tel: BI 8-1330, Yr: 1957, Emp: 25, ▲1

American Electric Cable Co., 181 Appleton St., Holyoke, Mass., 85, Tel: JEfferson 9-9893, Yr: 1918, Emp: 50, $900,000

American Electrical Heater Co., 6110 Cass Ave., Detroit 2, Mich., 96, Tel: TRinity 5-2505, Yr: 1894, Emp: 175, ▲2

**American Electronic Laboratories, Inc., 121 N. Seventh St., Philadelphia 6, Pa., 1, 14, 19, 38, 39, 40, 47, 49, 52, 63, 72, 83, 94, Tel: WAlnut 5-8780, Yr: 1950, Emp: 180, ▲20, $1,950,000**

**See ad on page 369**

American Electronics Co., 178 Herricks Rd., Mineola, L.I., N.Y., 1, 2, 22, 39, 46, 52, 55, 72, 100, Tel: Ploneer 1-5030, Yr: 1952, Emp: 20, ▲2

**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 4, 9, 14, 17, 29, 30, 36, 38, 42, 47, 60, 63, Tel: DUnkirk 5-7401, Yr: 1945, Emp: 2000**

**See ad on page 164**

American Elite, Inc., 48-50 34th St., Long Island City 1, N.Y., Importer, 6, 61, 66, 67, 70, 77, 78, Tel: ST 6-8913

**American Feldmuehle Corp., 11 W. 42nd St., New York 36, N.Y., Importers, 54, 86, Tel: PEnnsylvania 6-9751, Yr: 1956, Emp: 3, ▲1, $33,000**

**See ad on page 619**

American Gas Furnace Co., 141 Spring St., Elizabeth, N.J., 89, 92, Tel: ELizabeth 2-2120, Yr: 1878, Emp: 150

American Geloso Electronics, Inc., 251 Park Ave., South, New York 10, N.Y., Importers, 2, 6, 19, 29, 31, 32, 38, 56, 59, 65, 80, Tel: ALgonquin 4-2282, Yr: 1957, Emp: 25, ▲1

American Hydromath Corp., 24-20 Jackson Ave., Long Island City 1, N.Y., 9, 58, 88, 89, 94, Tel: EN 2-4212, Yr: 1938, Emp: 15

American Instrument Co., Inc., 8030 Georgia Ave., Silver Spring, Md., 4, 14, 36, 38, 68, 74, 92, 94, Tel: JUniper 9-1727, Yr: 1919, Emp: 275

American Insulator Corp., New Freedom, Pa., 30, 39, 84, 89, 91, 93, 98, 104, Tel: GLen Rock 4211, Yr: 1916, Emp: 355, $800,000

American Latex Fibre Corp., 500 No. Broadway, Lawrence, Mass., 91, Tel: MUrdock 5-5172, Yr: 1953, Emp: 70

**American Lava Corp., Cherokee & Mfrs. Road, Chattanooga 5, Tenn., 43, 44, 48, 54, 86, 91, 93, 98, 104, Tel: AMherst 5-3411, Yr: 1902, Emp: 1200**

**See ad on page 178**

American Machine & Foundry Co., Government Products Group, 1701 K St., N.W., Washington 6, D.C., 4, 24, 27, 39, 43, 44, 58, 76, 84, 86, Tel: ME 8-6505, Yr: 1900, Emp: 12,000

American Machine & Foundry Co., Tobacco Div., 261 Madison Ave., New York 16, N.Y., 4, 9, Yr: 1900, Emp: 13,000

**American-Marietta Co., Adhesive, Resin & Chemical Div., 3400 13th Ave., S.W., Seattle 4, Wash., 99, Tel: MAin 3-3311, Yr: 1913, Emp: 120**

**See ad on page 691**

American Measurement & Control, Inc., 240 Calvary St., Waltham 54, Mass., 4, 30, 38, 45, Tel: TWinbrook 4-6212

American Metal Climax, Inc., 1270 Ave. of Americas, New York 20, N.Y., 97, 101, Tel: PL 9-9700, Yr: 1887, Emp: 10,000, $20,000,000

**American Microphone Mfg. Co., Div. G-C Textron Electronics, Inc., 412 S. Wyman St., Rockford, Ill., 59, Tel: WOodland 8-9661, Yr: 1920, ▲3**

**See ad on page 640**

**American Molded Products Co., 2723 W. Chicago Ave., Chicago 22, Ill., 45, 65, 89, 91, 98, Tel: ARmitage 6-3235, Yr: 1938, Emp: 350, $4,000,000**

**See ad on page 639**

American Optical Co., Instrument Division, Box "A", Buffalo 15, N.Y., 14, Tel: FI 4000

**American Platinum & Silver Div., Engelhard Industries, Inc., 231 New Jersey R.R. Ave., Newark 5, N.J., 97, 103, Tel: MArket 2-8035**

**See ad on page 170**

American Printed Circuits Co., 104 Forrest St., Metuchen, N.J., 64, 99, Tel: LIberty 8-5777, Yr: 1954, Emp: 7, ▲2, $150,000

American Products Mfg. Co., 8127-33 Oleander St., New Orleans 18, La., 91, 95, Tel: HU 2-1501, Yr: 1919

American Quartz Laboratories, Inc., Route 9-D, Garrison, N.Y., 28, 49, 89, 93, 99, Tel: GA 4-3338, Yr: 1946, Emp: 10

American Radar Components, Inc., 415 E. Main St., Denville, N.J., 83, Tel: OAkwood 7-5530, Yr: 1953, Emp: 25, ▲2

American Radio Co., Inc., 445 Park Ave., New York 22, N.Y., 77, 79, Tel: PLaza 3-5046, Yr: 1914

American Research Corp., Route 6, Farmington, Conn., 14, Tel: ORchard 7-2693, Yr: 1953, Emp: 25

American Research & Mfg. Corp., 920 Halpine Ave., Rockville, Md., 4, 14, 17, 23, 28, 30, 38, 45, 47, 63, 64, 76, 82, 85, 88, 89, 94, 98, 99, 100, Tel: HA 7-7116, Yr: 1951, Emp: 65, ▲2, $150,000

American Scientific Development Co., Barton & Alabama, Box 109, Redlands, Calif., 14, Tel: PYramid 3-2713, Yr: 1953, Emp: 9

American Screw Co., W. Main St., Willimantic, Conn., 91, Tel: HArrison 3-6331, Yr: 1830, Emp: 750

American Sealants Co., 103 Woodbine St., Hartford 6, Conn., 54, 95, Tel: JAckson 2-1188, Yr: 1956, Emp: 20

**American Silver Co., Inc., 36-06 Prince St., Flushing 54, N.Y., 48, 85, 97, 103, 104, Tel: FLushing 3-8012, Yr: 1946, Emp: 50, ▲1**

**See ad on page 685**

**American Super-Temperature Wires, Inc., 10 W. Canal St., Winooski, Vt., 85, 91, 93, 99, Tel: UNiversity 2-9636, Yr: 1955, Emp: 200**

**See ad on page 606**

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

**American Television & Radio Co., 300 E. Fourth St., St. Paul 1, Minn., 4, 6, 22, 47, 63, 82, 96, Tel: CApital 2-3791, Yr: 1931**

See ad on page 472

American Therme Electric Co., 1023 N. Fuller Ave., Los Angeles 46, Calif., 74, Tel: HOllywood 4-1632, Yr: 1942

**American Time Products, Inc., 61-20 Woodside Ave., Woodside 77, L.I., N.Y., 3, 16, 33, 65, Tel: OLympia 1-7800, Emp: 100, ▲3**

See ad on page 348

American Tower Co., Box 29, Shelby, Ohio, 39, Tel: 4-2181, Yr: 1951, Emp: 15, $280,000

**American Tube Bending Co., 15 Lawrence St., New Haven, Conn., 85, 91, Tel: STate 7-2131**

See ad on page 605

**Amersil Quartz Div., Engelhard Industries, Inc., 685 Ramsey Ave., Hillside, N.J., 49, Tel: MUrdock 8-4500**

See ad on page 170

**Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 4, 10, 47, 58, 60, 62, 78, Tel: BUckingham 1-2727, Yr: 1935, Emp: 50, $350,000**

See ads on pages 463, 577

**Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 43, 62, 66, 70, 77, 78, 79, 85, Tel: WElls 1-6200, Yr: 1930, Emp: 550, ▲15**

See ad on pages 42-45

**Amperite Co., Inc., 561 Broadway, New York 12, N.Y., 68, 78, 82, Tel: CAnal 6-1446, Yr: 1924, Emp: 80, ▲1**

See ad on page 579

Ampex Corp., Ampex Data Products Co., 934 Charter St., Redwood City, Calif., 9, 29, 32, 36, 61, 65, 80, Tel: EMerson 9-7111, Yr: 1946, Emp: 4700, $43,800,000

Ampex Corp., Professional Products Co., Audio Div., 806 Chestnut St., Redwood City, Calif., 29, 38, 61, 65, Tel: EMerson 9-7111, Yr: 1947, Emp: 1234

Ampex Military Products Co., P.O. Box 727, Redwood City, Calif., 9, 29, 61, 65, Tel: LY 1-5511, Yr: 1959, Emp: 100, $14,000,000

**Amphenol-Borg Electronics Corp., Amphenol Cable & Wire Div., S. Harlem Ave. at 63rd St., Chicago 38, Ill., 85, Tel: BIshop 2-1000, Yr: 1932, Emp: 400**

See ad on page 146

**Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 39, 46, 52, 54, 55, 71, 73, 85, Tel: BIshop 2-1000, Yr: 1932, Emp: 1500**

See ad on page 146

Amphenol-Borg Electronics Corp., Amphenol Western Div., 9201 Independence Ave., Chatsworth, Calif., 46, Tel: DIamond 1-0710, Emp: 200

Amplifier Corp. of America, 398 Broadway, New York 13, N.Y., 3, 29, 38, 63, 65, Tel: WOrth 6-2929, Yr: 1936, Emp: 20, ▲1

Amplivox Ltd., Beresford Ave., Wembley, Middlesex, England, 32, 38, 56, 59, Tel: WEmbley 8991, Yr: 1935, Emp: 250

**Amtron Corp., 17 Felton St., Waltham 54, Mass., 6, 7, 36, 52, 83, 94, Tel: TWinbrook 4-5020, Yr: 1956, Emp: 3, ▲1, $30,000**

See ad on page 591

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N.Y., 85, Tel: HAnover 2-6300

Anadex Instruments, Inc., 11734 Arminta St., Van Nuys, Calif., 9, 10, 38, 58, Tel: TRiangle 3-1580, Yr: 1957, Emp: 15, ▲2, $180,000

**Analab Instrument Corp., 30 Canfield Rd., Cedar Grove, N.J., 25, Tel: CEnter 9-6500, Yr: 1959, Emp: 9, ▲4**

See ad on page 321

Analogue Controls, Inc., 200 Frank Rd., Hicksville, L.I., N.Y., 4, 9, 14, 30, 38, 63, 69, 72, 91, Tel: OVerbrook 1-7300, Yr: 1955, Emp: 140, ▲1

Anchor Metal Co., Inc., 966 Mecker Ave., Brooklyn 22, N.Y., 54, 97, 101, 103, Tel: STagg 2-7090

Anchor Plastics Co., Inc., 36-36 36th St., Long Island City 6, N.Y., 98, 99, Tel: RAvenswood 9-1494, Yr: 1941, Emp: 125

Anchor Specialty Mfg. Co., 300 Hollister Rd., Teterboro, N.J., 14, 55, 84, 87, 89, 94, Tel: ATlas 8-1939, Yr: 1950, Emp: 10, ▲1

Anders Electric Products, Inc., 50 Brook Rd., Needham Heights 94, Mass., 47, 63, Tel: HIllcrest 4-6990, Yr: 1958, Emp: 16

Andersen Labs., Inc., 501 New Park Ave., West Hartford 10, Conn., 4, 50, 94, Tel: ADams 6-1281, Yr: 1950, Emp: 72, ▲4, $700,000

Anderson Electric Corp., P.O. Box 2151, Birmingham 1, Ala., 46, Tel: TRemont 9-0411, Yr: 1926, Emp: 450, ▲2

Andrea Radio Corp., 27-01 Bridge Plaza North, Long Island City 1, N.Y., 6, 61, Tel: STillwell 4-5111, Yr: 1937, Emp: 400, ▲7

Andrew Antenna Corp., Ltd., 606 Beech St., Whitby, Ont., Canada, 39, 46, 52, 72, 83, 85, Tel: MO 8-3348, Yr: 1953, Emp: 35, ▲2

**Andrew Corp., 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 39, 46, 52, 72, 83, 85, Tel: TRiangle 4-4400, Yr: 1934, Emp: 360, ▲80**

See ad on page 371

ANelex Corp., 150 Causeway St., Boston 14, Mass., 9, Tel: RI 2-1720, Yr: 1952

**Anetsberger Brothers, Inc., 100 North Anets Dr., Northbrook, Ill., 84, Tel: CRestwood 2-0770**

See ad on page 599

Ansco Division, General Aniline & Film Corp., Vestal Parkway East, Binghamton, N.Y., 20, 27, 30, 38, 40, 75, 80, 83, 89, 91, 94, Tel: RA 9-6555, Yr: 1812, Emp: 3800, ▲1, $990,867

**Ansley Mfg. Co., Arthur, New Hope, Pa., 64, Tel: AXtel 7-2711, Yr: 1948, Emp: 20, ▲1**

See ad on page 497

Antara Chemicals, Div. General Aniline & Film Corp., 435 Hudson St., New York 14, N.Y., 48, 97, Tel: WAtkins 4-0600, Yr: 1929, Emp: 8000, $1,100,000

**Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 14, 17, 21, 27, 39, 40, 46, 52, 80, 83, 86, Tel: EDgewood 4-8770, Yr: 1957, Emp: 11, ▲2, $100,000**

See ad on page 379

Antenna Specialists Co., The, 12435 Euclid Ave., Cleveland 6, Ohio, 39, Tel: SW 1-7878, Yr: 1953, Emp: 98, ▲2

**Antenna Systems, Inc., Hingham Industrial Ctr., Hingham, Mass., 39, 52, 83, 84, 89, Tel: RIverview 9-4700, Yr: 1959, Emp: 75, ▲10, $1,000,000**

See ad on page 369

Anthony & Co., J. L., 115 Baker St., Providence 5, R.I., 48, 74, 89, 97, 103, Tel: HO 7-9700, Yr: 1914, Emp: 20

Anti-Corrosive Metal Products Co., Inc., P.O. Box 1894, Albany, N.Y., 91, Tel: PErshing 2-7711, Yr: 1927, Emp: 130, ▲3, $1,000,000

Antlab, Inc., 6330 Proprietors Rd., Worthington, Ohio, 4, 9, 16, 20, 21, 23, 28, 33, 39, 58, Tel: TUxedo 5-5396, Yr: 1954, Emp: 78, ▲6

**Anton Electronic Laboratories, Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 14, 24, 46, 54, 64, 69, 78, Tel: EVergreen 6-5715, Yr: 1949, Emp: 325, ▲25, $1,900,000**

See ad on pages 319, 409, 581

Anton Machine Works, 1226 Flushing Ave., Brooklyn 37, N.Y., 83, 104, Tel: GL 6-9255, Yr: 1933, Emp: 50

Apex Coated Fabrics Co., Inc., 12-16 E. 22nd St., New York 10, N.Y., 89, 99 Tel: SPring 7-3140

Apex Machine Co., 14-13 118th St., College Point 56, L.I., N.Y., 96, Tel: FL 8-2010

Applegate & Co., C. J., 1840 24th St., Boulder, Colo., 4, 63, 64, 82, 94, Tel: HIllcrest 2-8750, Yr: 1949, Emp: 9, ▲1, $100,000

Applied Dynamics Corp., 330 Bear Hill Rd., Waltham 54, Mass., 3, 21, 38, 96, Tel: TWinbrook 4-7010, Yr: 1956, Emp: 14, ▲1

Applied Dynamics, Inc., Box 612, Ann Arbor, Mich., 4, 9, 30, 38, 64, 94, Tel: NO 2-4493, Yr: 1957, Emp: 15, ▲4







Applied Electro Mechanics, Inc., 2350 Duke St., Alexandria, Va., 1, 14, 45, 64, 72, 81, 89, 91, 96, Tel: KIng 8-2166, Yr: 1952, Emp: 8, ▲2, $60,000

Applied Electronics Co., Subsid. Raytheon Co., 213 E. Grand Ave., South San Francisco, Calif., 18, 22, 26, 84, 87, 89, Tel: PLaza 6-4100, Yr: 1946, Emp: 140, ▲3, $1,000,000

**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 1, 9, 10, 19, 25, 29, 35, 36, 72, 75, Tel: LIberty 9-1500, Yr: 1959, Emp: 100, ▲5, $1,000,000**

See ad on page 353

Applied Magnetics Corp., 1407 Norman Firestone Blvd., Goleta, Calif., 9, 29, 65, 88, 94, Tel: WO 7-2016, Yr: 1957, Emp: 25, ▲3

Applied Physics Corp., 2724 S. Peck Rd., Monrovia, Calif., 14, 24, Tel: HIllcrest 6-7181, Yr: 1946, Emp: 200

Applied Radiation Corp., 2104 N. Main St., Walnut Creek, Calif., 14, 19, 21, 24, 38, 57, 63, 76, 79, 83, 94, Tel: YE 5-2250, Yr: 1953, Emp: 150, ▲5, $1,600,000

**Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 21, 36, 38, 40, 52, 80, 83, Tel: POrt Washington 7-8707, Yr: 1950, Emp: 46, ▲4, $750,000**

See ad on page 360

Applied Technology Corp., 475 Fifth Ave., New York 17, N.Y., 4, 38, 40, 69, 72, Tel: LExington 2-4991, Yr: 1958

Applied Technology, Inc., 930 Industrial Ave., Palo Alto, Calif., 20, 26, 27, 38, 52, 88, 94, Tel: DA 1-5135, Yr: 1959, Emp: 15, ▲4, $141,000

Arber Mfg. Co., Inc., 40 McDermott Rd., North Haven, Conn., 91, 102, Tel: LO 2-6424, Yr: 1946, Emp: 10, $153,287

Arch Gear Works, Inc., 97 Holmes St., North Quincy 71, Mass., 4, 30, 72, Tel: GR 1-9600, Yr: 1946, Emp: 150, ▲4

Arco Electronics, Inc., 64 White St., New York 13, N.Y., 11, 33, 43, Tel: WO 6-0530, Yr: 1945, Emp: 80, ▲2, $2,100,000

Arde Assoc., Engineering Div., 75 Austin St., Newark 2, N.J., 88, 89, 92, 94, 100, Tel: BIgelow 8-8583, Yr: 1951, Emp: 135, ▲4, $200,000

Ardente Acoustic Labs., Ltd., Minerva Rd., London N.W. 10, England, 38, 45, 46, 69, 72, 76, Tel: ELGar 3923

**Arenberg Ultrasonic Laboratory, Inc., 94 Green St., Jamaica Plain 30, Mass., 14, 28, 38, 40, 50, Tel: JAmaica 2-8640, Yr: 1950, Emp: 4, ▲1**

See ad on page 435

Argonne Electronics Mfg. Corp., 165-11 South Rd., Jamaica 33, N.Y., 34, 38, 41, 46, 52, 55, 56, 58, 59, 61, 65, 71, 72, 73, 76, 85, 91, 96, 98, Tel: OLympia 7-7528, Yr: 1951

Aries Laboratories, Inc., 225 Greenwich Ave., Stamford, Conn., 93, 98, 99, Tel: RAvenswood 9-9001

Ark Electronics Corp., 624-26 Davisville Rd., Willow Grove, Pa., 14, 52, 88, 94, 102, Tel: LIvingston 8-1100, Yr: 1952, Emp: 12, ▲5, $12,000

Arkay Products Mfg. Co., 4111 W. Jefferson Blvd., Los Angeles 16, Calif., 4, 38, 56, 63, 72, 85, Tel: RE 1-2501, Yr: 1951, Emp: 36, ▲1, $236,000

Arlin Mfg. Co., 12 Perkins St., Lowell, Mass., 89, 91, 93, 99, Tel: GLenview 4-6751, Yr: 1954, Emp: 10

Arma Div., American Bosch Arma Corp., 320 Fulton Ave., Hempstead, N.Y., 1, 4, 9, 30, Tel: PIoneer 2-2000, Yr: 1954, Emp: 9000, ▲300, $100,000,000

Armel Electronics, Inc., 810 Fifth Ave., Brooklyn 32, N.Y., 46, 71, 73, Tel: STerling 8-0122, Yr: 1949, Emp: 70

Armour Alliance Industries, 16123 Armour St., N.E., Alliance, Ohio, 89, 91, Tel: TAlbot 1-3510, Yr: 1896, Emp: 500

Armour Research Foundation, Ill. Institute of Technology, 10 W. 35th St., Chicago 16, Ill., 94, Tel: CA 5-9600, Yr: 1936, Emp: 1275

Armstrong Cork Co., W. Liberty & Charlotte Sts., Lancaster, Pa., 81, 95, Tel: EXpress 7-0611

Armstrong Products Co., P.O. Box 1-RA, Warsaw, Ind., 95, 96, 99, Yr: 1949, Emp: 30

Armstrong Whitworth Equipment, Sir W. G. Armstrong Whitworth Aircraft, Ltd., Hucclecote, Gloucester, England, 4, 9, 36, 38, 39, Tel: GLoucester 6-7011, Yr: 1956, Emp: 300

Arnhold Ceramics, Inc., 1 E. 57th St., New York 22, N.Y., 56, 69, 96, Tel: PLaza 5-8213

**Arnold Engineering Co., The, P.O. Box G, Marengo, Ill., 48, 57, Tel: ANdover 3-6300 (Chicago), Yr: 1936, Emp: 700, ▲10**

See ad on pages 72-73

Arnold Magnetics Corp., 6050 W. Jefferson Blvd., Los Angeles 16, Calif., 38, 45, 47, 63, 76, 96, Tel: VE 7-5315, Yr: 1954, Emp: 60

Arnoux Corp., 11924 W. Washington Blvd., Los Angeles 66, Calif., 2, 4, 5, 9, 22, 36, 38, 46, 47, 54, 58, 63, 72, 75, 76, 88, 91, Tel: UPton 0-5371, Yr: 1952, Emp: 200

Arrow-Hart & Hegeman Electric Co., The, 103 Hawthorn St., Hartford 6, Conn., 72, Tel: CHapel 9-8471, Yr: 1890, Emp: 2300

Arrow Machinists & Fabricators, 154 E. Third St., Mt. Vernon, N.Y., 84, 87, 89, Tel: OWens 9-4000, Yr: 1951, Emp: 15

Arrow Radio Co., 1829 Davenport Rd., Toronto, Ont., Canada, 43, Yr: 1944, Emp: 12

Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 89, 103, 104, Tel: HUmboldt 4-2100, Yr: 1923, Emp: 150

See ad on page 703

Artisan Electronics Corp., 171 Ridgedale Ave., Morristown, N.J., 45, 68, 72, Tel: JEfferson 8-8500, Yr: 1950, Emp: 50, $500,000

Artisan Metal Works Co., 11100 Madison Ave., Cleveland 2, Ohio, 31, 84, 87, 91, Tel: LAkewood 1-6173, Yr: 1929, Emp: 100, $500,000

**Artos Engineering Co., 2735 S. 28th St., Milwaukee 46, Wis., 96, Tel: MItchell 5-6010, Yr: 1914, Emp: 200**

See ad on page 667

Artronic Instrument Co., The, 11232 Triangle Lane, Silver Spring, Md., 1, 9, 14, 21, 25, 33, 50, 64, 76, 88, 89, 94, Tel: LOckwood 5-4417

Arwood Precision Casting Corp., 321 W. 44th St., New York 36, N.Y., 83, Tel: JUdson 2-4210

Asco Wire & Cable Co., The, 2 Burroughs St., Bridgeport 8, Conn., 85, Tel: EDison 6-1864, Yr: 1950, Emp: 30

Asheville-Schoonmaker Mica Co., 900 Jefferson Ave., Newport News, Va., 93, 104, Tel: CHestnut 4-7311, Yr: 1928, Emp: 350

Ashland Electric Products, Inc., 32-02 Queens Blvd., Long Island City 1, N.Y., 42, 60, Tel: EXeter 2-4010, Yr: 1952, Emp: 100, $750,000

Assembly Products, Inc., Wilson Mills Rd., Chesterland, Ohio, 4, 14, 58, 68, Tel: HAmilton 3-3131, Yr: 1945, Emp: 290, ▲5

Associated American Winding Machinery, Inc., 750 St. Anns Ave., New York 56, N.Y., 96, Tel: CYpress 2-5050, Yr: 1952, Emp: 19

Associated Commodity Corp., 620 Fifth Ave., New York 20, N.Y., 93, Tel: CIrcle 5-6150, Yr: 1919

Associated Electrical Industries, Ltd., Instrumentation Div., P.O. Box No. 1, Harlow, Essex, England, 4, 9, 16, 38, 47, 58, 74, Tel: HArlow 2-1231

Associated Engineering Corp., 65 Kent St., Brookline 46, Mass., 55, 89, Tel: ASpinwall 7-1664, Yr: 1949, Emp: 23, ▲3, $250,000

Associated Engineering & Mfg. Corp., Glen Ridge, N.J., 85, 88, 89, 96, 97, 104, Tel: PIlgrim 3-8899, Yr: 1950, Emp: 50, ▲5

**Associated Research, Inc., 3792 W. Belmont Ave., Chicago 18, Ill., 3, 5, 14, 15, 63, 76, Tel: COrnelia 7-4040, Yr: 1936, Emp: 35, ▲1**

See ad on page 279

**Associated Specialties Co., 1751 Main St., Orefield, Pa., 63, Tel: EXpress 5-1275, Yr: 1952**

See ad on page 475



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Associated Spring Corp., 18 Main St., Bristol, Conn., 45, 73, 88, 89, 91, 92, 96, 104, Tel: LUdlow 3-1331, Yr: 1923, Emp: 3500

Associated Spring Corp., B-G-R Div., 40300 Plymouth Rd., Plymouth, Mich., 89, 91, Tel: GLenview 3-6100

**Associated Testing Laboratories, Inc., 115 Route 46, Wayne, N.J., 14, 92, 94, 96, Tel: CLifford 6-2800, Yr: 1956, Emp: 120, ▲6**

**See ads on pages 279, 660**

Astatic Corporation, The, Jackson & Harbor Sts., Conneaut, Ohio, 15, 59, 61, 65, Tel: 2-2656, Yr: 1933, Emp: 500

Astra, Inc., P.O. Box 226, Raleigh, N.C., 88, 94, Tel: VAnce 8-4386

Astron Corp., 255 Grant Ave., East Newark, N.J., 43, 52, Tel: HUmboldt 2-7800

Atkins & Merrill, Inc., Boston Post Rd., South Sudbury, Mass., 39, 84, 89, 91, 99, 102, Tel: HIlltop 3-8822, Yr: 1938, Emp: 170, $200,000

Atlantic Design Co., 796 Broad St., Newark 2, N.J., 88, Tel: MArket 3-5864, Yr: 1951, Emp: 350, ▲50, $1,000,000

Atlantic Research Corp., Shirley Hwy. at Edsall Rd., Alexandria, Va., 3, 14, 15, 17, 18, 34, 36, 38, 59, 75, 88, Tel: FL 4-3400, Yr: 1949, Emp: 1500, ▲3, $270,000

Atlantis Electronics Corp., 3326 Broadway, Garland, Tex., 4, 14, 38, 45, 63, 64, 88, 96, Tel: BRoadway 8-2465, Yr: 1957, Emp: 20, ▲1, $150,000

Atlas Engineering Co., Inc., 176 Blue Hill Ave., Roxbury 19, Mass., 38, 45, 47, 52, 57, 63, 76, Tel: HIghlands 5-7100, Yr: 1950, Emp: 170, ▲4

Atlas Precision Products Co., 3801 Castor Ave., Philadelphia 24, Pa., 30, 89, Tel: JEfferson 5-3700, Yr: 1929, Emp: 250

Atlas Sound Corp., 1449 39th St., Brooklyn 18, N.Y., 56, 59, Tel: GEdney 8-5500, Yr: 1935, Emp: 100, $1,000,000

Atlee Corporation, 47 Prospect St., Woburn, Mass., 44, 49, 53, 91, 104, Tel: WEIls 3-5390, Emp: 95, ▲1

Atohm Electronics, 7648 San Fernando Rd., Sun Valley, Calif., 5, 11, 14, 69, 75, 89, Tel: STanley 7-9873, Yr: 1959, Emp: 50, ▲3

Atomic Accessories, Inc., 811 W. Merrick Rd., Valley Stream, L.I., N.Y., 16, 24, 58, 102, Tel: CU 5-9300, Yr: 1958, Emp: 17, ▲2

Atronic Products, Inc., One Bala Ave., Bala-Cynwyd, Pa., 3, 4, 14, 19, Tel: GR 7-1860, Yr: 1958

Attleboro Refining Co., Inc., 400 Union St., Attleboro, Mass., 89, 97, Tel: CAstle 2-3705

Atwood, Wilfrid L., 528 Adelaide Ave., S.E., Warren, Ohio, 4, 88, 92, Tel: EX 4-3868, Yr: 1948, Emp: 1, ▲1, $30,000

Auburn Mfg. Co., The, Stack St., Middletown, Conn., 89, 91, 93, 99, 102, 104, Tel: DIamond 6-6631, Yr: 1868, Emp: 75

Auburn Plastics, Inc., 950 McMaster St., Auburn, N.Y., 71, 84, 89, 93, 95, 98, 99, Yr: 1876, Emp: 750

Audax, Inc., 38-19 108th St., Corona, N.Y., 32, 56, 61, 65, Yr: 1939, Emp: 125

Audio Design Service, 216-18 40th Ave., Bayside 61, N.Y., 88, 94, 100, Tel: BAyside 4-4400

Audio Devices, Inc., 444 Madison Ave., New York 22, N.Y., 9, 65, Tel: PLaza 1-6640, Yr: 1937, Emp: 200, ▲3

Audio Electronic Corp., 1345 W. Fond du Lac Ave., Milwaukee 5, Wis., 56, 84, Tel: COncord 4-9010, Yr: 1947, Emp: 12

Audio-Master Corp., 17 E. 45th St., New York 17, N.Y., 29, 32, 61, Tel: OXford 7-0725

Audiosears Corp., Roxbury, N.Y., 55, 56, 59, 72, 85, Yr: 1950, Emp: 52, $250,000

**Audiotex Mfg. Co., Div. G-C Textron Electronics, Inc., 412 S. Wyman St., Rockford, Ill., 65, Tel: WOodland 8-9661**

**See ad on page 640**

Audiotronics Corp., 11057 Weddington St., North Hollywood, Calif., 6, 29, 32, 38, Tel: TRiangle 7-0567, Yr: 1957, Emp: 15, ▲2, $250,000

Auerbach Electronics Corp., 17th & Arch Sts., Philadelphia 3, Pa., 4, 9, 64, Tel: MOhawk 4-7633, Yr: 1957, Emp: 37, ▲13, $500,000

**Augat Brothers, Inc., 31 Perry Ave., Attleboro, Mass., 49, 53, 71, 91, 104, Tel: CAstle 2-2202, Yr: 1931, Emp: 100, $800,000**

**See ad on page 543**

Austenal Co., Div. Howe Sound Co., Microcast Products, 224 E. 39th St., New York 16, N.Y., 89, Tel: OX 7-5656, Yr: 1925, Emp: 1500

Austin Electronics, Div. The Austin Company, 76 9th Ave., New York 11, N.Y., 4, 9, 14, 16, 30, 38, 88, 89, 94, Tel: WA 4-3630, Yr: 1878, Emp: 250

Auto-Swage Products, Inc., 258 Canal St., Shelton, Conn., 73, 104, Tel: REgent 5-3361, Yr: 1947, Emp: 50, $250,000

Auto-Test, Inc., 600 S. Michigan Ave., Chicago 5, Ill., 14, 58, 63, 76, 84, Tel: WAbash 2-5459, Yr: 1947, Emp: 40, ▲1

**Automatic Coil Co., Inc., 195 Sackett St., Brooklyn 31, N.Y., 45, 52, 73, 76, Tel: ULster 2-5454, Yr: 1951, Emp: 35**

**See ad on page 399**

**Numbers following address show the product and service classes in which the firm appears. Information following telephone number is as follows. Yr: Year in which firm was founded. Emp: Total number of employees. ▲: Number of IRE Members employed. $: Net radio-electronic sales during last fiscal year.**

**Automatic Electric Co., Northlake, Ill., 68, 94, Tel: FIllmore 5-7111, Yr: 1889, Emp: 8000, ▲35, $120,000,000**

**See ad on page 66-67**

**Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 40, 46, 49, 52, 55, 63, 68, 71, 72, 80, 83, 91, Tel: EVergreen 8-6057, Yr: 1941, Emp: 210**

**See ad on page 409**

Automatic Production Research, 19 Beechwood Ave., Mount Vernon, N.Y., 69, 89, 94, 96, Tel: MO 4-7011, Yr: 1954, Emp: 5

Automatic Radio Mfg. Co., Inc., 122 Brookline Ave., Boston 15, Mass., 6, Tel: CO 6-1420, Yr: 1920

Automatic Switch Co., 50-56 Hanover Rd., Florham Park, N.J., 68, 72, Tel: FRontier 7-4600, Yr: 1888

Automatic Timing & Controls, Inc., King of Prussia, Pa., 4, 8, 10, 14, 15, 16, 24, 30, 33, 38, 58, 68, 72, 75, 76, 82, 88, Tel: BRoadway 9-1100, Yr: 1921, Emp: 300

Automation Dynamics Corp., 255 County Rd., Tenafly, N.J., 4, 9, 14, 20, 23, 24, 26, 36, 38, 39, 63, 75, Tel: LOwell 7-3232, Yr: 1957, Emp: 12, ▲2

Automation Electronics, Inc., 11924 W. Washington Blvd., Los Angeles 66, Calif., 46, Tel: UPton 0-6215, Yr: 1952, Emp: 220

Automation Engineering Lab., Inc., 24 Bridge St., Greenwich, Conn., 88, 89, 91, 94, 96, Tel: NO 1-6000, Yr: 1954, Emp: 30

Automation, Inc., 212 Worcester St., Wellesley Hills 82, Mass., 4, 9, Tel: CEdar 5-6621, Yr: 1954, Emp: 4, ▲1, $80,000

Automation Industries, Inc., 401 E. Green St., Pasadena, Calif., 4, 14, 38, Tel: SYcamore 3-8169

Automation Industries, Inc., Magnetics Div., 771 Hamilton Ave., Menlo Park, Calif., 38, 45, 57, 63, 76, Tel: DAvenport 6-7110, Yr: 1952, Emp: 25

Automation Management, Inc., 25 Brigham St., Westboro 80, Mass., 4, 9, 23, 36, 58, 96, 100, Yr: 1955, Emp: 3

Autometric Corp., 1501 Broadway, New York 21, N.Y., 4, 9, 15, 77, 94, Tel: BRyant 9-8700, Yr: 1957

Autonetics, Div. North American Aviation, Inc., 9150 E. Imperial Hwy., Downey, Calif., 1, 4, 9, 14, 27, 29, 94, Tel: SPruce 3-2233, Yr: 1928, Emp: 15,000

Autoscrew Co., Inc., 216 W. 18th St., New York 11, N.Y., 91, 104, Tel: WAtkins 9-1291, Yr: 1907, Emp: 15, $100,000

Autotron Inc., 2413 Main St., Santa Monica, Calif., 39, 45, 46, 53, 69, 73, 89, Tel: EX 9-8256, Yr: 1955, Emp: 12

Autotron, Inc., 3629 N. Vermilion St., Danville, Ill., 4, Tel: HIckory 6-0650, Yr: 1945, Emp: 15, $500,000





Autotronics, Inc., P.O. Box 208, Florissant, Mo., 4, 30, 63, Tel: TEmple 7-3565, Emp: 105, ▲4

Autron Engineering, Inc., 1301 Wilshire Blvd., Los Angeles 17, Calif., 13, Tel: HUbbard 3-7030, Yr: 1945, Emp: 10

**Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., 14, 25, 56, 88, 89, 93, 94, 96, Tel: OLiver 8-8911, Yr: 1929, Emp: 2300**

**See ad on page 278**

Avery Label Co., 1616 So. California, Monrovia, Calif., 91, Tel: MU 1-5237, Yr: 1935, Emp: 438, $537,000

Aviel Electronics, Inc., 1755 Berkeley St., Santa Monica, Calif., 40, 46, 55, 68, 72, Tel: UPton 0-6529, Yr: 1957, Emp: 20, $325,000

Avien, Inc., 58-15 Northern Blvd., Woodside 77, N.Y., 4, 30, 33, 38, 58, Tel: YEllowstone 2-4600, Yr: 1948, Emp: 340, ▲15, $8,000,000

Avionics Corp. of America, Maple Ave. & Horsham Rd., Horsham, Pa., 4, 14, 26, 28, 30, 37, 63, 84, 85, 87, 89, 94, Tel: OSborn 5-6611, Emp: 150, ▲1, $800,000

Avionics Ltd., P.O. Box 200, Niagara-on-the-Lake, Ontario, Canada, 21, 38, 64, 68, 83, 89, Tel: HOward 8-3632, Yr: 1953, Emp: 10

Avnet Corp., 5877 Rodeo Road, Los Angeles 16, Calif., 43, 46, 70, Tel: UP 0-6141

Avnet Electronics Corp., 70 State St., Westbury, L.I., N.Y., 43, 46, 55, 66, 68, 70, 72, 76, 77, Tel: EDgewood 3-5800

Avo Limited, Avocet House, 92-96 Vauxhall Bridge Rd., London S.W. 1, England, 3, 5, 14, 24, 28, 37, 38, 58, Tel: VIctoria 3404

Avon Tube Div., Higbie Mfg. Co., Wagner Road, Rochester, Mich., 89, 91, 97, Tel: OLive 2-9871, Yr: 1929, Emp: 375

**Axel Electronics, Inc., 134-20 Jamaica Ave., Jamaica 18, L.I., N.Y., 43, 52, Tel: AX 1-3900, Yr: 1956, Emp: 85, ▲4, $1,000,000**

**See ad on page 388**

# B

B&B Electronics Corp., 17360 S. Gramercy Pl., Gardena, Calif., 85, Tel: FAculty 1-1956, Yr: 1957, Emp: 115, ▲1, $750,000

B&C Insulation Products, Inc., Lincoln Hway., Iselin, N.J., 93, Tel: LIberty 8-0815, Yr: 1945, Emp: 6, $100,000

B&F Instruments, Inc., 3614 N. Lawrence St., Philadelphia 40, Pa., 5, 9, 14, 38, 58, 63, 75, Tel: GArfield 5-4175, Yr: 1952, Emp: 35, ▲3

BJ Electronics, Borg-Warner Controls, 3300 Newport Blvd., Santa Ana, Calif., 4, 9, 14, 21, 24, 27, 28, 29, 36, 38, 40, 52, 65, 75, 83, 89, 94, 100, Tel: KImberly 5-5581, Yr: 1945, Emp: 350, ▲15

B & K Instruments, Inc., 3044 West 106 St., Cleveland 11, Ohio, 3, 14, 59, Tel: CLearwater 1-8430, Yr: 1958, Emp: 12, $1,100,000

B & K Mfg. Co., 1801 W. Belle Plaine Ave., Chicago 13, Ill., 14, 37, Tel: EAstgate 7-7270

BTU Engineering Corp., Bear Hill Rd., Waltham 54, Mass., 92, Yr: 1951, Emp: 40

Babcock Radio Engineering, Inc., 1640 Monrovia Ave., Costa Mesa, Calif., 1, 4, 28, 36, 39, Tel: LIberty 8-7705, Yr: 1946, Emp: 550, ▲20, $2,500,000

Babcock Relays, Inc., 1640 Monrovia Ave., Costa Mesa, Calif., 68, Tel: LIberty 8-7705, Yr: 1955, Emp: 110, $1,000,000

Bach Auricon, Inc., 6900 Romaine St., Hollywood 38, Calif., 9, 14, 15, 29, 34, 38, 58, 61, Tel: HO 2-0931, Yr: 1931, Emp: 70, ▲3

Bache & Co., Semon, 636 Greenwich St., New York 14, N.Y., 17, 34, 91, Tel: WAtkins 4-2121, Yr: 1847, Emp: 200, $250,000

Bacon Industries, Inc., 192 Pleasant St., Watertown 72, Mass., 89, 91, 93, 94, 95, 98, Tel: WAtertown 4-5000, Yr: 1952, Emp: 15, ▲3, $25,000

Baer Co., N.S., 1-11 Montgomery St., Hillside 5, N.J., 89, 93, 99, Tel: MUrdock 8-2250

Bailey, Inc., P. A., 14 Alsop Ave., Middletown, Conn., 14, 29, 32, 33, 38, 39, 63, 94, Tel: DIamond 6-9610, Yr: 1930, Emp: 13, $17,000

Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, Ohio, 4, 9, 36, 58, 84, Tel: GLenville 1-4600

**Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 14, 17, 19, 24, 30, 36, 52, 63, 64, Tel: UNiversity 4-7420, Yr: 1936, Emp: 500, ▲15, $5,000,000**

**See ad on page 280**

Baker Chemical Co., J. T., No. Broad St., Phillipsburg, N.J., 95, Tel: GLencourt 4-2151, Yr: 1904, Emp: 800

Baker Co., Inc., The, 106 Granite St., Biddeford, Me., 14, 84, 92, 96, Tel: ATlantic 4-5951, Emp: 50

**Baker Contact Div., Engelhard Industries, Inc., 207 Grant Ave., East Newark, Harrison P.O., N.J., 72, 97, Tel: BIgelow 3-0300**

**See ad on page 170**

**Baker Platinum Div., Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 85, Tel: BIgelow 3-0300**

**See ad on page 170**

**Balco Capacitors, 50 Edison Place, Newark 2, N.J., 43, Tel: MItchell 3-5200, Yr: 1946, Emp: 50, ▲2**

**See ad on page 390**

Baldwin-Lima-Hamilton Corp., Electronics & Instrumentation Div., 42 Fourth Ave., Waltham 54, Mass., 14, 38, 58, 75, 96, Tel: TW 4-6700, Yr: 1956, Emp: 700, $6,000,000

Baldwin Piano Co., The, Industrial Products Div., 1801 Gilbert Ave., Cincinnati 2, Ohio, 9, 20, 24, 38, 76, Tel: MAin 1-4300

**Ballantine Laboratories Inc., Boonton, N.J., 3, 14, 38, 47, Tel: DEerfield 4-1432, Yr: 1929, Emp: 83, ▲7**

**See ad on page 144**

Ballastran, Div. Telex, Inc., 1701 No. Calhoun St., Fort Wayne 7, Ind., 76, Tel: EAstbrook 2285

Baracket, Albert J., Box 9127, Richmond 27, Pa., 88

**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 4, 14, 30, 38, 42, 60, 68, 72, 74, 75, Tel: WOodland 8-6833, Yr: 1900, Emp: 5100**

**See ad on page 465**

Barber Labs, Alfred W., 32-44 Francis Lewis Blvd., Flushing 58, N.Y., 7, 14, 31, 64, Tel: IN 3-3306, Yr: 1939, Emp: 10, ▲1, $175,000

Barco Chemical Products Co., 701-3 La Salle St., Chicago 5, Ill., 95, Tel: HArrison 7-2916, Yr: 1929, Emp: 12

Barco, Inc., Box 1222, Milwaukee 1, Wis., 43, 66, 69, 99, Tel: BRoadway 6-8515, Yr: 1950, Emp: 10, $50,000

Barden Corp., The, 200 Park Ave., Danbury, Conn., 91, Tel: PIoneer 3-9201, Yr: 1942, Emp: 1500

Barium & Chemicals, Inc., P.O. Box 390, Willoughby, Ohio, 95, 96, 97, Tel: WHitehall 2-5151, Yr: 1938, Emp: 80

Barker & Williamson Inc., Canal St. & Beaver Dam Rd., Bristol, Pa., 2, 3, 10, 11, 12, 14, 22, 26, 28, 31, 35, 38, 39, 44, 45, 46, 47, 50, 52, 58, 63, 72, 76, 80, 83, 84, 88, 89, 91, Tel: STillwell 8-5581, Yr: 1934, Emp: 375, $3,000,000

Barnes Development Co., 213 W. Baltimore Ave., Lansdowne, Pa., 4, 5, 11, 14, 71, 88, 89, 94, Tel: MAdison 6-3294, Yr: 1946, Emp: 22, ▲1, $60,000

Barnes Engineering Co., 30 Commerce Rd., Stamford, Conn., 4, 14, 17, 91, Tel: FIreside 8-5381, Yr: 1950, Emp: 240

Barnes & Reinecke, 230 E. Ohio St., Chicago 11, Ill., 4, 9, 10, 14, 30, 33, 47, 58, 75, 82, 88, 94, 100, Tel: DElaware 7-6350, Yr: 1934, Emp: 258, $500,000

Barnstead Still & Sterilizer Co., 2 Lanesville Terrace, Boston 31, Mass., 96, Tel: JAmaica 4-3100, Yr: 1878, Emp: 200, ▲3

Barrett Co., The Leon J., 1725 Grafton Rd., Worcester 1, Mass., 96, Tel: PL 5-4306, Yr: 1848, Emp: 35, $50,000

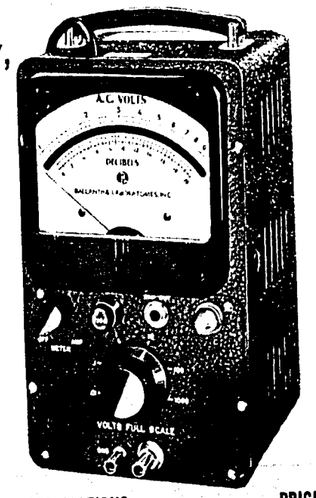
Barry-Wright Corp., 700 Pleasant St., Watertown 72, Mass., 14, 81, 87, 88, 89, 96, Tel: WAtertown 3-1150, Yr: 1945, Emp: 350, ▲20, $9,000,000



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

# BALLANTINE ELECTRONIC VOLTMETERS

## Famous since 1935 for Accuracy, Sensitivity and Reliability




Ballantine Voltmeters feature the same accuracy of reading on a logarithmic voltage scale. Alone or in combination with Ballantine accessories, they may be used to measure AC voltages from 20 microvolts to 28,000 volts, DC voltages from 10 microvolts to 100 volts and AC and DC currents from 0.1 microampere to 10 amperes.

Prices for modifications in mountings, finishes, special scales, terminal arrangements, etc., will be furnished on request.

All prices shown are net, F.O.B. Boonton, New Jersey, and are subject to change without notice. Write or call for a brochure on any of the instruments listed below.

| MODEL | FREQUENCY RANGE | VOLTAGE RANGE | INPUT IMPEDANCE | ACCURACY OVER ENTIRE SCALE | APPLICATIONS | PRICE |
|---|---|---|---|---|---|---|
| 300 Voltmeter | 10 CPS–150 KC | 1 MV–100 V | 0.5 meg shunted by 30 pf | 2% | General purpose, precision laboratory AC VTVM. | $220 |
| 300-D Voltmeter | 10 CPS–250 KC | 1 MV–1000 V | 2 meg shunted by 15 or 25 pf, depending on voltage range | 2% | General purpose, precision laboratory AC VTVM, a product improvement on the Model 300. | $255 |
| 300-E Voltmeter | 30 CPS–100 KC | 300 μV–300 V | 2 meg shunted by 20 or 30 pf, depending on voltage range | 2% | For mounting on 9½ inch relay rack. Rear connections for input, power, and decade switching. | $255 |
| 300-G Voltmeter | 10 CPS–250 KC | 1 MV–1000 V | 2 meg shunted by 15 or 25 pf, depending on voltage range | 1% 20 CPS-20 KC, 1 MV-250 V; 2% elsewhere | General purpose, precision laboratory AC VTVM, the most precise instrument in the Ballantine line. | $315 |
| 302-C Voltmeter, Battery Operated | 2 CPS–150 KC | 100 μV–1000 V | 2 meg shunted by 10 or 25 pf, depending on voltage range | 3% 5 CPS–100 KC; 5% elsewhere | Portable, battery-operated; no hum, with gain to 60 db. May be used on ungrounded or symmetrical circuits. | $255 |
| 305-A Voltmeter Peak Reading | 5 CPS–500 KC, sine waves. Pulses, 0.5 μs up and 5 PPS up | 1 MV–1000 V Peak or Peak-to-Peak | 2 meg shunted by 10 or 25 pf, depending on voltage range | 2%, sine waves 20 CPS to 200 KC; 4% elsewhere. 3% pulses above 3 μs and 100 PPS, and up to 5% other conditions | Measures Peak or Peak-to-Peak value of any repetitive waveform, distorted or undistorted sinewaves, or pulses. Its operating mode can be selected to respond to a peak to peak and positive or negative peak of the waveform. | $395 |
| 310-A Voltmeter | 10 CPS–2 MC or 5 CPS–4 MC as a null detector | 100 μV–100 V (Down to 40 μV at reduced accuracy) | 2 meg shunted by 9 or 19 pf, depending on voltage range | 3% 15 CPS–1 MC; 5% elsewhere | Multi-purpose broadband VTVM for measurements such as low and high-level acoustics, low-level vibration, carrier telephone transmission, ultrasonic, and rf measurements. For use as an extremely sensitive null detector for signals as low as 10 microvolts. | $250 |
| 314 Voltmeter Wide Band | 15 CPS–6 MC | 1 MV–1000 V (100 μV–1 MV without probe) | 11 meg shunted by 8 pf with probe, or 1 meg shunted by 25 pf without probe | 3% 15 CPS–3 MC; 5% elsewhere | Wide-range unit of great sensitivity to facilitate development and servicing of equipment in video applications, and R.F. heating, vibration, ultrasonics, piezo-electricity, etc. | $300 |
| 316 Voltmeter Very Low Frequency | 0.05 CPS–30 KC | 0.02 V–200 V Peak-to-Peak | 10 meg shunted by 17 or 40 pf, depending on voltage range | 3% | For development, design and routine testing of automatic control systems involving low frequency servomechanisms and where sub-audio frequencies down to 0.01 cps are encountered. Minimum pointer "flutter" down to 0.05 cps. | $330 |
| 320 Voltmeter True RMS | 5 CPS–500 KC | 100 μV–320 V | 10 meg shunted by 8 or 18 pf, depending on voltage range | 3% 15 CPS–150 KC; 5% elsewhere | Determines true root-mean-square magnitudes of periodic complex waves or voice potentials. Built-in calibrator. Crest factor range at full scale is 4.5 for high voltage scale and 15 for low voltage scale. Immune to severe overload. | $445 |
| 220-C Decade Amplifier, Battery Operated | 10 CPS–150 KC | Amplifies precisely 10 times or 100 times, as selected | 5 meg shunted by 15 pf | 2% | To increase sensitivity of Model 300 to 20 μv. Provides no-hum pre-amplifier of accurate gain over wide band. Output source impedance less than 900 ohms in series with 2 μf for 10 x gain, and less than 7000 ohms in series with 2 μf for 100 x gain. | $110 |

**420 DC and AC Precision Calibrator**

Provides accurate, convenient way of calibrating voltmeters, oscillographs, and other voltage-sensitive devices. Voltage Range: 0-10 V RMS, Peak-to-Peak, or DC. Frequency: 1 KC. Accuracy: better than 0.5% above 1 MV. Distortion and Hum: less than 0.25%. Setting Resolution: approaches 0.01% above 10 MV. Output Impedance (AC): 2-20 ohms depending on range setting. Output Impedance (DC): 0-4000 ohms depending on dial setting. Price: $365

**520 Direct Reading Capacitance Meter**

Provides one of the most convenient ways of measuring capacitance over an extremely wide range of values as encountered in paper, plastic, mica, ceramic, and air-dielectric types. Capacitance Range: 0.01 pf to 12 μF. Accuracy: 2% above 0.1 pf; 5% below 0.1 pf with dissipation factors as high as 0.05. Test Frequency: 1 KC. "Go-No-Go" acceptance limit pointers may be set to any desired limits, making it easy for completely untrained personnel to make accurate selections. Price: $295

**700 Sensitive Inverter**

A stable, precise voltmeter accessory that permits the measurement of DC potentials as low as 10 microvolts by converting the DC into a precisely amplified AC signal to which a Ballantine voltmeter is responsive. Input Voltage Range: 10 μv — 100 V DC. Features a built-in calibrator of 0.25% accuracy. Accuracy: better than 1% above 100 μv; Input Resistance: 10 meg for 1:100, or 50 meg for 10:1. May be used with Ballantine series 600 Shunt Resistors to measure DC from 0.01 μa to 10 a. Price: $365

**710 Linear AC to DC Converter**

Converts an AC voltage to a precise DC voltage which can be measured with a DC device such as a Type K Potentiometer, Digital DC Voltmeter, Recorder, etc. Features accuracy better than 0.25%. Input Voltage Range: 1 MV — 1000 V. Frequency Range: 30 cps — 250 KC. Input Impedance: 2 meg shunted by 15 pf, except 2 meg shunted by 25 pf on most sensitive range. Accuracy: ±0.25% 50 cps — 10 KC; ±0.5% 30 cps — 50 KC; ±1% above 50 KC. Price: $450

**BALLANTINE LABORATORIES, Inc.** Boonton, New Jersey
Phone: DEerfield 4-1432 TWX: BONTN 831

For details, circle #134 on Reader Service Card





Barta-Griffin Co., P.O. Box 808, 72 Commercial St., Worcester 1, Mass., 95, Tel: PLeasant 5-1231, Yr: 1920, Emp: 12, $60,000

Bartlett Mfg. Co., 1871 Grove St., Glenview, Ill., 64, Tel: PArk 4-5232, Yr: 1956, Emp: 10, $150,000

Barton Electronics, Inc., 1000 Farmington Ave., W. Hartford 7, Conn., 4, 14, Tel: ADams 3-3613, Yr: 1953, Emp: 4, ▲1

Barton Mines Corp., North Creek, N.Y., 95, Tel: 2296, Yr: 1878, Emp: 118

Barwood Electronics, Inc., 120 So. Maryland Ave., Glendale 5, Calif., 45, 63, 72, 76, Tel: CHapman 5-4063, Yr: 1955, Emp: 15, $150,000

Baso, Inc., 730 North Jackson St., Milwaukee 1, Wis., 68, Tel: BR 3-5388, Yr: 1915, Emp: 1013, ▲4

Bastian Bros. Co., 1600A Clinton Ave., N., Rochester 1, N.Y., 91, 98, Tel: COngress 6-5650, Yr: 1895, Emp: 400, $10,000

Bausch & Lomb Incorporated, 81461 Bausch St., Rochester 2, N.Y., 1, 14, 17, 24, 34, Tel: LOcust 2-3000, Yr: 1853

Beach-Russ Co., 420 Lexington Ave., New York 17, N.Y., 4, 14, 96, Tel: OR 9-7636, Yr: 1898, Emp: 110, ▲2

**Bead Chain Mfg. Co., The, 6 Mountain Grove St., Bridgeport 5, Conn., 55, 72, 104, Tel: EDison 4-4124, Yr: 1920, Emp: 200**

See ad on page 453

Bean & Co., Morris, Hyde Rd., Yellow Springs, Ohio, 83, Tel: ROckwell 7-7301

Bearing Inspection, Inc., 3311 East Gage Ave., Huntington Park, Calif., 3, 14, Tel: LUdlow 2-6131, Yr: 1955, Emp: 30, $10,000

Beattie-Coleman, Inc., 1000 No. Olive, Anaheim, Calif., 9, 19, 25, 34, Tel: PRospect 4-4503, Yr: 1946, Emp: 80

Beckman Instruments, Inc., Berkeley Div., 2200 Wright Ave., Richmond, Calif., 4, 9, 10, 14, 21, 23, 30, 58, 75, Tel: LAndscape 6-7730, Yr: 1935, Emp: 380

Beckman Instruments, Inc., Helipot Div., 2500 Fullerton Rd., Fullerton, Calif., 30, 50, 58, 60, 69, 91, Tel: TRojan 1-4848, Yr: 1935, Emp: 900, ▲20, $12,000,000

Beckman Instruments, Inc., Scientific & Process Instruments Div., 2500 Fullerton Road, Fullerton, Calif., 9, 14, 38, 63, 78, Tel: TRojan 1-4848, Yr: 1935, Emp: 2300

Beckman Systems Division, 325 N. Muller, Anaheim, Calif., 4, 9, 14, 36, 38, 68, Tel: PRospect 4-5130, Yr: 1935, Emp: 350

Beckman & Whitley, Inc., 993 E. San Carlos Ave., San Carlos, Calif., 15, 25, 58, 75, Tel: LYtell 3-7824, Yr: 1948, Emp: 125, ▲2, $2,000,000

Beck's Inc., 298-300 E. Fifth St., St. Paul 1, Minn., 9, 64, 72, 94, Tel: CApital 4-6465, Yr: 1917, Emp: 15, $48,000

Beede Electrical Instrument Co., Inc., So. Main St., Penacook, N.H., 58, Tel: PLaza 3-6362, Yr: 1900, ▲1

Beemer Engineering Co., 401 N. Broad St., Philadelphia 8, Pa., 91, Tel: WAlnut 2-0900, Yr: 1930, Emp: 50

**Behlman Engineering Co., 2911 Winona Ave., Burbank, Calif., 38, 47, 63, Tel: VIctoria 9-5733, Yr: 1952, Emp: 130, ▲10, $1,600,000**

See ad on page 477

Bekey Electric Div., Genisco Inc., 2233 Federal Ave., Los Angeles 64, Calif., 30, 60, Tel: GRanite 8-1276

Bel Fuse, Inc., 198 Van Vorst St., Jersey City, N.J., 43, 50, 53, 86, 95, Tel: HEnderson 2-0163, Yr: 1949

Bell Aircraft Corp., Avionics Div., P.O. Box 1, Buffalo 5, N.Y., 1, 4, 6, 7, 9, 20, 22, 27, 30, 36, 38, 39, 40, 47, 57, 63, 75, 76, Tel: BUtler 5-7851, Yr: 1935, Emp: 3000

Bell & Gossett Co., 8200 N. Austin Ave., Morton Grove, Ill., 4, 8, 9, 14, 22, 33, 35, 36, 38, 58, 63, 64, 68, Tel: INdependence 3-4040

Bellaire Electronics, Inc., 62 White St., Red Bank, N.J., 28, 38, 39, 40, 45, 52, 53, 63, 76, Tel: SH 1-8383, Yr: 1951, Emp: 35, ▲1

Bellandi Co., Inc., M., 7508 W. Grand Ave., Elmwood Park, Ill., 38, 43, 46, 61, 69, 71, 73, 89, 91, Yr: 1955, Emp: 39

**Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 14, 39, 46, 52, 53, 54, 68, 71, 72, 73, Tel: ENfield 3322, Yr: 1922, Emp: 1000, ▲1**

See ad on page 411

Belz Industries, Inc., 89 Union St., Mineola, L.I., N.Y., 39, 40, 46, 76, 83, 84, 87, 89, 91, 92, 94, Yr: 1959, Emp: 60, $790,000

Bendix Corp., The, Bendix-Pacific Div., 11600 Sherman Way, North Hollywood, Calif., 4, 9, 10, 17, 18, 20, 27, 30, 36, 38, 39, 45, 52, 58, 91, 100, Tel: POplar 5-1010, Yr: 1938, Emp: 4241, ▲150, $30,000,000

Bendix Corp., The, Bendix Radio Div., E. Joppa Road, Towson 4, Md., 1, 6, 12, 22, 27, 39, Tel: VAlley 3-2200, Yr: 1930, Emp: 6000

Bendix Corp., The, Bendix Systems Div., 3300 Plymouth Rd., Ann Arbor, Mich., 1, 4, 9, 18, 36, Tel: NOrmandy 5-7766, Yr: 1913, Emp: 50,000, $276,000,000

Bendix Corp., The, Cincinnati Div., 3130 Wasson Rd., Cincinnati 8, Ohio, 14, 24, 64, Tel: ELmhurst 1-2323

Bendix Corp., The, Computer Div., 5630 Arbor Vitae St., Los Angeles 45, Calif., 9, 29, Tel: Spring 6-2220, Yr: 1952, Emp: 583, ▲125

**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 1, 4, 9, 10, 14, 27, 30, 38, 39, 52, 60, 63, 72, Tel: ATlas 8-2000, Yr: 1916, Emp: 10,000**

See ad on pages 103-106

Bendix Corp., The, Friez Instrument Div., 1400 Taylor Ave., Baltimore 4, Md., 4, 38, 91, 100, Tel: VAlley 3-4040, Yr: 1876, Emp: 1046

Bendix Corp., The, Industrial Controls Section, 12950 W. Eight Mile, Detroit 37, Mich., 4, 9, 14, 30, 38, 60, 64, 96, Tel: JO 6-9800, Yr: 1958, Emp: 120, $3,000,000

Bendix Corp., The, Montrose Div., South Montrose, Pa., 14, 30, 38, 45, 58, 60, 63, 72, 75, 89, Tel: 570, Yr: 1951, Emp: 750, ▲2

Bendix Corp., The, Pioneer-Central Div., Sonic Energy Products, Davenport, Iowa, 14, 38, 96, Tel: 4-9101

**Bendix Corp., The, Red Bank Div., Electron Tube Products, State Highway #35, Eatontown, N.J., 14, 21, 77, 78, 79, Tel: LIberty 2-2000, Emp: 2000**

See ad on page 574

**Bendix Corp., The, Red Bank Div., Semiconductor Products, 201 Westwood Ave., Long Branch, N.J., 66, 70, Tel: CApital 2-6220, Yr: 1955, Emp: 250**

See ad on page 504

**Bendix Corp., The, Scintilla Div., Sidney, N.Y., 43, 46, Tel: LOwell 3-9511, Yr: 1925, Emp: 4800, ▲1, $25,000,000**

See ad on page 148

Bendix Corp., The, York Division, York, Pa., 9, 14, 27, 29, 39, 63, 64, 83, Tel: 47-1951, Yr: 1952, Emp: 1102, ▲31

Benson-Lehner Corp., 1860 Franklin St., Santa Monica, Calif., 4, 9, 10, 16, 25, 29, 89, 94, Tel: EXbrook 3-9921, Yr: 1950, Emp: 350

Benson Mfg. Co., 1811 Agnes Street, Kansas City, Mo., 42

Bentley-Harris Mfg. Co., Hector & Lime Sts., Conshohocken, Pa., 91, 93, Tel: TAylor 8-7600, Yr: 1924, Emp: 107

Bently Scientific Co., 2811 Seventh, Berkeley 10, Calif., 4, 14, 38, 75, 85, 86, 88, 94, Tel: TH 3-6306, Yr: 1956, Emp: 6, ▲1, $75,000

Berg Mfg. Corp., 142 Reno Ave., New Cumberland, Pa., 46, 73, Tel: CEdar 8-9395, Yr: 1950, Emp: 75, ▲1

Bergen Laboratories, Inc., 60 Spruce St., Paterson 1, N.J., 4, 14, 29, 33, 38, 47, 58, 63, 66, Tel: ARmory 8-3020, Yr: 1951, Emp: 45, ▲3, $350,000

Berkeley/Dynamics, P.O. Box 1098, Burlingame, Calif., 4, Tel: DI 3-8707, Yr: 1957, Emp: 5, ▲2

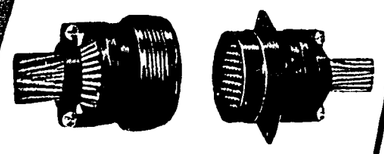
Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

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MIL-C-26500 **48 SERIES**

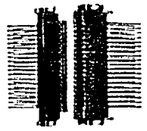
Complete family of miniature environmentally resistant connectors unaffected by 1000 hours of 200°C. Performance and design of the future!



*Micro Min*

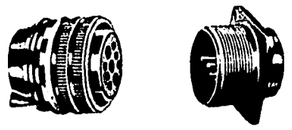
Contacts on .050" Centers. Smallest connectors ever developed for microminiature circuitry—50% size, 80% weight reduction from standard "miniatures."

19 contacts or 38 contacts



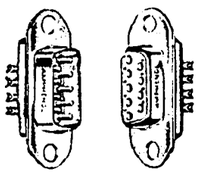
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Berkeley Enterprises, Inc., 815 Washington St., Newtonville 60, Mass., 100, Tel: DEcatur 2-5153, Yr: 1954, Emp: 5, ▲1, $20,000

Berkshire Electric Cable Co., Leeds, Mass., 85, Tel: JUstice 4-3853, Yr: 1949, Emp: 55, $1,000,000

Berkshire Laboratories, 584 Bank Village, Greenville, N.H., 3, 14, 76, Tel: GReenville 111, Yr: 1949, Emp: 1, ▲1

Berkshire Transformer Corporation, Kent, Conn., 45, 76, Tel: WA 7-3541, Yr: 1947, Emp: 140, $900,000

Berman Laboratories, 112-03 Rockaway Blvd., Ozone Park 20, N.Y., 19, Tel: VIrginia 3-1015, Yr: 1949

Berneo Engineering Corp., 2320 South Tibbs Ave., Indianapolis 41, Ind., 4, 64, 68, 72, 84, 87, 89, 92, Tel: CHapel 1-2871, Yr: 1952, Emp: 50

Beryllium Corp., The, P.O. Box 1462, Reading, Pa., 97, Tel: WAlker 9-0781, Yr: 1929, Emp: 500

Bethlehem Instrument Co., Inc., Bethlehem, Pa., 58, 68

Betinis, E. J., 5800 W. 95th St., Oak Lawn, Ill., 88

Bevin-Wilcox Line Co., The, East Hampton, Conn., 91, Tel: AN 7-2414, Yr: 1919, Emp: 25

Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa., 5, 14, 21, 22, 23, 33, 36, 58, 68, 69, Tel: LOcust 4-1620, Yr: 1895, Emp: 200, ▲2, $500,000

Biggs Co., Inc., Carl H., 1547-14th St., Santa Monica, Calif., 54, 89, 93, 94, 95, Tel: UPton 0-1910, Yr: 1949

Bingham Mfg. Co., J. F., 69 Bay State Rd., Lawrence, Mass., 84, 87, Tel: MUrdock 5-5188, Yr: 1888, Emp: 105

Biophysical Electronics, Inc., New Hope, Pa., 9, 19, 75, 88, 94, Tel: AXtel 7-3271, Yr: 1952, Emp: 16, ▲3

Bird & Co., Inc., Richard H., 1 Spruce St., Waltham 54, Mass., 62, Tel: TWinbrook 4-0160

**Bird Electronic Corp., 30303 Aurora Road, Cleveland 39, Ohio, 21, 28, 39, 46, 52, 58, 72, 83, Tel: CHurchill 8-1200, Yr: 1942, Emp: 104, ▲10, $1,700,000**

**See ad on page 306**

Birdair Structures, Inc., 1800 Broadway, Buffalo 12, N.Y., 39, Tel: KEystone 5100, Yr: 1955, Emp: 40

Birmingham Sound Reproducers, Ltd., Old Hill, Staffs., England, 61, Tel: INdependence 1-3447

**Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 39, 46, 53, 55, 71, 72, 73, 85, 86, 89, 91, 93, 96, Tel: WOrth 6-5611, Yr: 1923**

**See ad on page 607**

Bischoff Chemical Corp., 220 Miller Rd., Hicksville, L.I., N.Y., 95, Tel: WE 1-4343

Bishop & Co., Jr., Malvern, Pa., 85, 91, 95, 97, Tel: NIagara 4-3100, Yr: 1842, Emp: 500

Bishop Mfg. Corp., 10 Canfield Rd., Cedar Grove, N.J., 93, Tel: CEnter 9-2100, Emp: 50

Bittermann Electric Co., Inc., Barlow St., Canaan, Conn., 45, 76, Tel: TAylor 4-7315, Yr: 1944, Emp: 45, $175,000

Biwax Corporation, 3411 Howard St., Skokie, Ill., 95, Tel: OR 3-1050

Bjorksten Research Laboratories, P.O. Box 265, Madison 1, Wis., 88, 94, Tel: ALpine 6-5581, Yr: 1945, Emp: 100, ▲4

Black Light Eastern Corp., 4 Manhasset Ave., Pt. Washington, L.I., N.Y., 15, 19, 95, 96, Tel: POrt Washington 7-7850

Black & Webster, Inc., 570 Pleasant St., Watertown 72, Mass., 45, 96, Tel: WAlnut 6-0100, Yr: 1915, Emp: 35

Blackburn, Inc., P. W., 67 Main St., Dobbs Ferry, N.Y., 54, 93, Tel: OWens 3-2620

Blackhawk Engineering Co., Inc., 14 N. Parker Drive, Janesville, Wis., 52, Tel: PL 2-6826, Yr: 1958, Emp: 3, ▲1, $15,000

Blaco Mfg. Co., 6541 Euclid Ave., Cleveland 3, Ohio, 91, Tel: EXpress 1-0197, Yr: 1904, Emp: 10, $60,000

Blaine Electronetics, Inc., 14757 Keswick St., Van Nuys, Calif., 39, 83, 94, Tel: ST 2-6303, Yr: 1957, Emp: 20, ▲1, $150,000

Blaw-Knox Co., 300 6th Ave., Pittsburgh 22, Pa., 39, Tel: STerling 1-2700

Blaw-Knox Co., Blaw-Knox Equipment Div., P.O. Box #1198, Pittsburgh 30, Pa., 39, 89, 94, Tel: STerling 1-2700, Yr: 1906, Emp: 2000

Blickman, Inc., S., Weehawken, N.J., 92, 96, Tel: UN 3-0800

**Bliley Electric Co., 200 Union Station Bldg., Erie, Pa., 33, 49, 50, 52, Tel: GLendale 6-7561, Yr: 1930, Emp: 175, ▲1**

**See ad on pages 92-93**

Blinn Co., The Delbert, P.O. Box 757, Pomona, Calif., 89, 91, 96, 98, 101, Tel: NAtional 9-3900, Yr: 1958, Emp: 15

Bliss Electronic Corp., P.O. Box 366, Sussex, N.J., 14, 32, 38, 85, Tel: Sussex 2-3000, Yr: 1947, Emp: 21, ▲1

Block Associates, Inc., 396 Putnam Ave., Cambridge 39, Mass., 17, 38, 47, 63, 70, 101, Tel: UNiversity 7130, Yr: 1957, Emp: 40, ▲3

Blonder-Tongue Laboratories, Inc., 9 Alling St., Newark 2, N.J., 6, 7, 23, 28, 32, 34, 38, 39, 40, 46, 51, 52, 72, 76, 80, Tel: MArket 2-8151, Yr: 1950, Emp: 250, ▲10

Blue M Electric Co., 138th & Chatham St., Blue Island, Ill., 4, 14, 92, 96, Tel: FUlton 5-9000, Yr: 1946, Emp: 85, ▲1, $120,000

Bo Myte Co., The, Green St., Silverdale, Pa., 38, 64, 93, 99, Tel: ALpine 7-2300, Yr: 1956, Emp: 30

Bodine Electric Co., 2500 W. Bradley Place, Chicago 18, Ill., 60, Tel: IRving 8-3515, Yr: 1905, Emp: 577

**Bodnar Products Corp., 238 Huguenot St., New Rochelle, N.Y., 84, 89, 91, 98, Tel: NEw Rochelle 6-4664, Yr: 1938, Emp: 30, ▲1**

**See ads on pages 598, 632**

Boesch Mfg. Co., Inc., 45 River St., Danbury, Conn., 10, 14, 96, Tel: Pioneer 3-5571, Yr: 1900, Emp: 95, ▲2

Bogart Mfg. Co., 315 Seigel St., Brooklyn 6, N.Y., 39, 40, 49, 52, 72, 83, 102, Tel: HYacinth 7-4972, Yr: 1942, Emp: 250, ▲23

Bogen-Presto Co., P.O. Box 500, Paramus, N.J., 6, 29, 32, 34, 38, 61, 65, 76, 80, Tel: DIamond 3-5700, Yr: 1932, Emp: 800

Bogue Electric Mfg. Co., 52 Iowa Ave., Paterson 3, N.J., 63, Tel: LAmbert 5-2200

Bolta Products, Div. General Tire & Rubber Co., 70 Garden St., Lawrence, Mass., 98, 99, Tel: MUrdock 3-7121, Yr: 1929, Emp: 1000, ▲6, $500,000

**Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 38, 40, 52, 63, 70, 78, 79, 83, 94, Tel: WAlker 2-6000, Yr: 1948, Emp: 750, ▲70, $11,300,000**

**See ad on page 150**

Bon-De Electronic Laboratories, Inc., 135 Cabot St., Beverly, Mass., 14, 24, 54, 96, Tel: WAlker 2-1106, Yr: 1956, Emp: 12, $200,000

Bond Electronics Corp., 60 Springfield Ave., Springfield, N.J., 69

Bone Engineering Corp., 701 W. Broadway, Glendale 4, Calif., 4, 9, 10, 14, 39, 47, 63, 83, Tel: CH 5-2638, Yr: 1945, Emp: 100, ▲2, $500,000

Bonny Mfg. Corp., The, 146 Main St., Maynard, Mass., 89, 91, 93, 98, 99, Tel: TWinoaks 7-9311, Yr: 1952, Emp: 38, $500,000

**Boonton Electronics Corp., 738 Speedwell Ave., Morris Plains, N.J., 5, 14, 28, 33, Tel: JEfferson 9-4210, Yr: 1953, Emp: 41, ▲6, $450,000**

**See ad on page 256**

Boonton Molding Co., 300 Myrtle Ave., Boonton, N.J., 84, 89, 91, 93, 99, Tel: DEerfield 4-4100, Yr: 1921, Emp: 432

**Boonton Radio Corp., 50 Intervale Rd., Boonton, N.J., 28, 33, 36, 37, Tel: DEerfield 4-3200**

**See ad on page 328**

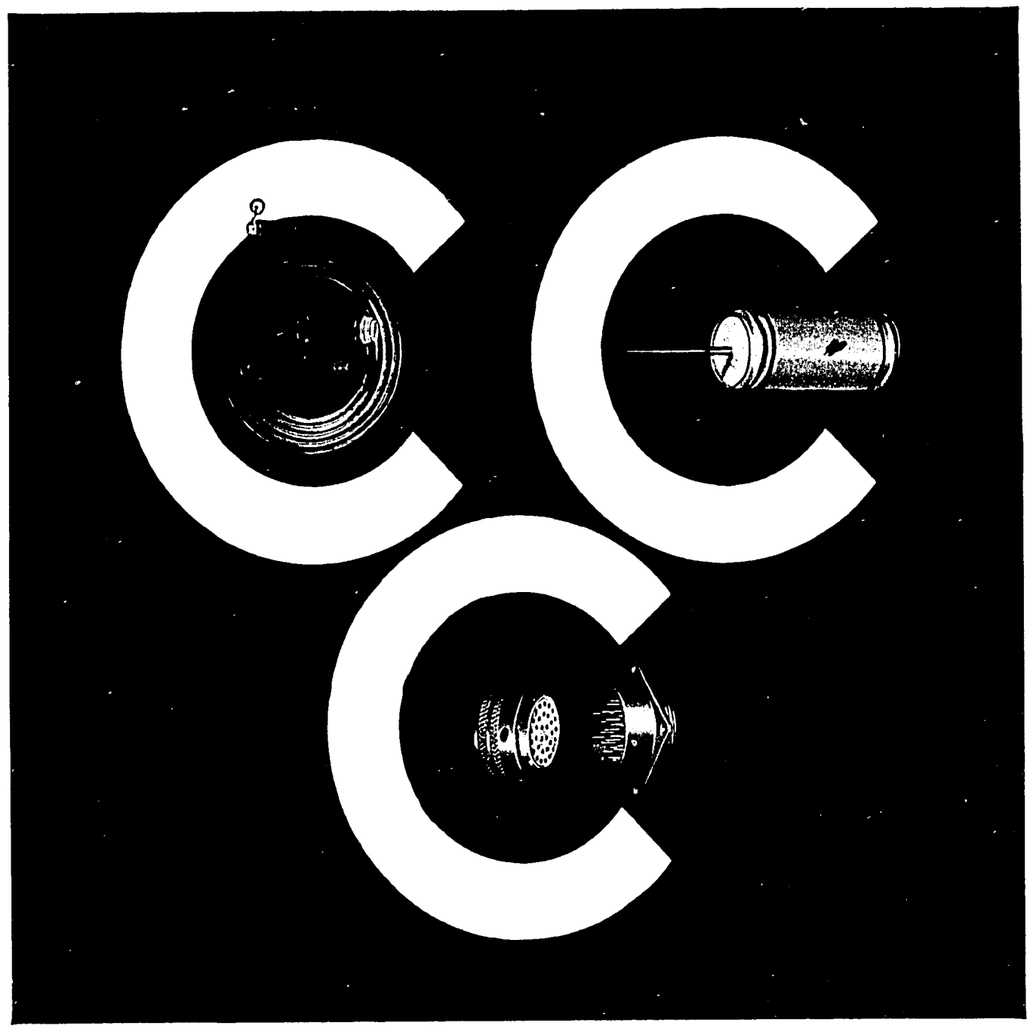
Boots Aircraft Nut Corp., Newtown Turnpike, Norwalk, Conn., 91, Tel: VIctor 7-2446, Yr: 1938, Emp: 75

Borden Chemical Co., The, 350 Madison Ave., New York 17, N.Y., 93, 95, 99, Tel: MUrray Hill 7-4100

**Borg Equipment Div., Amphenol-Borg Electronics Corp., 120 So. Main St., Janesville, Wis., 33, 60, 69, 91, Tel: PLeasant 4-6616, Yr: 1951, Emp: 300**

**See ad on page 524**

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.



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Borg-Warner Controls: See B. J. Electronics

Boston Insulated Wire & Cable Co., 65 Bay St., Boston, Mass., 85, Tel: CO 5-2101, Yr: 1905, Emp: 168, ▲1, $1,500,000

Bourns, Inc., 6135 Magnolia Ave., Riverside, Calif., 69, 75, Tel: OVerland 4-1700, Yr: 1946, Emp: 960, $9,000,000

Bow Solder Products Co., Inc., 251 Freeman St., Brooklyn 22, N.Y., 97, 103, Tel: EVergreen 9-4863, Yr: 1943, Emp: 25

Bowl-Mor Company, Inc., P.O. Box 426, Newtown Rd., Littleton, Mass., 84, 87, 96, Tel: HUnter 6-3515, Yr: 1947, Emp: 364, ▲3, $65,000

**Bowmar Instrument Corp., 8000 Bluffton Rd., Box 2835, Fort Wayne, Ind., 9, 10, 30, 38, Tel: SHerwood 3121, Yr: 1951, Emp: 445, ▲1, $600,000**

**See ad on page 340**

Bozak Mfg. Co., The R. T., Box 1166, Darien, Conn., 38, 56, Tel: TEmple 8-6521, Yr: 1949, Emp: 50, ▲1

Brach Mfg. Corp., Div. General Bronze Corp., 200 Central Ave., Newark 3, N.J., 30, 38, 39, 63, 82, Tel: HUmboldt 2-1500, Yr: 1906, Emp: 250, ▲20, $10,392,460

Bracke-Seib X-Ray Co., Inc., 16 Pelham Bay Park West, Pelham Manor, N.Y., 14, 19, 63, Tel: PE 8-4347, Yr: 1947, Emp: 5, $25,000

Bradford Components, Inc., 65 South Ave., Salamanca, N.Y., 69, Tel: 2310

Bradley Associates, Inc., 1658 N. Damen Ave., Chicago 47, Ill., 81, Tel: ARmitage 6-8197

Bradley Semiconductor Corp., 275 Welton St., New Haven 11, Conn., 66, 82, Tel: STate 7-7181, Yr: 1939, Emp: 80, ▲4

**Brady Co., W. H., 734 W. Glendale Ave., Milwaukee 9, Wis., 91, 93, Tel: EDgewood 2-8100, Yr: 1914**

**See ad on page 639**

Brainin Corp., C.S., 320 Washington St., Mt. Vernon, N.Y., 72, 97, Tel: MOunt Vernon 8-5500, Yr: 1938, Emp: 110, ▲2

Bram Metallurgical-Chemical Co., 820-65th Ave., Philadelphia 26, Pa., 49, 85, 86, 97, 101, Tel: WA 4-2121, Yr: 1939, Emp: 75, $200,000

Brand-Rex Div., William, American Enka Corp., 31 Sudbury Road, Concord, Mass., 85, 91, 93, 99, Tel: EMerson 9-9630, Yr: 1960, Emp: 875, $5,000,000

**Branson Corp., 41 S. Jefferson Rd., Whippany, N.J., 4, 45, 68, Tel: TU 7-1100, Yr: 1948, Emp: 50, ▲1**

**See ad on page 511**

Branson Ultrasonic Corp., 37 Brown House Rd., Stamford, Conn., 14, 38, 75, 96, Tel: FIreside 8-7781, Yr: 1946, Emp: 50, ▲3, $1,700,000

Braun-Knecht-Heimann Co., Industrial Div., 601 O'Neill Ave., Belmont, Calif., 78, Tel: LYtell 3-8276, Yr: 1849, Emp: 500

**Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 49, 53, 72, 89, 91, 102, 101, Tel: HAwthorne 7-1773, Yr: 1946, Emp: 80**

**See ads on pages 449, 537, 517**

Breeze Corporations Inc., 700 Liberty Ave., Union, N.J., 4, 46, 91, Tel: MUrdock 6-4000, Yr: 1926, Emp: 677

Breon Laboratories, 1520 Evergreen Road, Williamsport 29, Pa., 49, Yr: 1938, Emp: 5

Brevel Products Corp., 601 West 26th St., New York 1, N.Y., 30, 60, Tel: WAtkins 4-4737

Brew & Co., Inc., R.D., 90 Airport Rd., Concord, N.H., 50, Tel: CApitol 5-6605, Yr: 1946, Emp: 150, ▲12

Brick Electronic Equipment Co., 820 Blanche Ave., Norwood, N.J., 13, Tel: POplar 8-0109

Bright Radio Labs., Inc., 222 E. 2nd St., Mineola, L.I., N.Y., 15, 17, 32, 38, 41, 59, 63, 76, 91, Tel: Pioneer 2-5520, Yr: 1951, Emp: 5, $35,000

Bright Star Industries, 600 Getty Ave., Clifton, N.J., 41, 89, Tel: GRegory 1-3200, Yr: 1909, Emp: 300

Brilmayer Labs., Inc., E. W., 86 Fulton St., New York 38, N.Y., 14, Tel: BEekman 3-7914, Yr: 1946, Emp: 6, $250,000

Bristol Co., The, P.O. Box 1790 IRD, Waterbury 20, Conn., 4, 5, 9, 10, 13, 14, 16, 17, 26, 30, 33, 36, 38, 47, 58, 68, 72, 74, 75, 84, 91, Tel: PLaza 6-4151, Yr: 1889, Emp: 1000

Bristol Motors, Div. Vocaline Co. of America, Old Saybrook, Conn., 1, 58, 60, 68, 72, 89, Tel: EV 8-3414

Britton Electronics Corp., 19 Warren Place, Mt. Vernon, N.Y., 47, 63, 66, 70, Yr: 1958, Emp: 60

Broadcast Equipment Specialties Corp., P.O. Box #149, Beacon, N.Y., 29, Tel: TWinbrook 6-6276, Yr: 1952, Emp: 6, $50,000

Brocker Laboratories, 935 Commercial St., Palo Alto, Calif., 21, 38, 47, 63, 88, 94, Tel: DAvenport 1-3113, Yr: 1956, Emp: 4, $50,000

Brooks & Perkins, Inc., 1950 W. Fort St., Detroit 16, Mich., 16, 34, 39, 83, 84, 87, 89, 94, 97, 102, Tel: TA 5-5900, Yr: 1943, Emp: 450

Brooks Research, Inc., P.O. Box 3867, Brighton Station, Rochester 10, N.Y., 3, 5, 9, 14, 21, 36, 38, 63, 82, 88, 94, 95, Tel: LUdlow 6-2720, Yr: 1957, Emp: 30, ▲5, $300,000

Brown, Inc., Dayton T., 1305 Strong Rd., Copiague, L.I., N.Y., 91, Tel: TUrner 4-2700, Yr: 1950, Emp: 190

Brown, Ltd., S. G., 80 Shore Rd., Port Washington, L.I., N.Y., 56, Tel: PO 7-7700

Brown, W. J., 71 Gurley Rd., Stamford, Conn., 88, Tel: DAvis 4-4602

Brubaker, Paul M., 100 Essex Ave., Glen Ridge, N.J., 88, Tel: PI 3-5748

Bruel & Kjaer, A/S, Naerum, Denmark, 3, 5, 14, 16, 38, 47, 52, 58, 59, 75, 96, Tel: 80-05-00, Emp: 450

Bruno-New York Industries Corp., 460 W. 34th St., New York 1, N.Y., 1, 9, 14, 21, 28, 32, 38, 40, 52, 58, 96, Tel: LOngacre 4-5930, Yr: 1950, Emp: 250

Brunswick Instruments, P.O. Box 813, New Brunswick, N.J., 5, 14, 21, 28, 47, 62, 88, 94, Tel: CHarter 7-5919, Yr: 1953, Emp: 4, ▲1

Brush Beryllium Co., The, 5209 Euclid Ave., Cleveland 3, Ohio, 93, 95, 97, Tel: ENdicott 1-5400, Yr: 1931, Emp: 1060, $18,000,000

Brush Instruments, Div. Clevite Corp., 37th & Perkins, Cleveland 14, Ohio, 14, 16, 25, 38, 75, Tel: ENdicott 1-3315, Yr: 1930, Emp: 350

Bryant Computer Products Div., Bryant Chucking Grinder Co., P.O. Box 620, Springfield, Vt., 9, 65, Tel: TU 5-2141, Yr: 1958, Emp: 100, ▲1

**Buchanan Electrical Products Corp., 607 U.S. Highway 22, Hillside, N.J., 46, 55, 73, 91, 96, Tel: WAverly 3-7474, Yr: 1943, Emp: 100**

**See ad on page 557**

Buck Engineering Co., Inc., 37-41 Marcy St., Freehold, N.J., 14, 63, 84, 89, Tel: FRechold 8-1111, Yr: 1933, Emp: 35, ▲2, $350,000

Buck Instrument Co., Boulder Industrial Park, Boulder, Colo., 4, 14, 38, Tel: HIllcrest 2-3741, Yr: 1959, Emp: 12

Buckbee Mears Co., Fourth & Rosabel Sts., St. Paul 1, Minn., 38, 46, 64, 85, 89, 91, 101, Tel: CApitol 7-6371, Yr: 1907, Emp: 221

Bucknell Engineering Co., Inc., 10717 E. Rush St., S. El Monte, Calif., 47, Tel: GIlbert 3-5923, Yr: 1959, Emp: 25, ▲1

**Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 42, 44, 45, 52, 55, 84, 87, 89, 91, Tel: HEnderson 1-7166, Yr: 1928, Emp: 110, ▲2, $2,000,000**

**See ad on page 625**

Budd Electronics, Inc., 43-22 Queens St., Long Island City 1, N.Y., 1, 4, 8, 9, 17, 18, 20, 21, 22, 23, 27, 36, 42, 63, 96, Tel: EXeter 2-5050, Yr: 1888, Emp: 1000, ▲50

Budd-Stanley Co., Inc., 43-01 22nd St., Long Island City 1, N.Y., 21, 39, 40, 52, 83, Tel: STillwell 6-4706, Yr: 1950, Emp: 140, ▲4, $1,800,000

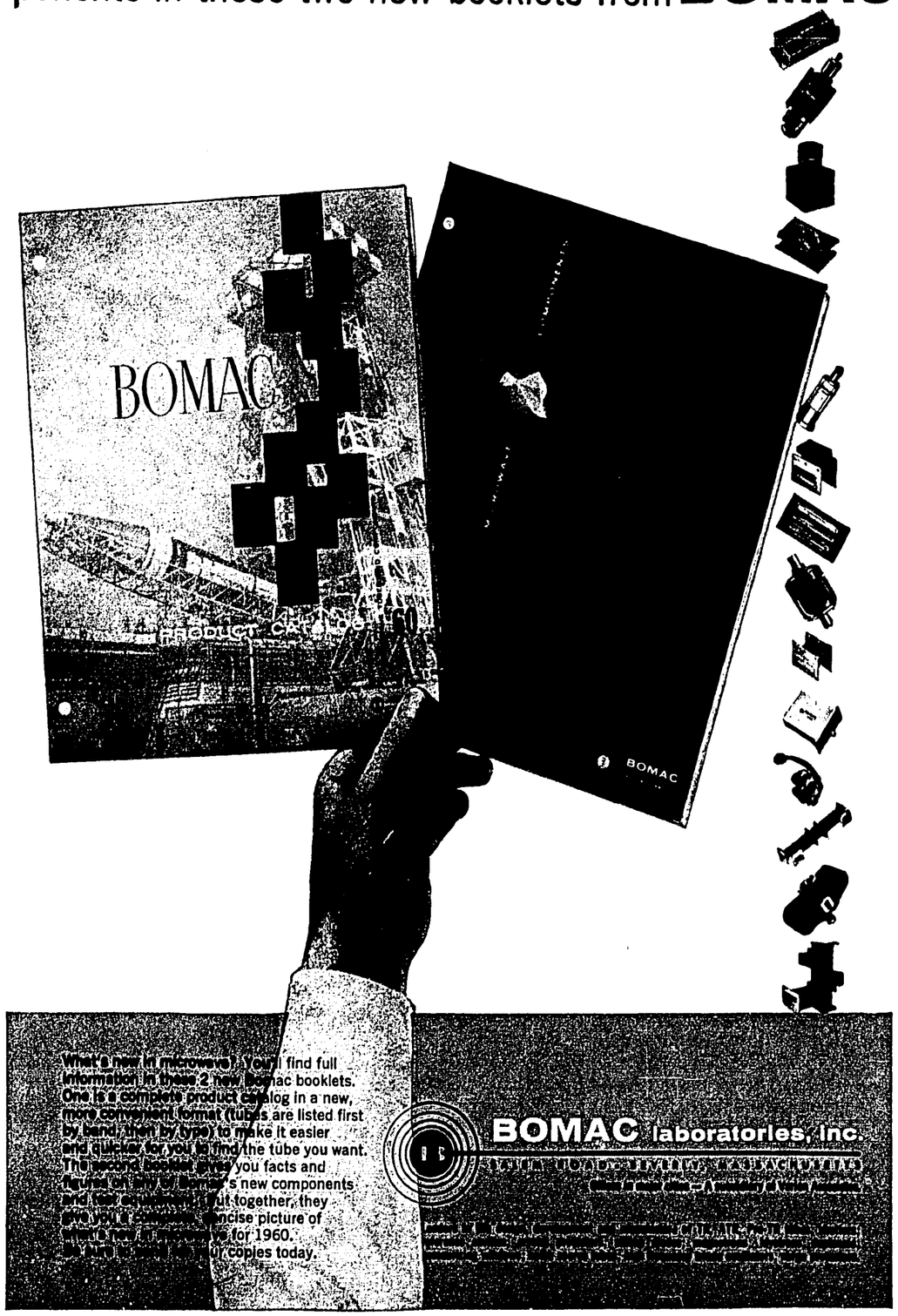
Budelman Electronics Corp., 375 Fairfield Ave., Stamford, Conn., 7, 8, 20, 21, 23, 26, 32, 38, 59, 83, Tel: FIreside 8-9231, Yr: 1951, Emp: 50, ▲5

**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 14, 25, 38, 47, 63, 64, 94, Tel: CLoverdale 3-8931, Yr: 1957, Emp: 8, $17,000**

**See ad on page 321**

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

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**Bulova Watch Co., Inc., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 3, 4, 23, 24, 28, 30, 33, 36, 37, 38, 49, 52, 64, 71, 82, Tel: NEwtown 9-5700, Yr: 1875, Emp: 3500, ▲300, $4,000,000**

See ad on page 426

Bundy Electronics Corp., 171 Fabyan Pl., Newark 12, N.J., 38, 45, 52, 63, Tel: ESsex 2-1872, Yr: 1954, Emp: 30, ▲2, $300,000

Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N.Y., 1, 3, 9, 14, 16, 18, 26, 33, 35, 89, Tel: ULster 8-0100, Yr: 1878, Emp: 50, $100,000

Bureau of Engraving, Inc., 300 S. Fourth St., Minneapolis 15, Minn., 64, Tel: FEderal 9-8721, Yr: 1898

**Burgess Battery Co., Div. Servel, Inc., Dept. IRE, Foot of Exchange St., Freeport, Ill., 41, Tel: ADams 2-2161, Yr: 1916, Emp: 1500**

See ad on page 384

Burke Electric & X-Ray Co., Ltd., 61-63 Yorkville Ave., Toronto 5, Ontario, Canada. 19, Tel: WA 2-5138, Yr: 1928, Emp: 10, ▲1

Burke & James, Inc., 321 S. Wabash Ave., Chicago 4, Ill., 16, 31, 96, Tel: HArrison 7-8393

Burling Instrument Co., 16 River Rd., Chatham, N.J., 74, Tel: MErcury 5-9481, Yr: 1935, Emp: 12

**Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 1, 21, 27, 38, 43, 63, 76, Tel: ORiole 8-3070, Yr: 1955, Emp: 18, ▲3, $175,000**

See ad on page 479

Burndy Corp., H. H. Buggie Div., P.O. Box 817, Toledo 1, Ohio, 39, 46, 71, 73, Tel: OX 1-2461

**Burndy Corp., Omaton Div., Richards Ave., Norwalk, Conn., 46, 73, Tel: TEmple 8-4444, Yr: 1924, $13,817,300**

See ad on page 411

**Burnell & Co., Inc., 10 Pelham Pkwy., Pelham Manor, N.Y., 45, 52, Tel: PElham 8-5000, Yr: 1945, Emp: 360, ▲4, $3,000,000**

See ad on pages 88-89

Burnett Radio Lab., W. W. L., 4818 Idaho St., San Diego 16, Calif., 49, 88, 94, Tel: ATwater 2-2740, Yr: 1927, ▲1

Burnley Battery & Mfg. Co., Clay St., North East, Pa., 103, Tel: SAratoga 5-3595

Burr-Brown Research Corp., Box 6444, Tucson, Ariz., 3, 9, 38, 58, 64, 94, Tel: AXtel 8-0772, Yr: 1956, Emp: 8, ▲2, $100,000

Burroughs Corp., 6071 Second Ave., Detroit 32, Mich., 9, 10, Tel: TRinity 5-2260, Yr: 1886, Emp: 36,000, ▲500, $360,000,000

Burroughs Corp., Electronic Instruments Div., 1209 Vine St., Philadelphia 7, Pa., 9, 48, 64, 76, Tel: LOcust 7-1401, Yr: 1952, ▲15

Burroughs Corp., Electronic Tube Div., Plainfield, N.J., 62, 78, Tel: PLainfield 6-0876, Yr: 1954, Emp: 125, ▲15

Burton-Rodgers, Inc., Blade & Helen St., Cincinnati 16, Ohio, 4, 9, 14, 30, 38, 62, 64, Tel: UNiversity 1-2155, Yr: 1935, Emp: 225, ▲3

**Bussmann Mfg. Division, McGraw-Edison Co., University at Jefferson, St. Louis 7, Mo., 53, Tel: GArfield 1-1740**

See ad on page 448

Bytrex Corp., 50 Hunt St., Newton 58, Mass., 4, 14, 30, 38, 58, 63, 75, Yr: 1957, Emp: 21, ▲1, $250,000

# C

CBS Electronics, Div. Columbia Broadcasting System, Inc., 100 Endicott St., Danvers, Mass., 9, 59, 61, 64, 67, 70, 72, 77, 78, 79, Tel: SPring 4-2360, Yr: 1921, Emp: 4112, ▲250

CBS Laboratories, Div. Columbia Broadcasting System, Inc., 227 High Ridge Rd., Stamford, Conn., 3, 4, 6, 7, 9, 13, 17, 18, 22, 24, 29, 34, 36, 56, 75, 77, 78, 88, 104, Tel: DAvis 5-4321, Yr: 1936, Emp: 225, ▲75

C & D Batteries, Div. The Electric Autolite Co., Washing & Cherry Sts., Conshohocken, Pa., 41, 66, Yr: 1906, Emp: 300

C-E-I-R, Inc., 1200 Jefferson Davis Hwy., Arlington 2, Va., 94, Yr: 1952, Emp: 275, ▲8, $5,000,000

C.E.S. Electronic Products, Inc., 5026 Newport Ave., San Diego 7, Calif., 4, 5, 14, 38, 40, 52, 64, Yr: 1957, Emp: 6, ▲1, $60,000

**CFI Corporation, Dept. IRE, Cottage Pl., Mineola, L.I., N.Y., 54, 86, 89, 93, 104, Tel: PIoneer 6-0571, Yr: 1958, Emp: 27 ▲1, $175,000**

See ad on page 619

CGS Laboratories, Inc., 59 Danbury Rd., Route 7, Wilton, Conn., 9, 21, 36, 45, 52, 72, 76, 83, 89, 94, Tel: POrter 2-5521, Yr: 1946, Emp: 120, ▲7, $2,269,778

C & K Components, Inc., 101-103 Morse St., Newton 58, Mass., 9, 10, 89, 94, Tel: WAlnut 6-0800, Yr: 1957, Emp: 150, ▲9, $1,000,000

**CTS Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 40, 69, 72, 82, Tel: ELkhart 3-0310, Yr: 1896, Emp: 1600, ▲5**

See ad on page 2

C.W.S. Waveguide Corp., 301 W. Hoffman Ave., Lindenhurst, L.I., N.Y., 39, 40, 46, 72, 80, 83, Tel: TUrner 8-7150, Yr: 1958, Emp: 35, $150,000

Cable Design, Inc., 66 Rushmore St., Westbury, L.I., N.Y., 85, Tel: EDgewood 3-5323, Yr: 1958, Emp: 55, ▲1, $50,000

Cable Specialists of Conn., 95 Kitts Lane, Newington 11, Conn., 14, 38, 85, 89, 94, Yr: 1953, Emp: 4, $100,000

Caddell-Burns Mfg. Co., Inc., 40 E. 2nd St., Mineola, L.I., N.Y., 39, 45, 76, Tel: Pioneer 6-2310, Yr: 1946, Emp: 35, ▲1, $200,000

Cadre Industries Corp., P.O. Box 150, Endicott, N.Y., 1, 4, 9, 12, 18, 22, 26, 30, 31, 38, 47, 55, 63, 64, 84, 85, 89, Tel: Pioneer 8-3373, Yr: 1951, Emp: 1200, $5,000,000

Caig Laboratories, 16 Stanwood Rd., New Hyde Park, L.I., N.Y., 95, 96, Tel: Pioneer 2-0278, Yr: 1955, Emp: 6, ▲1

Calbest Electronics, 1801 Exposition Blvd., Los Angeles 16, Calif., 6, 32, 56, 63, 69, 80, Tel: REpublic 1-7291, Yr: 1941, Emp: 125

Caledonia Electronics & Transformer Corp., Maple St., Caledonia, N.Y., 15, 52, 76, Tel: KE 8-4123

California Computer Products, Inc., 8714 Cleta St., Downey, Calif., 9, 16, 36, 63, 64, 72, 88, 89, Tel: WAlnut 3-1913, Yr: 1958, Emp: 26, ▲6, $200,000

California Technical Industries, Div. Textron, Inc., 1421 Old Country Rd., Belmont, Calif., 9, 14, 21, 39, Tel: LYtell 3-8466, Yr: 1946, Emp: 180, ▲12, $2,000,000

Caltron Products Co., 3518 W. Pico Blvd., Los Angeles 19, Calif., 65, 96, Tel: REpublic 4-2120, Yr: 1942, Emp: 15, ▲2

Camblock Corp., Div. Willor Mfg. Corp., 825 Bronx River Ave., New York 72, N.Y., 73

Cambridge Communications Corp., 238 Main St., Cambridge 42, Mass., 100

Cambridge Filter Corp., 738 E. Erie Blvd., Syracuse 1, N.Y., 81, Tel: GRanite 5-1608

Cambridge Pattern Works, Inc., 55 First St., Cambridge 41, Mass., 81, Tel: KI 7-8191, Yr: 1911, Emp: 21, $180,000

Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass., 9, 24, 40, 43, 45, 46, 55, 64, 73, 86, 91, 98, Tel: TRowbridge 6-2800, Yr: 1941, Emp: 210, ▲1

Camden Wire Co., Inc., Masonic Ave., Camden, N.Y., 85, Tel: CAmden 645

Camera Equipment Co., Inc., 315 W. 43rd St., New York 36, N.Y., 4, 17, 34, 39, 41, 47, 58, 60, Tel: JUdson 6-1420

Camloc Fastener Corp., 22 Spring Valley Rd., Paramus, N.J., 91, Tel: HUbbard 9-4900, Yr: 1938, Emp: 210

Campbell Co., Inc., Colin, Miry Brook Rd., Danbury, Conn., 45, 76, 94, Tel: PI 3-6701, Yr: 1950, Emp: 50, ▲1

Campro Products, Inc., 3131 Columbus Rd., Canton, Ohio, 84, 98, Tel: GL 5-0331, Yr: 1946, Emp: 90, $30,000



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Standard, sub-miniature and high temperature electronic components for military and commercial applications.

Built to your specifications, or available from stock, in industrial quantities, at factory prices, through your local CENTRALAB distributor.





**VARIABLE RESISTORS**

1/4W. Linear Motion, wirewound 100 to 20K ohms and composition 10K to 2.5 meg. .250" x .325" x 1.250".

1/10W. Microminiature, 0.286" diam: Ultra-miniature, 0.502" diam; sub-miniature, 5/8" diam; 500 ohms to 10 megs.

1/4 W. and 1/2W. Sub-miniature—For instruments and military. 43/64" diam. 500 ohms to 2.5 megs.

1/4W. Multiple-miniature—Up to 4 variable and 9 fixed resistors on a 3/4" x 2-1/4" steatite plate. 1000 ohms to 5 megs.

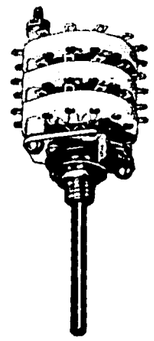
1/2W. Standard—For radio, TV. Single, Twin or dual-concentric. 15/16" diam. 250 ohms to 10 megs.

1-1/2W. Wirewound—for military and instruments. 11/16" diam., 5/16" deep. 4 ohms to 30K ohms.

2-5W. Wirewound—For instruments and TV. Single or dual-concentric. 1-5/32" diam. 1 ohm thru 100K ohms.

*Write for Group B bulletins.*

# RELIABILITY



**ELECTRONIC SWITCHES**

Sub-miniature rotary—15/16" diam. for military and high reliability applications. Rating 0.5 amp. at 6VDC, 100 ma. at 110VAC, Laminated phenolic, steatite, single or multiple sections.

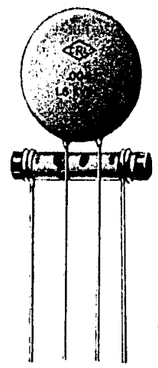
Standard rotary—1-5/16" diam. laminated phenolic or steatite insulation, single or multiple sections. Rating 2 amps. at 15VDC. 150 ma. at 110VAC. (Resistive load.)

Heavy-duty power—For transmitter, industrial control, laboratory testing, military, commercial. 2-13/16" diam. 7-1/2 amp. rating at 110VAC. 25,000 cycles minimum.

Spring return—1-5/16" diam., coil or C-type springs, phenolic, steatite, single or multiple sections.

Specialized—Lever, slide, tone, tuner sections, others.

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**CERAMIC CAPACITORS**

Ultra-miniature—3 to 12 VDC, 0.22—2.2 mfd.—for low power factor transistor applications.

Temperature compensating—Discs, tubulars, 150 v to 6,000 VDCW, 1 mmf.—0.1 mf. Capacitance +100 to −5250 ppm.

Bypass—Coupling—Discs, tubulars, 150 v to 6,000 VDCW, 1 mmf.—0.1 mf.

High Voltage—High Accuracy—High Voltage types, up to 30,000 VDCW. High Accuracy types, ± 1% tolerance, 500 VDCW, up to 2,500 mmf.

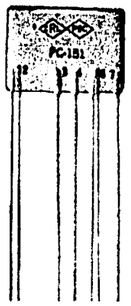
Trimmer—Tubular or flat. Meet JAN-C-81 specifications. 1 mmf. to 400 mmf. 500 VDCW.

Feed-thru—10—5000 mmf., 500—1,500 VDCW, bushing, shoulder, ring, eyelet, resistor-capacitor combinations.

Specialties—Stand-off, button-shape, potted, other capacitors.

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**PACKAGED CIRCUITS**

Complete computer and Radio-TV circuits, amplifiers, oscillators, detector networks, resistor networks—including transistors, capacitors, resistors, wiring and inductance, manufactured to your specific performance limits.

PEC® circuits result in substantial savings in assembly costs. These high reliability packaged circuits can be supplied in a wide variety of terminals for printed circuit board applications.

1/2W. resistors meet applicable MIL-R-11 specifications, 50 ohms to 50 megs. Capacitors up to .01 mmf.

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**ENGINEERED CERAMICS**

High alumina—85%, 95%, 99%—for high frequency, high temperature applications, close tolerance (± .00025") designs. Jan I-10-L6A grade.

Grade Jan I-10-L5A steatite, Grade L2A Corderite, and Grade L2A Electrical Porcelain. For applications where high dielectric and compressive strength, high dimensional stability, low loss and low power factor are required, there is a CENTRALAB ceramic material for the job.

CENTRALAB also specializes in metalizing of ceramics, for hermetic seals or mechanical attachment of other ceramic or metal parts.

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For details, circle #138 on Reader Service Card






Canadian Aviation Electronics, Ltd., Box 2030, St. Laurent, Montreal 9, P.Q., Canada, 1, 4, 9, 14, 27, 30, 38, 62, 63, 64, 75, 76, 89, 94, 100, Tel: MElrose 1-6781, Yr: 1947, Emp: 1271, ▲127, $8,000,000

Canadian General Electric Co., Ltd., Electronic Equipment & Tube Dept., 830 Lansdowne Ave., Toronto 4, Ont., Canada, 7, 22, 27, Tel: LEnnox 4-6511

Canadian Marconi Co., 2442 Trenton Ave., Montreal 16, Canada, Importers, 1, 3, 5, 6, 7, 14, 18, 20, 21, 22, 23, 25, 26, 27, 28, 31, 33, 34, 36, 37, 38, 39, 40, 45, 50, 51, 52, 55, 76, 77, 79, 85, 88, 91, Tel: REgent 8-9141, Yr: 1902, Emp: 2200, ▲50

Canadian Radium & Uranium Corp., 43 W. 16th St., New York 11, N.Y., 84, 89, 91, Tel: WA 4-3760, Yr: 1936, Emp: 50

Canadian Westinghouse Co., Ltd., 286 Sanford Ave. N., Hamilton, Ontario, Canada, 1, 9, 18, 20, 27, 28, 38, 39, 50, 52, 58, 62, 63, 72, 77, 79, 83, 94, Tel: JAckson 8-8811, Yr: 1891, Emp: 9088, ▲107

Cannon Co., C. F., Springwater, N.Y., 56, Tel: 531, Yr: 1919, Emp: 40, $220,000

**Cannon Electric Co., Dept. 425, 3208 Humboldt St., Los Angeles 31, Calif., 46, 54, 55, 72, Tel: CApitol 5-1251, Yr: 1915, Emp: 2810, $11,000,000**

**See ad on page 410**

Canoga Division, Underwood Corp., 15530 Oxnard St., Van Nuys, Calif., 4, 9, 20, 25, 27, 36, 38, 39, 40, 52, 63, 83, Tel: STate 6-9010, Yr: 1947, Emp: 250, ▲20, $3,300,000

Capcon, Inc., 61 Stanton St., New York 2, N.Y., 43, 52, Tel: GRamercy 5-0080, Yr: 1951, Emp: 120, ▲5, $950,000

Capehart Corp., Dynamic Electronics Div., 87-46 123 St., Richmond Hill 18, L.I., N.Y., 1, 3, 5, 6, 9, 12, 14, 17, 18, 20, 21, 22, 23, 25, 26, 27, 28, 31, 32, 38, 39, 40, 47, 52, 63, 80, 83, Tel: HIckory 1-1100, Yr: 1934, Emp: 385, ▲100, $3,500,000

Capitol Machine Co., 36 Balmforth Ave., Danbury, Conn., 72, Tel: Pioneer 3-2758

Capps & Co., Inc., 20 Addison Pl., Valley Stream, L.I., N.Y., 15, 65, Tel: VAlley Stream 5-4413, Yr: 1929, Emp: 20

Carad Corp., 2850 Bay Rd., Redwood City, Calif., 3, 14, 21, 45, 50, 52, 63, 76, 91, 96, Tel: EM 8-2969, Yr: 1952, Emp: 60, ▲2, $100,000

Carbonneau Industries, Inc., 100 Lexington Ave. S.W., Grand Rapids, Mich., 56, Yr: 1945, Emp: 185

Carborundum Co., The, Globar Plant, P.O. Box 339, Niagara Falls, N.Y., 39, 40, 51, 69, 82, 83, 86, 91, 92, 93, 97, 102, Tel: BU 5-5715, Emp: 10,000, $5,000,000

Carborundum Co., The, Refractories Div., Perth Amboy, N.J., 54, 86, 93, 97, Tel: HIllcrest 2-3380

Cardwell Condenser Corp., 30 E. Montauk Hwy., Lindenhurst, L.I., N.Y., 44, 83

Carey Electronic Engineering Co., 1880 Clifton Ave., Springfield, Ohio, 84, 94, Tel: FA 3-6300, Yr: 1942, Emp: 25, ▲1

Carling Electric, Inc., 505 New Park Ave., West Hartford 10, Conn., 62, 72, Tel: ADams 2-4161, Yr: 1920, Emp: 200, ▲1, $1,000,000

Carmer Industries, 22 N. 26th St., Kenilworth, N.J., 91, 93, 99, Tel: CHestnut 5-1495

Carmody Corp., 2360 Wehrle Dr., Buffalo 21, N.Y., 4, 9, 14, 30, 35, 57, 84, Tel: SPring 7700, Yr: 1951, Emp: 50, $500,000

Carol Cable Co., 190 Middle St., Pawtucket, R.I., 85, Tel: PAwtucket 2-3100, Yr: 1921, Emp: 350, $1,000,000

Carpenter Mfg. Co., Inc., P.O. Box 217, DeWitt 14, N.Y., 96, Tel: GIbson 6-0670, Yr: 1955, Emp: 16

Carpenter Steel Co., The, 101 W. Bern St., Reading, Pa., 97, Tel: FRanklin 4-8211, Yr: 1889, Emp: 3100

Carroll Pressed Metal, Inc., 133 Dewey St., Worcester 10, Mass., 42, 72, 84, 87, 89, 91, 104, Tel: SWift 9-4116, Yr: 1903, Emp: 25

Carson Mfg. Co., Inc., 2424 E. 55th St., Indianapolis 20, Ind., 72, 76, Tel: CLifford 1-9591, Yr: 1946, Emp: 160, ▲1, $3000

Carter Mfg. Corp., 23 Washington St., Hudson, Mass., 69, Tel: JOrden 2-2206, Yr: 1955, Emp: 30, ▲2

Carter Motor Co., 2711 W. George St., Chicago 18, Ill., 47, 60, Tel: JU 8-7700, Yr: 1932

Carter Parts Company, 3101 Madison, Skokie, Ill., 55, 69, 72, Tel: ORchard 4-0340, Yr: 1923, Emp: 166, ▲1, $309,000

Caswell Electronics Corp., 411 Queens Lane, San Jose 12, Calif., 21, 40, 52, 83, Tel: CYpress 7-9333, Yr: 1959, Emp: 10, ▲1

Catalin Corp. of America, 1 Park Ave., New York 16, N.Y., 99, Tel: MU 3-2100, Yr: 1927

Catalyst Research Corp., 6101 Falls Rd., Baltimore 9, Md., 41, 63, 89, 93, Tel: DRexel 7-7100, Yr: 1930, Emp: 285, ▲2, $2,800,000

Caterpillar Tractor Co., Engine Div., Peoria, Ill., 63, Tel: 6-3311, Yr: 1928, Emp: 20,000, ▲65

Cathodeon, Ltd., Meadowcroft Labs., Church St., Cambridge, England, 17, 54, 68, 75, 79, Tel: CAmbridge 5-6181, Yr: 1931, Emp: 165

Cavitron Electron Oscillator Co., 355 N. Newport Blvd., Newport Beach, Calif., 92, 96, Yr: 1945, ▲1

Cedar Engineering Div., Control Data Corp., 5806 W. 36th St., Minneapolis 16, Minn., 1, 4, 9, 14, 30, 38, 45, 60, Yr: 1953, Emp: 250, ▲2

Celanese Plastics Co., Div. Celanese Corp. of America, 744 Broad St., Newark 2, N.J., 93, 99, Tel: MI 2-6800

**Celco—Constantine Engineering Labs. Co., 70 Island Ave., Mahwah, N.J., 38, 45, 60, 76, Tel: DAvis 7-1123, Yr: 1950, Emp: 125, ▲2**

**See ads on pages 60-61, 84-85**

Central Dynamics, Ltd., 147 Hymus Blvd., Pte. Claire, Que., Canada, 1, 10, 30, 31, 38, 63, 64, 84, 87, 89, 91, Tel: OXford 7-0810, Yr: 1958, Emp: 35, ▲2, $120,000

Central Electronic Mfrs., Div. Nuclear Corp. of America, 2 Richwood Pl., Denville, N.J., 67, 78, 79, 82, 83, Tel: OAkwood 7-1200, Yr: 1945, Emp: 200, ▲5, $1,000,000

Central Electronics, Inc., 1247 W. Belmont Ave., Chicago 13, Ill., 2, 23, 31, 35, Tel: EA 7-7460, Yr: 1950, Emp: 75, ▲1

Central Research Laboratories, Inc., Red Wing, Minn., 11, 25, Tel: DU 8-3566, Yr: 1945, Emp: 50, ▲2, $75,000

Central Scientific Co., 1700 Irving Pk. Rd., Chicago 13, Ill., 14, 96, Tel: WEllington 5-8600, Yr: 1900, Emp: 600, ▲3

Central Screw Co., 3501 Shields Ave., Chicago 9, Ill., 91

Central Transformer Co., 900 W. Jackson Blvd., Chicago 7, Ill., 15, 63, 76, 82, Tel: TAylor 9-1936, Yr: 1951, Emp: 75, ▲1, $550,000

**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 38, 43, 44, 48, 54, 64, 69, 72, 93, Tel: WOodruff 2-9200, Yr: 1922, Emp: 3000, $20,000,000**

**See ad on page 152**

Centre Circuits, Inc., P.O. Box 165, State College, Pa., 96, Tel: ADams 8-9191, Yr: 1955, Emp: 20, ▲2, $200,000

Centronix, Inc., 1000 N.W. 28th St., Miami 42, Fla., 9, 16, 36, 38, 84, 87, 89, Tel: NE 3-2505, Yr: 1951, Emp: 120, ▲8, $1,100,000

Century Electric Co., 1806 Pine St., St. Louis 3, Mo., 60, 63, Tel: CEntral 1-1920, Yr: 1903, Emp: 2500

Century Electronics & Instruments, Inc., 1333 N. Utica, Tulsa 10, Okla., 14, 15, 16, 23, 25, 38, 72, Tel: LUther 4-7111, Yr: 1946, Emp: 166, ▲7, $4,000,000

**Century Plating Co., 229 Ferris Ave., White Plains, N.Y., 89, Tel: WHite Plains 8-3777**

**See ad on page 632**

**Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 46, 54, 83, 86, 91, Tel: WEst Lebanon 3-5851, Yr: 1952, Emp: 37, $450,000**

**See ad on page 452**

Ceramic Specialties Co., Inc., 444 W. 6th St., East Liverpool, Ohio, 43, 48, 86, 92, 93, 98, Tel: FUlton 5-9757, Yr: 1932, Emp: 90, $2,500,000

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Cerberus AG, Werk fur Elektronentechnik, Mannedorf, Switzerland, 4, 62, 78, Tel: 051-74-15-55, Yr: 1941, Emp: 225, ▲1

Cetec Corporation, 1400 Industrial Way, Redwood City, Calif., 34, Tel: EMerson 9-5913, Yr: 1959, Emp: 15, ▲5

Cetron Electronic Corp., 715 Hamilton St., Geneva, Ill., 4, 14, 17, 67, 75, 78, 79, 94, 96, 101, Tel: CEnter 2-4140, Yr: 1920, Emp: 125, ▲3, $1,200,000

Chadwick-Helmuth Co., 472 E. Duarte Rd., Monrovia, Calif., 3, 9, 14, 25, Tel: ELliott 8-4567, Yr: 1953, Emp: 15, ▲2

Chance Vought Electronics Div., P.O. Box 5907, Dallas 22, Tex., 1, 4, 9, 14, 27, 30, 38, 39, 52, 59, 64, 83, Tel: AN 2-3211, Yr: 1922, Emp: 12,000, ▲50

Channel Master Corp., Ellenville, N.Y., 6, 39, 52, 61, 77, 80, 84, 85, 91, 97, 98, 99, Tel: ELlenville 1300, Yr: 1947, Emp: 967, ▲3, $30,000,000

Channer Corporation, 1488 Skokie Blvd., Highland Park, Ill., 85, Yr: 1946, Emp: 35, $325,000

Chapin Electronics, Inc., 275 Main St., Webster, Mass., 4, 27, Tel: WEbster 2359W, Yr: 1954, Emp: 20, $250,000

Chart-Pak, Inc., 1 River Rd., Leeds, Mass., 91, 96, Tel: JUstice 4-5446, Yr: 1950, Emp: 67, ▲2

Chase Brass & Copper Co., 236 Grand St., Waterbury 20, Conn., 83, 85, 91, 97, 103, Tel: PLaza 6-9444, Yr: 1917

**Chassis-Trak, Inc., 525 S. Webster Ave., Indianapolis 19, Ind., 87, Tel: FLeetwood 9-5407, Yr: 1952, Emp: 80, ▲2**

**See ad on page 626**

Chemalloy Electronics Corp., Gillespie Airport, Santee, Calif., 15, 21, 38, 40, 97, 100, 102, 103, Tel: HIckory 4-7661, Yr: 1950, Emp: 9, ▲1, $81,000

Chemfab Corporation, 43-67 11th St., Long Island City 1, N.Y., 93, 99, Tel: RAvenswood 9-6961

Chemo Products, Inc., P.O. Box 169, West Warwick, R.I., 91, 93, 98, 99, Tel: VAlley 1-1400, Yr: 1946, Emp: 100, $1,000,000

Chemtronic Corp., 309 11th Ave. S., Nashville 4, Tenn., 43, Tel: CHapel 2-0228, Yr: 1958, Emp: 115

Cherry Electrical Products Corp., 1650 Deerfield Rd., Highland Park, Ill., 72, Tel: HDlewood 2-8182

Chesapeake Instrument Corp., Shadyside, Md., 1, 9, 16, 18, 28, 38, 63, 75, 88, 94, Tel: UNiversity 7-2151, Yr: 1954, Emp: 130, ▲5, $300,000

**Chester Cable Corp., Oakland Ave., Chester, N.Y., 85, Tel: HOmestead 9-2141, Yr: 1945, Emp: 175, $3,000,000**

**See ad on page 124**

Chester-Morton Electronics Corp., 10th St. & Morton Ave., Chester, Pa., 14, 55, 73, 85, Tel: TRemont 4-6363, Yr: 1952, Emp: 80, ▲1, $600,000

Chet Engineering Co., 8140 Orion, Van Nuys, Calif., 45, 57, 88, Tel: STate 6-7226, Yr: 1956, Emp: 14, $190,000

Chicago Aerial Industries, Inc., 1980 Hawthorne Ave., Melrose Park, Ill., 4, 6, 9, 14, 17, 25, 30, 34, 36, 58, 64, 75, 94, Tel: FIllmore 5-1840, Yr: 1924, Emp: 800, $5,000,000

**Chicago Condenser Corp., 3255 W. Armitage Ave., Chicago 47, Ill., 43, 63, Tel: CApitol 7-7070, Yr: 1944, Emp: 75, ▲2, $500,000**

**See ad on page 392**

Chicago Dial Co., 1315 N. North Branch St., Chicago 22, Ill., 81, 91, Tel: WHitehall 3-4200, Yr: 1916, Emp: 200

**Chicago Dynamic Industries, Inc., Precision Products Div., 1725 W. Diversey Blvd., Chicago 14, Ill., 10, 72, Tel: WEllington 5-4600, Yr: 1932, Emp: 350, ▲2**

**See ad on page 546**

Chicago Electronic Div., Land-Air, Inc., 4751 N. Olcott Ave., Chicago 31, Ill., 1, 3, 4, 9, 12, 14, 19, 22, 23, 24, 27, 28, 36, 38, 39, 47, 64, 68, 72, 85, 88, 89, 94, 100, Tel: UN 7-7550

**Chicago Electronic Engineering Co., 3223 W. Armitage Ave., Chicago 47, Ill., 38, 52, 76, Tel: CApitol 7-3130, Yr: 1942. Emp: 107, ▲3, $1,198,000**

**See ad on page 565**

Chicago Magnetic Control, 1616 N. Damen Ave., Chicago 47, Ill., 38, 45, 52, 76, Tel: ARmitage 6-7400, Yr: 1950, Emp: 15, ▲1, $165,000

**See ad on page 565**

**Chicago Miniature Lamp Works, 1508 N. Ogden Ave., Chicago 10, Ill., 62, Tel: MOhawk 4-1741, Yr: 1910, Emp: 130, $1,200,000**

**See ad on page 471**

Chicago Rivet & Machine Co., 950 S. 25th Ave., Bellwood, Ill., 91, 96, Tel: LI 4-5100, Yr: 1922, Emp: 850

**Chicago Standard Transformer Corp., 3504 W. Addison, Chicago 18, Ill., 45, 52, 63, 76, 82, Tel: INdependence 3-7400, Emp: 2000, ▲6**

**See ad on page 565**

Chicago Telephone of California, Inc., P.O. Box 269, 105 Pasadena Ave., South Pasadena, Calif., 45, 69, 72, 76, Tel: CLinton 5-7186, Yr: 1956, Emp: 120

Chicago Telephone Supply Corp., see: CTS Corp.

Chicago Thrift-Etching Corp., 1555 N. Sheffield, Chicago 22, Ill., 81, 89, 91, Tel: MIchigan 2-1630, Yr: 1909, Emp: 200

Chisholm Industries, Ltd., Electronic Ave., Port Moody, B.C., Canada, 1, 2, 6, 7, 18, 22, 26, 84, 87, Tel: WEbster 9-1166

Christie Electric Corp., 3410 W. 67th St., Los Angeles 43, Calif., 47, 63, Tel: PLeasant 3-2607, Yr: 1929, Emp: 135, ▲5

Chrono-Log Corp., Box 4587, Philadelphia 31, Pa., 4, 9, 10, 14, 19, 29, 34, 58, 88, 100, Tel: LOcust 7-5178, Yr: 1957, Emp: 7, ▲1

Chu Associates, P.O. Box 387, Whitcomb Ave., Littleton, Mass., 39, 52, 83, Tel: GLadstone 6-3282, Yr: 1955, Emp: 36, ▲6, $425,000

Churchill Lighting Corp., 344 Franklin St., Melrose 76, Mass., 84, 87, 89, 91, Tel: NOrmandy 5-4700, Yr: 1948, Emp: 20

Ciba Products Corp., Fair Lawn, N.J., 93, Tel: SWarthmore 1-1122, Emp: 500

**Cimco Wire & Cable Co., 303 W. Crescent Ave., Allendale, N.J., 85, Tel: DAvis 7-2522**

**See ad on page 607**

Cinaudagraph, Inc., 7331 N. Clark St., Chicago 26, Ill., 38, 45, 57, 75, 76, Yr: 1956, Emp: 150, ▲2, $1,500,000

**Cinch Manufacturing Co., 1026 S. Homan Ave., Chicago 24, Ill., 46, 53, 55, 64, 71, 73, Tel: NEvada 2-2000**

**See ad on pages 46-47**

Cincinnati Sub Zero Products, 3932 Reading Rd., Cincinnati 29, Ohio, 14, 96, Tel: PLaza 1-8810, Yr: 1940, Emp: 62

**Circo Ultrasonic Corp., 51 Terminal Ave., Clark, N.J., 38, 88, 94, 96, Tel: FUlton 8-8600, Yr: 1959, Emp: 25, ▲1, $250,000**

**See ad on page 669**

**Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 46, 62, 64, 71, 73, 91, Tel: WOodland 7-1113, Yr: 1954, Emp: 25, ▲3, $250,000**

**See ad on page 471**

**Clairex Corp., 19 W. 26th St., New York 10, N.Y., 70, Tel: MUrray Hill 4-0940, Yr: 1953, Emp: 30, ▲3, $400,000**

**See ad on page 534**

Clare & Co., C. P., 3101 W. Pratt Blvd., Chicago 45, Ill., 68, 72, Tel: AMbassador 2-7700, Yr: 1937, Emp: 1500, ▲3, $14,000,000

Clark Co., Inc., David, 360 Park Ave., Worcester 2, Mass., 32, 38, 56, 59, 75, 88, Tel: PLeasant 6-6216, Yr: 1935

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, Ohio, 4, 30, 68, 69, 72, 82, Tel: ULster 1-2000, Yr: 1925, Emp: 1500

**Clark Crystal Co., Inc., 2 Farm Rd., Marlboro, Mass., 49, 71, 74, Tel: HUntley 5-1411, Yr: 1947, Emp: 15, ▲2**

**See ad on page 429**

**Clark Electronic Laboratories, Box 165, Palm Springs, Calif., 58, 66, 67, 68, 75, Tel: FAirview 8-2210, Yr: 1907, Emp: 19, ▲1, $500,000**

**See ad on page 561**

Clarostat Mfg. Co., Inc., Washington St., Dover, N.H., 11, 40, 69, 72, Tel: SHerwood 2-1120, Yr: 1921, Emp: 1500





Clary Corp., 408 Junipero St., San Gabriel, Calif., 9, Tel: AT 7-6111, Yr: 1939, Emp: 650, $1,000,000

Clear Beam Antenna Co., 21341 Roscoe Blvd., Canoga Park, Calif., 39, Tel: DIamond 7-2255, Yr: 1952, Emp: 75

Clearprint Paper Co., 1482 67th St., Emeryville, Calif., 16, 91

**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 1, 2, 3, 5, 7, 12, 14, 15, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31, 34, 35, 36, 88, 89, 94, Tel: OAkwood 7-6800, Yr: 1952, Emp: 35, ▲3, $350,000**

**See ad on page 308**

Cletron, Inc., 1974 E. 61st St., Cleveland 3, Ohio, 22, 56, Yr: 1945, Emp: 270, ▲2

Cleveland Container Co., The, 6201 Barberton Ave., Cleveland 2, Ohio, 91, 93, 99, Tel: OL 1-4500, Yr: 1923, Emp: 1200

Cleveland Electronics, Inc., 1974 E. 61st St., Cleveland 3, Ohio, 52, 56, 84, Tel: EXpress 1-3831, Yr: 1945, Emp: 260, ▲5

Cleveland Fabricating Co., The, 7424 Bessemer Ave., Cleveland 27, Ohio, 89, 91, 93, Tel: DI 1-5508, Yr: 1951, Emp: 53

Cleveland Metal Specialties Co., 1783 E. 21st St., Cleveland 14, Ohio, 9, 17, 36, 38, 39, 46, 64, 71, 72, 73, 84, 89, 94, Tel: PRospect 1-4186, Yr: 1907, Emp: 20, ▲1, $200,000

Clevite Electronic Components, Div. Clevite Corp., 3405 Perkins Ave., Cleveland 14, Ohio, 52, 56, 65, 75, Tel: EN 1-1730, Yr: 1930, Emp: 500

**Clevite Transistor Products, 241-257 Crescent St., Waltham 54, Mass., 70, Tel: TWinbrook 4-9330, Emp: 1400**

**See ad on page 536**

Clifton Precision Products Co., Inc., Maple at Broadway, Clifton Heights, Pa., 9, 30, 60, 76, Tel: HIlltop 9-1200, Yr: 1917, Emp: 1127, ▲1

Clippard Instrument Laboratories, Inc., 7390 Colerain Rd., Cincinnati 39, Ohio, 14, 45, Tel: JAckson 1-4261, Yr: 1947, Emp: 160, $1,000,000

Clipper Gear & Machine Co., 15301 E. Twelve Mile, Roseville, Mich., 4, 9, 10, 13, 18, 20, 21, 24, 27, 30, 58, 96, Tel: PRescott 3-0150, Yr: 1951, Emp: 25, ▲2, $100,000

Clough-Brengle Co., The, 6014 N. Broadway, Chicago 40, Ill., 3, 5, 28, 36, Tel: AM 2-2200, Yr: 1932, Emp: 20, ▲2

Co Engineering Co., P.O. Box 194, Boonton, N.J., 4, 18, 29, 47, 61, 72, 88, 91, Tel: DEerfield 4-9300, Yr: 1951, Emp: 8

Co-operative Industries, Inc., 100 Oakdale Rd., Chester, N.J., 46, 83, 85, 91, 102, Tel: TRinity 9-5151, Yr: 1946, Emp: 275, $1,000,000

Coast Coil Co., 5333 W. Washington Blvd., Los Angeles 16, Calif., 11, 45, 52, 76, Tel: WEbster 6-6188, Yr: 1950, Emp: 35

Coast Pro-Seal & Mfg. Co., 2235 Beverly Blvd., Los Angeles 57, Calif., 95, Tel: SY 5-5985

Coastal Publications Corp., 130 W. 42nd St., New York 36, N.Y., 100, Tel: LOngacre 3-2100, Yr: 1950, Emp: 220, ▲75, $2,000,000

Cobelm, Inc., 226 Passaic Ave., Caldwell, N.J., 89, 92, 95, 96, Tel: CApital 6-6675, Yr: 1951, Emp: 7, ▲1, $120,000

**Cohan Epner Co., Inc., 142 W. 14th St., New York 11, N.Y., 89, Tel: CHelsea 3-3411, Emp: 100**

**See ad on page 633**

**Cohn Corp., Sigmund, 121 S. Columbus Ave., Mount Vernon, N.Y., 85, 97, Tel: MOunt Vernon 4-5300, Yr: 1901, Emp: 150**

**See ad on page 609**

Coil Co. of America, Inc., 218 Washington St., Northvale, N.J., 38, 45, 57, 63, 76, 82, Tel: CL 5-3431, Yr: 1940, Emp: 30, ▲2, $100,000

Coil Engineering & Mfg. Co., Inc., 200 Main St., Roanoke, Ind., 45, 76, Tel: 2013, Yr: 1936, Emp: 300, $1,500,000

Coil Winders, Inc., New York Ave., Westbury, L.I., N.Y., 38, 39, 45, 47, 51, 52, 57, 63, 73, 76, Tel: EDgewood 4-3170, Yr: 1946, Emp: 120, ▲4

**Coil Winding Equipment Co., 19 Maxwell Ave., Oyster Bay, N.Y., 96, Tel: WAlnut 2-5660, Yr: 1946, Emp: 30, ▲2, $200,000**

**See ad on page 668**

Coilcraft, Inc., Jandus Rd., Cary, Ill., 38, 39, 45, 50, 52, 76, 91, 98, Tel: MErcury 2361, Yr: 1946, Emp: 300, ▲3, $2,000,000

Coils-Electronics Co., 2939-49 N. 2nd St., Philadelphia 33, Pa., 3, 4, 9, 14, 15, 17, 28, 38, 45, 63, 64, 84, 88, 89, 94, Yr: 1953, Emp: 35, $125,000

Colber Corporation, 26 Buffington St., Irvington, N.J., 69, 86

Cole Electric Co., 8139 Steller Dr., Culver City, Calif., 46, 55, 72, 73, 84, 92, Tel: UPton 0-4701, Yr: 1938, Emp: 100

Coleman Cable & Wire Co., 1900 River Rd., River Grove, Ill., 85, Tel: NAtional 5-6215, Yr: 1941, Emp: 98

Coleman Electronics, Inc., 133 E. 162nd St., Gardena, Calif., 4, 9, Tel: FAculty 1-4775, Yr: 1959, Emp: 15, $200,000

Coleman Instruments, Inc., 42 Madison St., Maywood, Ill., 14, Tel: FIllmore 5-9100

**Collectron Corp., 304 E. 45th St., New York 17, N.Y., 46, 72, 89, 91, 98, Tel: MUrray Hill 9-7120, Yr: 1951, Emp: 150**

**See ad on page 547**

Collins Corp., G. L., 2820 E. Hullett St., Long Beach 5, Calif., 4, 33, 75, 76, Tel: MEtcalf 0-1101, Yr: 1954, Emp: 45, $350,000

Collins Electronics, Inc., Stevensville, Md., 47, 63, Tel: MIssion 3-4661, Yr: 1955, Emp: 37, ▲3, $252,215

Collins Radio Company, Cedar Rapids, Iowa, 1, 2, 6, 7, 8, 18, 20, 22, 26, 27, 31, 39, 52, 63, Tel: EMpire 3-2661, Yr: 1932, Emp: 11,000, $117,864,139

Collins Radio Co., Central Sales Office, P.O. Box 1891, Dallas 21, Tex., 1, 2, 3, 4, 6, 7, 8, 9, 12, 18, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 34, 35, 36, 38, 39, 46, 47, 49, 52, 55, 59, 60, 61, 63, 64, 65, 66, 67, 77, 78, 79, 80, 82, 87, 91, 100, Tel: ADams 5-4511, Yr: 1933, Emp: 12,012, $117,864,139

Collins Radio Co., Texas Division, 1930 Hi-Line Dr., Dallas 7, Tex., 20, 21, 26, 27, 31, 38, 39, 40, 52, 60, 63, 76, 79, 80, 83, 100, Tel: AD 5-4511, Emp: 1500

Collins Radio Company, Western Division, 2700 W. Olive Ave., Burbank, Calif., 9, 13, 35, 52, Tel: VIctoria 9-3361, Yr: 1926, Emp: 1200

Columbia Electric Mfg. Co., 4519 Hamilton Ave. N.E., Cleveland 14, Ohio, 58, Yr: 1928, Emp: 100

Columbia Products Co., RFD #3, Columbia, S.C., 39, 99, Tel: SUnset 7-8710, Yr: 1919, Emp: 245, ▲3, $175,000

**Columbia Technical Corp., 61-02 31st Ave., Woodside 77, N.Y., 50, 95, Tel: AStoria 8-7401, Emp: 50, ▲5**

**See ad on pages 434-664**

Columbia Wire & Supply Co., 2850 Irving Park Rd., Chicago 18, Ill., 85, Tel: COrnelia 7-3160, Yr: 1937, Emp: 100, $1,000,000

**Columbian Carbon Co., Mapico Iron Oxides Unit, 380 Madison Ave., New York 17, N.Y., 97, Tel: MUrray Hill 7-2300, Yr: 1904, Emp: 150, ▲2**

**See ads on pages 434, 664**

Columbus Electric Mfg. Co., 2005 E. Main St., Columbus 5, Ohio, 72, 89, Tel: CL 2-4112, Yr: 1958, Emp: 50, ▲1

**Columbus Electronics Corp., 1010 Saw Mill River Rd., Yonkers, N.Y., 43, 66, 70, Tel: YOnkers 8-1221, Yr: 1947, Emp: 100, ▲6, $800,000**

**See ad on page 505**

Columbus Process Co., Inc., 2851 Southeastern Ave., Columbus, Ind., 76, Tel: DRexel 2-4471, Yr: 1945, Emp: 150, ▲2, $3,900,000

Colvin Laboratories, Inc., 364 Glenwood Ave., East Orange, N.J., 38, 63, 69, 75, Tel: OR 7-1221, Yr: 1952, Emp: 110, $500,000

**Comar Electric Co., 3319 Addison St., Chicago 18, Ill., 45, 68, 72, Tel: JUniper 8-2410, Yr: 1942, Emp: 428, $2,700,000**

**See ad on page 166**

Comco Plastics, Inc., 98-31 Jamaica Ave., Richmond Hill 18, N.Y., 73, 84, 89, 91, 93, 99, Emp: 75

Comet, Ltd., Waldeggstrasse 72, Liebefeld-Berne, Switzerland, 78, Tel: 63 05 83, Yr: 1948, Emp: 55

Commercial Plastics Co., 961 George St., Chicago 14, Ill., 91, 93, 98, 99, Tel: GRaceland 7-8220, Yr: 1951, Emp: 35, ▲1



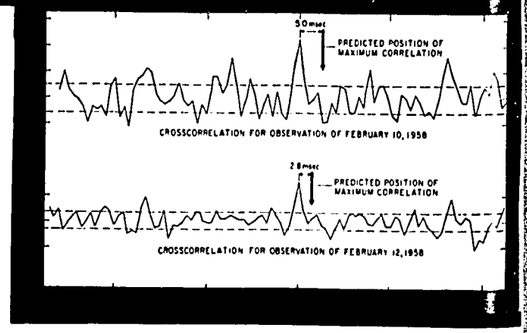
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Continental Electronics' giant transmitter at M.I.T. Lincoln Laboratory is the most powerful on earth. With it, man has made his first contact with another planet – by bouncing a radar signal off Venus for a space round trip of 56,000,000 miles.

This is a significant forward step since it means we have pushed our radio signals a hundred times further than ever before. It means we can measure space distances with amazing new accuracy. The powerful pulses from this transmitter were beamed into space from a huge antenna 84 feet from rim to rim. It is the same radar used to sight and track earth satellites and for other space probe programs.

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Correlation curves showing radar returns from Venus. The central peaks indicate the exact time of the radar waves from Earth to Venus and back (about five minutes). Each peak is the result of elaborate calculations by a high-speed digital computer on many thousands of tiny echoes originally beamed by Continental Electronics' transmitter

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For details, circle #139 on Reader Service Card




**Communication Accessories Co., 50 Highway & 71 By-Pass, Lee's Summit, Mo., 38, 45, 50, 52, 76, Tel: BRoadway 1-1700 (Kansas City), Yr: 1948, Emp: 504, ▲20, $2,217,000**

See ad on page 182

**Communication Measurements Laboratory, Inc., 348 Leland Ave., Plainfield, N.J., 5, 14, 38, 47, 63, Tel: PLainfield 4-5502**

See ad on page 479

Communications Co., Inc., 300 Greco Ave., Box 520, Coral Gables 34, Fla., 1, 12, 22, 31, 39, Tel: HIland 6-0846, Yr: 1938, Emp: 125, ▲3, $1,000,000

Communications Engineering Co., 36519 S. Gratiot Ave., Mt. Clemens, Mich., 89, 94, Tel: HOward 5-1431

Community Engineering Corp., P.O. Box 824, State College, Pa., 6, 17, 25, 38, 39, Tel: AD 8-2461, Yr: 1953, Emp: 22, ▲3

Component Mfg. Service, Inc., 1 Component Park, West Bridgewater, Mass., 46, 49, 55, 71, Tel: JUniper 8-0163

Component Research Co., Inc., 3019 S. Orange Dr., Los Angeles 16, Calif., 43, 44, Tel: WE 3-1105, Yr: 1958, Emp: 6, ▲1

Components Corp., 2855-57 N. Halsted St., Chicago 14, Ill., 38, 45, 47, 51, 52, 76, Tel: EA 7-6566, Yr: 1955, Emp: 35, ▲1

Components Corp., 106 Main St., Denville, N.J., 34, 61, 63, Tel: OAkwood 7-0290, Yr: 1943, ▲1

**Components for Research, Inc., 979 Commercial St., Palo Alto, Calif., 14, 46, 63, 76, 88, 89, 98, 99, Tel: DAvenport 1-5252, Yr: 1956, Emp: 6, ▲2, $70,000**

See ad on page 688

Composite Industrial Metals, Inc., 235 Georgia Ave., Providence 5, R.I., 48, 72, 85, 97, 103, Tel: HOpkins 7-8767, Yr: 1958, Emp: 21, $125,000

CompuDyne Corp., 400 S. Warminster Rd., Hatboro, Pa., 4, Tel: OSborne 5-4100, Yr: 1952, Emp: 80, ▲2, $2,200,000

**Computer Control Co., Inc., Eastern Div., 983 Concord St., Framingham, Mass., 4, 9, 10, 14, 36, 64, Tel: TRinity 5-6185, Yr: 1953, Emp: 220**

See ad on page 264

**Computer Control Co., Inc., Western Div., 2251 Barry Ave., Los Angeles 64, Calif., 4, 9, 10, 14, 36, 62, 64, Tel: BRadshaw 2-9135**

See ad on page 264

Computer Engineering Associates, Inc., 350 N. Halstead St., Pasadena, Calif., 9, 11, 38, 47, 63, Tel: ELgin 5-7121, Yr: 1952, Emp: 43, $100,000

Computer Equipment Corp., 1931 Pontius Ave., Los Angeles 25, Calif., 4, 9, Tel: GRanite 8-0161, Yr: 1958, Emp: 17, ▲3, $300,000

**Computer Instruments Corp., 90 Madison Ave., Hempstead, L.I., N.Y., 30, 36, 69, 72, 75, Tel: IVanhoe 3-8200, Yr: 1949, Emp: 135, ▲5**

See ad on pages 528-529

Computer-Measurements Co., Div. Pacific Industries, Inc., 12970 Bradley Ave., Sylmar, Calif., 4, 9, 10, 14, 21, 23, 58

Computer Systems, Inc., 611 Broadway, New York 12, N.Y., 9, 14, 16, 30, 38, Tel: SPring 7-4016, Yr: 1950, Emp: 100, ▲15

Computing Devices of Canada Limited, Box 508, Ottawa 4, Ont., Canada, 9, 24, 30, 38, 94, Tel: TAlbot 8-2711, Yr: 1949, Emp: 650, ▲15

Conant Laboratories, Box 3997, Bethany Sta., Lincoln 5, Neb., 66, Tel: IVanhoe 8-0132, Yr: 1933, Emp: 8, $200,000

Conap, Inc., 619 S. Union St., Olean, N.Y., 94, Yr: 1957, Emp: 6, ▲1

**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 4, 9, 15, 16, 29, 30, 36, 88, Tel: ALgonquin 4-5106, Yr: 1956, Emp: 40, ▲5, $697,288**

See ad on page 249

Con Jenser Products Co., 140 Hamilton St., New Haven 4, Conn., 43, 63, Tel: SPruce 7-5111, Yr: 1952, Emp: 50

Conductorlab Inc., Main St., Groton, Mass., 61, 86, 89, Tel: GIlbert 8-5140, Yr: 1958, Emp: 14, ▲1, $150,000

Conn-Craft Co., 301 Fairlawn Ave., Waterbury 5, Conn., 84, 89, 91, Tel: PLaza 4-1811, Yr: 1946, Emp: 3

Connecticut Hard Rubber Co., The, 407 East St., New Haven 9, Conn., 91, 93, 95, 102, Tel: SP 7-3631, Yr: 1921, Emp: 300

Connecticut Instrument Corp., 80 Danbury Rd., Wilton, Conn., 17, 49, 86, 89, 91, 96, 104, Tel: POrter 2-5545, Yr: 1958, Emp: 12, ▲1, $75,000

Connector Corp. of America, 12959 Sherman Way, No. Hollywood, Calif., 46, 83, Tel: TRiangle 7-9653, Yr: 1951, Emp: 10, $100,000

**Connector Seals Corp., 300 N. Lake Ave., Pasadena, Calif., 46, Tel: CUmberland 3-7224, Yr: 1957, Emp: 32**

See ad on page 450

Connolly & Co., Wallace E., P.O. Box 295, Menlo Park, Calif., 48, 49, 66, Tel: DAvenport 3-1930, Yr: 1957, Emp: 20

Conrad, Inc., 141 Jefferson St., Holland, Mich., 14, Tel: EXport 2-3161, Yr: 1951, Emp: 100, $2,000,000

Consolidated Airborne Systems, Inc., 900 Third Ave., New Hyde Park, L.I., N.Y., 5, 14, 30, Tel: HUnter 8-1606, Yr: 1957, Emp: 65, ▲1, $250,000

Consolidated Avionics Corp., 800 Shames Drive, Westbury, L.I., N.Y., 4, 9, 14, 33, 36, 47, 63, 64, Tel: EDgewood 4-8400, Yr: 1955, Emp: 175, ▲20, $2,000,000

Consolidated Controls Corp., 3 Durant Ave., Bethel, Conn., 4, 9, 30, 33, 38, 58, 72, 75, Tel: Pioneer 3-6721, Yr: 1957, Emp: 230, $2,200,000

Consolidated Diesel Electric Corp., 880 Canal St., Stamford, Conn., 47, 60, 63, 81, Tel: DAvis 5-2261, Yr: 1942, Emp: 600

Consolidated Electrodynamics Corp., 360 Sierra Madre Villa, Pasadena, Calif., 4, 9, 14, 17, 25, 29, 36, 38, 46, 58, 63, 65, 75, Tel: MUrray 1-8121, Yr: 1937, Emp: 3000

Consolidated Mining & Smelting Co. of Canada, Ltd., 215 St. James St. West, Montreal, Quebec, Canada, 85, 91, 97, 101, 103, Tel: AVenue 8-3103, Yr: 1906, Emp: 7000

**Consolidated Reactive Metals, Inc., 115 Hoyt St., Mamaroneck, N.Y., 85, 97, 104, Tel: OWens 8-2300, Yr: 1933, Emp: 25, ▲1**

See ad on page 609

**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 5, 11, 14, 44, 55, 64, 69, Tel: YOnkers 3-5900, Yr: 1954**

See ad on page 523

Consolidated Vacuum Corp., 1775 Mt. Read Blvd., Rochester 3, N.Y., 4, 14, 24, 94, 96, Tel: GLenwood 3-7972, Yr: 1953, Emp: 350

Consolidated Wire & Associated Companies, 1635 S. Clinton St., Chicago 16, Ill., 39, 85, Tel: HAymarket 1-4141

Constanta Co. of Canada Ltd., The, 280 Regina Ave., Montreal 19, Quebec, Canada, 69, Tel: POntiac 8-3235, Yr: 1954, Emp: 25, $150,000

Constantin & Co., L.L., Route #46, Lodi, N.J., 46, 54, 96, Tel: GRegory 1-0100, Yr: 1946, Emp: 495, $7,000,000

**Contact, Inc., P.O. Box 244, Maynard, Mass., 96, Tel: TWinoaks 7-2642, Yr: 1951, Emp: 10, ▲1**

See ad on page 669

Continental Can Co., 100 East 42nd St., New York 17, N.Y., 91, 99, Tel: OX 7-1200

Continental Connector Corp., 34-63 56th St., Woodside 77, N.Y., 46, 73, Tel: TWining 9-4422, Yr: 1952, Emp: 550

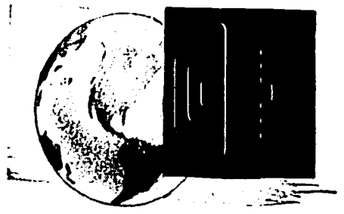
Continental Consultants, Inc., P.O. Box 111, Bryn Mawr, Pa., 88, Tel: LAwrence 5-2115

Continental Device Corp., 12515 Chadron Ave., Hawthorne, Calif., 66, 70, Tel: ORegon 8-1891, Yr: 1958, Emp: 200

Continental-Diamond Fibre Corp., Newark, Del., 89, 93, 98, 99, Tel: ENdicott 8-8531

Continental Electric Co., Inc., 325 Ferry St., Newark 5, N.J., 42, 47, 60, 63, Tel: MItchell 2-4050, Yr: 1922, Emp: 320

Continental Electronics Corp., 302 Oakland St., Brooklyn 22, N.Y., 3, 18, 38, 45, 55, 59, 68, 72, Tel: EVergreen 3-3331, Yr: 1944, Emp: 15, ▲2, $500,000



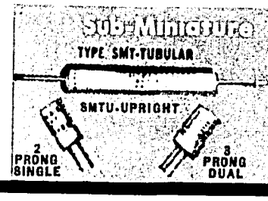
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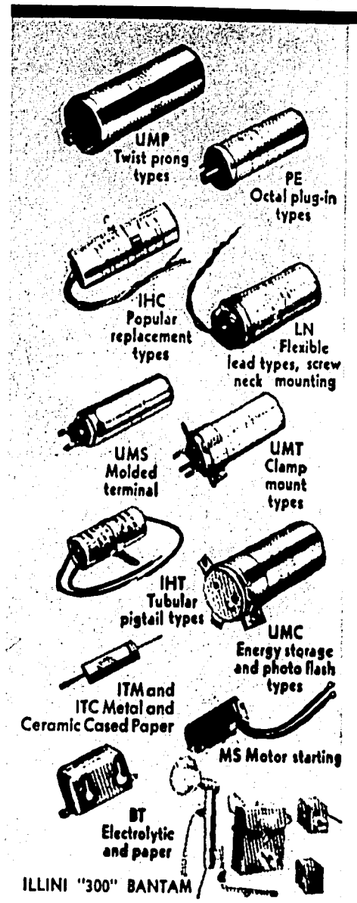
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**TYPE IHC** Popular multiple section types with flexible leads, insulating sleeves and mounting straps. Equally adaptable for original equipment or replacement purposes. Available in capacities from 10 to 250 MFD at 25 to 500 WVDC.

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**TYPE UMS** Hermetically sealed inverted can type with screw neck mounting and molded-in terminals. Wide ranges of capacities and voltage ratings. Meets all government specs.

**TYPE UMT** Inverted can type with clamp mounting. Hermetically sealed, shock resistant with new molded terminal construction. Ideal for use in highest quality equipment. Meets all government specs. Wide capacity and voltage ranges.

**TYPE IHT** Popular tubular aluminum can, pigtail type electrolytic. Internal riveted construction. In capacity ranges of 1 to 2000 MFD and from 6 to 600 WVDC. Also available with solder lug terminals. Supplied with insulating sleeves.

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**TYPES IMT and SMT** Newly developed "miniature" and sub-miniature electrolytics with hermetic seals. Especially designed for printed circuits, portable equipment, transistor equipment and any application where size and weight must be kept at an absolute minimum. Capacity ranges from .5 to 100 MFD and from 3 to 50 WVDC. Ceramic case and aluminum case types.

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**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 1, 7, 20, 26, 27, 31, 35, 38, 63, 83, Tel: EVergreen 1-1135, Yr: 1946, Emp: 579, ▲22, $9,000,000**

See ad on page 156

Continental Mfg., Inc., 1612 California St., Omaha 2, Neb., 6, 26, 32, 38, 80, Yr: 1955, Emp: 35

Continental Precision Products, 1026 East 179th St., New York 60, N.Y., 89, 91, Tel: LUdlow 9-9284

Continental Screw Co., 459 Mt. Pleasant St., New Bedford, Mass., 91, Tel: WYman 3-2621, Yr: 1904, Emp: 300

Continental Sound Engineering, Inc., 12730 W. Burleigh Rd., Brookfield, Wis., 4, 38, 88, 94, Tel: SUnset 2-4900, Yr: 1934, Emp: 32, ▲1, $650,000

Continental Wire Corp., 322 No. Cherry St. Ext., P.O. Box 366, Wallingford, Conn., 85, Tel: COlony 9-1121

Continental-Wirt Electronics Corp., 5221 Greene St., Philadelphia 44, Pa., 69, 72, Tel: GErmantown 8-9331, Yr: 1895, Emp: 135, $1,250,000

Control, Div. Magnetics Inc., Diamond Bldg., Butler, Pa., 38, 48, Tel: 7-3787, Yr: 1949, Emp: 375, ▲2, $1,830,000

Control Corp., 718 Central Ave., Minneapolis 11, Minn., 8, 9, 36, 68, Tel: FE 5-7893, Yr: 1937, Emp: 160, ▲4

Control Data Corp., 501 Park Ave., Minneapolis 15, Minn., 4, 9, 14, 29, 45, 60, 91, Tel: FEderal 9-0111, Yr: 1957, Emp: 800, ▲10

Control Dynamics Corp., 7120 Fulton Ave., No. Hollywood, Calif., 68, 71, Yr: 1959, Emp: 26, ▲1

**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 3, 6, 7, 9, 18, 20, 21, 23, 28, 33, 38, 39, 40, 45, 47, 50, 52, 63, 83, Tel: HAmilton 7-7961, Yr: 1951, Emp: 125, ▲10, $800,000**

See ad on page 440

Control Equipment Corp., 19 Kearney Road, Needham Heights 94, Mass., 4, 9, 10, 14, 33, 38, 63, 64, 94, Tel: HIllcrest 4-7550, Yr: 1956, Emp: 15, ▲2, $100,000

Control Indicating Corp., Bradley Field, Windsor Locks, Conn., 4, 58, 91, Tel: NAtional 3-2183, Yr: 1960, Emp: 5, ▲1

Control Instrument Co., Inc., Subsid. Burroughs Corp., 67 Thirty-Fifth St., Brooklyn 32, N.Y., 9, 30, 36, 89, 94, Tel: STerling 8-0658, Yr: 1934, Emp: 784

Control Products, Inc., 280 Ridgedale Ave., East Hanover, N.J., 72, Tel: TU 7-5000, Yr: 1945, Emp: 120, ▲1

Control Switch Div., Controls Co. of America, 4218 W. Lake St., Chicago 24, Ill., 62, 72, Emp: 500

Controlled Atmosphere Enclosures Mfg. Co., Inc., 1061 East 8th St., Jacksonville, Fla., 14, 81, 89, 92, Tel: ELgin 4-5601, Yr: 1954, Emp: 23

Controls Company of America, Appliance, Automotive & Electron Divs., 9555 Soreng Ave., Schiller Park, Ill., 4, 60, 66, 70, 72, Tel: NA 5-9000, Yr: 1932, Emp: 600

Contronics, 37 Leon St., Boston, Mass., 14, Tel: GA 7-4621

Convair-Pomona, Convair Div. General Dynamics Corp., 1675 West Fifth St., Pomona, Calif., 94, Tel: NAtional 9-5111, Yr: 1951, Emp: 6000

Cook Co., Ken, 9929 W. Silver Spring Rd., Milwaukee 18, Wis., 100, Tel: HOpkins 6-6060, Yr: 1944, Emp: 125

Cook Electric Co., 2700 N. Southport Ave., Chicago 14, Ill., 4, 9, 14, 18, 21, 27, 36, 38, 39, 47, 60, 63, 64, 68, 72, 73, 76, 82, 84, 86, 87, 89, 94, 96, 102, Tel: DIversey 8-6700, Yr: 1897, Emp: 1800, ▲100

Cook Electric Co., Data-Stor Div., 8100 Monticello Ave., Skokie, Ill., 9, 29, 36, 38, Tel: ORchard 3-9200, Yr: 1897, Emp: 5000, ▲250, $15,000,000

Cook Technological Center, Div. Cook Electric Co., 6101 W. Oakton St., Morton Grove, Ill., 4, 9, 14, 17, 18, 20, 21, 22, 24, 27, 29, 30, 36, 39, 63, 64, 84, 88, 89, 94, Tel: NIles 7-6600, Yr: 1898, Emp: 1800, ▲75, $50,000,000

Cooper Development Div., The Marquardt Corp., 2626 South Peck Rd., Monrovia, Calif., 17, Tel: HIllcrest 6-3138

Cooper Electronics, Inc., 28th & Parrish, Philadelphia 30, Pa., 3, 84, Yr: 1950, Emp: 20, ▲1, $250,000

Coors Porcelain Co., 600 9th St., Golden, Colo., 39, 46, 54, 86, 93, 101, Tel: CR 9-4533, Yr: 1910, Emp: 750, ▲3

Corbett Science Laboratories, F.W., 3117 Venice Blvd., Los Angeles 19, Calif., 4, 9, 14, 16, 19, 29, 34, 38, 68, 69, 75, Tel: REpublic 3-5251, Yr: 1912, Emp: 12, $75,000

Corkpak Co., Inc., The, 70 Argyle Ave., New Rochelle, N.Y., 91, 93, Tel: NEw Rochelle 2-1713, Yr: 1934

**Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 5, 11, 14, 39, 43, 47, 50, 52, 58, 63, 69, 70, Tel: PLainfield 6-9000, Yr: 1910, $24,700,000**

See ad on Cover 3

**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 40, 43, 44, 45, 50, 54, 64, 69, 73, 75, 80, 83, 86, 91, 104, Tel: FOrest 2-5571, Yr: 1851, Emp: 10,000, ▲30, $8,801,000**

See ads on pages 390, 523

Corning Glass Works, Electrical Products Div., Houghton Park, Corning, N.Y., 43, 44, 45, 49, 50, 54, 64, 69, 86, 91, 93, 104, Tel: 2-5011, Yr: 1851, Emp: 13,300

Cornish Wire Co., Inc., 50 Church St., New York 7, N.Y., 85, Tel: BArclay 7-5140

Cornwell Electronics Corp., 84 So. Water St., Byram, Conn., 38, 45, 48, 51, 52, 61, 63, 68, 76, 82, Tel: JEfferson 1-8064, Yr: 1947, Emp: 78, ▲2, $87,000

Corona Engineering Service, 94-52 Corona Ave., Elmhurst 73, N.Y., 4, 14, 45, 68, 88, Tel: HIllside 7-2777, Yr: 1947

**Corson Electric Mfg. Corp., 540 39th St., Union City, N.J., 43, Tel: UNion 6-4227, Yr: 1949, Emp: 25**

See ad on page 390

Cortland Industries, Inc., 4515 W. Cortland Ave., Chicago 39, Ill., 89, 91, 93, 99, Tel: CApital 7-1500, Yr: 1937, Emp: 150, $1,000,000

Cosa Corporation, Chrysler Bldg., 405 Lexington Ave., New York 17, N.Y., Importers, 14, 96, Tel: YUkon 6-9696, Yr: 1940, Emp: 75

**Cosmic Condenser Co., 853 Whittier St., New York 59, N.Y., 43, Tel: LUdlow 9-3360, Yr: 1930**

See ad on page 391

Cosmic Inc., 1028 Connecticut Ave., Washington 6, D.C., Importers, 3, 4, 12, 14, 15, 18, 19, 20, 21, 24, 25, 38, 57, Tel: ME 8-2620, Yr: 1957, Emp: 6, ▲2, $125,000

Cosmo Plastics Co., 3239 West 11th St., Cleveland 9, Ohio, 89, 91, 98, Tel: TOwer 1-3596, Yr: 1945, Emp: 70, $150,000

**Coto-Coil Co., Inc., 74 Pavilion Ave., Providence 5, R.I., 45, Tel: WIlliams 1-3355, Yr: 1917, Emp: 70, $500,000**

See ad on page 100

Cottrell Paper Co., Inc., Rock City Falls, N.Y., 93, Tel: TUlip 5-7510, Yr: 1926, Emp: 70

Couch Ordnance, Inc., 3 Arlington St., No. Quincy 71, Mass., 68, 72, Tel: BI 8-4147, Yr: 1894, Emp: 235

Counting Instruments Limited, 5 Elstree Way, Boreham Wood, Hertfordshire, England, 10, Tel: ELstree 1382, Yr: 1931, Emp: 450

Cox & Co., Inc., 115 E. 23rd St., New York 10, N.Y., 19, 74, 92, Tel: ORegon 4-4727, Yr: 1944, Emp: 125, ▲3, $750,000

Craig Electronics, 3455 Meier St., Los Angeles 66, Calif., 4, Tel: EXmont 7-8215, Yr: 1951, Emp: 3

Craig Systems, Inc., 360 Merrimack St., Lawrence, Mass., 39, 84, 87, 89, Tel: MUrdock 8-6961, Yr: 1941, Emp: 550, ▲2

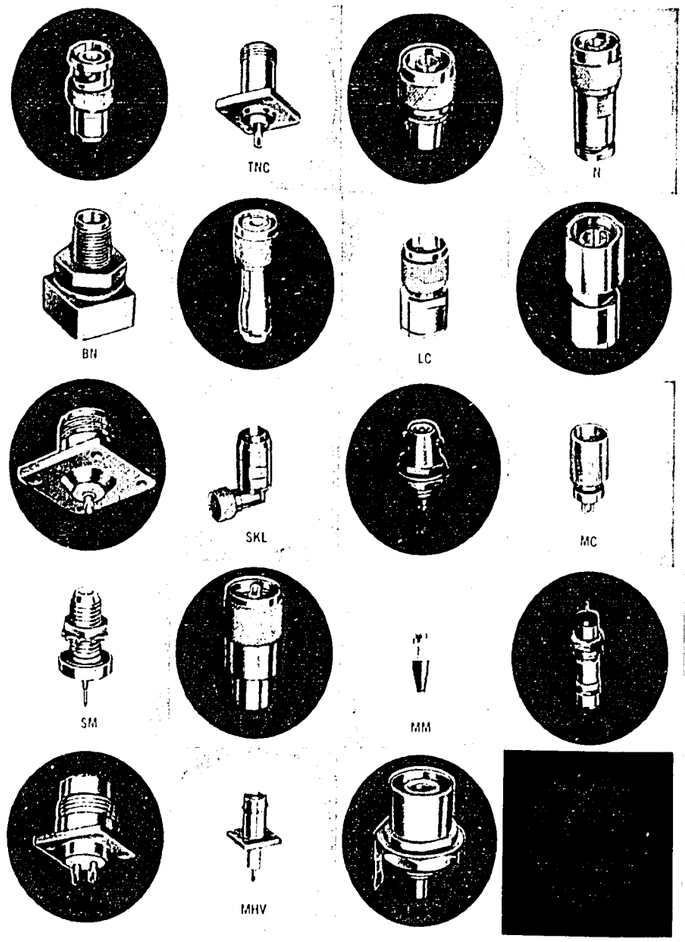
Cramer Controls Corp., P.O. Box 22, Centerbrook, Conn., 4, 10, 58, 60, 68, 72, Tel: SOuth 7-8255, Yr: 1923, Emp: 350, ▲2

Crane Packing Co., 6400 Oakton St., Morton Grove, Ill., 89, 93, 99, Tel: ORchard 4-0100

Cratex Mfg. Co., 1600 Rollins Rd., Burlingame, Calif., 91, Tel: OXford 7-1600, Yr: 1922, $50,000



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.




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# Alphabetical Directory

Crescent Engineering & Research Co., 5140 N. Peck Road, El Monte, Calif., 8, 75. Tel: GI 1-0528, Yr: 1938, Emp: 125

Crest Trans-former Corp., 1834 W. North Ave., Chicago 22, Ill., 76, Tel: EVerglade 4-1600, Yr: 1936, Emp: 81, $575,279

Croname Inc., 6231 Howard St., Chicago 48, Ill., 30, 61, 81, 89, 91, Tel: NIles 7-6100, Yr: 1903, Emp: 1200

Crosby-Teletronics Corp., 54 Kinkel St., Westbury, L.I., N.Y., 6, 13, 14, 28, 31, 36, 58, 72, 80, Tel: ED 3-1027

Crosley Division, Avco Corp., 1329 Arlington St., Cincinnati 25, Ohio, 1, 6, 7, 9, 12, 17, 18, 20, 22, 26, 27, 30, 39, Tel: KIrby 1-6600, Yr: 1920, Emp: 4100, ▲150

**Cross Company, H., 3229 Bergenline Ave., Union City, N.J., 97, Tel: UNion 3-1134, Yr: 1933**

**See ad on page 685**

Crouse-Hinds Company, Syracuse 1, N.Y., 4, Tel: GRanite 4-8111, Yr: 1897, Emp: 2500

Crowley Div., A. O. Smith Corp., 1 Central Ave., West Orange, N.J., 39, 40, 45, 48, 57, 83, 86, 102, Tel: ORange 3-7650, Yr: 1927, Emp: 90

Crown Engineering, 3821 Commercial N.E., Albuquerque, N.M., 3, 4, 7, 14, 21, 25, 32, 33, 36, 38, 45, 47, 51, 52, 58, 63, 76, 84, 87, 88, 89, 94, Tel: DI 1-2311, Yr: 1948, Emp: 83, ▲6, $550,000

Crown Tool, Inc., Subsid. Deluxe Coils, Inc., 810 N. Cass St., Wabash, Ind., 96, Tel: 1105

Crucible Steel Company of America, P.O. Box 2518, Pittsburgh 30, Pa., 57, 85, 90, 91, 96, 97, Tel: VAlantic 1-3800, Yr: 1900, Emp: 16,000, ▲5

Crystal Research Laboratories, Inc., 29 Allyn St., Hartford 4, Conn., 96, Tel: JAckson 7-3215, Emp: 25

Crystalonics, Inc., 249 5th St., Cambridge 42, Mass., 38, 70, Tel: KIrkland 7-2750, Yr: 1959, Emp: 20, ▲1, $30,000

Cubic Corp., 5575 Kearny Villa Rd., San Diego 11, Calif., 9, 14, 21, Tel: BRowning 7-6780, Yr: 1951, Emp: 375

Cunningham Son & Co., Inc., James, 33 Litchfield St., Rochester 8, N.Y., 9, 68, 72, Tel: BAker 5-7210, Yr: 1838, Emp: 50, ▲2, $382,000

Curtis Development & Mfg. Co., 3276 North 33rd St., Milwaukee 16, Wis., 73, Tel: HIlltop 5-1817, Yr: 1931, Emp: 125

**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 9, 14, 27, 36, 46, 50, 58, 60, 63, 68, 71, 72, 82, Tel: SWarthmore 1-0100, Yr: 1951, Emp: 2025**

**See ad on page 510**

Curtiss-Wright Corp., Electronics Div., IMI Branch, 5400 Acoma Road, S.E., P.O. Box 8324, Albuquerque, N.M., 9, 14, 15, 64, 68, 88, Tel: AM 8-2471, Yr: 1958, Emp: 43, ▲5





Curtiss-Wright Corp., Santa Barbara Div., 6767 Hollister Ave., Goleta, Calif., 92

Cushing & Nevell, Inc., 101 Park Ave., New York 17, N.Y., 100, Tel: ORegon 9-3810, Yr: 1933, Emp: 190, ▲20, $5,000,000

Custom Components, Inc., 21 Passaic Ave., Caldwell, N.J., 39, 48, 52, 83, 91, 98, 102, Tel: CApital 6-3403, Yr: 1953, Emp: 13, $400,000

Cutler-Hammer, Inc., 372 N. 12th St., Milwaukee 1, Wis., 4, 30, 57, 58, 62, 68, 72, 88, 92, Tel: BRoadway 1-7800, Yr: 1893, Emp: 6500

Cycle Trans-former Corp., 356 Glenwood Ave., East Orange, N.J., 38, 45, 52, 76, Tel: OR 4-0731, Yr: 1941, Emp: 50, ▲1, $300,000

Cyclotron Specialties Co., Moraga 9, California, 10, Tel: OR 6-1712

# D

D.K.E. Electronic Bases, Inc., 27 Wright, Newark 8, N.J., 67, 71, 77, 78, 79, 85, 86, 89, 101

D & R, Ltd., 102 E. Gutierrez St., Santa Barbara, Calif., 3, 9, 14, 38, 45, 47, 52, 60, 63, 76, Tel: WOodland 3-1116, Yr: 1951, Emp: 70, ▲1, $1,000,000

Daco Instrument Co., Tillary & Prince Sts., Brooklyn 1, N.Y., 4, 10, 14, 30, 58, 60, 72, 84, 89, 91, Tel: ULster 5-8350, Yr: 1929, Emp: 185, $190,000

**Dage Electric Co., Inc., 67 North Second St., Beech Grove, Ind., 46, 54, Tel: STate 6-0158, Yr: 1951, Emp: 140, $1,600,000**

**See ad on pages 132-133**

Dahlstrom Metallic Door Co., 119 Buffalo St., Jamestown, N.Y., 84, 87, Tel: 7091, Yr: 1904, Emp: 700

Dale Products, Inc., 1302 28th Ave., Columbus, Neb., 39, 60, 69, 89, 91, Tel: LOcust 4-3131, Yr: 1951, Emp: 750

Dallons Semiconductors, Div. Dallons Laboratories, Inc., 5066 Santa Monica Blvd., Los Angeles 29, Calif., 3, 14, 19, 49, 66, 96, Tel: NO 1-1951, Yr: 1925, Emp: 250, ▲7

Dalmo Victor Co., Div. Textron, Inc., 1515 Industrial Way, Belmont, Calif., 1, 4, 9, 12, 15, 16, 18, 21, 30, 31, 36, 38, 39, 83, 88, 89, 91, Tel: LYtell 1-1414, Yr: 1921, Emp: 565, $13,000,000

Dalweld Company, Inc., 13 Bertel Ave., Mount Vernon, N.Y., 85, 92, 97, 103, Tel: MO 1-8698, Yr: 1955, Emp: 16

Dano Electric Co., 97 Main St., Winsted, Conn., 45, Tel: FRontier 9-3302, Yr: 1936, Emp: 150

Dante Electric Mfg. Co., Marne Park, Bantam, Conn., 46, 53, 73, 91, Tel: JOrdan 7-5307, Yr: 1923

Darrill Products Corp., 7 Falmouth St., Attleboro, Mass., 81, 89, 91, 93, 98, Tel: CA 2-7410, Yr: 1957, Emp: 35, $150,000

Data Display, Inc., 1820 Como Ave., St. Paul 8, Minn., 58, 62, Tel: MIdway 6-8673, Yr: 1958, Emp: 15, ▲6

Data Products Co., Inc., 7320 Westmore Road, Rockville, Md., 9, 10, 14, 36, 64, Tel: GArden 4-6750, Yr: 1959, Emp: 15, ▲1

Datascan Inc., P.O. Box 785, Clifton, N.J., 1, 5, 9, 14, 17, 63, Tel: PRescott 3-8803, Yr: 1958, Emp: 18, ▲1

Datex Corp., 1307 So. Myrtle Ave., Monrovia, Calif., 1, 9, 14, 30, 33, 36, 64, Tel: ELliott 9-5381, Yr: 1952, Emp: 166, ▲10, $3,000,000

Datronics Engineers, Inc., 1925 St. Elmo Ave., Bethesda 14, Md., 88, 94, Tel: OLiver 6-2505

Daven Co., The, 530 W. Mt. Pleasant Ave., Livingston, N.J., 3, 9, 11, 14, 31, 38, 40, 47, 51, 52, 63, 64, 69, 72, 88, 89, 94, Tel: WYman 2-4300, Yr: 1928, Emp: 192, ▲63

Davenport Mfg. Co., 2530-32 N. Elston Ave., Chicago 47, Ill., 1, 9, 14, 38, 45, 47, 63, 82, 94, Tel: DIckens 2-5620, Yr: 1954, Emp: 15, $225,000

Davidson Electronic Development Co., 2211 Peninsula Drive, Erie, Pa., 88, 94, Tel: TF 3-9818, Yr: 1951, Emp: 8, ▲2

Davidson Optronics, Inc., 2223 Ramona Blvd., West Covina, Calif., 17, Tel: EDgewood 7-7281, Yr: 1933, Emp: 175

Davies Molding Co., Harry, 1428 N. Wells St., Chicago 10, Ill., 73, 84, 91, 98, Tel: MIchigan 2-7240, Yr: 1931, Emp: 160, $250,000

Davis Electronics, Inc., P.O. Box #1247, Burbank, Calif., 2, 18, 22, 39, 54, 73, 80, 95, Tel: DI 7-2259, Yr: 1948, Emp: 105, ▲5

Davis, George C., Suite 527, Munsey Bldg., Washington 4, D.C., 88, Tel: STerling 3-0111, Yr: 1937, Emp: 14, ▲1

Davis & Hemphill, 2000 Furnace Ave., Elk Ridge 27, Md., 91, Tel: 90, Yr: 1906

Davis Plastics Co., Joseph, Kearny, N.J., 99, Tel: WYman 1-0930, Yr: 1917, Emp: 250

Dawe Instruments Ltd., 99-101 Uxbridge Rd., Ealing, London W5, England, 3, 11, 14, 38, 58, Tel: EAling 6215, Yr: 1911, Emp: 300, $1,200,000

Daystrom Incorporated, Control Systems Div., 1455 Miramar Rd., La Jolla, Calif., 4, 9, Tel: GL 1-0121, Yr: 1956, Emp: 172, ▲58

Daystrom Incorporated, Military Electronics Div., Archbald, Pa., 9, 14, 27, 36, 84, 89, 91, Tel: JErmyn 1100, Yr: 1951, Emp: 1000, ▲150

Daystrom Incorporated, Transicoil Div., Worcester, Pa., 30, 38, 60, Tel: JU 4-2121

Daystrom Incorporated, Weston Instrument Div., 614 Frelinghuysen Ave., Newark 12, N.J., 4, 8, 9, 14, 16, 17, 21, 24, 28, 30, 38, 47, 58, 66, 68, 69, 76, Tel: BIgelow 3-1700

Daystrom Pacific, Div. Daystrom Incorporated, 9320 Lincoln Blvd., Los Angeles 45, Calif., 69, Tel: OR 4-7100

Dayton Aircraft Products, Inc., 812 N.W. First St., Ft. Lauderdale, Fla., 1, 30, 38, 39, 63, 85, 86, 89, 91, 98, Tel: JAckson 3-5151, Yr: 1945

Dayton Electronic Products Co., 915 Webster St., Dayton 1, Ohio, 1, 9, 10, 20, 21, 25, 38, 47, 63, 64, 75, 82, 85, 94, Tel: BA 4-0569, Emp: 12, ▲3, $150,500

Daytronic Corp., 223-227 S. Jefferson St., Dayton 2, Ohio, 1, 38, 58, 75, Tel: BA 4-1021, Yr: 1954, Emp: 11, ▲1, $200,000

De Tec-Tronic Corp., 2542 N. Halsted St., Chicago 14, Ill., 4, Tel: EAstgate 7-3662, Yr: 1947, Emp: 10

Dearborn Electronic Laboratories, Inc., P.O. Box 3131, Orlando, Fla., 45, Tel: MIdway 7-3891, Yr: 1953, Emp: 90, ▲2, $750,000

Dearborn Electronic Laboratories, Inc., 1421 N. Wells St., Chicago 10, Ill., 45, 52, Tel: WHitehall 4-2112, Yr: 1953, Emp: 80, $1,200,000

Decker Corporation, The, 15 Monument Road, Bala Cynwyd, Pa., 3, 4, 5, 14, 17, 19, 38, 58, 72, 75, 83, Tel: MOhawk 1-6700, Yr: 1951, Emp: 205, ▲10, $3,000,000

**Dee Electric Co., 1648 West Haddon St., Chicago 22, Ill., 92, 96, Tel: BElmont 5-5151, Yr: 1950**

**See ad on page 655**

Defiance Machine & Tool Co., 1920 So. Vandeventer Ave., St. Louis 10, Mo., 89, 91, 96, Tel: PRospect 3-0567, Yr: 1941, Emp: 50, ▲2

**Defiance Printed Circuit Corp., 81 Albion St., Wakefield, Mass., 64, 89, Tel: CRystal 6-5311, Yr: 1956, Emp: 30, $217,000**

**See ad on page 197**

Deitz Co., Inc., 9 E. Wesley St., S. Hackensack, N.J., 4, 72, 75, 89, 91, Tel: HUbbard 8-8516, Yr: 1948, Emp: 20, ▲1, $240,000

DeJur-Amsco Corporation, Electronics Div., 45-01 Northern Blvd., Long Island City 1, N.Y., 16, 58, 69, Tel: RAvenswood 1-1008, Yr: 1922, Emp: 500

**Del Electronics Corp., Dept. RE, 521 Homestead Ave., Mt. Vernon, N.Y., 14, 17, 45, 58, 63, 72, 76, Tel: OWens 9-2000, Yr: 1951, Emp: 50, ▲3, $300,000**

**See ads on pages 282, 481, 567**

De Landri Precision Elements Co., Inc., 39 School St., Yonkers, N.Y., 30, 91, Tel: GReenleaf 6-3678, Yr: 1956, Emp: 12, $60,0000

Delco Radio Division, General Motors Corp., 700 East Firmin St., Kokomo, Ind., 6, 9, 63, 66, 70, Tel: GLadstone 2-8211, Yr: 1936, Emp: 1830

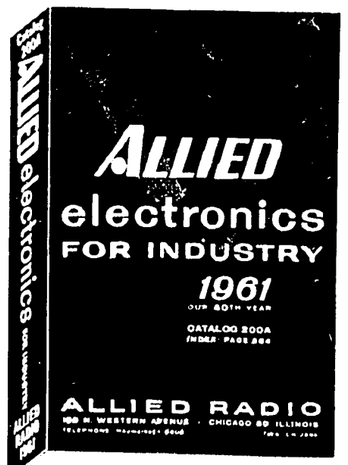
Delevan Electronics Corp., 77 Oleon Rd., East Aurora, N.Y., 45, Tel: CYpress 3600, Yr: 1953, Emp: 135

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr.: Year of founding. Emp.: Total employees. ▲: Number of IRE members. $: Net radio-electronic sales during last fiscal year.

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Dell Optics Co., Limited, 327 55th St., West New York, N.J., 17, 98. Tel: UN 7-1399. Yr: 1952. Emp: 29

Delmhorst Instrument Co., 601 Cedar St., Boonton, N.J., 14. Tel: DE 4-2557. Yr: 1937. Emp: 10

Delta Coils, Inc., 1128 Madison Ave., Paterson 3, N.J., 39, 40, 45, 48, 50, 52, 76. Tel: MU 5-5878. Yr: 1950. Emp: 100. ▲2. $600,000

Delta Design, Inc., 7460 Girard Ave., La Jolla, Calif., 14. Tel: GL 4-1185

Delta-F, Inc., 113 East State St., Geneva, Ill., 10, 33, 49, 63, 64. Tel: CEnter 2-7600. Yr: 1958. Emp: 20. ▲1

Delta Radio Co., 115 Worth St., New York 13, N.Y., 45, 76. Tel: RE 2-6649. Yr: 1934. Emp: 12. ▲1

Deltek, 639 South B St., Tustin, Calif., 10, 17, 63. Yr: 1960. Emp: 8. ▲3

Deltime, Inc., 139 Hoyt St., Mamaroneck, N.Y., 9, 50. Tel: OWens 8-5800. Yr: 1956. Emp: 50. ▲2

Deltron Inc., 8th & Cambria St., Philadelphia 33, Pa., 3, 4, 14, 38, 47, 63. Tel: REgent 9-4101. Yr: 1952. Emp: 50. ▲1. $350,000

**Deluxe Coils, Inc., P.O. Box 451, Wabash, Ind., 45, 63. Tel: 1720. Yr: 1948. Emp: 750. $5,000,000**

**See ad on page 398**

**DeMornay-Bonardi, 780 So. Arroyo Parkway, Pasadena, Calif., 21, 10, 52, 80, 83. Tel: SYcamore 2-4112. Yr: 1951. $650,000**

**See ad on pages 52-53**

Dennison Mfg. Co., 300 Howard St., Framingham, Mass., 91, 93. Tel: TRinity 3-3511

**Dependable Printed Circuits, 827 Black Oak Ridge Rd., Wayne, N.J., 64, 89. Tel: TE 5-2765. Emp: 20. ▲1. $150,000**

**See ad on page 199**

Derivation & Tabulation Associates, Inc., 95 Harrison St., West Orange, N.J., 100. Tel: ORange 3-3903. Yr: 1956. Emp: 12. ▲1

DeRyder Electronics, 18 Notch Road, Little Falls, N.J., 14, 23, 37, 63, 88, 94. Tel: CLifford 6-2142. Yr: 1941. Emp: 8. ▲1. $218,500

Design Tool Corp., 772 Bergen St., Brooklyn 38, N.Y., 4, 19, 92, 96. Tel: STerling 3-3191. Yr: 1951. Emp: 25

Designers For Industry, Inc., 1211 Fulton Parkway, Cleveland 9, Ohio, 1, 3, 4, 9, 12, 13, 14, 17, 19, 20, 22, 23, 24, 26, 27, 28, 29, 31, 33, 36, 38, 47, 49, 58, 64, 75, 80, 88, 89, 94. Tel: SHadyside 9-0700. Yr: 1935. Emp: 225. ▲25. $1,000,000

Destron Co., 25914 Chalmette, Rolling Hills Estates, Calif., 2, 4, 22, 68, 72. Tel: FR 8-3450. Yr: 1951. Emp: 2. ▲1. $1400

Deutsch Co., The, Electronic Components Div., Municipal Airport, Banning, Calif., 16, 51, 72, 89, 91, 98. Tel: VIctor 9-6701. Yr: 1938. Emp: 935





Deutsch Fastener Corp., P.O. Box 61072, 14501 S. Figueroa, Gardena, Calif., 91

Devco Engineering, Inc., Pier Lane West, Caldwell, N.J., 4, 62, 84, 87, 89, 91, 96. Tel: CApital 6-0610. Yr: 1951. Emp: 26

Development Engineering Co., Inc., 9 Cross St., Norwalk, Conn., 14. Tel: VOlunteer 6-7720

Developmental Electronics Corp., 1213 So. Broadway, Los Angeles 37, Calif., 50, 64, 76. Tel: ADams 4-7751. Yr: 1951. Emp: 25. ▲2

Developmental Engineering Corp. (DECO), 1000 Connecticut Ave., Washington, D.C., 94. Tel: ST 3-2550. Yr: 1953. Emp: 100. ▲12

Devol Research Corp., Brookside Dr., Greenwich, Conn., 4, 9, 18, 88, 91, 96. Tel: PI 3-6721. Yr: 1945

De Wald Radio Div., United Scientific Labs., 35-15 37th Ave., Long Island City 1, N.Y., 2, 6, 38, 80. Yr: 1921. Emp: 100. ▲3

Dewey & Co., Inc., G. C., 202 E. 44th St., New York 17, N.Y., 88, 91. Tel: MUrray Hill 2-7369

Di An Controls, Inc., 40 Leon St., Boston 15, Mass., 1, 4, 9, 10, 30, 36, 38, 64. Tel: HIghlands 5-5640. Yr: 1958. Emp: 54. ▲8. $600,000

Dial Products Co., 19 Cottage St., Bayonne, N.J., 30, 63. Tel: HEmlock 7-0720. Yr: 1953

**Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 16, 62, 71, 72. Tel: HYacinth 7-7600. Yr: 1937. Emp: 200. ▲4**

**See ad on page 172**

Dialtron Corp., 203 Harrison Pl., Brooklyn 37, N.Y., 68. Tel: HYacinth 7-7600. Yr: 1955. Emp: 100. ▲2

Diamond Antenna & Microwave Corp., 35 River St., Winchester, Mass., 21, 39, 40, 49, 52, 72, 80, 83, 89, 91, 94. Tel: PArkview 9-5500. Yr: 1956. Emp: 50. ▲5. $650,000

Diamond Drill Carbon Co., The, 244 Madison Ave., New York 16, N.Y., 49. Tel: LExington 2-3006

Diamond Electronics Corp., 61 White St., New York 13, N.Y., 33, 43, 44. Tel: WOrth 6-0530. Yr: 1957. Emp: 20. ▲1. $110,000

Diamond Power Specialty Corp., Diamond Electronics Div., P.O. Box 415, Lancaster, Ohio, 4, 14, 17, 23, 34, 36, 63, 64, 78, 88, 89, 94, 96, 104. Tel: OLive 3-6510. Yr: 1946. Emp: 42. ▲5. $750,000

Diamond Tool Engineering Co., 108 Massachusetts Ave., Boston 15, Mass., 61, 91. Tel: COmmonwealth 6-2700. Yr: 1946. Emp: 40

Diamonite Products Mfg. Co., Div. U.S. Ceramic Tile, Shreve, Ohio, 86, 93, 104. Yr: 1944. Emp: 150. ▲1. $727,469

Dice Co., J. W., 16 Highwood Ave., Englewood, N.J., 14. Tel: LOwell 9-0171. Yr: 1949. Emp: 8. $150,000

Dicon Corporation, P.O. Box 177, Port Washington, N.Y., 4, 8, 9, 10, 11, 14, 16, 18, 19, 20, 23, 24, 25, 32, 36, 38, 39, 47, 58, 63, 72, 75, 82, 88, 94. Tel: POrt Washington 7-6900. Yr: 1960. Emp: 8. ▲6

Dictaphone Corp., 730 3rd Ave., New York 17, N.Y., 29. Tel: YUkon 6-1900. Yr: 1923. Emp: 3300. ▲8. $33,630,000

Dictograph Products, Inc., 95-25 149 St., Jamaica 35, N.Y., 32, 38, 74, 76. Tel: JAmaica 6-2323

Diebel Die & Manufacturing Co., 2711 W. Irving Park Rd., Chicago 18, Ill., 89. Tel: IN 4-3100. Yr: 1938. Emp: 200. $1,000,000

Diehl Mfg. Co., 1188 Finderne Ave., Somerville, N.J., 4, 28, 30, 38, 60, 69. Tel: RAndolph 5-2200. Yr: 1888. Emp: 2000

Dielectric Products Engineering Co., Inc., Raymond, Me., 21, 39, 40, 46, 52, 72, 83, 85, 89, 91, 96, 102. Tel: OLdfield 5-4555. Yr: 1952. Emp: 150. ▲2

Dietz Co., Inc., Henry G., 12-16 Astoria Blvd., Long Island City 2, N.Y., 75, 84. Tel: RA 6-3317. Yr: 1917. Emp: 16. ▲1. $150,000

Digital Equipment Corp., Maynard, Mass., 9, 10, 64. Tel: TWinoaks 7-8822

Digittran Co., The, Div. Endevco Corp., 660 So. Arroyo Pkwy., Pasadena, Calif., 9, 10, 36, 64, 72. Tel: MUrray 1-9667. Yr: 1950. Emp: 212. ▲8

Digitronics Corp., Albertson Ave., Albertson, N.Y., 4, 9, 64. Tel: Pioneer 7-5030. Yr: 1957. Emp: 75. ▲15. $916,587

Dilectrix Corp., Allen Blvd. & Grand Ave., Farmingdale, L.I., N.Y., 93, 99. Tel: CHapel 9-7999

Dilectron Division, Bestran Corp., 2669 So. Myrtle Ave., Monrovia, Calif., 43. Yr: 1957. Emp: 150. ▲2

**Dimco-Gray Co., 212 E. 6th St., Dayton 2, Ohio, 58, 72, 89, 91, 98. Tel: BAldwin 2-6703. Yr: 1948. Emp: 50. $100,000**

**See ad on page 611**

Dimensions Inc., 7311 25th Ave., Brooklyn 4, N.Y., 9, 62, 77. Tel: CLoverdale 6-8182. Yr: 1958. Emp: 2. ▲1

Dimick Mfg. Co., Jefferson, Ore., 39, 93, 94, 98. Tel: FAirfax 7-2555. Yr: 1951. Emp: 8. $83,000

Direct TV Replacements, Ltd., 138, Lewisham Way, London S. E. 14, England, 3, 5, 9, 11, 14, 17, 21, 25, 28, 29, 45, 52, 76, 80. Tel: TIdeway 6666. Yr: 1952. Emp: 60. ▲1

Dit-Mco, Inc., Electronics Div., 911 Broadway, Kansas City 5, Mo., 14. Tel: HArrison 1-6011

Division Lead Co., 7712 W. 61st Place, Summit, Ill., 48, 55, 84, 89, 91, 95, 97, 101, 102, 103, 104. Tel: REliance 5-8600. Yr: 1918. Emp: 100

Dixon Corp., Burnside St., Bristol, R.I., 89, 91, 93, 99. Tel: CL 3-7500. Yr: 1876. Emp: 150

Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City 3, N.J., 95. Tel: DElaware 3-3000. Yr: 1827. Emp: 950

Dixon Electronics Co., 13411 W. McNichols Rd., Detroit 35, Mich., 12, 68. Tel: UN 1-4231. Yr: 1951. Emp: 3. ▲1. $2000

Djordjevic Engineering Co., Djeco Div., 1933 N. Damen, Chicago 47, Ill., 3, 4, 9, 14, 17, 21, 30, 33, 38, 45, 47, 52, 63, 66, 67, 72, 76, 82, 88, 92, 94, 96. Tel: ARmitage 6-7308. Yr: 1957. Emp: 30. ▲1. $200,000

Dmeter Mfg. Co., Inc., P.O. Box 88, Yonkers, N.Y., 11, 58, 69, 75. Tel: YOnkers 9-1770

DoALL Company, The, 731 North Laurel Ave., Des Plaines, Ill., 96. Tel: VA 4-1122

Dohn Metal Products, Inc., 315 Lexington Ave., Brooklyn 16, N.Y., 84, 89. Tel: NEvins 8-9472. Yr: 1916. Emp: 58. $160,000

Dolinko & Wilkens, Inc., 1907 Summit Ave., Union City, N.J., 13, 44. Tel: UNion 7-6630. Yr: 1947. Emp: 21. ▲1. $200,000

Dollar Co., The Robert, Communications Equipment Div., 50 Drumm St., San Francisco 11, Calif., 4, 12, 22, 26, 35. Tel: EXbrook 2-8151. Yr: 1946. Emp: 7. $55,000

Dominion Electrohome Industries, Ltd., 243 Duke St. W., Kitchener, Ont., Canada, 6, 32, 38, 42, 60, 61, 80, 84, 92. Tel: SHerwood 3-0271. Yr: 1907. Emp: 1200. ▲15

Donnelly Mfg. Co., 530 Winter St., Waltham 54, Mass., 84, 87, 89. Tel: TW 3-5700. Yr: 1907. Emp: 250. $2,300,000

Donner Scientific Co., Subsid. Systron-Donner Corp., 888 Galindo St., Concord, Calif., 3, 9, 11, 15, 30, 38, 52, 63, 75. Tel: MUlberry 2-6161. Yr: 1953. Emp: 200. ▲1

Dorne & Margolin, Inc., 29 New York Ave., Westbury, L.I., N.Y., 39, 76, 83. Tel: EDgewood 1-3200. Yr: 1947. Emp: 140. ▲6. $1,500,000

Dorsett Electronics Labs., Inc., 119 W. Boyd, P.O. Box 862, Norman, Okla., 36, 38, 52, 63, 82. Tel: JEfferson 4-3750. Yr: 1950. Emp: 100. ▲2. $500,000

**Douglas Microwave Co. Inc., 252 E. 3rd St., Mt. Vernon, N.Y., 21, 27, 39, 40, 52, 72, 76, 80, 83. Tel: MOunt Vernon 8-6900. Yr: 1952. Emp: 55. ▲5. $800,000**

**See ad on pages 90-91**

Douglas Radio Laboratories, 176 Norfolk Ave., Boston 19, Mass., 24, 63, 94. Tel: HI 5-8836. Yr: 1945

Dow Corning Corp., Midland, Mich., 93, 95, 99, 101. Tel: TEmple 2-2371. Yr: 1942

Dow-Key Co., Inc., S.E. Highway 59, Thief River Falls, Minn., 46, 68, 72. Tel: MU 1-3075. Yr: 1950. Emp: 25. ▲1. $175,000



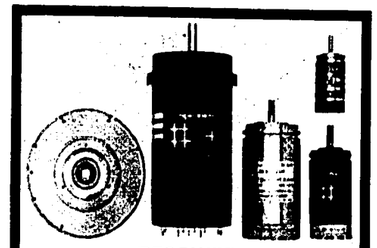
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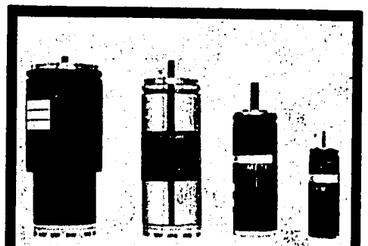
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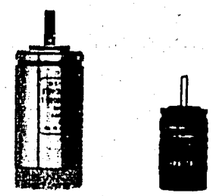
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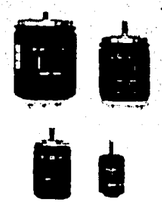
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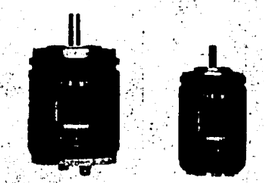
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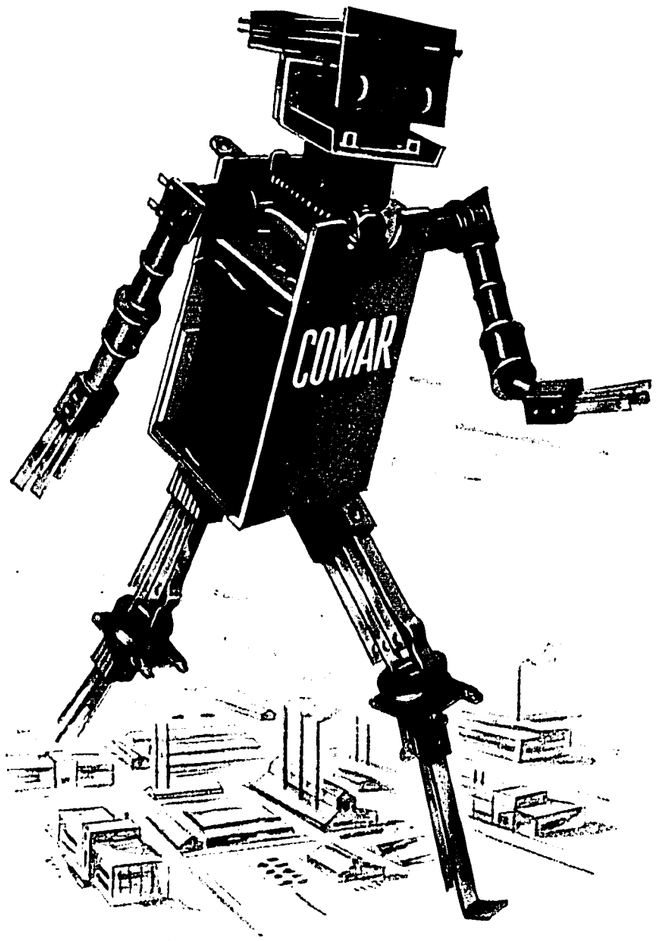
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Dynamics Corp. of America, 25 W. 43rd St., New York 36, N.Y., 2, 7, 9, 20, 22, 26, 27, 30, 31, 38, 39, 45, 48, 49, 60, 63, 76, Tel: BRyant 9-1082, Yr: 1940, Emp: 6500, ▲150, $55,000,000

Dynamics Instrumentation Co., 1118 Mission St., South Pasadena, Calif., 14, 21, 38, 52, 63, 72, 84, Tel: MUrray 2-3318, Yr: 1956, Emp: 30, ▲2

Dynamics Research Corp., 38 Montvale Ave., Stoneham, Mass., 1, 4, 9, Tel: ST 6-3900, Yr: 1955, Emp: 25, ▲1, $300,000

Dynapar Corporation, 7312 N. Ridgeway, Skokie, Ill., 4, 9, 10, 23, 33, 75, Tel: ORchard 4-6655, Yr: 1952, Emp: 17, ▲2, $120,000

Dynatran Electronics Corp., 178 Herricks Rd., Mineola, L.I., N.Y., 4, 14, 16, 58, 63, Tel: Pioneer 1-4141, Yr: 1959, Emp: 12, ▲2

Dynisco, Inc., 42 Carelton St., Cambridge 42, Mass., 75, Tel: UNiversity 4-7260, Yr: 1953, Emp: 60, ▲1

Dytronics Company, P.O. Box 3676, Columbus 14, Ohio, 3, 5, 38, 52, Tel: AMherst 3-0890

Dzus Fastener Co., Inc., 125 Union St., West Islip, L.I., N.Y., 91, Yr: 1932

# E

E-H Research Laboratories, 1922 Park Blvd., Oakland 6, Calif., 10, 14, 24, 28, 33, 38, 58, 63, 76, Tel: GLencourt 2-0732

El Laboratories, 1165 Morena Blvd., San Diego 10, Calif., 25, Tel: BR 6-2126

E-Kay Mfg. Co., Inc., P.O. Box 144, Little Falls, N.J., 89, 91, Tel: CL 6-5767, Yr: 1953, Emp: 8, ▲1, $75,000

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, N.S., Canada, Importers, 1, 3, 4, 15, 18, 20, 21, 23, 26, 27, 30, 32, 38, 39, 40, 45, 46, 48, 52, 63, 64, 68, 75, 76, 83, 84, 87, 88, 89, 90, 91, Tel: HAlifax 6-7491, Yr: 1946, Emp: 285**

**See ad on page 400**

E.M.I.-Cossor Electronics, Ltd., 2005 Mackay, St., Montreal, Quebec, Canada, 1, 7, 9, 14, 18, 20, 22, 23, 25, 26, 27, 29, 31, 37, 38, 39, 45, 47, 50, 63, 65, 68, 75, 77, 78, 79, 83, 88, 91, Tel: VI 2-7955, Yr: 1918, Emp: 320, ▲8

E.M.I. Electronics, Ltd., Hayes, Middlesex, England, 4, 6, 7, 9, 14, 17, 19, 20, 21, 23, 21, 25, 29, 31, 37, 39, 77, 78, 79, 80, 83, 92, 100, Tel: SOuthall 2468, Yr: 1898, Emp: 13,000

E O Electronics, Inc., 14 Morris Ave., Mountain Lakes, N.J., 3, 14, 24, 38, 63, Tel: DEerfield 4-8727, Yr: 1952, Emp: 5, ▲1, $65,000

EPIC, Inc., 150 Nassau St., New York 38, N.Y., Importers, 5, 11, 14, 16, 25, 43, 58, Tel: DIgby 9-2470, Yr: 1949, Emp: 5





**ESC Electronics Corporation, 534 Bergen Blvd., Palisades Park, N.J., 45, 50, 52, 76, 83, Tel: WIndsor 7-0400, Yr: 1953, Emp: 235, ▲11, $2,300,000**

**See ad on page 436**

E-T-A Products Co. of America, 6284 No. Cicero Ave., Chicago 46, Ill., 68, 72, Tel: KIldare 5-1554

E-Z Way Towers, Inc., P.O. Box 5767, 5901 E. Broadway, Tampa 4, Fla., 39, Tel: 4-2171, Yr: 1951, Emp: 28, $206,000

Eagle Electric Mfg. Co., Inc., 23-10 Bridge Plaza So., Long Island City 1, N.Y., 53, 62, 71, 72, 76, 85, 91, 103, Tel: STillwell 4-9200

Eagle Metalcraft, Inc, 3550 Burnet Ave., E. Syracuse, N.Y., 83, 84, 87, 89, Tel: HE 7-3858, Yr: 1953, Emp: 16, $250,000

Eagle Signal Co., 202 20th St., Moline, Ill., 4, 10, 45, 58, 68, 72, 89, Tel: MOline 2-5571, Yr: 1926, Emp: 550, $800,000

Eastern Air Devices, Inc., 385 Central Ave., Dover, N.H., 42, 69, Tel: SHerwood 2-3330

Eastern Foilcal Nameplate Corp., 1061 Linden Ave., Ridgefield, N.J., 84, 89, 91, Tel: WHitney 3-3220, Yr: 1953, Emp: 35

Eastern Industries, Inc., 100 Skiff St., Hamden 14, Conn., 4, 30, 38, 42, 80, 96, Tel: CHestnut 8-3841, Yr: 1947, Emp: 800, $6,000,000

Eastern Smelting & Refining Corp., 109 W. Brookline St., Boston 18, Mass., 97, Tel: CO 6-7504, Yr: 1896, Emp: 50

Eastern Technical Associates, Inc., Main St., N. Acton, Mass., 58, 72, Tel: COlonial 3-7719, Yr: 1956, Emp: 24

Eastern Tool & Mfg. Co., 1 Montgomery St., Belleville 9, N.J., 89, 91, Tel: PLymouth 9-7100, Yr: 1910, Emp: 200, $10,000

**Eastman Kodak Co., 343 State St., Rochester 4, N.Y., 13, 17, 24, 34, 70, Tel: LOcust 2-6000**

**See ad on page 300**

Eaton Electronics Corp., Deep River 1, Conn., 64, Tel: LAmbert 6-5876, Yr: 1954, Emp: 20

Ebauches S. A., Dept. Oscilloquartz, c/o Freeport Engineering Co., 350 Fifth Ave., New York 1, N.Y., 4, 9, 23, 33, 38, 49, 58, 70, 94, Tel: LO 5-2488

Ebauches S. A., Dept. Semiconducteurs, Faubourg Hopital #1, Neuchatel, Switzerland, 38, 70, 71, 75, Tel: 038/5 74 01, Yr: 1957, Emp: 37, ▲1

Eberline Instrument Corp., 805 Early St., Santa Fe, N.M., 24, Tel: YUcca 2-1881, Yr: 1950, Emp: 132, ▲5, $2,857,000

Ebert Electronics Corp., 212-26 Jamaica Ave., Queens Village 28, N.Y., 68, Tel: SP 6-1800

Eby Co., Hugh H., 4701 Germantown Ave., Philadelphia 44, Pa., 38, 46, 53, 64, 71, 73, 89, 98, 104, Tel: DA 4-7000, Yr: 1921, Emp: 300, $2,500,000

Ecco Electronic Components Corp., 578 Nepperhan Ave., Yonkers, N.Y., 39, 40, 46, 55, 72, Tel: GReenleaf 6-5500, Yr: 1958, Emp: 45, $500,000

Eckel Valve Co., 1425 First St., San Fernando, Calif., 57, 72, 91, Tel: EMpire 1-6251, Yr: 1950

Eclipse Electronics, Ltd., 153 Logan Ave., Toronto 8, Ont., Canada, 43, 52, Tel: HOward 5-3188, Yr: 1957, Emp: 7, ▲1

Edal Industries, Inc., 4 Short Beach Rd., East Haven, Conn., 66, Yr: 1958

Edcliff Instruments, 1711 S. Mountain Ave., Monrovia, Calif., 9, 69, 75, Tel: ELliott 8-4571

Edgerton, Germeshausen & Grier, Inc., 160 Brookline Ave., Boston 15, Mass., 14, 24, 25, 78, Tel: CO 7-9700, Yr: 1947, Emp: 775, $9,810,000

Edison Industries, Thomas A., Instrument Div., 61 Lakeside Ave., West Orange, N.J., 4, 9, 30, 38, 58, 60, 68, 72, 74, 75, 85, Tel: ORange 3-6800, Yr: 1870

Edko Electronics Engineers Co., 397 Bedford, Ave., Brooklyn 11, N.Y., 45, 52, 57, 76, Tel: EV 4-2746, Yr: 1954, Emp: 8, ▲1, $160,000

Edmund Scientific Co., 101 E. Gloucester Tk., Barrington, N.J., 4, 14, 17, Tel: LIncoln 7-3488, Yr: 1942, Emp: 75

Edo Corp., 13-10 111th St., College Point 56, N.Y., 1, 18, 27, 75, 84, Tel: HIckory 5-6000, Yr: 1925, Emp: 750, $7,000,000

Edwards Engineering Co., 21 Yennicock Ave., Pt. Washington, L.I., N.Y., 29, Tel: POrt Washington 7-6700

Edwards High Vacuum (Canada), Ltd., P.O. Box 515, Burlington, Ont., Canada, 4, 14, 24, 96, 104, Tel: NElson 4-7757, Yr: 1954, Emp: 14

**Efcon, Incorporated, Patterson Place, Roosevelt Field, Garden City, L.I., N.Y., 43, Tel: Pioneer 1-4200, Yr: 1952, Emp: 50, ▲7, $250,000**

**See ad on pages 98-99**

Ehrenpreis, David, Consulting Engineers, 325 Spring St., New York 13, N.Y., 1, 3, 4, 9, 14, 21, 27, 28, 38, 39, 64, 84, 87, 88, 89, 94, 96, Tel: ORegon 5-9049, Yr: 1955, Emp: 10, ▲1

Ehrick Co., The Fred, 134 22nd St., Brooklyn 32, N.Y., 84, Tel: STerling 8-0813, Yr: 1921, Emp: 44, $230,000

Eichwald & Co., Inc., B., 237 E. 39th St., New York 16, N.Y., 88

Eicor Division, The Scranton Corp., 4059 W. North Ave., Chicago 39, Ill., 30, 42, 47, 60, 61, 63, 72, 89, Tel: HU 6-2060, Yr: 1938, Emp: 139

Eidson Electronic Co., 1902 N. 3rd St., Temple, Tex., 49, 88, Tel: PR 3-3901, Yr: 1935, Emp: 3, $12,000

**Eisler Engineering Co., Inc., 753 S. 13th St., Newark 3, N.J., 4, 76, 92, 94, 96, Tel. BIgelow 3-5310, Yr. 1920, Emp. 110**

**See ad on page 669**

**Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., 14, 39, 67, 71, 72, 79, 104, Tel: LYtell 1-1451, Yr: 1934, Emp: 2300**

**See ad on pages 80-81**

El-Rad Mfg. Co., 4300 N. California, Chicago 18, Ill., 39, 45, 50, 52, 76, 80, 89, Tel: IRving 8-7300, Yr: 1944, Emp: 300, ▲4, $2,000,000

Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N.J., 91, Tel: MUrdock 6-6000, Yr: 1934, Emp: 1100, ▲4

**Elastic Stop Nut Corp. of America, Agastat Timing Instruments Div., Dept. A37-76, 1027 Newark Ave., Elizabeth 3, N.J., 68, 72, Tel: ELizabeth 2-2900, Yr: 1909, Emp: 350**

**See ad on page 513**

Elco Corporation, M St. Below Erie Ave., Philadelphia 24, Pa., 46, 71, 104, Tel: CUmberland 9-5500, Yr: 1947, Emp: 100, ▲8, $3,500,000

Elcon Laboratory, Inc., 238 Main St., Cambridge 42, Mass., 9, 17, 19, 25, 94, Tel: TRowbridge 6-8855, Yr: 1959, Emp: 11, ▲3, $100,000

Elcor, Inc., 1225 W. Broad St., Falls Church, Va., 14, 24, 38, 58, 63, 76, 88, Tel: JE 2-8850, Yr: 1956, Emp: 12

Eldema Corp., 1804 Belcroft Ave., El Monte, Calif., 62, Tel: GIlbert 4-7077, Yr: 1951, Emp: 55, ▲1

Eldorado Electronics, 2821 10th St., Berkeley 10, Calif., 9, 10, 21, Tel: TH 1-4613, Yr: 1953, Emp: 30, ▲5

**Electra Manufacturing Co., 4051 Broadway, Kansas City 11, Mo., 43, 69, Tel: WEstport 1-6864**

**See ad on page 526**

**Electralab Printed Electronics Corp., 179 A St., Industrial Ctr., Needham Heights 94, Mass., 43, 64, 96, Tel: Hillcrest 4-3912, Yr: 1952, Emp: 200**

**See ad on page 499**

**Electran Mfg. Co., 1901 N. Clybourn Ave., Chicago 14, Ill., 76, Tel: BIshop 8-4596, Yr: 1944, Emp: 80, $500,000**

**See ad on page 566**

Electrend Products Corp., State & Water Sts., St. Joseph, Mich., 3, 23, 38, 39, 45, Tel: YUkon 3-5571, Yr: 1877, Emp: 100, $50,000

Electri-Cord Mfg. Co., Inc., 2554 E. 18th St., Brooklyn 35, N.Y., 85, Yr: 1945, Emp: 60, ▲1

Electric Autolite Co., The, Champlain St., Toledo 1, Ohio, 16, 41, 45, 58, 60, 72, 82, 85, 89, 91, 94, 96, 98, Tel: CHerry 3-3131, Yr: 1911, Emp: 15,000

Electric Cords & Supply Corp., 413 E. 3rd St., Los Angeles 13, Calif., 85, 98, Tel: MAdison 8-2278, Yr: 1936, Emp: 85

Electric Design & Mfg. Co., 8th & Jefferson Sts., Burlington, Iowa, 58, Tel: PLaza 2-7685, Yr: 1916, Emp: 26, $135,000



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

For Capacitors with GREATER RELIABILITY . . .

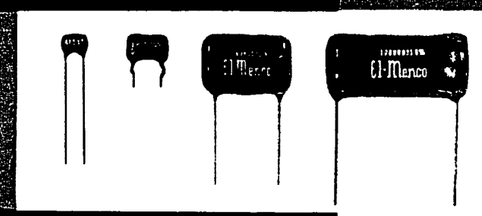
Choose El-Menco

The Capacitors You Find Wherever There's Electronics!

**EL-MENCO DUR-MICA CAPACITORS**

**Only 1 Failure Per 43,000,000 Unit-Hours!**

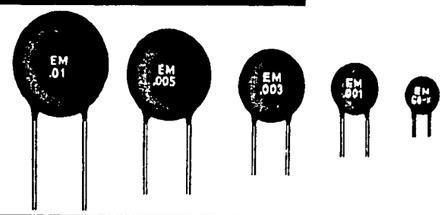
- It has been computed that "debugged" DM30, 10,030 M.M.F units, when subjected to 257,000 hours of life at 85°C with 100% of the rated DC voltage applied, will yield only 1 FAILURE PER 43,000,000 UNIT-HOURS!
- DM10, DM15, DM16, DM19, DM20 . . . perfect for miniaturization and for new designs using printed wiring circuits. Also available in DM30, DM42, and DM43.
- New "hairpin" parallel leads insure easy application.
- Exceed all electrical requirements of military specification MIL-C-5A.




**EL-MENCO CERAMIC DISC CAPACITORS**

**Toughest Ever!**

- Available in 500 working volts DC and 1,000 working volts DC ratings.
- Low-loss phenolic coating that is wax impregnated.
- Flat design assures reduced self-inductance . . . particularly adaptable to very high frequency applications.
- Insulation resistance far exceeds the 10,000 megohms minimum requirement.
- Exceed all electrical requirements of E.I.A. specifications RS-198.




**EL-MENCO *MYLAR-PAPER DIPPED CAPACITORS**

**Only 1 Failure in 7,168,000 Unit-Hours!**

- Life tests at 100°C with rated voltage applied have yielding only 1 FAILURE PER 716,800 UNIT-HOURS for 1 MFD. Since the number of unit-hours of these capacitors is inversely proportional to the capacitance, 0.1 MFD Mylar-Paper Dipped capacitors will yield only 1 FAILURE PER 7,168,000 UNIT-HOURS!
- Working volts DC: 200, 400, 600, 1000 and 1600.
- Durez phenolic resin impregnated.
- Tolerances: ± 10% and ±20% (closer tolerances available).
- Dielectric strength: 2 or 2½ times rated voltage, depending upon working voltage.
- Exceed all electrical requirements of E.I.A. specification RS-164 and military specifications MIL-C-91A and MIL-C-25A.

*Registered Trademark of DuPont Co.

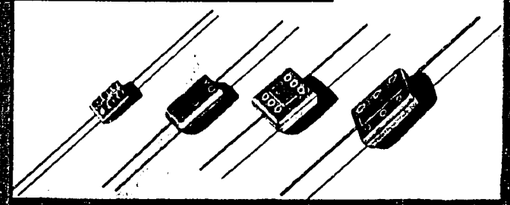


**EL-MENCO MOLDED MICA CAPACITORS**

**Superior Performance!**

- Unmatched for excellent stability, dielectric strength, high insulation resistance, extremely high "Q" and correspondingly low power factor.
- Units can be subjected to a short "debugging" life test at elevated voltage and temperature for removal of early life failures and for improved reliability.

*Write for Free Samples and Booklets on Any of The Above Capacitors*



El-Menco Capacitors

THE ELECTRO MOTIVE MFG. CO., INC.

• molded mica • dipped mica • mica trimmer • dipped paper
• tubular paper • ceramic • silvered mica films • ceramic discs






Electric Eye Equipment Co., 1938 E. Fairchild, Danville, Ill., 2, 4, 30, 38, 63, 84, 89, Tel: HI 6-6500

Electric Hotpack Co., Inc., The, 5019 Cottman St., Philadelphia 35, Pa., 4, 14, 92, 94, Tel: DE 3-1700, Yr: 1908, Emp: 100

Electric Indicator Co., Inc., Camp Ave., Stamford, Conn., 42, 60, Tel: DAvis 2-1671, Yr: 1928, Emp: 150, $1,200,000

Electric Machinery Mfg. Co., 800 Central Ave., Minneapolis 13, Minn., 4, 30, 60, 63, Tel: FEderal 9-6751, Yr: 1897, Emp: 1,000

Electric Motors & Specialties, Inc., Corner King & Hamsher Sts., Garrett, Ind., 60, Tel: FL 7-4141, Yr: 1913, Emp: 200, $55,000

Electric Regulator Corp., Norwalk, Conn., 4, 9, 23, 30, 38, 68, 72, 75, 82, Tel: VIctor 7-2101, Yr: 1945

Electric Soldering Iron Co., Inc., W. Elm St., Deep River, Conn., 95, 96, Tel: LA 6-5975, Yr: 1927, Emp: 25

Electric Specialty Co., 211 South St., Stamford, Conn., 4, 8, 14, 18, 30, 38, 39, 42, 45, 47, 48, 60, 63, 64, 69, 72, 75, 76, 82, 96, Tel: FIreside 8-6203, Yr: 1913, Emp: 300, ▲1, $500,000

Electric Terminal Corp., P.O. Box 2217, Providence 5, R.I., 46, 73, Tel: STuart 1-2189, Yr: 1946, Emp: 45

**Electrical Industries, Div. of Philips Electronics & Pharmaceutical Industries Corp., 691 Central Ave., Murray Hill, N.J., 46, 54, 73, 89, 91, Tel: CRestview 7-4300, Yr: 1943, Emp: 450**


**See ad on page 180**


Electrical & Physical Instrument Corp., 42-19 27th St., Long Island City 1, N.Y., 14, 21, 40, 50, Tel: STillwell 4-6389

Electrical Refractories Co., The, 50 Clark St., East Palestine, Ohio, 48, Tel: GArden 6-9133, Yr: 1919, Emp: 70, $150,000

Electrical Service Co., 1271 Mission St., San Francisco 3, Calif., 4, 10, 38, 72, 89, Yr: 1938, Emp: 5, $35,000

Electrical Testing Laboratories, Inc., 2 East End Ave., New York 21, N.Y., 94, Tel: BUtterfield 8-2600, Yr: 1896, Emp: 115, ▲5, $50,000

Electrical Utilities Co., 2423 St. Vincents Ave., La Salle 5, Ill., 43, Tel: CApitol 3-1732

Electrical Windings, Inc., 2015 N. Kolmar Ave., Chicago 39, Ill., 45, 76, Tel: BELmont 5-3360, Yr: 1937, Emp: 175

Electro Assemblies, Inc., 4444 N. Kedzie Ave., Chicago 25, Ill., 45, 52, 76, 86, Tel: KEystone 9-3100, Yr: 1950, Emp: 30

Electro-Capacitors Co., 10132 Edes Ave., Oakland 3, Calif., 43, Tel: LO 8-7910, Yr: 1954, Emp: 20, $312,000

Electro Chemical Co., 230 E. 127th St., New York 35, N.Y., 95, 96, Tel: LEhigh 4-4828, Yr: 1926

Electro-Chemical Engraving Co., Inc., 1100 Brook Ave., New York 56, N.Y., 38, 43, 46, 64, 69, 71, 73, 84, 87, 89, 91, Tel: LUdlow 8-9000, Yr: 1910, Emp: 600

**Electro Contacts, Inc., Div. of Electro Switch Corp., Osterville, Mass., 46, 72, 91, Tel: GArden 8-6986 (Hyannis, Mass.), Yr: 1957, Emp: 15**


**See ad on page 548**


Electro Development Co., 11701 Keswick St., Van Nuys, Calif., 46, 72, Tel: TRiangle 3-1850, Yr: 1950, Emp: 50, ▲1, $100,000

Electro Development Corp., 3939 University Way, Seattle 5, Wash., 4, 30, 47, 63, 76, Tel: ME 3-3909, Yr: 1957, Emp: 115, ▲6, $500,000

Electro Devices, Inc., 580 Main St., Wilmington, Mass., 96, Tel: PArkview 9-2851

Electro Engineering Works, 401 Preda St., San Leandro, Calif., 45, 63, 76, Tel: LOckhaven 9-3326, Yr: 1946, Emp: 170, ▲2, $1,500,000

Electro-Etch Circuits, Inc., 7112 S. Victoria Ave., Los Angeles 43, Calif., 64, 97, Tel: PLeasant 2-6111, Yr: 1957, Emp: 40, $250,000

Electro-Flex Heat, Inc., 83 Woodbine St., Hartford 6, Conn., 69, 92, Tel: CH 6-5413, Yr: 1954, Emp: 57

**Electro Impulse Laboratory, Inc., 208 River St., Red Bank, N.J., 11, 21, 28, 40, Tel: SHadyside 1-0104, Yr: 1948, Emp: 25, $250,000**


**See ad on page 310**


Electro Instruments, Inc., 3540 Aero Ct., San Diego 11, Calif., 3, 9, 10, 14, 16, 17, 24, 29, 30, 33, 36, 38, 47, 69, Tel: BRowning 7-6590, Yr: 1954, Emp: 720, ▲75, $6,000,000

**Electro-Mec Laboratory, Inc., 47-51 33rd St., Long Island City 1, N.Y., 9, 14, 69, Tel: STillwell 6-3402, Yr: 1950, Emp: 160, ▲1**


**See ad on page 264**


**Electro-Mechanical Instrument Co., 8th & Chestnut Sts., Perkasie, Pa., 58, Tel: ALpine 7-6561, Yr: 1944, Emp: 65, $500,000**


**See ad on page 459**


Electro-Mechanical Research, Inc., P.O. Box 3041, Sarasota, Fla., 3, 4, 9, 14, 36, 75, 78, Tel: RIngling 6-1148, Yr: 1911, Emp: 800

Electro-Mechanical Specialties Co., Inc., 528 W. Lambert Rd., Whittier, Calif., 68, 72, Tel: RAymond 3-7271, Yr: 1950, Emp: 60, ▲9, $345,000

Electro-Medical Laboratory, Inc., S. Woodstock 12, Vt., 16, 19, Tel: WOodstock 340, Yr: 1935, Emp: 7, ▲1

Electro-Miniatures Corp., 608 Huyler St., S. Hackensack, N.J., 36, 46, 72, Tel: HUbbard 9-7770, Yr: 1955, Emp: 90

**Electro Motive Mfg. Co., Inc., Willimantic, Conn., 43, 44, Tel: HArrison 3-1551, Yr: 1926, Emp: 1500, $10,000,000**


**See ad on page 168**


Electro Networks, Inc., 1920 Park St., Syracuse 8, N.Y., 15, 52, 76, Yr: 1957, Emp: 28, $170,000

Electro-Optical Systems, Inc., 125 N. Vinedo Ave., Pasadena, Calif., 94, Tel: MUrray 1-0108, Yr: 1956, Emp: 250

Electro-Pack, Inc., 11505 Jefferson Blvd., Culver City, Calif., 42, 84, 87, 88, 89, 91, Tel: UPton 0-5711, Yr: 1959, Emp: 52, $210,000

Electro-Physics Co., 287-D Broadway, New York 7, N.Y., 4, 82, 89, 94, 100, Tel: WOrth 4-1290, Yr: 1950

Electro-Physics Labs., 1900 Walker Ave., Monrovia, Calif., 46, 85, Tel: MUrray 1-8156, Yr: 1959

Electro Precision Corporation, Box 669, Arkadelphia, Ark., 4, 25, 30, 38, 58, 64, Tel: CHapel 6-2272

Electro Products Laboratories, Inc., 4501 N. Ravenswood, Chicago 40, Ill., 4, 75, Tel: LOngbeach 1-1707, Yr: 1936, Emp: 60, ▲2

**Electro-Pulse, Inc., 6711 S. Sepulveda Blvd., Los Angeles 45, Calif., 4, 9, 10, 14, 27, Tel: ORegon 8-2211, Yr: 1953, Emp: 96, ▲7**


**See ad on page 264**


Electro Radiation, Inc., 2200 Colorado Ave., Santa Monica, Calif., 9, 13, 16, 17, 19, 69, 70, 88, 90, 94, 101, Tel: GL 1-1795, Yr: 1960, Emp: 15

Electro Scientific Industries, 7524 S.W. Macadam, Portland 19, Ore., 5, 9, 11, 14, 33, 43, 69, 76, Tel: CHerry 6-3331, Yr: 1949, Emp: 135, ▲8, $1,385,000

Electro-Seal Corp., 946 North Ave., Des Plaines, Ill., 4, 9, 14, 16, 63, 64, 66, 74, 76, 82, 84, 89, 91, 94, 96, Tel: RO 3-0047, Yr: 1947, Emp: 125, ▲3

Electro-Sonic Laboratories, Inc., 35-54 36th St., Long Island City 6, N.Y., 32, 59, 61, 75, 76, Tel: RAvenswood 8-6370, Yr: 1952, Emp: 20, ▲1, $500,000

Electro Tec Corp., 10 Romanelli Ave., S. Hackensack, N.J., 36, 38, 46, 68, 72, 83, Tel: HUbbard 7-4940, Yr: 1945, Emp: 534, $5,000,000

Electro-Voice, Inc., Cecil & Carroll Sts., Buchanan, Mich., 2, 12, 18, 22, 31, 56, 59, 61, Tel: OXbow 5-6831, Emp: 1000

Electrochemical Inds., Inc., 35 Armory St., Worcester 3, Mass., 95, 99, Tel: PL 3-5918

Electrocraft Component Div., G-C Electronics Co., 400 S. Wyman, Rockford, Ill., 46, 55, 72, Tel: WOodland 8-9661

Electrodyne Co., Inc., Endicott St., Norwood, Mass., 19, Tel: NO 7-3203

Electrofilm, Inc., 7116 Laurel Canyon Blvd., North Hollywood, Calif., 92, 93, 95, Tel: TRiangle 7-1321, Yr: 1949, Emp: 175



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

CHEMICAL DIVISION

**113 Astor St., Newark 2, N. J.**
*Atomex® Immersion 24K Gold Solution,*
*Deoxo® Puridryer, Deoxo® Purifier,*
*Deoxo® Indicator, Minoxo® Indicator,*
*Nitroneal® Gas Generator,*
*Rhodium Plating Solution*

H. A. WILSON DIVISION

**U. S. Highway 22, Union, N. J.**
*Thermometal® Thermostatic Bi-Metal,*
*Composite Metals, Special Alloys,*
*Powdered and Sintered Metals,*
*Precious Metal Contacts and Contact Materials*

BAKER PLATINUM DIVISION

**113 Astor St., Newark 2, N. J.**
*Fine Wire, Platinum Clad Tungsten Wire,*
*Composite Wire and Sheet*

# ESSENTIAL ELECTRONIC PRODUCTS

BAKER CONTACT DIVISION

**207 Grant Ave., E. Newark, Harrison P.O., N. J.**
*Precious Metal Contacts,*
*Contact Sub-Assemblies,*
*Sintered Powder Metals*

AMERSIL QUARTZ DIVISION

**685 Ramsey Ave., Hillside, N. J.**
*Fused Quartz and Silica*
*in all shapes and forms*

AMERICAN PLATINUM & SILVER DIVISION

**231 N. J. Railroad Ave., Newark 5, N. J.**
*Silva-Brite Silver Plating Process*

D. E. MAKEPEACE DIVISION

**Attleboro, Mass.**
*Slip Rings,*
*Slip Ring Assemblies,*
*Waveguide Tubing,*
*Precision Drawn*
*Wire-Spring Parts,*
*Channel Sections*

ENGELHARD INDUSTRIES, INC.
EXECUTIVE OFFICES:
113 ASTOR STREET • NEWARK 2, NEW JERSEY

DOMESTIC DIVISIONS: AMERICAN PLATINUM & SILVER DIVISION • AMERSIL QUARTZ DIVISION • BAKER CONTACT DIVISION • BAKER DENTAL DIVISION • BAKER PLATINUM DIVISION • BAKER SETTING DIVISION • CHEMICAL DIVISION • HANOVIA LIQUID GOLD DIVISION • INSTRUMENTS & SYSTEMS DIVISION • IRVINGTON-BAKER REFINING DIVISION • D. E. MAKEPEACE DIVISION • RESEARCH & DEVELOPMENT DIVISION • H. A. WILSON DIVISION. COMPANIES ABROAD: ENGELHARD INDUSTRIES OF CANADA, LTD., TORONTO • ENGELHARD INDUSTRIES LTD., BAKER PLATINUM DIVISION, HANOVIA PRODUCTS DIVISION, LONDON • SOCIEDAD SURAMERICANA DE METALES PRECIOSOS S.A., BOGOTA • ENGELHARD INDUSTRIES S.A.R.L., PARIS • ENGELHARD INDUSTRIES A/S. COPENHAGEN • GLOVER & GOODE PTY., LTD., MELBOURNE • ENGELHARD INDUSTRIES, K.K., TOKYO • ENGELHARD INDUSTRIES, PTY., LTD., MELBOURNE • ENGELHARD INDUSTRIES, LTD., ZURICH • INDUSTRIE ENGELHARD S.P.A., ROME • GUILIANO STACCIOLI—METALLI PREZIOSI S.P.A., ROME • INVERSIONES EN INDUSTRIES NACIONALES, S.A., BOGOTA. ASSOCIATED COMPANIES: KALIE-CHEMIE-ENGELHARD KATALYSATOREN G.M.B.H., HANOVER






Electromath Corp., 115 Pleasant Ave., Roosevelt, L.I., N.Y., 69, 85, 89, Tel: MAyfair 3-3500, Yr: 1950, Emp: 32, ▲1, $300,000

Electromatic Equipment Co., 175 Remsen Ave., Brooklyn 12, N.Y., Importers, 96, Tel: PResident 1-8300

**Electron Arc Div., Ionics Inc., 244 Broad St., Lynn, Mass., 3, 4, 14, 17, 19, 26, 45, 47, 57, 63, 76, Tel: LY 8-2100, Yr: 1949, Emp: 12, ▲1, $10,000**


**See ad on page 485**


Electron Corporation, P.O. Box 5570, Dallas, Tex., 1, 2, 6, 7, 23, 34, 39, 88, Tel: AD 5-3121, Yr: 1957

Electron Enterprises, Inc., 6917-19-21 Stanley Ave., Berwyn, Ill., 6, 38, 61, Tel: BIshop 2-2636, Yr: 1916, Emp: 17, $500,000

Electron-Radar Products, 1806 W. Chicago Ave., Chicago 51, Ill., 1, 38, 40, 68, 70, 72, 78, Tel: EStebrook 9-1232

Electronet Div., Rue Products, 4323 Corinth Ave., Culver City, Calif., 1, 2, 6, 7, 9, 14, 18, 26, 47, 52, 63, 64, 73, 82, 89, 93, 98, Tel: EXmont 7-8666, Yr: 1948, Emp: 60, $750,000

Electronic Applications, Inc., 194 Richmond Hill Ave., Stamford, Conn., Importers, 3, 5, 6, 7, 11, 14, 18, 20, 21, 26, 28, 29, 33, 34, 38, 40, 43, 52, 56, 58, 59, 61, 69, 80, 83, 85, Tel: DA 5-1575 4, Yr: 1957, Emp: 7, ▲1, $300,000

Electronic Assembly Co., Inc., 5 Prescott St., Roxbury 19, Mass., 15, 63, 76, Tel: HIghlands 2-6100, Yr: 1956, Emp: 35

Electronic Assistance Corp., 20 Bridge Ave., Red Bank, N.J., 1, 8, 9, 12, 22, 27, 38, 75, 96, Tel: SHadyside 7-5100, Yr: 1958, Emp: 260, ▲5, $1,000,000

Electronic Associates, Inc., Long Branch & Naberal Ave., Long Branch, N.J., 3, 9, 14, 16, 29, 30, 38, 43, 47, 64, 68, 84, 88, Tel: CApital 9-1100, Yr: 1945, Emp: 1100, ▲65, $13,000,000

Electronic Batteries, Inc., 34-35th St., Brooklyn 32, N.Y., 41, Tel: ST 8-3611, Yr: 1916

Electronic Cable Corp., 126 Jackson St., Cambridge 40, Mass., 4, 38, 45, 64, 85, 88, 89, 91, 98, Tel: TR 6-7250, Yr: 1957, Emp: 30, ▲1, $200,000

Electronic Chemical Corp., 813 Communipaw Ave., Jersey City 4, N.J., 95, Tel: DElaware 2-2877, Yr: 1947

Electronic Coils, Inc., 33 Lyman St., Springfield 1, Mass., 45, 76, Tel: REpublic 6-6339, Yr: 1950, Emp: 75, ▲2, $100,000

Electronic Communications, Inc., 1501-72nd St., North, St. Petersburg 10, Fla., 1, 9, 10, 13, 17, 20, 22, 27, 30, 31, 36, 38, 60, 63, 80, Tel: DI 5-9301 Yr: 1927, Emp: 1100, $21,500,000

Electronic Components Corp., 520 Interstate, Addison, Ill., 76, Tel: KIngswood 3-7720, Yr: 1944, Emp: 750, ▲2, $6,000,000

Electronic Computer Co., Inc., 618 Maple St., Conshohocken, Pa., 9, 14, 38, 47, 68, 88, Tel: TAylor 8-3967, Yr: 1956, Emp: ▲1, $40,000

Electronic Control Corp., 1573 East Forest, Detroit 7, Mich., 1, 19, 68, Tel: TEmple 2-6625, Yr: 1935, Emp: 6, ▲1, $70,000

Electronic Controls Inc., 85 Magee Ave., Stamford, Conn., 1, 9, 35, 36, 88, 94, Yr: 1959, Emp: 12, ▲4, $50,000

Electronic Counters Inc., Eileen Way, Syosset, L.I., N.Y., 1, 10, 14, 23, 58, Tel: OVerbrook 1-3200, Yr: 1960, Emp: 10, ▲1

Electronic Devices, Inc., 50 Webster Ave., New Rochelle, N.Y., 66, Tel: NEw Rochelle 2-8500, Yr: 1951, Emp: 50, $600,000

Electronic Enclosures, Inc., 3629 Holdrege Ave., Los Angeles 16, Calif., 34, 42, 84, 87, 88, 89, 94, 96, Tel: VErmont 7-5163, Yr: 1956, Emp: 35, $480,000

Electronic Energy Conversion Corp., 342 Madison Ave., New York 17, N.Y., 63

Electronic Engineers, Inc., 5646 W. Division St., Chicago 51, Ill., 3, 32, 65, Tel: ES 8-3060, Yr: 1950, Emp: 22, ▲2

Electronic Enterprises, Inc., 65-67 7th Ave., Newark 4, N.J., 67, 78, Tel: HU 2-0630, Yr: 1940, Emp: 60, $1,000,000

**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 2, 3, 5, 11, 14, 25, 28, 37, 38, 58, 61, 63, 80, Tel: STillwell 6-8700, Yr: 1945, Emp: 225, ▲7**


**See ad on page 283**


**Electronic Manufacturing Co., 670-72 South 17th St., Newark, N.J., 104, Tel: ESsex 4-7600**


**See ad on page 703**


**Electronic Measurements Co., Inc., Maple Ave. & Lewis St., Eatontown, N.J., 63, 82, Tel: LIberty 2-0300, Yr: 1939, Emp: 100, ▲3**


**See ad on page 478**


Electronic Measurements Corp., 625 Broadway, New York 12, N.Y., Importers, 5, 14, 23, 25, 28, 37, 38, 63, Tel: GRamercy 5-0610

Electronic Mechanics, Inc., 101 Clifton Blvd., Box 259, Clifton, N.J., 71, 73, 89, 93, 98, 99, 104, Tel: GRegory 3-1108, Yr: 1935, Emp: 125, ▲1

Electronic Parts Mfg. Co., Inc., 508 25th St., Union City, N.J., 85, 89, 91, 94, 97, 104, Tel: UN 5-1028, Yr: 1948, Emp: 8

Electronic Plastics Co., 18624 Parthenia St., Northridge, Calif., 9, 38, 47, 63, 64, 89, 91, Tel: DIckens 5-5595, Yr: 1953

Electronic Plastics Corp., 16 New Salem St., Wakefield, Mass., 73, 84, 89, 91, Tel: CRystal 6-4969, Yr: 1955, Emp: 35, $300,000

Electronic Processes Corp. of California, 436 Bryant St., San Francisco 7, Calif., 4, 58, 64, Tel: EXbrook 7-3881, Yr: 1944, Emp: 18, ▲1

Electronic Production & Development, Inc., 501 North Prairie Ave., Hawthorne, Calif., 63, 64, 89, 93, 95, 98, Tel: ORegon 8-7642, Yr: 1959, Emp: 50, $50,000

Electronic Products Co., 111 E. Third St., Mount Vernon, N.Y., 24, 78, Tel: MO 4-9293, Yr: 1941, Emp: 100, ▲1

Electronic Prototypes, Inc., 285 Columbus Ave., Boston 16, Mass., 89, 94, Tel: KEnmore 6-0173, Yr: 1944, Emp: 22, ▲1, $137,000

Electronic Research Associates, Inc., 67 Factory Place, Cedar Grove, N.J., 14, 18, 38, 47, 56, 63, Tel: CEnter 9-3800, Yr: 1953, Emp: 200, ▲30

Electronic Specialty Co., 5121 San Fernando Rd., Los Angeles 39, Calif., 1, 4, 9, 10, 14, 17, 20, 23, 27, 30, 33, 36, 38, 39, 40, 42, 47, 52, 60, 63, 64, 68, 72, 76, 82, 83, 88, 94, Tel: CH 5-3771, Yr: 1949, Emp: 700, $11,000,000

Electronic Systems, Div. Mechanical Products, Inc., 1824 River St., Jackson, Mich., 20, 21, Yr: 1960, Emp: 50, ▲1

Electronic Systems Development Corp., 1184 E. Main St., Ventura, Calif., 1, 9, 38, 72, Tel: MIller 8-1287

Electronic Systems Engineering Co., 2308 Dorchester Drive, Oklahoma City, Okla., 32, 38, Tel: VIctor 2-1333 Yr: 1945, Emp: 7, ▲1, $24,000

Electronic Teaching Laboratories, Inc., 5034 Wisconsin Ave., N.W., Washington 16, D.C., 29, 34, 59, 65, Tel: EM 2-9722, Yr: 1955, Emp: 70, $760,000

**Electronic Transformer Co., Inc., 70 Washington St., Brooklyn 1, N.Y., 38, 45, 76, Tel: MAin 5-6123, Yr: 1937, Emp: 175, $2,000,000**


**See ad on page 567**


Electronic Transistors Corp., 9226 Hudson Blvd., North Bergen, N.J., 38, 66, 70, 72, 83, 89, 94, Tel: UNion 9-2100, Yr: 1959, Emp: 60, ▲5, $250,000

Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Pa., 9, 25, 38, 63, 77, 79, 104, Tel: CHestnut Hill 7-6800, Yr: 1937, Emp: 98, ▲11, $800,000

Electronica Industrial Ltda., Rua Caramuru, 285-305, Sao Paulo, Brazil, 1, 17, 38, 43, 71, 77, 92, Tel: 7-7163, Yr: 1949, Emp: 50, ▲3, $1,000,000

Electronics Corp. of America, One Memorial Drive, Cambridge 42, Mass., 4, 9, 10, 14, 17, 58, 70, Tel: UNiversity 4-8000, Yr: 1951, Emp: 500, ▲222

Electronics, Inc. of Pa., 39 York Rd., Willow Grove, Pa., 3, 14, 25, 28, 32, 38, 64, Tel: OLdfield 9-6666, Yr: 1957, Emp: 26, ▲1, $88,000

Electronics Research, 221 Angelique St., Weehawken, N. J., 1, 30, 88, 94, 100, Tel: UN 3-5136, Yr: 1951, Emp: 15, ▲6

Electrons, Inc., 127 Sussex Ave., Newark 3, N.J., 67, 78, Tel: HU 2-5978, Yr: 1928, Emp: 150, ▲2



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

**Chromel-R**—A modified 80-20 nickel-chromium alloy for use in potentiometers and precision wire wound resistors. Possesses resistivity of 800 ohms/cmf at 20° C., temperature coefficient controlled within 0 ± 10 ppm/°C., exceptional linearity and stability from —65° to +150° C.

Chromel-P/Alumel—The world's standard base metal thermocouple combination for measuring operating temperatures in laboratory and heat treat furnaces—jet engines, nuclear reactors. Accuracy is guaranteed to close specified limits over the entire range from —300° to +2300° F.

Chromel-A—The original 80-20 nickel-chromium resistance alloy that first made electric heating practical. Widely used in major appliances, industrial furnaces and many other devices requiring heating elements capable of operating up to 2150° F. under adverse conditions.

Alloy 815-R—A lower density, higher resistivity iron-chromium-aluminum resistor material that gives you 14% more ohms per pound. Noted for strength, ductility, resistance to wear and corrosion. Resistivity: 815 ohms/cmf at 20° C. Temp. Coeff.: 0 ± 10 ppm/° C. from — 65° to +150° C.

**Chromel-P/Copel-XM**—A basic thermo-electric alloy combination used primarily as thermopiles to actuate and control operating temperatures of domestic furnaces, hot water heaters, stoves, ranges and other types of heating equipment. Noted for accuracy and reliability in service.

Chromel-AA—A new modified 80-20 type nickel-chromium resistance alloy developed especially for use in controlled atmosphere furnaces. It is highly resistant to corrosion, carburization, oxidation and "green rot" over the entire range of operating temperatures up to 2150° F.

Copel—A 55-45 copper-nickel alloy for use in edge-wound resistors, rheostats, motor starters and many other types of devices where operating Temperatures do not exceed 1000° F. Has resistivity of 294 ohms/cmf at 68° F., low temperature coefficient and exceptional mechanical stability.

Hoskins Cunife—A new improved copper-nickel-iron ductile permanent magnet alloy. Possesses high coercive force and energy product values, greater uniformity. Readily stamped, machined or otherwise formed by conventional methods for economical production of close tolerance parts.

Chromel-C—A 60-16 nickel-chromium-iron alloy used primarily as heating elements in small domestic appliances and other devices that require high resistance in limited space for operating temperatures up to 1700° F. Also used as cold resistor alloy in current-temperature controls.

Unequalled for uniformity, performance, reliability

**HOSKINS**

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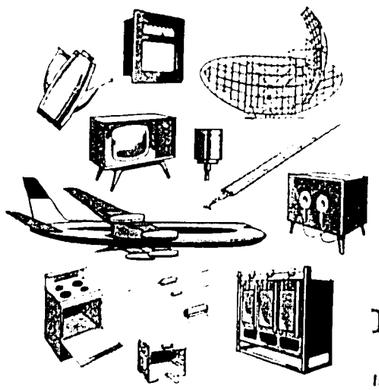
**ALLOYS**

Chromel-D—A time proven low nickel heating element alloy developed for use in controlled atmosphere furnaces required to operate in the critical temperature range between 1500° and 1800° F. It is highly resistant to corrosion, possesses exceptional mechanical stability.

Alloys 815, 835 and 875—Three superior iron-chromium-aluminum resistance alloys for use at operating temperatures up to 2150°, 2250° and 2350° F. respectively. Suitable for certain types of appliances, industrial furnaces and kilns where proper supports can be provided.

DETAILED TECHNICAL DATA on these and other Hoskins Custom Quality Alloys are yours for the asking. Hoskins metallurgical research, development and customer engineering services are also available to help you solve special design and application problems. Write or call today!

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Electrovert Inc., 124 E. 40th St., New York 16, N.Y., 91, 92, 96, 103. Tel: OX 7-8396. Yr: 1953. Emp: 15. ▲2

Electro, Inc., 1555 18th St., Santa Monica, Calif., 28. Tel: EXbrook 3-3023. Yr: 1955. Emp: 6. ▲2. $80,000

**Elgin National Watch Co., Elgin Advance Relays, 2435 N. Naomi St., Burbank, Calif., 68. Tel: VIctoria 9-1116**

**See ad on page 513**

Elk Electronic Labs., Inc., 333 W. 52nd St., New York 19, N.Y., 3, 4, 5, 6, 11, 21, 23, 31, 33, 38, 40, 47, 52, 94. Tel: Plaza 7-0520. Yr: 1948

Elliott-Automation Limited, 31 Portland Place, London W. 1., England, 1, 3, 4, 5, 8, 9, 10, 33, 20. Tel: LAngham 9271. Yr: 1899. Emp: 8,500. $10,000,000

**Ellis, David, 1187 Roxbury Place, Thousand Oaks, Calif., 88. Tel: HUdson 5-5622**

**See ad on page 628**

Ellis and Watts Products, Inc., Cincinnati 36, Ohio, 96. Tel: SYcamore 1-1725

Ellison Draft Gage Co., Inc., 538 W. Monroe St., Chicago 6, Ill., 1, 11, 58, 72, 96. Tel: RA 6-2296

Elna Ferrite Laboratory Inc., RR 1, Box 226, Saugerties, N.Y., 39, 88, 86. Tel: CHerry 6-3864

Elpac, Inc., 1270 Artesia St., Fullerton, Calif., 11, 13, 89. Tel: LAwrence 2-8127. Yr: 1960. Emp: 16

Elveco Etablissements, 70, rue de Strasbourg, Vincennes, France, 11. Yr: 1921

Elzee Metal Prods. Co., Inc., 775 39th St., Brooklyn 32, N.Y., 81, 87, 89, 91. Yr: 1943. Emp: 70. ▲2. $750,000

**Emcor Ingersoll Products Div., Borg-Warner Corp., Dept. 1227, 630 Congdon Ave., Elgin, Ill., 81. Tel: SHerwood 1-3190. Yr: 1950. Emp: 110. ▲2**

**See ad on page 600**

Emeloid Co., Inc., The, 1239 Central Ave., Hillside 5, N.J., 89, 98, 99. Tel: ELizabeth 2-1911. Yr: 1919. Emp: 140

Emerson Apparatus Co., 187 Tremont St., Melrose 76, Mass., 21, 42, 91, 92. Tel: NOrmandy 5-2415. Yr: 1908. Emp: 17

Emerson & Cuming, Inc., 869 Washington St., Canton, Mass., 11, 39, 93, 95, 99, 102. Tel: CAnton 6-1066. Yr: 1952. Emp: 225. ▲1

Emerson Electric Mfg. Co., The, 8100 Florissant Ave., St. Louis 36, Mo., 7, 9, 11, 36, 38, 39, 63, 64. Tel: COlfax 1-1800

**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 3, 20, 21, 23, 28, 38, 39, 40, 52, 63, 80, 83, 88, 94. Tel: VIctor 2-8400. Yr: 1946. Emp: 180. ▲10**

**See ads on pages 307, 309, 313, 315, 379, 581**

Empire Electronics Co., Inc., 60 Spruce St., Paterson 1, N.J., 55, 85, 89. Tel: ARmory 4-8282. Yr: 1950. Emp: 35. $350,000

Endevco Corp., 161 E. California Blvd., Pasadena, Calif., 11, 33, 55. Tel: SY 5-0271

**Endicott Coil Co., Inc., 21 Charlotte St., Binghamton, N.Y., 15, 89. Tel: SWarthmore 7-1263. Yr: 1951. Emp: 200. ▲1**

**See ad on page 101**

Endo Corporation, Rt. 73 & Fellowship Rd., Maple Shade, N.J., 33, 46, 55, 75, 83, 89, 93, 98, 99, 102. Tel: NOrmandy 3-1700. Yr: 1956. Emp: 40. ▲1. $120,000

**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 17, 19, 21, 19, 50, 51, 58, 72, 74, 75, 83, 85, 86, 91, 92, 93, 97, 103, 104. Tel: BIgelow 2-2700. Yr: 1879**

**See ad on page 170**

Engineered Electronics Co., 1441 E. Chestnut Ave., Santa Ana, Calif., 1, 9, 10, 33, 55, 63, 64, 72. Tel: KImberly 7-5651. Yr: 1954. Emp: 100. ▲10. $2,000,000

Engineering Associates, 134 Patterson Rd., Dayton 19, Ohio, 1, 3, 4, 5, 6, 7, 10, 13, 14, 16, 20, 21, 24, 25, 27, 28, 33, 39, 47, 60, 63, 68, 76, 79, 80, 83, 89, 94. Tel: AX 3-1662

Engineering Model Lab., Inc., 65 Union St., Ashland, Mass., 94. Yr: 1949. Emp: 30. ▲1. $30,000

English Electric Valve Co., Ltd., Chelmsford, Essex, England, 33, 11, 66, 67, 78, 79. Tel: CHelmsford 3491

Enjaco Corp., 100 Glen Rd., P.O. Box 3671, Cranston 10, R.I., 11, 96. Tel: HOpkins 7-3411. Yr: 1958. Emp: 15

Ensco, Inc., 3100 Eldridge St., Salt Lake City 15, Utah, 3, 9, 11, 19, 30, 33, 63, 89. Tel: HUnter 5-9162. Yr: 1955. Emp: 15. ▲3. $120,000

Ensign Coil Co., 2520 South Pulaski Rd., Chicago 23, Ill., 15, 52, 76. Tel: CRawford 7-1111. Yr: 1939. Emp: 150. $1,300,000

Entron Incorporated, Box 287, Bladensburg, Md., 33, 40, 46, 63, 88. Tel: APpleton 7-9585. Yr: 1952. Emp: 90. ▲10. $1,500,000

**Epco Products, Inc., P.O. Box 298, Wallkill, N.Y., 76. Tel: WAllkill 3-1104. Yr: 1949. Emp. 100. $600,000**

**See ad on page 566**

Epoxy Products, Div. Joseph Waldman & Sons, 137 Coit St., Irvington, N.J., 89, 91, 93, 98, 99. Tel: ESsex 5-6000. Yr: 1955. Emp: 50

Eppley Laboratory, Inc., The, 12 Sheffield Ave., Newport, R.I., 5, 11, 17, 21, 33, 92. Tel: VIking 7-1020. Yr: 1917. Emp: 18. ▲1. $650,000

Epsco, Inc., 275 Massachusetts Ave., Cambridge, Mass., 9, 10, 64. Tel: UN 4-1950. Yr: 1951. Emp: 750. ▲53. $8,703,110

Epsco Worcester, 207 Main St., Worcester 8, Mass., 11, 15, 16, 19, 25, 38. Tel: PLeasant 7-8391. Yr: 1939. Emp: 50

Equipto Division, Aurora Equipment Co., 101 S. Highland Ave., Aurora, Ill., 84. Tel: EM 6-9611. Yr: 1940

Equipto Electronics Corp., 319 N. Webster St., Naperville, Ill., 81, 87, 89. Tel: HEmwood 5-7100. Yr: 1960. Emp: 15. ▲1

Era Electric Corp., 67 E. Centre St., Nutley, N.J., 15, 76. Tel: NUtley 2-5611

Fraser Co., Inc., The, 1068 N. Clinton St., Syracuse 4, N.Y., 96. Tel: GRegate 6-7111. Yr: 1955. Emp: 55. ▲1

Eico Radio Laboratories, Inc., 67 Stewart Ave., Garden City, N.Y., 1, 22, 23, 26, 38, 39. Tel: PI 1-0300. Yr: 1955. ▲3. $500,000

**Ercolino, M. D., Asbury Park, N.J., 88. Tel: PRospect 5-7252**

**See ad on page 628**

Erdco Engineering Corp., Official & Westgate, Addison, Ill., 4, 11, 33, 2, 92. Tel: KIngswood 3-6733. Yr: 1946. Emp: 30. ▲1

**Ericsson Telephone Co., Ltd., L. M., 215 Park Ave. S., New York 7, N.Y., Importers, 77, 78, 79. Tel: ORegon 7-8100**

**See ad on page 581**

Erie Pacific Div., Erie Resistor Co., 1902 Weber Way, Hawthorne, Calif., 9, 11, 33, 47, 63, 64. Yr: 1955. Emp: 25. ▲2

**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 1, 9, 10, 23, 13, 11, 52, 58, 61, 64, 69, 70, 73, 75, 76, 84, 86, 89, 91, 93, 94, 98. Tel: GLendale 6-8592. Yr: 1928. Emp: 1200. ▲12. $21,500,000**

**See ad on pages 10-11**

Erwood, Inc., 1750 W. Bertteau, Chicago 13, Ill., 11, 33, 38, 75, 84, 87, 88, 89, 91, 96. Tel: BI 8-0622. Yr: 1950. Emp: 30

Escon, Inc., Subsid. Glass-Tite Inds., Inc., 725 Branch Ave., Providence, R.I., 96. Tel: TE 1-6300

Espey Mfg. Co., Inc., Saratoga Industries Div., Ballston & Congress Aves., Saratoga Springs, N.Y., 1, 2, 4, 9, 11, 13, 14, 21, 27, 28, 38, 43, 45, 47, 50, 52, 58, 63, 64, 69, 75, 76, 80, 82, 84, 87, 88, 89, 94, 98, 100. Tel: SAratoga 1-4000. Yr: 1928. Emp: 350. ▲16

Essential Electronics Corp., 1011 Power Ave., Cleveland 14, Ohio, 19. Tel: SUperior 1-7136. Yr: 1956. Emp: 10. ▲1

Essex Electronics, Div. Nytronics Inc., 550 Springfield Ave., Berkeley Heights, N.J., 39, 45, 50, 52, 63, 64, 76, 89, 98. Tel: CR 3-9300. Emp: 102

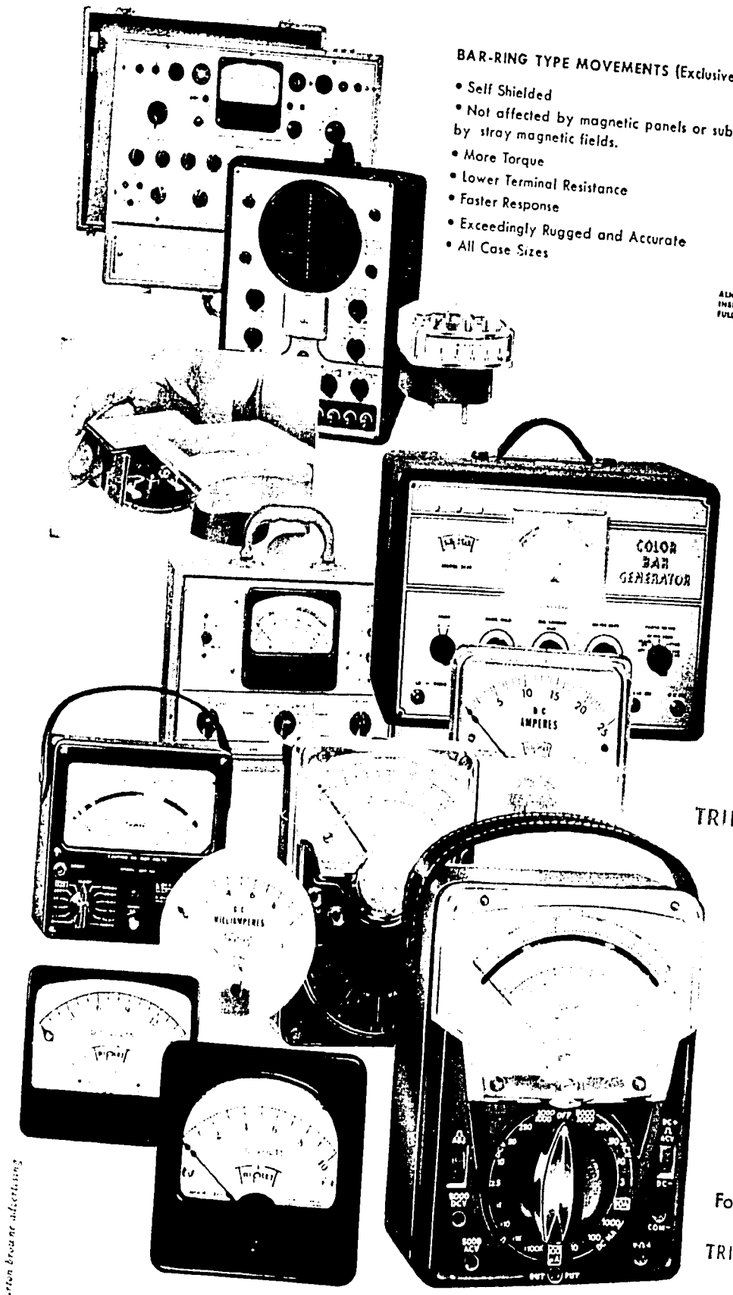
Essex Wire Corp., Carolina Industrial Plastics Div., Mount Airy, N.C., 99. Tel: STate 6-2127

Essex Wire Corp., Cords Ltd., 121 Dodge Ave., De Kalb, Ill., 85. Tel: DE Kalb 6-2721

Essex Wire Corp., Magnet Wire Div., 1601 Wall St., Fort Wayne, Ind., 85. Tel: EAstbrook 0311

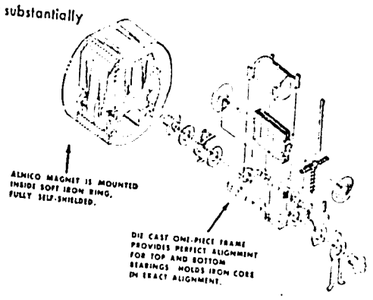
Essex Wire Corp., Magnetic Windings Div., Freemansburg Rd. & Hobson Blvd., Easton, Pa., 45, 76. Tel: BE 3-2751. Emp: 700

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year




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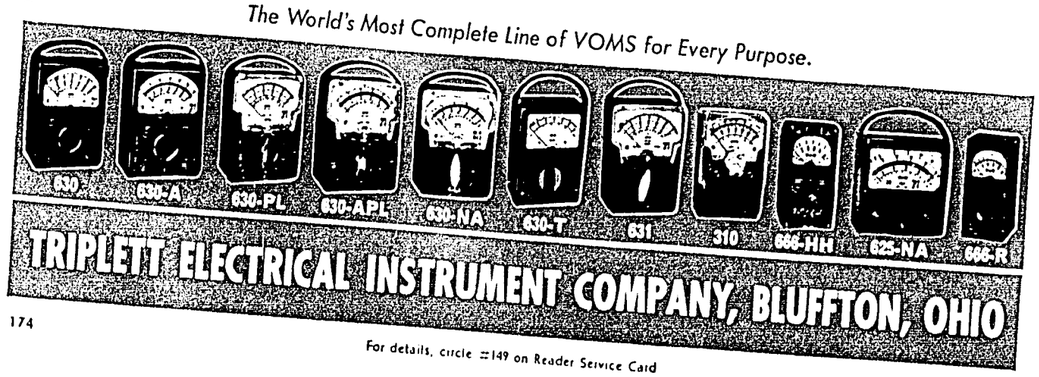
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Essex Wire Corp., RBM Controls Div., 131 Godfrie St., Logansport, Ind., 68, 72, Tel: LOgansport 5121, Yr: 1930

Etelco, Ltd., 22 Lincoln's Inn Fields, London, W. C. 2, England, 8, 15, 24, 32, 36, 55, 68, 72, 78, Tel: HOL 6936, Emp: 6000, $2,800,000

Ethylene Corp., 245 Broad St., Summit, N.J., 85, 89, 93, 99, Tel: CR 7-2600, Yr: 1950, Emp: 25

Eubanks Engineering Co., 260 North Allen Ave., Pasadena, Calif., 96, Tel: SYcamore 5-5051, Yr: 1952, Emp: 25

Eugene Engineering Co., Inc., 1217 Hyde Park Ave., Boston 36, Mass., 39, 42, 84, 87, 88, 89, 91, Tel: HYde Park 3-1101, Yr: 1947, Emp: 85, $1,000,000

Evans Findings Co., Inc., 55 Johnson St., Providence 5, R.I., 91, Tel: WHitney 1-1115

Everlast Tap & Die Corp., 215 East 149th St., New York 51, N.Y., 81, 88, 89, 91, 94, 96, Yr: 1917, Emp: 20

**Ewald Instruments, Route 7, Kent, Conn., 4, 92, 96, Tel: WAlker 7-3278, Yr: 1954**

**See ad on page 671**

Exact Electronics, Inc., P.O. Box 552, Portland 7, Ore., 3, 9, 11, 19, 21, 36, Tel: CHerry 4-3511, Yr: 1957, Emp: 5, ▲3

Exact Engineering & Mfg., Inc., P.O. Box 117, Oceanside, Calif., 4, 9, 10, 30, 58, 63, 88, Tel: SAratoga 2-2111, Yr: 1952, Emp: 50, $300,000

Exactel Instrument Co., 185 Evelyn Ave., Mountain View, Calif., 4, 11, 30, 38, Tel: YOrkshire 8-6558, Yr: 1956, Emp: 6, $180,000

Excellex Electronics, Inc., 8806 Van Wyck Expwy., Jamaica 18, N.Y., 74, 89, 99, Tel: AX 1-3585, Yr: 1951, Emp: 20, ▲2, $200,000

Executone, Inc., 415 Lexington Ave., New York 17, N.Y., 18, 29, 32, 68, Tel: MUrray Hill 7-7140, Yr: 1936, Emp: 400, ▲4

# F

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 20, 21, 27, 28, 38, 39, 40, 43, 49, 52, 58, 63, 76, 80, 83, 92, 94, 96, Tel: RAvenswood 1-9000, Yr: 1944, Emp: 650, ▲25, $7,000,000**

**See ad on pages 125-128**

Fair-Rite Products Corp., 1 Commercial Row, Wallkill, N.Y., 48, Tel: TW 5-3700, Emp: 52, ▲1

Fairbanks Wire Co., Inc., 2287 Hollers Ave., New York 69, N.Y., 85, Tel: FAirbanks 4-1266, Yr: 1950, Emp: 20, $75,000

Fairchild Camera & Instrument Corp., Defense Products Div., Robbins Lane, Syosset, L.I., N.Y., 9, 13, 24, 25, Tel: WEIls 1-4300, Yr: 1920

Fairchild Controls Corp., Components Div., 225 Park Ave., Hicksville, L.I., N.Y., 4, 9, 58, 69, 72, 75, Tel: WEIls 8-5600, Yr: 1925, Emp: 2100, $10,000,000

Fairchild Engine & Airplane Corp., Fairchild Astronics Div., Straight Path Rd., Wyandanch, L.I., N.Y., 1, 4, 9, 11, 27, 50, 89, 91, Tel: MIdland 3-7171, Yr: 1945, Emp: 600, ▲6

Fairchild Recording Equipment Corp., 10-40 45th Ave., Long Island City 1, N.Y., 4, 29, 34, 38, 40, 51, 52, 61, 63, 65, Tel: STillwell 4-6363, Yr: 1903, Emp: 70

**Fairchild Semiconductor Corp., 545 Whisman Rd., Mountain View, Calif., 70, Tel: YOrkshire 8-8161, Yr: 1957, Emp: 1100, ▲13**

**See ad on pages 122-123**

Fairfield Engineering Corp., 111 Manhattan St., Stamford, Conn., 4, 17, 30, 38, 47, 68, 72, 82, Tel: DAvis 5-1561, Yr: 1957, Emp: 30, ▲2, $200,000

**Fairmount Chemical Co., Inc., Dept. ID, 136 Liberty St., New York 6, N.Y., 103, Tel: BArclay 7-6375, Yr: 1939, Emp: 100, $30,000**

**See ad on page 700**

Falcon Division, General Thermodynamics Corp., 211 Concord Turnpike, Cambridge 40, Mass., 11, 30, 83, 91, Tel: TRowbridge 6-3269

**Falstrom Co., 71A Falstrom Ct., Passaic, N.J., 84, 87, 89, Tel: PRescott 7-0013, Yr: 1870, Emp: 218, ▲1**

**See ad on page 631**

Famon Electronic Industries, Inc., 139 Frelinghuysen Ave., Newark 12, N.J., 6, 32, 38, 61, 70, Tel: BIgelow 3-1020, Yr: 1954, Emp: 150, ▲3, $1,250,000

**Fansteel Metallurgical Corp., North Chicago, Ill., 43, 63, 66, 70, 72, 85, 97, 102, 104, Tel: DExter 6-4900, Yr: 1907, Emp: 2500, ▲5, $7,500,000**

**See ad on pages 130-131**

Faradyne Electronics Corp., Affil. Mansol Ceramics, 171 Cortland St., Belleville 9, N.J., 10, 18, 91, 104, Tel: PLymouth 1-2100

Farinon Electric Co., 116 D St., Redwood City, Calif., 20, 26, 36, 52, 84, Tel: EMerson 9-5217, Yr: 1958, Emp: 11, ▲5, $300,000

Farley & Loetscher Mfg. Co., 7th & White, Dubuque, Iowa, 93, 99, Tel: 2-5451, Yr: 1929

Farmer Electric Products Co., Inc., 2300 Washington St., Newton Lower Falls 62, Mass., 38, 58, 72, Tel: DEcatur 2-8383, Yr: 1919, Emp: 15, $150,000

Farnsworth Electronics Co., Pacific Div., 815 San Antonio Rd., Palo Alto, Calif., 43, 54, Tel: DAvenport 6-9900, Yr: 1952, Emp: 75, ▲2, $500,000

Farr Company, P.O. Box 90187, Airport Station, Los Angeles 45, Calif., 52, Tel: ORegon 8-3873

Farrall Instrument Co., P.O. Box 658, Grand Island, Neb., 19, 88, 89, Tel: DU 4-4530, Yr: 1958, Emp: 4, ▲1, $75,000

**Farwell Metal Fabricating, 73 W. Fairfield Ave., St. Paul 7, Minn., 84, 87, 89, Tel: CApital 4-5348, Yr: 1859, Emp: 175**

**See ad on page 601**

Farwest Mfg. Div., Inc., 209 First Ave., S., Seattle 4, Wash., 3, 4, 9, 17, 21, 30, 33, 45, 56, 58, 62, 63, 64, 68, 72, 85, 89, 90, 99, Tel: MAin 4-5656, Yr: 1945, Emp: 15, $117,313

Fasco Industries, Inc., Aurora & Union, Rochester 2, N.Y., 4, 42, 45, 60, 72, 73, 92, Tel: HAmilton 6-4300, Yr: 1928, Emp: 1000, $2,000,000

**Fast & Co., John E., Subsid. Victoreen Instrument Co., 3594 N. Elston Ave., Chicago 18, Ill., 13, 45, Tel: JUniper 8-2715, Yr: 1919, Emp: 150**

**See ad on page 391**

Fastex Div., Illinois Tool Works, 195 Algonquin Rd., Des Plaines, Ill., 11, 39, 91, 93, Tel: AN 7-2121, Yr: 1912

Fawn Plastics Co., Inc., 240 York Rd., Timonium, Md., 62, 93, Tel: CHerbrook 2-1600, Yr: 1946, Emp: 100, $2000000

Fecker Division, J. W., American Optical Co., 6592 Hamilton Ave., Pittsburgh 6, Pa., 1, 4, 9, 11, 17, 23, 30, 33, 65, Tel: EMerson 1-7615, Yr: 1833

Federal Anti-Capacity Switch Co., P.O. Box 25, Lancaster, N.Y., 72, Tel: NI 4-1600, Yr: 1930, Emp: 2, $12,000

Federal Electric Corp., Div. ITT, 621-671 Industrial Ave., Paramus, N.J., 94, 100, Tel: CO 1-7200, Yr: 1951, Emp: 3000

Federal Electronic Products, Inc., 1330 Pompton Ave., Cedar Grove, N.J., 96, 104, Tel: CLifford 6-4600, Yr: 1957, Emp: 30, ▲1, $250,000

Federal Machine Co., Inc., 307 Garfield Ave., Jersey City 5, N.J., 89, 96, Tel: HE 5-1500, Yr: 1951, Emp: 30

Federal Manufacturing & Engineering Corp., 1055 Stewart Ave., Garden City, N.Y., 1, 3, 4, 6, 7, 8, 11, 18, 20, 21, 22, 23, 27, 28, 30, 31, 34, 36, 38, 40, 55, 61, 62, 63, 68, 71, 80, 81, 83, 84, 87, 88, 89, 91, 94, Tel: PI 2-7400, Yr: 1921, Emp: 350, ▲12, $3,755,000

Federal Pacific Electric Co., 50 Paris St., Newark 1, N.J., 58, Tel: MArket 3-6500

Federal Scientific Corp., 615 West 131st St., New York 27, N.Y., 3, 11, 27, 38, Tel: AUdubon 6-4400, Yr: 1957, Emp: 25, ▲11, $300,000

**Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 53, 55, 62, 71, 72, 73, 91, Tel: IRving 8-5744, Yr: 1931, Emp: 16**

**See ad on page 642**

**Federal Tool Engineering Co., 1100 Pompton Ave., Cedar Grove, N.J., 1, 63, 94, 96, 104, Tel: CLifford 6-5300, Yr: 1946, Emp: 85, $1,200,000**

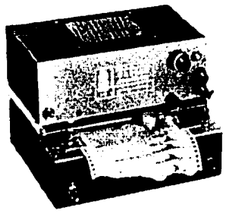
**See ad on page 670**

# COMPACT PANEL & PORTABLE RECORDERS

## VARIAN 1 & 2 CHANNEL POTENTIOMETER TYPE

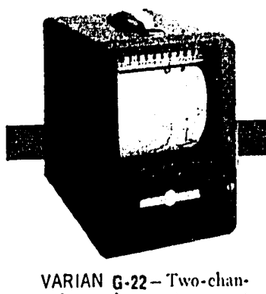
Moderate cost recorders of very compact size that use the same time-proven potentiometer principle with which expensive chart recorders achieve superior stability, sensitivity, ruggedness and high input impedance. Versatility features include zero adjustment, span adjustment and interchangeable input chassis. Chart is rectilinear. Pen driving power is ample, even for inkless recording, since it is independent of the source being measured.

### VARIAN G-10 SPECIFICATIONS VARIAN G-22



VARIAN G-10 – Horizontal chart position provides greatest accessibility for notes. Designed for bench use. Easily portable.

| MODEL | FIXED-SPAN G-10 (span permanently set) | ADJUSTABLE-SPAN G-10 (continuous adjustment with inside controls) | G-22 DUAL CHANNEL with A21 or A22 input chassis |
|---|---|---|---|
| Base Price (not including options or accessories) | $365.00 | $420.00 | A21 $ 975.00<br>A22 1075.00 |
| Span (millivolts across chart) | 100 mv., d.c., fixed | As specified within 10-100 mv. d.c. range | 10-100 mv., d.c., as specified |
| Full Scale Balancing Time | Standard 2½ seconds<br>*Optional 1 second* | Standard 2½ seconds<br>*Optional 1 second* | 1 second |
| Limit of Error | 1% of span | 1% of span | 1% of span |
| Sensitivity (½ deadband) | ¼% of span | ¼% of span | ¼% of span |
| Reference System | Mercury cell | Mercury cell | A21 Mercury Cell<br>A22 Continuous Electronic |
| Input & Source Resistance | Null balance potentiometer provides input resistance greater than 500K when system is off null, approaching infinity at null. Maximum permissible source resistance ranges from 50K ohms at 10 mv. to 100K ohms at 100 mv. | | Same as G-10 |
| Input Circuit | Ungrounded. Signals floating above ground by as much as 200 volts d.c. are permissible with proper considerations. | | Two channels electrically independent and ungrounded. Each may be floated by 200 volts d.c. |
| Input Polarity | Positive-going signals cause left-to-right pen travel. *Optional reversed polarity: positive-going signals cause right-to-left pen travel.* | | Positive-going signals cause left-to-right pen travel. |
| Chart Dimensions | Calibrated width nominally 5"; Overall 6¾"; Length 85'. | | Same as G-10 |
| Chart Speeds | Single speed standard. *Dual speed optional.* 1, 2, 4, 8, 12, 16"/min., 1, 2, 4, 6, 15, 16, 24, 30, 40, 48"/hr. *Any combination available on dual speed.* | | Sce G-11A speeds; chart-speed shifter standard on G-22; dual motors optional; high speeds optional (12", 15" & 16"/min.) |
| Power Requirements | 110-120 volts, 1 ph, 58-62 cps, 55 volt-amp. max., power factor approx. 0.7. Also 50-cycle version, 115/230 volts. | | 110-120 volts, 1 ph,58-62 cps |
| Overall Dimensions | 7" high x 10¾" wide x 10" deep. | | 11⅜" high x 8⅜" wide x 12¾" deep |
| Weight | Basic recorder 15 lbs. net. Maximum shipping weight 25 lbs. | | Basic Recorder 33 lbs. net |
| Accessories Available | Inkless charts, stylii, card-type charts, chart take-up unit, carrying case, replaceable chart drive motor assemblies. | | Retransmitting slidewires available as an option. Event markers, alarm contacts, additional input chassis under development. |



VARIAN G-22 – Two-channel recorder, most compact and low cost of its type. Quick plug-in input chassis. Portable and panel mount versions.

### VARIAN G-11A SPECIFICATIONS

| MODEL | G-11A with A1 or A2 input chassis | G-11A with B1 input chassis | G-11A with F1 input chassis | G-11A with T2 input chassis |
|---|---|---|---|---|
| Base Price (not including options or accessories) | A1 $470.00<br>A2 $515.00 | $515.00 | $470.00 | $545.00 |
| Type | Gen. purpose null-balance potentiometer | Gen. purpose potentiometer with input attenuator | Current-type for use as general purpose recording milliammeter | Thermocouple potentiometer with reference junction compensation. |
| Span | 9-100 mv. d.c. as specified | Nine-step adjustable 10 mv. to 100 volts d.c. | 1 milliampere, d.c. | 0°F to 400, 600, 750, 1100, 1800 or 2200°F; 30° to 220°F, −150°F to +250°F, and −200°C to +50°C |
| Field Span-Adjust | Continuous, with inside controls | Knob on front panel | Fixed<br>No adjustment | Front-panel plug-in range elements |
| Full-scale Balancing Time | 1 second | 1 second | 1 second | 1 second |
| Limit of Error | 1% of span | 1% of span on 10 mv.<br>2% on all others | 1% of span | 1% of span |
| Reference System | A1 – Mercury cell<br>A2 – Cont. electronic | Mercury cell | Mercury cell | Continuous electronic |
| Sensitivity (½ deadband) | ¼% of span | ¼% of span | ¼% of span | ¼% of span |
| Input Resistance | Same as G-10 | 100K ohms minimum | 1350 ohms | — — |
| Maximum Source Resistance | Same as G-10 | — — | — — | — — |
| Input Circuit | Ungrounded. Signals floating above ground by as much as 200 volts d.c. are permissible with proper considerations. | | | |
| Chart Dimensions | Calibrated width nominally 5"; Overall width 6¾"; Length 85' | | | |
| Chart Speeds – Standard<br>Optional<br>Optional<br>Optional | Single Speed<br>*Dual chart motors*<br>*1-4 chart speed shifter*<br>*Quadruple chart speeds* | ½, 1, 2, 3, 8, 12, 15, 20, 24 and 30"/hour; 1, 2, 4, 6 and 8"/ minute.<br>*Dual Motors provide most combinations of two speeds.*<br>*Chart speed shifter divides any basic speed by four. Quadruple speeds achieved by two motors plus shifter.* | | |
| Case dimensions | Portable – 10½" high x 8¼" wide x 7¾" deep.<br>Panel mounting – 10⅜" high x 8⅝" wide x 7¾" deep with 5¼" behind front panel. | | | |
| Power Requirement | 110-120 volts, 1 phase, 58-62 cps, 55 volt amperes max., power factor approximately 0.7. 50-cycle version available, 110-120 volts only. | | | |
| Weight | Basic recorder 15 lbs. net. Maximum shipping weight 25 lbs. | | | |
| Accessories Available | Inkless charts, stylii, solenoid-operated event marker pen, extra input chassis, replaceable chart drive motor assemblies. | | | |

SPECIFICATIONS AND PRICES SUBJECT TO CHANGE WITHOUT NOTICE.



VARIAN G-11A – Ideal form for portable use or panel or rack mounting. Many interchangeable input chassis and versatility features.

*Varian recorders are sold and serviced by representatives in principal U.S. cities and abroad. Prices are F.O.B. Palo Alto. Prices and specifications subject to change without notice. Write today for literature. Address Instrument Division.*

**VARIAN associates**
PALO ALTO 42, CALIFORNIA

NMR & EPR SPECTROMETERS, MAGNETS, FLUXMETERS, GRAPHIC RECORDERS, MAGNETOMETERS, MICROWAVE TUBES, MICROWAVE SYSTEM COMPONENTS, HIGH VACUUM EQUIPMENT, LINEAR ACCELERATORS, RESEARCH AND DEVELOPMENT SERVICES





Federal Tool & Mfg. Co., 3600 Alabama Ave., Minneapolis 16, Minn., 89, Tel: WEst 9-7843, Yr: 1945, Emp: 200

Feedback Controls, Inc., 8 Erie Dr., Natick, Mass., 4, 9, 30, 38, 88, 94, Tel: TWinbrook 4-1020, Yr: 1954, Emp: 95, ▲4, $1,000,000

Feiler Engineering & Mfg. Co., 8026 N. Monticello, Skokie, Ill., 32, Tel: COrnelia 7-8280, Yr: 1940, Emp: 50

Feiner & Sons, Inc., P., 522 W. 45th St., New York 36, N.Y., 84, 87, 89, Tel: PL 7-6150, Yr: 1880, Emp: 100, $500,000

Felker Manufacturing Co., 1128 Border Ave., Torrance, Calif., 94, 96, Tel: FAirfax 8-4704, Yr: 1935, Emp: 125

Fen-Tone Corp., 106 Fifth Ave., New York 11, N.Y., Importers, 29, 59, 61, Tel: OR 5-1707

Fen-ske, Fedrick & Miller, Inc., 12820 Panama St., Los Angeles 66, Calif., 4, 9, 16, 28, 36, Tel: UPton 0-6041, Yr: 1956, Emp: 210, ▲45

**Fenwal Electronics, Inc., 33G Mellen St., Framingham, Mass., 69, Tel: TRinity 2-5110, Yr: 1946, Emp: 120, ▲5**

**See ad on page 530**

Fenway Machine Co., Inc., 3107 N. Broad St., Philadelphia 32, Pa., 96, Tel: BAldwin 5-0850

Ferranti Electric, Inc., 30 Rockefeller Plaza, New York 20, N.Y., 4, 9, 21, 45, 50, 76, 77, 78, 79, Tel: CIrcle 7-0911, Yr: 1892, Emp: 18,000

Ferranti-Packard Electric, Ltd., Industry St., Toronto 15, Ont., Canada, 1, 4, 9, 14, 21, 24, 58, 63, 64, 88, 91, Tel: ROger 2-3661, Yr: 1891, Emp: 1000

Ferris Instrument Co., 110 Cornelia St., Boonton, N.J., 28, 33, 40, Tel: DE 4-0781, Yr: 1932, Emp: 25, ▲4

Ferritronics Limited, 157 Willowdale Ave., Willowdale, Ontario, Canada, 48, 50, 51, 52, 76, 88, Yr: 1960, Emp: 10, ▲4

Ferro Corp., Louthan Plant–Refractories Div., P.O. Box 781, East Liverpool, Ohio, 48, 86, 93, Tel: FUlton 5-1538, Yr: 1901

Ferrodynamics Corp., Gregg St. & Rte. 17, Lodi, N.J., 65, Tel: DI 2-7017, Yr: 1956, Emp: 30, ▲3, $850,000

**Ferrotec, Inc., 217 California St., Newton 58, Mass., 40, 72, 83, Tel: DEcatur 2-7600, Yr: 1958, Emp: 40, ▲3, $100,000**

**See ad on page 591**

**Ferroxcube Corporation of America, 50 East Bridge St., Saugerties, N.Y., 9, 17, 36, 39, 48, 57, 69, 70, 86, 90, 91, Tel: CHerry 6-2811, Yr: 1950, ▲2**

**See ads on pages 267, 354, 423, 457, 525, 620**

Fidelitone, Inc., 6415 Ravenswood Ave., Chicago 26, Ill., 61, 65, 91, Tel: BRiargate 4-0075, Yr: 1929, Emp: 250, ▲1

Fidelity Amplifier Co., 1633 N. Halsted St., Chicago 14, Ill., 11, 19, 32, 38, 58, 62, 73, 85, 89, Tel: MOhawk 4-3515, Yr: 1944, Emp: 20, ▲1, $25,000

Fidelity Chemical Products Corp., 470 Frelinghuysen Ave., Newark, 12, N.J., 95, 96, Tel: BI 2-4110, Yr: 1942, ▲1

Fidelity Instrument Corp., 1000 E. Boundary Ave., York, Pa., 38, 63, 82, Tel: 7675, Yr: 1953, Emp: 60, $850,000

**Film Capacitors, Inc., 3400 Park Ave., New York 56, N.Y., 43, 63, Tel: CYpress 2-5181, Yr: 1946**

**See ad on page 479**

Film Resistors, Inc., 242 Ridgedale Ave., Morristown, N.J., 69, Tel: JEfferson 8-2440

**Filmohm Corp., 48 W. 25th St., New York 10, N.Y., 9, 17, 21, 39, 40, 69, Tel: WAtkins 4-6605, Yr: 1955, Emp: 40, ▲6**

**See ad on page 525**

Filtors, Incorporated, 30 Sagamore Hill Dr., Port Washington, N.Y., 68, Tel: POrt Washington 7-8220, Yr: 1938, Emp: 400, ▲12

Filtron Company, Inc., 131-15 Fowler Ave., Flushing 55, L.I., N.Y., 43, 50, 52, 63, 76, 88, 94, 102, Tel: HI 5-7000, Yr: 1946, Emp: 490

Fire Control Co., Inc., 703 Thornton St., Wilmington 1, Del., 4, 74, Tel: OLympia 5-5370, Yr: 1946, Emp: 10

Fischer & Porter Co., 480 Warminster Rd., Warminster, Pa., 4, 9, 10, 36, 58, 75, 89, 91, 99, 104, Tel: OSborne 5-6000, Yr: 1937, Emp: 1100

Fish-Schurman Corp., 70 Portman Rd., New Rochelle, N.Y., 17, Tel: NEw Rochelle 6-1300, Yr: 1923, Emp: 40

Fisher Berkeley Corp., 4224 Holden St., Emeryville 8, Calif., 8, 32, 34, 38, 84, 87, 89, Tel: OLympic 5-9696, Yr: 1957, Emp: 25

Fisher Co., Inc., Oscar, P.O. Box 426, Newburgh, N.Y., 19, 94, Tel: JOhn 2-3900, Yr: 1947, Emp: 60

Fisher & Crome, 109 N. Comac St., Philadelphia 7, Pa., 73, 84, 89, 91, 93, 99, Tel: LOcust 4-5054, Yr: 1945, Emp: 18, $150,000

Fisher Engineering, Inc., 2060 U. S. 24 E., Box 327, Huntington, Ind., 76, 89, Tel: 315, Yr: 1950, Emp: 50, ▲1, $375,000

Fisher-Pierce Co., The, 170 Pearl St., S. Braintree 85, Mass., 4, 58, 68, Tel: VIctor 3-5000, Yr: 1937, Emp: 700

Fisher Radio Corp., 21-21 44th Dr., Long Island City 1, N.Y., 6, 38, 56, 61, 80, Tel: EX 2-2500

Fisher Research Lab., Inc., 1975 University Ave., Palo Alto, Calif., 2, 14, 15, 18, 22, 24, 26, 58, Tel: DA 2-4646, Yr: 1932, Emp: 60, ▲1, $850,000

**Fitchburg Engineering Corp., Dept. D, Fitchburg, Mass., 96, Tel: DIamond 3-7416, Yr: 1929, Emp: 150, ▲1, $62,000**

**See ad on page 670**

Five Star Co., Inc., The, 100 W. Main St., Plantsville, Conn., 45, 68, Tel: MArket 8-5561, Yr: 1945, Emp: 150

Flexaust Co., 100 Park Ave., New York 17, N.Y., 42, Tel: ORegon 9-1300, Yr: 1938, Emp: 50, $150,000

Flexo International Corp., 3720 N. Milwaukee, Ave., Chicago 41, Ill., 59, 96, Yr: 1932, Emp: 75

Flexonics Corporation, 1315 S. 3rd Ave., Maywood, Ill., 74, 75, Tel: FIllmore 3-8000, Yr: 1902, Emp: 1400

Flight Research, Inc., P.O. Box 1-F, Richmond 1, Va., 1, 9, 25, 27, 43, Tel: REpublic 7-4163, Yr: 1945, Emp: 10, ▲2

Flo-Tronics, Inc., 1420 Zarthan Ave., So., Minneapolis 16, Minn., 4, 65, Tel: LIberty 5-1111, Yr: 1960, Emp: 16, ▲1

Flock Process Co., Inc., 373 Main Ave., Norwalk, Conn., 91, Yr: 1939, Emp: 10, $100,000

Flow Corporation, 85 Mystic St., Arlington 74, Mass., 3, 4, 14, 58, 75, Tel: MIssion 8-6710, Yr: 1953, Emp: 30, ▲2, $150,000

Fluke Manufacturing Co., Inc., John, P.O. Box 7161, Seattle 33, Wash., 3, 14, 17, 58, 63, Tel: PRospect 6-1171, Yr: 1919, Emp: 150, ▲7, $2,000,000

Fluoro Plastics, Inc., 36th & Filbert Sts., Philadelphia 1, Pa., 89, 91, 93, 99, Yr: 1933, Emp: 100, $240,000

Fluorocarbon Co., The, 1206 E. Ash Ave., Fullerton, Calif., 99, Yr: 1955, Emp: 36

Fluorulon Laboratories, Inc., P.O. Box 305, Caldwell, N.J., 91, 93, 99, Tel: CAldwell 6-8118

Flush Wall Radio Co., 1012 Cleveland St., Clearwater, Fla., 32, Tel: CLearwater 31-6061, Yr: 1940, Emp: 6

Food Machinery & Chemical Corp., 1105 Coleman Ave., San Jose, Calif., 4, 91, Tel: CY 4-8121, Yr: 1928, Emp: 15,500, ▲10, $30,000

Food Machinery & Chemical Corp., Chemicals & Plastics Div., 161 E. 42nd St., New York 17, N.Y., 99, Tel: MU 7-7400, Yr: 1883, Emp: 16,000

Foote Mineral Co., 18 W. Chelten Ave., Philadelphia 44, Pa., 93, 95, 96, 101, Tel: VIctor 8-4000, Yr: 1876

**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 9, 30, 45, 50, 52, 76, 84, 87, 89, 91, Tel: YEllowstone 4-2691, Yr: 1948, Emp: 200, ▲3, $1,200,000**

**See ads on pages 341, 399, 403, 437, 563, 569**

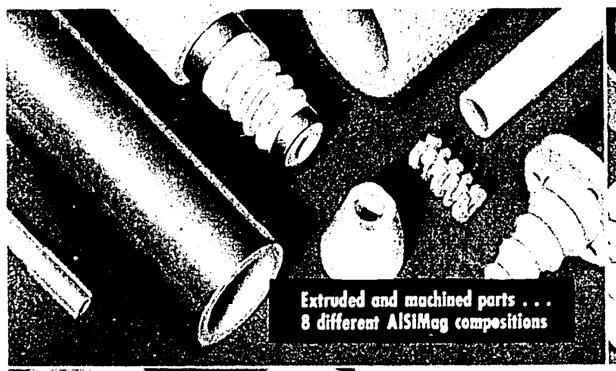
Ford Radio & Mica Corp., 536 63rd St., Brooklyn 20, N.Y., 104, Tel: GEdney 9-8300, Yr: 1917, Emp: 125, ▲1, $1,200,000

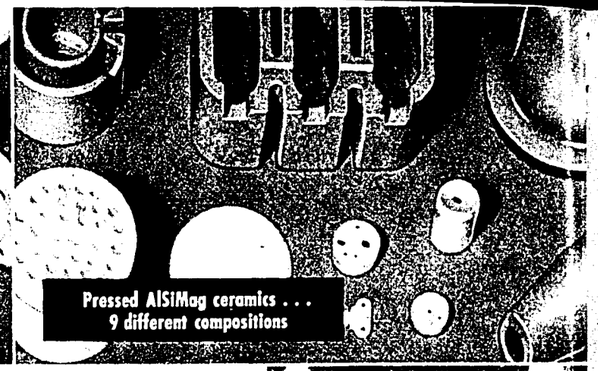
Forest Electric Co., The, 1001 N. 25th Ave., Melrose Park, Ill., 76, Tel: MU 1-0180, Yr: 1946, Emp: 60, ▲2, $600,000

Form-It Products, Inc., 1619 W. Walnut St., Chicago 12, Ill., 89, 98, Tel: HAymarket 1-7337, Yr: 1956, Emp: 15, $131,475

Forma Scientific Inc., P.O. Box 619, Marietta, Ohio, 14, 92, 94, 96, Yr: 1952, Emp: 45, ▲1, $50,000

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.







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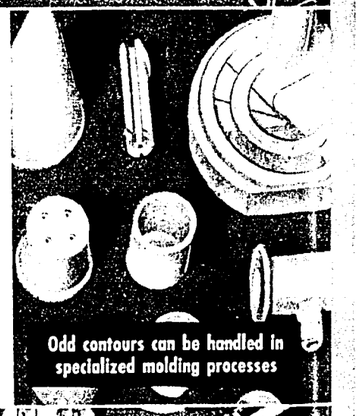
Specialized engineering talent in depth • The quantity you need . . . deliveries and quality as agreed • Special speedy service on prototypes • Specialized equipment for smaller quantity production • Unequaled facilities for volume production when you really need volume.

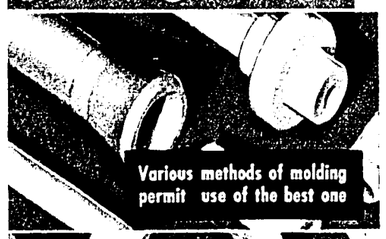
***from one source . . .***

These are typical samples picked up in our Inspection Department over a week end. They illustrate the great variety of technical ceramics constantly flowing through our ultra-modern plants.

Parts are shown approximately ½ size.

***Property Chart Sent on Request.***

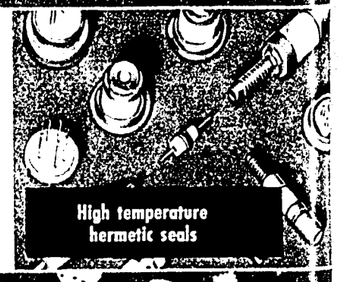




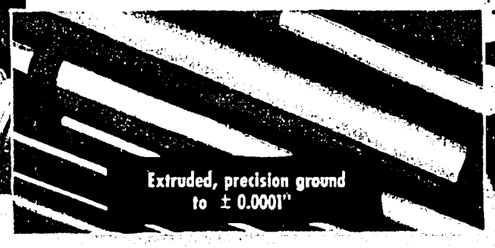


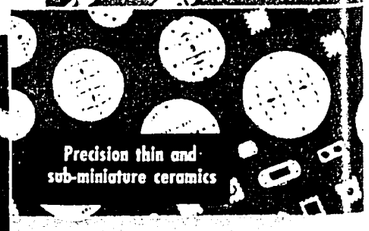









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A Subsidiary of Minnesota Mining and Manufacturing Company

**AMERICAN LAVA CORPORATION**

**CHATTANOOGA 5, TENN.**
**58TH YEAR OF CERAMIC LEADERSHIP**

**For service, contact American Lava representatives in Offices of Minnesota Mining & Manufacturing Co. in these cities (see your local telephone directory):** Boston: Newton Center, Mass. • Chicago: Bedford Park, Ill. • Cleveland, O. • Dallas, Texas • Los Angeles, Cal. New York: Ridgefield, N. J. • Philadelphia, Pa. • St. Louis, Mo. • St. Paul, Minn. • So. San Francisco, Cal. • Seattle, Wash. **All other export:** Minnesota Mining & Manufacturing Co., International Division, 99 Park Ave., New York, N. Y.




Formica Corp., Subsid. American Cyanamid Co., 4614 Spring Grove Ave., Cincinnati 32, Ohio, 93, 99, Tel: KIrby 1-3670, Yr: 1913, Emp: 1300

Foster Transformer Co., 3820 Colerain Ave., Cincinnati 23, Ohio, 15, 76, Tel: MUlberry 1-2120, Yr: 1935, Emp: 190, ▲1

**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 6, 7, 9, 23, 28, 34, 35, 38, 63, 72, 84, 88, 91, Tel: CEnter 9-6100, Yr: 1954, Emp: 75, ▲6, $500,000**


**See ad on page 180**


Franke Gear Works, Inc., Armac Gear Division, 1101 Ravenswood Ave., Chicago 40, Ill., 30, Tel: LO 1-0950, Emp: 50

Franklin Co., Inc., Bernard, 4045 Torresdale Ave., Philadelphia 24, Pa., 84, Tel: JE 3-4500

Franklin Electronics, Inc., E. 4th St., Bridgeport, Pa., 9, 11, 24, 33, Tel: BR 2-4800, Yr: 1951, Emp: 85

Franklin Engineering, 977 Commercial St., Palo Alto, Calif., 39, 53, 69, Tel: DAvenport 1-1702, Yr: 1956, Emp: 6, $30,000

Franklin Fibre-Lamitex Corp., 129 Lafayette St., New York 13, N.Y., 17, 38, 46, 48, 53, 55, 71, 73, 84, 88, 89, 91, 93, 95, 98, 99, Tel: CA 6-4376, Yr: 1921, Emp: 60, ▲3, $500,000

**Franklin Systems, Inc., 2734 Hillsboro Rd., P.O. Box 3250, West Palm Beach, Fla., 24, 58, 61, 84, 88, 89, 94, Tel: TEmple 3-1602, Yr: 1957, Emp: 26, ▲5, $250,000**


**See ad on page 320**


Frederick Research Corp., 2601 University Blvd., W., Wheaton, Md., 88, 94, 100, Tel: LOckwood 5-3873, Yr: 1951, Emp: 60, ▲3

**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5, 10, 11, 14, 28, 38, 43, 45, 47, 51, 52, 63, 76, Tel: EVergreen 6-1300, Yr: 1929, Emp: 375**


**See ad on page 366**


Freeman Co., The, 8th & Walnut Sts., Yankton, S.D., 39, Tel: NOrth 5-2829, Yr: 1937, Emp: 65, $50,000

Frenchtown Porcelain Co., 8th & Harrison Sts., Frenchtown, N.J., 18, 51, 61, 86, 91, 93, Tel: FRenchtown 180, Yr: 1917, Emp: 300, ▲3

**Frequency Standards, P.O. Box 504, Asbury Park, N.J., 4, 21, 40, 52, 76, 80, 83, Tel: PRospect 4-0500, Yr: 1952, Emp: 110, ▲6, $1,450,000**


**See ad on page 113**


Fried, Walter, Crescent Beach Dr., Huntington, L.I., N.Y., 4, 88, Tel: HAmilton 7-1300

Friend, Albert W., P.O. Drawer 29, Bala-Cynwyd, Pa., 88, 94, Tel: MOhawk 4-0275, Yr: 1953, Emp: 1, ▲1

Fugle-Miller Labs., Inc., 301 Central Ave., Clark, N.J., 15, 52, 63, 69, 76, Tel: FUlton 1-2727, Yr: 1947, Emp: 62, ▲1, $125,000

Funfstuck, Horst, 7521 Paso Robles Ave., Van Nuys, Calif., 88, Tel: DI 2-4915

Furane Plastics Inc., 4516 Brazil St., Los Angeles 39, Calif., 93, 95, 99, 102, Tel: CHapman 5-1151, Yr: 1945, Emp: 100, ▲3

Furnas Electric Co., 1000 McKee St., Batavia, Ill., 72, Tel: TR 9-3410, Yr: 1952, Emp: 550

Furzehill Laboratories, Ltd., 57 Clarendon Rd., Watford, Herts., England, 3, 5, 14, 25, 28, 33, Tel: WAtford 3-1636, Yr: 1927, Emp: 105

Fusion Engineering, 17921 Roseland Ave., Cleveland 12, Ohio, 92, 96, 105, Tel: IVanhoe 6-2333, Yr: 1955, Emp: 50

**Fusite Corp., Dept H-1, 6000 Fernview Ave., Cincinnati 13, Ohio, 46, 51, Tel: REdwood 1-2020, Yr: 1948, Emp: 225, ▲1**


**See ad on page 194**


# G

G B Electronics, Subsid. General Bronze Corp., Hook Creek Blvd., Valley Stream, L.I., N.Y., 27, 39, 52, 83, 84, 87, 94, Tel: LOcust 1-8300, Yr: 1953, Emp: 550, ▲25, $14,000,000

**G-C Electronics Co., Div. Textron Inc., 400 S. Wyman St., Rockford, Ill., 39, 46, 53, 55, 59, 62, 65, 69, 72, 73, 85, 91, 95, 96, 98, Tel: WOodland 8-9661, Yr: 1928, Emp: 600, ▲1**


**See ad on page 640**


G-L Electronics Co., Inc., P.O. Box 966, Camden 5, N.J., 88, Tel: WO 6-2730, Yr: 1956, $1,151,967

GM Laboratories, Inc., 1300 N. Knox Ave., Chicago 51, Ill., 11, 30, 60, Tel: PEnsacola 6-1800, Yr: 1925, Emp: 700, ▲3, $1,000,000

GOE Engineering Co., 219 S. Mednik Ave., Los Angeles 22, Calif., 53, 91, 93, 104, Tel: ANgelus 1-2133, Yr: 1950, Emp: 12, ▲1

GPL Division, General Precision, Inc., 63 Bedford Rd., Pleasantville, N.Y., 6, 7, 9, 19, 23, 26, 27, 34, 35, 76, Tel: ROdgers 9-5000, Yr: 1915, Emp: 2000

GV Controls, Inc., Okner Pkwy., Livingston, N.J., 68, 74, Tel: WYman 2-6200, Yr: 1919, Emp: 160, ▲3, $2,150,000

Gables Engineering, Inc., 247 Greco Ave., Coral Gables 34, Fla., 38, 61, 72, 84, 89, 94, Tel: Highland 5-3785, Yr: 1946, Emp: 50, ▲3, $1,100,000

**Gabriel Electronics Div., Gabriel Co., Millis, Mass., 39, 52, 76, 83, 88, 89, 94, Tel: FR 6-2953**


**See ad on page 372**


Gahagan, Inc., Watetman Ave., Esmond, R.I., 70, Tel: CEntredale 1-1000

Galaxy Engineering Corp., 1211 W. Magnolia, Burbank, Calif., 30, 51, 53, 86, 89, 91, 98, Tel: VI 9-1191, Yr: 1953, Emp: 7, $162,000

Gamewell Co., The, 1253 Chestnut St., Newton Upper Falls, Mass., 69, Tel: BIgelow 4-1240, Yr: 1855, Emp: 400, ▲6, $750,000

Gap Instrument Corp., 116 E. Merrick Rd., Freeport, L.I., N.Y., 30, 60, Tel: FReeport 8-1050, Yr: 1953, Emp: 16, $1,000,000

Gar Precision Parts, Inc., 190 Henry St., Stamford, Conn., 23, Tel: FI 8-2671, Yr: 1950, Emp: 90, $1,000,000

Garde Mfg. Co., 53 John St., Cumberland, R.I., 75, 89, 91, 93, Tel: PAwtucket 6-3200, Emp: 40

Gardiner Electronics Co., 2545 E. Indian School Rd., Phoenix, Ariz., 24, Tel: CR 4-9681

Gardner-Denver Co., Front St., Quincy, Ill., 96, Tel: BAldwin 2-5400, Yr: 1859, Emp: 4000, $20,000,000

Gardner-Denver Co., "Wire Wrap" Div., 1333 Fulton St., Grand Haven, Mich., 96, Tel: 551, Yr: 1859, Emp: 1600

Garlock Electronic Products, Garlock, Inc., Camden 1, N.J., 46, 71, 73, 84, 86, 89, 91, 93, 98, 99, Tel: WOodlawn 4-2212, Yr: 1887, Emp: 3000

Garrard, 30 Shore Rd., Pt. Washington, L.I., N.Y., 61, Tel: PO 7-7700

Garrett Corp., The, 9851 Sepulveda Blvd., Los Angeles 45, Calif., 1, 9, 17, 30, 33, 42, 46, 47, 52, 60, 64, 75, 85, 91, Tel: SP 6-1010, Yr: 1939, Emp: 5600

Garron Aircraft Supply, Inc., 5 Union Square, New York 3, N.Y., 85, 91, Tel: ORegon 5-8709, Yr: 1917, Emp: 22, $242,000

**Gates Electronic Co., 1705-1 Taylor Ave., New York 60, N.Y., 14, 15, 17, 63, 66, 76, Tel: TYrone 2-6190, Yr: 1951, Emp: 21, ▲2, $125,000**


**See ad on page 184**


Gates Radio Company, 123 Hampshire St., Quincy, Ill., 7, 22, 23, 29, 31, 34, 35, Tel: BA 2-8202, Yr: 1922, Emp: 195

Gavitt Wire & Cable Co., Central St., Brookfield, Mass., 39, 64, 85, Tel: ATlantic 7-6476, Yr: 1925, Emp: 275, ▲3

Gear Specialties, Inc., 2635 W. Medill Ave., Chicago 47, Ill., 30, Tel: DI 2-3200, Yr: 1946, Emp: 325, $200,000

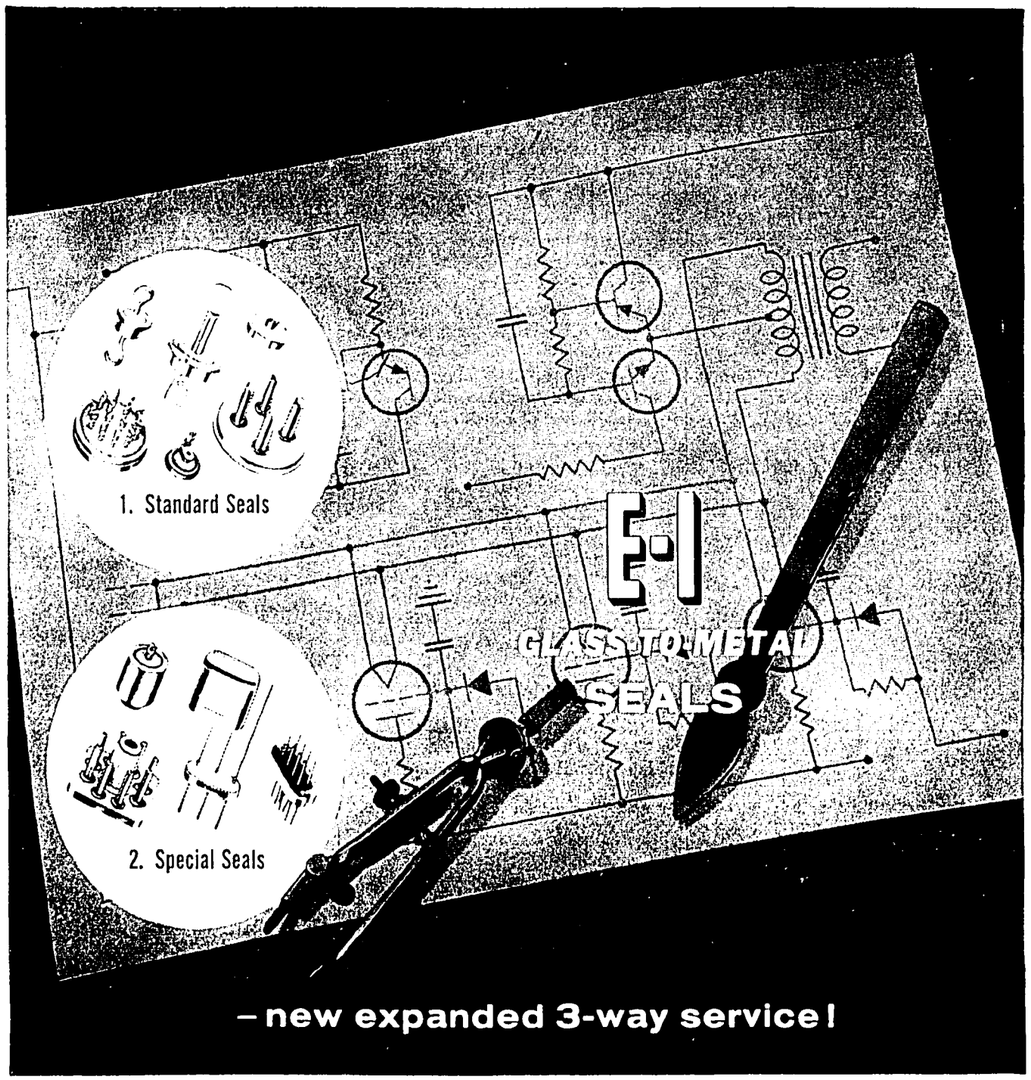
Geartronics Corp., Actuator Products Div., 14 Nashua St., Woburn, Mass., 30, 91, Yr: 1955, Emp: 65, $20,000

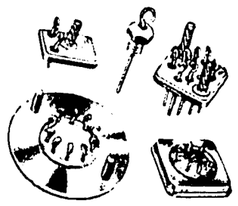
Geartronics Corp., Massachusetts Gear Div., 942 Main St., West Concord, Mass., 30, 91, Tel: EMerson 7-2971, Yr: 1922, Emp: 125

Gemco Electric Co., 25635 W. Eight Mile, Detroit 40, Mich., 1, 11, 30, 36, 38, 45, 53, 58, 63, 64, 72, 73, 82, 84, 91, Tel: KEnwood 3-0700, Yr: 1946, Emp: 55, $100,000

General Applied Science Labs., Inc., Merrick & Stewart Aves., Westbury, L.I., N.Y., 3, 4, 9, 10, 11, 64, 83, 89, 94, Tel: ED 3-6960, Yr: 1950, Emp: 115, ▲10, $1,000,000

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**COMPLETE ENGINEERING AND SAMPLE SERVICE PLUS A NATIONWIDE NETWORK OF FIELD ENGINEERS—**

E-I glass-to-metal seals are the industry standard for dependability . . . have been service-proven on vital space age projects and in critical commercial equipment. If you have a seal problem ask E-I for a recommendation. Sales engineers are located in all principal cities.

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**ELECTRICAL INDUSTRIES**

MURRAY HILL, NEW JERSEY






General Atronics Corp., 1 Bala Ave., Bala Cynwyd, Pa., 33, 91. Tel: GR 7-1360, Yr: 1955, Emp: 50, ▲25

General Automatic Corp., 111 53rd St., Union City, N.J., 63. Tel: UNion 4-1367, Yr: 1953

General Automatics, Inc., 972 Elwynne Ct., Palo Alto, Calif., 1, 9, 15, 32, 36, 50, 52, 63, 64, 81, 83, 89, 91, 100. Tel: DAvenport 1-0300, Yr: 1954, Emp: 25, ▲2

General Cable Corp., 730 Third Ave., New York 17, N.Y., 35. Tel: YUkon 6-8300, Yr: 1882

**General Ceramics, Div. Indiana General Corp., Dept. P, Crows Mill Rd., Keasbey, N.J., 86. Tel: VAlley 6-5100, Yr: 1908, Emp: 500**

**See ad on page 618**

General Circuits, Inc., 1645 St. Paul St., Rochester 21, N.Y., 9, 33, 35, 36, 64, 69, 71, 73, 89, 91, 96. Tel: CO 6-1120, Emp: 50

General Coil Products Corp., 117-12 Liberty Ave., Jamaica 35, N.Y., 29, 45, 76. Tel: AXdell 1-3790, Yr: 1953, Emp: 50, $500,000

**General Communication Co., 677 Beacon St., Boston 15, Mass., 1, 11, 20, 21, 28, 33, 38, 39, 40, 68, 72, 83, 89, 91, 97. Tel: COpley 7-6030, Yr: 1937, Emp: 116**

**See ad on page 331**

General Computers, Inc., 9000 W. Pico Blvd., Los Angeles 35, Calif., 9, 11, 33. Tel: BRadshaw 2-6010, Yr: 1957, Emp: 25, ▲2, $250,000

General Control Co., 1200 Soldiers Field Rd., Boston 34, Mass., 1, 60, 72. Tel: STadium 2-7140, Yr: 1934, Emp: 50

General Controls Co., 301 Allen Ave., Glendale 1, Calif., 1, 10, 11, 60, 63, 69, 72, 74. Tel: CItrus 9-2181, Yr: 1930, Emp: 5000

General Crystal Co., Inc., 372 Wilmot Ave., Burlington, Wis., 39, 49. Tel: RO 3-2125, Yr: 1943, Emp: 25, ▲1

General Devices, Inc., P.O. Box 253, Princeton, N.J., 9, 10, 11, 20, 21, 24, 28, 36, 37, 38, 39, 47, 63, 72. Tel: DAvis 9-2323, Yr: 1953, Emp: 197, ▲23, $2,500,000

General Electric Co., 6901 Elmwood Ave., Philadelphia 42, Pa., 17, 63. Tel: SAratoga 9-4200

General Electric Co., Apparatus Sales Div., 1 River Rd., Schenectady 5, N.Y., 1, 8, 9, 11, 16, 17, 25, 36, 38, 43, 45, 47, 58, 60, 63, 68, 69, 72, 73, 76, 82, 92, 96. Tel: FR 4-2211

General Electric Co., Capacitor Dept., John St., Hudson Falls, N.Y., 43. Tel: RH 7-3311

General Electric Co., Cathode Ray Tube Dept., Electronics Park, Syracuse, N.Y., 77. Tel: GRanite 6-4111, Yr: 1948, Emp: 1200

General Electric Co., Clock & Timer Dept., Homer Ave., Ashland, Mass., 58, 60. Tel: TRinity 2-1331

General Electric Co., Communication Products Dept., Mountain View Road, Lynchburg, Va., 8, 12, 15, 18, 20, 22, 25, 31. Tel: VI 6-7311

General Electric Co., Defense Systems Dept., 300 S. Geddes St., Syracuse 4, N.Y., 91. Tel: GRanite 6-4111, Yr: 1958, Emp: 2500

General Electric Co., Electronic Capacitor Product Section, P.O. Box 1328, Irmo, S.C., 43. Tel: AL 2-6532, Emp: 500

**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 9, 18, 20, 27, 38, 39, 48, 50, 52, 61, 75, 86, 89, 90, 91. Tel: GRanite 6-4111**

**See ads on pages 263, 267, 435 437, 501, 621**

General Electric Co., Laminated Products Dept., 1 Plastics Ave., Coshocton, Ohio, 95, 99. Tel: MAin 2-5400, Yr: 1878, Emp: 500

General Electric Co., Lamp Metals & Components Dept., 21800 Tungsten Rd., Cleveland 17, Ohio, 35, 39, 95, 97, 103, 104. Tel: KI 1-5050

General Electric Co., Light Military Electronics Dept., French Road, Utica, N.Y., 1, 4, 9, 20, 25, 27, 36. Tel: SW 7-3000, Yr: 1953, Emp: 6000

General Electric Co., Magnetic Materials Sect., 7336 No. Natl. Road, Edmore, Mich., 57, 69, 82. Tel: HA 7-5161, Emp: 600, ▲6, $9,000,000

General Electric Co., Miniature Lamp Dept., Nela Park, Cleveland 12, Ohio, 62. Tel: GL 1-6000, ▲2

General Electric Co., Ordnance Dept., 100 Plastics Ave., Pittsfield, Mass., 1, 4, 9, 18, 25, 36, 39. Tel: HIllcrest 3-3561, Emp: 1200

**General Electric Co., Power Tube Dept., Building 267, Schenectady 5, N.Y., 52, 67, 78, 79, 83. Tel: FRanklin 4-2211, Ext. 5-3433, Emp: 10,000**

**See ad on page 582**

General Electric Co., Receiving Tube Dept., 316½ W. 9th St., Owensboro, Ky., 61, 67, 77, 78, 104. Tel: MUrray 3-2301, Yr: 1896, Emp: 6500, ▲30

General Electric Co., Semiconductor Products Dept., Charles Bldg., Liverpool, N.Y., 60, 70. Tel: GR 6-4111

General Electric Co., Silicone Products Dept., Mechanicville-Waterford Road, Waterford, N.Y., 93, 95. Tel: ADams 3-3330, Yr: 1942, Emp: 600

General Electric Co., Specialty Control Dept., P.O. Box 812, Waynesboro, Va., 1, 68. Tel: WH 2-8161, Yr: 1955, Emp: 1200

General Electric Co., Specialty Transformer Dept., 1635 Broadway, Fort Wayne, Ind., 11, 38, 63, 76. Tel: EAstbrook 7-131, Emp: 1200

General Electric Co., Water Design Dept., 95 Hathaway St., Providence 7, R.I., 22. Tel: STeinert 1-3500

General Electric Co., Dept. of England, Electric Wireless Operations, Wrotham, England, 1, 2, 4, 6, 8, 18, 20, 22, 26, 27, 35, 48, 49, 53, 57, 58, 62, 64, 65, 72, 76. Tel: Crowhurst 2152

General Electric Co., Dept. of England, 20 Shore Rd., Port Washington, L.I., N.Y., 39, 66, 67, 70, 77, 78, 83. Tel: POrt 7-2064

General Electric Microwave Corp., 25 Hoyt Ave., Buffalo 9, N.Y., 14, 32, 76, 96. Tel: BLaine 6-9625, Yr: 1953, Emp: 94, ▲2, $500,000

General Electrodynamics Corp., 4144 Lee Ave., Garland, Texas, 32, 38, 92. Tel: BRoadway 6-1801, Yr: 1955, Emp: 60, ▲4

General Electronic Controls, Dept. 1010, 5th Ave., Minneapolis 4, Minn., 1, 9, 38, 39, 52, 63, 83, 84. Tel: TE 9-3065, Yr: 1941, Emp: 225, ▲4, $

General Electronic Laboratories, Inc., 18 Ames St., Cambridge 42, Mass., 1, 4, 7, 20, 21, 26, 28, 29, 30, 36, 38, 48, 63, 70, 83, 89. Tel: TRowbridge 8-7600, Yr: 1946, Emp: 300, ▲20

General Engineer & Supply Co., Industrial Div., Pearl St., Attleboro, Mass., 2, 89, 91, 103, 104. Tel: ATtleboro 1-1161, Yr: 1944, Emp: 250

General Gaskets, Inc., Middletown, Conn., 91, 93, Yr: 1956, Emp: 12

**General Hermetic Sealing Corp., 99 East Hawthorne Ave., Valley Stream, L.I., N.Y., 4, 14, 54, 68, 72, 89, 91, 94. Tel: VAlley Stream 5-6363**

**See ad on page 284**

General Industries Company, Inc., Ohio & Taylor St., Elyria, Ohio, 60. Tel: EAstern 3-3156, Yr: 1903, Emp: 1200, ▲1

General Instrument Corp., Defense Electronics Products Group, 31 N. 3rd St., Brooklyn 11, N.Y., 1, 5, 6, . . 8, 9, 18, 20, 22, 23, 26, 27, 28, 31, 35, 36, 38, 62, 63, 66, 75, 89, 96. Tel: EVergreen 8-6000

General Instrument Corp., Semiconductor Div., 65 Gouverneur St., Newark 4, N.J., 11, 66, 70. Tel: HEmlock 3-2900

General Insulated Wire Works, P.O. Box 1736, 69 Gordon Ave., Providence, R.I., 35. Tel: HOpkins 1-2900

General Kinetics, Inc., 2611 Shirlington Rd., Arlington 6, Va., 9, 11, 29, 36, 38, 94, 96. Tel: JAckson 4-1066, Yr: 1960, Emp: 22, ▲3, $200,000

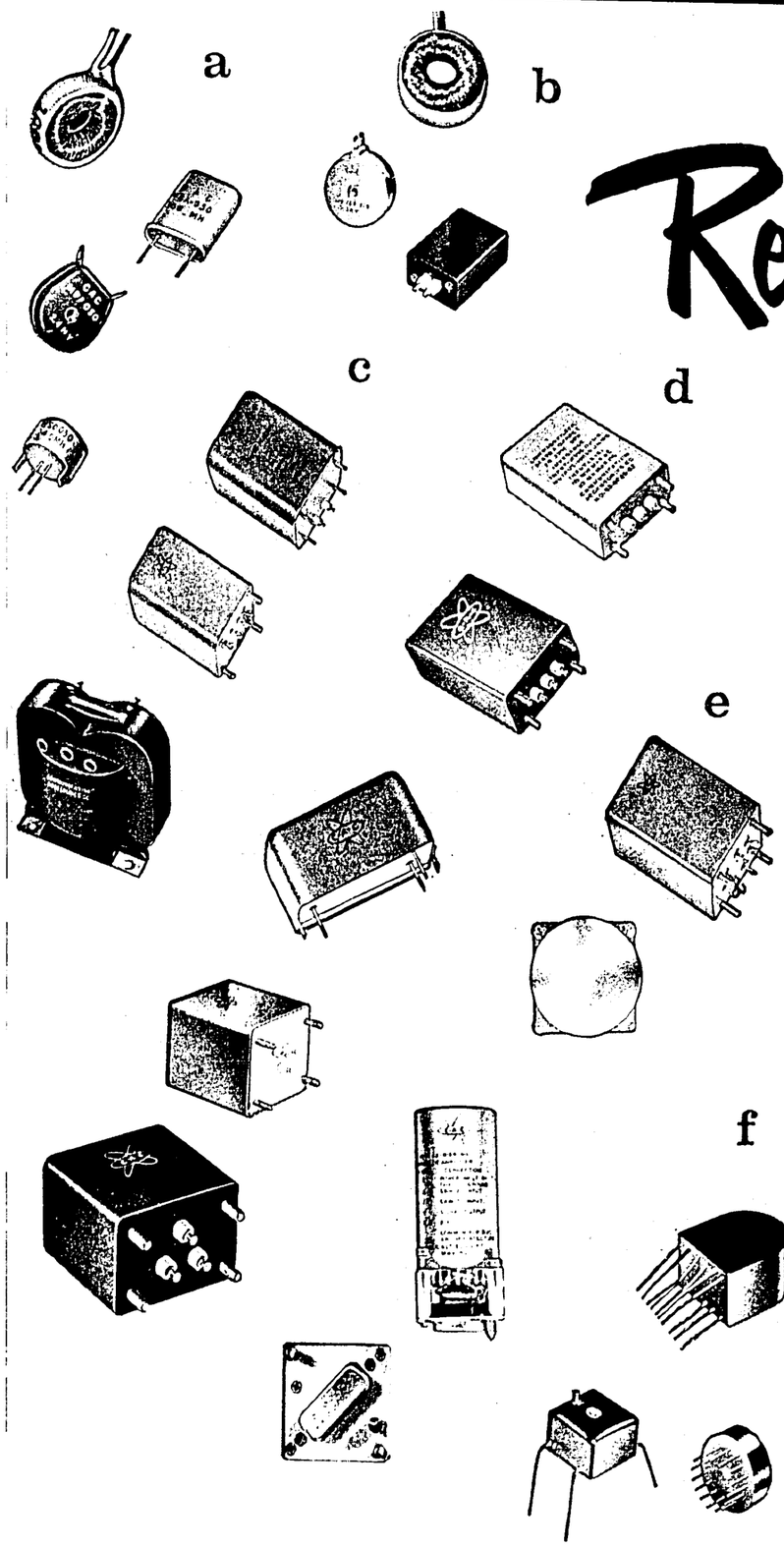
General Magnetic Corp., 10001 Livernois Ave., Detroit 31, Mich., 57, 90. Tel: WAlnut 1-7558

**General Magnetics, Inc., 2611 Louisiana Ave., Minneapolis 26, Minn., 1, 9, 38, 40, 45, 50, 52, 63, 64, 76, 82, 96. Tel: WEst 9-8571, Yr: 1959, Emp: 33, ▲5, $55,000**

**See ad on page 363**



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr.: Year of founding. Emp.: Total employees. ▲: Number of IRE members. $: Net radio-electronic sales during last fiscal year.




C-A-C Communication Accessories Company

# Reliability in Components

## precision elivery uality

**a** Sub-miniature Toroids

Uncased, plastic encapsulated, hermetically sealed. Inductances from .05 to 3000 mh. For sub-audio to 5 MC applications. Many values from stock. Also custom designs to your specific applications.

**b** Standard Toroids

A wide variety of inductance values, Q's and permeabilities to fulfill your requirements. Advanced winding techniques assure the finest performance obtainable. Many types and values available from stock.

**c** Power Transformers—Laminated Transformers—Reactors—Foil Wound Transformers

Many types designed to MIL-T-27A. High quality commercial specifications, hermetically sealed or encapsulated. Custom designed to circuit and mechanical requirements.

**d** Low Pass—Band Pass—Telegraph—Aircraft Navigation Filters and Delay Lines

L-C filters utilizing high Q toroidal inductors. C-A-C's years of experience in the design and manufacture of tight tolerance networks results in superior performance and reliability. C-A-C engineers welcome your inquiries.

**e** Magnetic Amplifiers

C-A-C specializes in development of magnetic amplifiers for specific applications—in conjunction with servo-motors, computers—both low and high level.

**f** Plastic Packaged Inductors

As a pioneer in the plastic packaging of inductors, C-A-C has developed practical techniques assuring high performance in the smallest physical size. For printed wiring and chassis-mounted applications.

For details, circle #153 on Reader Service Card

**COMMUNICATION ACCESSORIES COMPANY**
**Lee's Summit, Mo.** **Phone Kansas City BRoadway 1-1700**

Service
Quality
Performance






**General Magnetics, Inc.**, 135 Bloomfield Ave., Bloomfield, N.J., 9, 36, 38, 47, 63. Tel: PIlgrim 8-2100. Yr: 1950. Emp: 70. $600,000

See ads on pages 181, 185

General Measurements Co., Inc., 1066 Boylston Street, Newton Highlands 61, Mass., 5, 8, 30, 63. Tel: WO 9-9520

General Metal Products Co., 1610 Hooper St., Fresno, Pa., 38, 39. Tel: BRoadway 9-9122. Yr: 1941. Emp: 50. ▲1. $200,000

General Metals Inc., P.O. Box 183, Greensboro, N.C., 31, 32. Yr: 1956. Emp: 15. $50,000

General Metals Inc., P.O. Box 1561, Greensboro, N.C., 31, 32, 33, 36, 37, 38, 39. Tel: CHapel 2-0161. Yr: 1951. Emp: 15. ▲3. $150,000

General Metals Inc., Mechanical Dept., 1965 Central Ave., Muskegon, Mich., 1, 5, 6, 25, 30, 39, 63. Tel: SHerwood 7-6511. Yr: 1953. Emp: 1-99

General Naval Corp., 540 Fifth Ave., New York 36, N.Y., Tel: PLaza 7-0638. Yr: 1941. Emp: 1-9. ▲2

General Plastics Corp., Box 11, Main Ave., Passaic, N.J., 42, 45, 99. Tel: ARmory 4-1810. Yr: 1939. Emp: 85

General Products Corp., Salem St., Lyndonville, N.Y., 1, 5, 35, 63. Tel: LYndonville 2-2256. Yr: 1951. Emp: 1-99. ▲3. $500,000

General RE Furnace, Inc., 263 Beacon St., Boston 16, Mass., 85. Tel: KEnmore 6-2200. Yr: 1955. Emp: 10. ▲1

**General Radio Co., 22 Baker Ave., West Concord, Mass., 3, 4, 5, 11, 14, 16, 21, 23, 28, 33, 37, 38, 39, 40, 43, 44, 46, 50, 52, 55, 63, 69, 76, 82, 91, 93. Tel: EMerson 9-4400. Yr: 1915. Emp: 850. ▲70**

See ad on Cover 4

General Research & Supply Co., 5428 Division, Grand Rapids 8, Mich., 96. Tel: GRand Rapids 9-3331. Yr: 1943. Emp: 6-9

General Resistance, Inc., 144 Southern Blvd., New York 55, N.Y., 1, 11, 99. Tel: CYpress 2-1400. Yr: 1946. Emp: 99. ▲5

General Testing Laboratories, Inc., 81 Commercial Ave., Mamaroneck, N.Y., 94. Tel: WI 9-0955

General Time Corp., Central Research Lab., 167 Lafayette St., New York 13, N.Y., 1, 9, 10, 38, 94. Tel: WOrth 6-0322. Yr: 1930. Emp: 1-9. ▲5. $40,000

General Transistor Corp., 91-27 138 Pl., Jamaica 35, N.Y., 69, 70. Tel: HEmlock 1-1030. Yr: 1953. Emp: 1000. $10,000,000

General Transistor Corp., Mayer Hoyt Div., 2961 So. La Cienega Blvd., Los Angeles 34, Calif., 9, 29, 63. Tel: UPton 0-2501. Yr: 1955. Emp: 10. ▲1. $250,000

General Vacuum Corp., 800 Border St., E. Boston 28, Mass., 11, 92, 99. Tel: LO 7-3300. Yr: 1952. Emp: 50

General Winding Company, Inc., 450 West 50th St., New York 19, N.Y. Tel: BRyant 9-1330

Genisco, Incorporated, 2233 Federal Ave., Los Angeles 64, Calif., 1, 11, 38, 39, 63, 96. Tel: BR 2-2700. Yr: 1947. Emp: 200. $500,000

Genistron, Inc., 4250 W. Augusta Ave., Los Angeles 29, Calif., 1, 5, 11, 63. Tel: OR 2-0960. Yr: 1960. Emp: 1-9. ▲2. $Confidential

Gentage Corporation, Box 1, Federal Ave., Paterson, N.J., 99. Tel: AR 4-4141

George Products Co., Inc., 1 Dover Ave., Englewood, N.J., 38. Tel: WY 7-2632. Yr: 1946. Emp: 6

Georgia Research Corporation, Industrial Park, Rock Gamon, Box 5, Ft. Pa., 28, 30, 31, 32, 33, 34, 35, 37, 38, 39, 63, 92, 93. Tel: BR 4-1892. Yr: 1956. Emp: 20. ▲2

Geotronics, Engineering Laboratories, 1611 Orange Blvd., Box 1, Orange, Calif., 1, 5, 6, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99. Tel: WHitcomb 6-9425. Yr: 1960. Emp: 100. ▲5. $2,500,000

Gertsch Products, Inc., 3211 S. La Cienega Blvd., Los Angeles 16, Calif., 1, 5, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99. Tel: WEbster 8-9200. Yr: 1939. Emp: 100. ▲5. $2,500,000

Gertsch Products, Inc., 5126 Bowcroft St

Goodyear Aircraft Corp., 1210 Massillon Rd., Akron 19, Ohio, 27, 39, 83, Tel: REpublic 3-6361, Yr: 1942, Emp: 10,000

Gordon Associates, Inc., 62 White St., Red Bank, N.J., 88, 94, 100, Tel: SHadyside 1-2743

Gordos Corp., 250 Glenwood Ave., Bloomfield, N.J., 68, 72, Tel: PIlgrim 3-6800, Yr: 1947, Emp: 60, ▲1

Gore & Associates, Inc., W.L., 487 Paper Mill Road, Newark, Dela., 85, 93, 99, Tel: ENdicott 8-8325, Yr: 1958, Emp: 20

Gorham Electronics Div., Gorham Mfg. Co., 333 Adelaide Ave., Providence 7, R.I., 1, 20, 21, 27, 38, 39, 40, 52, 83, 89, 94, Tel: WIlliams 1-1000, Yr: 1940, Emp: 300, ▲2

**Gorman Machine Co., 480 S. Main St., Randolph, Mass., 45, 96, Tel: WOodlawn 3-7333, Yr: 1948, Emp: 15**

**See ad on page 670**

Gorn Electric Co., Inc., Stamford, Conn., 46, Tel: FI 8-7591

Gotham Audio Sales Co., Inc., 2 West 46th St., New York 36, N.Y., 3, 14, 29, 32, 34, 38, 40, 55, 58, 59, 61, 65, 76, Tel: COlumbus 5-4111, Yr: 1954, Emp: 5, ▲2, $450,000

Gould-National Batteries, Inc., Nicad Division, E-1201 First National Bank Bldg., St. Paul 1, Minn., 41, Tel: CApital 2-7471, Yr: 1898, Emp: 5000, $1,000,000

Gow-Mac Instrument Co., 100 Kings Rd., Madison, N.J., 63, 94, 96, Tel: FR 7-3450, Yr: 1935, Emp: 16

Grace Electronic Chemicals, Inc., 101 N. Charles St., Baltimore 1, Md., 97, 101, Tel: PLaza 2-7699, Yr: 1957, Emp: 150, ▲2, $500,000

Graf-Tek, Inc., P.O. Box 74, Ridgewood, N.J., 100, Tel: OL 2-3664, Yr: 1959, Emp: 6, ▲1

Grafo Colloids Corp., 310 Wilkes Pl., Sharon, Pa., 95, Tel: DIamond 6-5023, Yr: 1933, Emp: 20

Gramer-Halldorson Transformer Corp., 700 W. 7th St., Mt. Carmel, Ill., 45, 52, 76, 82, Tel: 1200, Yr: 1909, Emp: 200, $1,100,000

Gramm Trailer Corp., 425 E. O'Connor, Lima, Ohio, 84, 87, Tel: CA 9-7015, Yr: 1899, Emp: 179

Granco Products, Inc., 83-30 Kew Gardens Road, Kew Gardens, N.Y., 6, 80, 84, Tel: VIrginia 9-8900, Yr: 1952, Emp: 350, ▲4, $3,000,000

Grand Sliding Mechanisms, Inc., 2401 W. Ohio St., Chicago 12, Ill., 87, Tel: CHesapeake 3-0400, Yr: 1958, Emp: 22, $100,000

Grand Transformers, Inc., Beechtree & Marion Sts., Grand Haven, Mich., 45, 63, 76, Tel: 3106, Yr: 1951, Emp: 80, ▲1, $1,000,000

Granger Associates, 974 Commercial St., Palo Alto, Calif., 1, 20, 26, 27, 36, 38, 39, 83, 94, Tel: DAvenport 1-4175, Yr: 1956, Emp: 75, ▲22, $1,000,000

Granite State Machine Co., Inc., 124 Joliette St., Manchester, N.H., 27, 30, 38, 39, 80, 83, 84, 87, Tel: NAtional 7-7804, Yr: 1938, Emp: 180, ▲3, $1,000,000

**Grant Pulley & Hardware Corp., 43 High St., West Nyack, N.Y., 87, 91, Tel: ELmwood 8-4400, Yr: 1895, Emp: 500**

**See ad on page 622**

Graphic Controls Corp: See Technical Sales Corp.

Graphik-Circuits, Div. Cinch Mfg. Co., 200 So. Turnbull Canyon Rd., City of Industry, Calif., 64, 72, Tel: ED 3-1201, Yr: 1953, Emp: 161, $2,000,000

**Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 46, 72, 73, 83, 91, Tel: YOnkers 8-8400, Yr: 1913, Emp: 165**

**See ad on page 416**

Gray Instrument Co., 448 Mill Rd., Andalusia, Pa., 5, 11, 14, 33, 69, 94, Tel: HObart 4-2100, Emp: 19, $295,000

Gray & Kuhn, Inc., Div. IMC Magnetics Corp., 80 Swalm St., Westbury, L.I., N.Y., 50, 76, Tel: EDgewood 3-2194

Gray Mfg. Co., The, 16 Arbor St., Hartford 1, Conn., 1, 8, 27, 29, 35, Tel: ADams 3-1271, Yr: 1891, Emp: 600, ▲5, $8,000,000

Gray Radio Co., Inc., 501 Forest Hill Blvd., West Palm Beach, Fla., 18, Tel: JUstice 2-2201, Yr: 1937, Emp: 8, ▲3, $30,000

Grayhill, Inc., 561 Hillgrove Ave., La Grange, Ill., 55, 71, 72, Tel: FLeetwood 4-1040, Yr: 1943, Emp: 80, ▲3

Great Eastern Mfg. Co., 163-165 Remsen Ave., Brooklyn 12, N.Y., 66, 69, 70, 72, 84, Tel: PR 1-8400, Yr: 1950, Emp: 5, $120,000

**Great Eastern Metal Products Co., Div. GEMP Manufacturing Corp., 22 Woodworth Ave., Yonkers 2, N.Y., 89, 91, Tel: GReenleaf 6-7300, Yr: 1896, Emp: 17, $150,000**

**See ad on page 643**

Great Lakes Electric Mfg. Co., 7 S. Des Plaines St., Chicago 6, Ill., 47, Tel: ANdover 3-3565, Yr: 1917, Emp: 10

Green Instrument Co., 385 Putnam Ave., Cambridge 39, Mass., 96, Tel: ELiot 4-2989, Yr: 1946, Emp: 25

Green Instruments, Inc., Henry J., 2500 Shames Drive, Westbury, L.I., N.Y., 14, 58, Tel: EDgewood 3-5888, Yr: 1832, Emp: 25

Green Rectifier Co., 1-10 30th St., Fair Lawn, N.J., 4, 14, 38, 45, 47, 62, 63, 65, 66, 76, 82, 84, 87, 89, 92, 93, 95, 96, Tel: SWarthmore 7-8100, Yr: 1954, Emp: 73, ▲3, $200,000

Greene Electronics, Inc., 1840 Cranston St., Cranston 9, R.I., 38, 64, Tel: WI 2-0213, Yr: 1958, Emp: 14

Greenfield Hermetic Components Corp., 184 Shelburne Rd., Greenfield, Mass., 49, 54, Yr: 1958, Emp: 75

Greenleaf Mfg. Div., Mandrel Industries, Inc., 7814 Maplewood Ind. Ct., St. Louis 17, Mo., 4, 30, 60, 75, Tel: STerling 1-9888, Yr: 1945, Emp: 140, ▲1

Greenray Industries, Mounted Route, Mechanicsburg, Pa., 14, 21, 28, 33, 36, 52, Tel: POplar 6-7175, Yr: 1958, Emp: 6, ▲1

Greer Stop Nut Co., 2620 W. Flournoy St., Chicago 12, Ill., 91, Tel: VAn Buren 6-1636, Yr: 1880, Emp: 100, $1,000,000

Gregory Research Engineering Group, Box 11 Eastside Sta., Binghamton, N.Y., 29, 38, 65

**Greibach Instruments Corp., 329 North Ave., New Rochelle, N.Y., 14, 58, 68, Tel: NEw Rochelle 3-7900, Yr: 1951, Emp: 43, ▲6, $400,000**

**See ad on page 284**

Gremar Mfg. Co., Inc., 7 North Ave., Wakefield, Mass., 46, Tel: CR 9-4580, Yr: 1947, Emp: 180, ▲2, $1,750,000

**Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 30, 46, 55, 89, 91, 98, Tel: NEw Rochelle 3-8600, Yr: 1935, Emp: 350**

**See ad on page 643**

Grigsby Company, Inc., The, 407 N. Salem Ave., Arlington Heights, Ill., 72, Tel: CLearbrook 3-2180, Yr: 1946, Emp: 300

Grimson Color, Inc., 381 Park Ave. South, New York 16, N.Y., 6, 23, 34, 79, Tel: OREgon 9-9088, Yr: 1956, Emp: 12, ▲2

Gruenberg Electric Co., Inc., 9 Commercial Ave., Garden City, L.I., N.Y., 92, Tel: PIoneer 1-4180, Yr: 1927, Emp: 29, ▲1, $50,000

**Guardian Electric Mfg. Co., 1672 West Carroll Ave., Chicago 7, Ill., 4, 9, 10, 14, 30, 36, 38, 45, 47, 58, 63, 68, 72, 75, Tel: CHesapeake 3-1100, Yr: 1932**

**See ad on page 512**

Guardite Co., Div. American-Marietta Corp., Box 188, Wheeling, Ill., 14, Tel: LEhigh 7-1000, Yr: 1930, Emp: 125

**Gudebrod Bros. Silk Co., Inc., 225 W. 34th St., New York 1, N.Y., 91, Tel: LAckawanna 4-5858, Yr: 1870**

**See ad on page 642**

**Gudeman Co., The, 340 W. Huron St., Chicago 10, Ill., 43, 50, 52, 76, Tel: DElaware 7-7400, Yr: 1942, Emp: 1200, ▲3**

**See ad on page 393**

Gudeman Co. of California, Inc., The, 7473 Avenue 304, Visalia, Calif., 43, 45, 50, 76, Tel: REdwood 2-4811, Yr: 1953, Emp: 200, ▲1, $1,500,000

**Guidance Controls Corp., 110 Duffy Ave., Hicksville, N.Y., 4, 30, 45, 60, 69, Tel: WEIls 8-9500, Yr: 1958, Emp: 210, ▲1**

**See ad on page 342**





Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J., 1, 3, 4, 5, 9, 14, 18, 19, 23, 30, 33, 36, 38, 39, 41, 43, 44, 45, 46, 52, 58, 59, 61, 63, 64, 69, 73, 75, 76, 82, 86, 88, 96, Tel: LIberty 8-2800, Yr: 1942, Emp: 800, ▲50, $10,000,000

Gyra Electronics Corp., P.O. Box 184, La Grange, Ill., 10, 14, 24, 38, 63, Tel: FLeetwood 4-4644, Yr: 1958, Emp: 3, $100,000

Gyrex Corp., The, 3003 Pennsylvania Ave., Santa Monica, Calif., 3, 4, 9, 14, 33, 38, 52, 63, 68, 75, Tel: EXbrook 3-0462, Yr: 1956, Emp: 20, ▲2, $200,000

Gyro Electronics Co., 36 Walker St., New York 13, N.Y., 22, 47, Tel: WO 6-1290

# H

HPL Manufacturing Co., 15210 Miles Ave., Cleveland 28, Ohio, 84, 87, 89, Tel: WYoming 1-5000, Yr: 1941, Emp: 200

HRB-Singer, Inc., Science Park, State College, Pa., 1, 9, 32, 38, 39, 52, 88, Tel: ADams 7-7611, Yr: 1946, Emp: 620, ▲150, $8,800,000

**Hackensack Cable Corp., 127 Orchard St., Hackensack, N.J., 39, 85, Tel: HUbbard 7-1100, Emp: 112**

**See ad on page 611**

Hadfield, Bertram M., 1295 Old Worcester Rd., Framingham Center, Mass., 88, 91, Tel: TRinity 2-3152, Yr: 1951, Emp: 2, ▲1

Haledy Electronics Co., 57 William St., New York 5, N.Y., 4, 68, Tel: WHitehall 3-3140, Yr: 1950

Hall-Barkan Instruments, Inc., 181 Marbledale Road, Tuckahoe 7, N.Y., 30, 46, 89, 91, 94, Tel: WOodbine 1-4981, Yr: 1946, Emp: 52, $350,000

Hallamore Electronics Co., 714 N. Brookhurst St., Anaheim, Calif., 6, 14, 26, 34, 36, 37, 38, Tel: PRospect 4-1010, Yr: 1952, Emp: 850, ▲35, $5,500,000

Hallett Mfg. Co., 5910 Bowcroft St., Los Angeles 16, Calif., 18, 39, 43, 46, 52, 73, 84, 85, 89, 91, 92, 102, Tel: UPton 0-7094, Yr: 1916, Emp: 75, ▲5, $600,000

Halliburton, Inc., Mfg. Div., 4724 South Boyle Ave., Los Angeles 58, Calif., 84, 89, Tel: LUdlow 8-3181, Yr: 1910, Emp: 85

Hallicrafters Co., The, 4401 Fifth Ave., Chicago 24, Ill., 1, 2, 4, 6, 7, 9, 12, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 31, 33, 35, 36, 38, 39, 45, 46, 47, 50, 52, 63, 64, 66, 71, 72, 75, 76, 80, 83, 94, Tel: VA 6-6300, Yr: 1933, Emp: 1600

Hallikainen Instruments, 1341 7th St., Berkeley 10, Calif., 4, 14, 19, 58, Tel: LA 4-1757, Yr: 1952, Emp: 52

Hallmark, Clyde E., 2 Werling Rd., New Haven, Ind., 88, 94

Haloid Xerox, Inc., 2-20 Haloid St., Rochester 3, N.Y., 9, 13, Tel: GLenwood 3-9460, Yr: 1906, Emp: 1900

Hamilton Standard Division, United Aircraft Corp., Main St., Broad Brook, Conn., 1, 4, 9, 14, 15, 17, 30, 38, 43, 47, 52, 63, 64, 69, 73, 75, 82, 92, Yr: 1919, Emp: 700, $6,500,000

Hamilton Watch Co., Precision Metals Div., Lancaster, Pa., 38, 48, 76, 97, Tel: EXpress 4-7161, Yr: 1892, Emp: 1400

Hamlin, Inc., Lake & Grove Sts., Lake Mills, Wis., 54, 72, Tel: LAke Mills 208, Yr: 1950, Emp: 28, ▲2, $240,000

Hammarlund Mfg. Co., Inc., 460 West 34th St., New York, N.Y., 2, 4, 6, 23, 31, 33, 35, 36, 44, Tel: LO 5-1300

Hammond Mfg. Co., Ltd., Edinburgh Road, Guelph, Ontario, Canada, 76, Tel: TAylor 2-2960, Yr: 1927, Emp: 270, ▲6, $2,000,000

Hamner Electronics Co., Inc., P.O. Box 531, Princeton, N.J., 10, 14, 17, 21, 24, 38, 58, 63, 87, 89, Tel: PE 7-1320, Yr: 1954, Emp: 52, ▲1

Hampshire Engineering Co., 2300 Washington St., Newton Lower Falls 62, Mass., 9, 27, 88, 94, Tel: BIgelow 4-5937, Yr: 1954, Emp: 5, ▲2, $70,000

Handicraft Tools, Inc., Div. X-Acto, Inc., 48-41 Van Dam St., Long Island City 1, N.Y., 96, Tel: EXeter 2-3333, Yr: 1935, Emp: 40

Handley, Inc., 12960 Panama St., Los Angeles 66, Calif., 69, Tel: UPton 0-7950, Yr: 1953, Emp: 45, $100,000

Handy & Harman, 82 Fulton St., New York 38, N.Y., 85, 97, 103, Tel: BEekman 3-2460, Yr: 1867, Emp: 850

Hansen Mfg. Co., Inc., 1001 South Hart St., Princeton 10, Ind., 30, 60, Tel: FUlton 5-3415, Yr: 1907, Emp: 225, $500,000

Hanson-Gorrill-Brian, Inc., 85 Hazel St., Glen Cove, L.I., N.Y., 4, 9, 17, 29, 30, 38, 66, 104, Tel: ORIole 6-7300, Yr: 1946, Emp: 50, ▲5, $500,000

Harder Co., Donald C., 2580 K St., San Diego 2, Calif., 38, 45, 52, 76, 96, Tel: BElmont 9-8021, Yr: 1949, Emp: 20, ▲1, $100,000

Hardigg Industries, 1 W. Main St., S. Hadley Falls, Mass., 84, 91, Tel: JEfferson 3-6863 (Holyoke, Mass.)

**Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N.J., 69, Tel: MArket 2-8200, Yr: 1924, ▲1**

**See ad on page 527**

Harman-Kardon, Inc., Ames Court, Plainview, L.I., N.Y., 4, 6, 9, 10, 14, 24, 28, 36, 38, 64, 68, 72, 80, 88, 89, 94, Tel: EDgewood 4-1500

Harowe Precision, Inc., Mount Rd., Lenni Mills, Pa., 30, 60, Tel: GLobe 9-3600, Yr: 1956, Emp: 130, $800,000

Harper-Leader, Inc., 1016 S. Main St., Waterbury 20, Conn., 89, Tel: PLaza 6-8164

Harrel, Inc., 1788 First Ave., New York 28, N.Y., 4, 38, 45, 47, 68, 76, Tel: SAcramento 2-3683

Harris Refrigeration Co., 308 River St., Cambridge 39, Mass., 14, Tel: UN 4-1000

Harris Transducer Corp., P.O. Box 247, Woodbury, Conn., 3, 5, 14, 15, 18, 38, 75, 88, Tel: COngress 3-2116, Yr: 1951, Emp: 77, ▲4, $500,539

Harrison Electrosonics, Inc., B. M., 80 Winchester St., Newton Highlands 61, Mass., 3, 4, 5, 14, 15, 18, 38, 63, 75, Tel: DE 2-6350, Yr: 1954, Emp: 18, ▲5, $100,000

**Harrison Laboratories, Inc., 45 Industrial Rd., Berkeley Heights, N.J., 63, Tel: CRestview 3-9123, Yr: 1954, Emp: 40, ▲4, $600,000**

**See ad on pages 58-59**

**Hart Manufacturing Co., 265 Bartholomew Ave., Hartford 1, Conn., 68, 72, 74, Tel: JAckson 5-3191, Yr: 1896, Emp: 389, $3,000,000**

**See ad on page 515**

Hartley Products Co., 521 E. 162nd St., New York 51, N.Y., 56, 84, Tel: LUdlow 5-4239, Yr: 1955, Emp: 8, ▲3

Hartwell Aviation Supply Co., 9035 Venice Blvd., Los Angeles 34, Calif., 91, Tel: TExas 0-3781

Harvey-Wells Electronics, 5168 Washington St., W. Roxbury 32, Mass., 9, 10, 14, 24, 57, 63, Tel: FAirview 7-8000

Harworth Mfg. Co., 109 El Camino Real, Menlo Park, Calif., 19, Tel: DAvenport 2-7213, Yr: 1944, Emp: 4, $25,000

Hassall, Inc., John, P.O. Box 2212, Westbury, L.I., N.Y., 73, 91, Tel: ED 1-6200, Yr: 1850, Emp: 110, $250,000

Hastings Products, 171 Newbury St., Boston 16, Mass., 6

Hastings-Raydist, Inc., Newcomb Ave., Hampton, Va., 4, 14, 58, Tel: PA 3-6531, Yr: 1954, Emp: 80, ▲6, $1,500,000

Hatfield Wire & Cable, Div. Continental Copper & Steel Industries, Inc., 487 Hillside Ave., Hillside 5, N.J., 85, Tel: MUrdock 8-6400, Yr: 1925, Emp: 700

Hathaway Instruments, Inc., 5800 E. Jewell Ave., Denver 22, Colo., 4, 14, 15, 16, 19, 23, 25, 33, 36, 38, 40, 47, 50, 52, 58, 60, 63, 68, 72, 82, 94, 96, Tel: SKyline 6-8301, Yr: 1939, Emp: 335, ▲4, $1,000,000

Haveg Industries, Inc., Plastics Park, Wilmington 8, Del., 85, 86, 89, 91, 93, 98, 99, Tel: WYman 8-2271, Yr: 1955, Emp: 2000, ▲10, $10,000,000

**Hawley Products Co., 333 N. 6th St., St. Charles, Ill., 56, 84, 89, Tel: JUno 4-3130, Yr: 1930, Emp: 700, ▲6, $2,500,000**

**See ad on page 456**

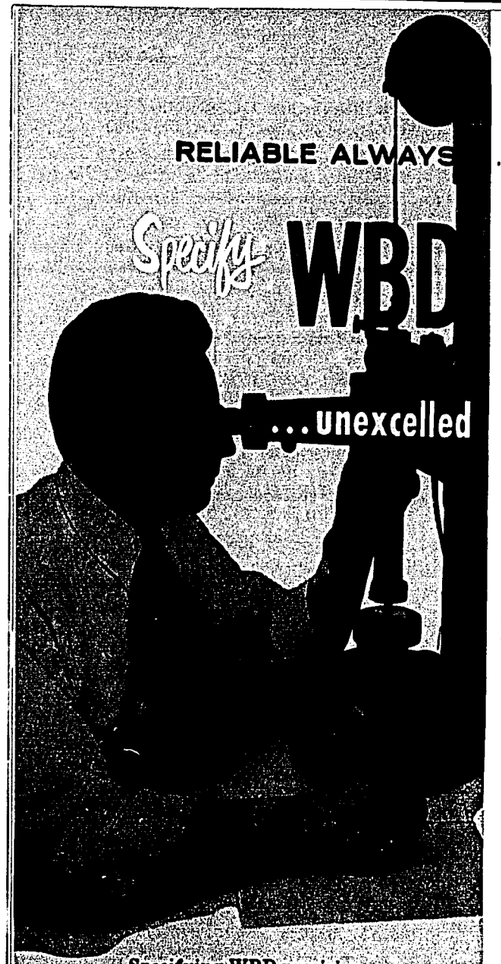
Haydon, Div. General Time Corp., 245 E. Elm St., Torrington, Conn., 58, 60, Tel: HUnter 9-3158, Yr: 1917, Emp: 500

Haydon Company, The A. W., 210 N. Elm St., Waterbury 20, Conn., 4, 9, 10, 33, 58, 60, 68, 72, Tel: PLaza 6-4481, Yr: 1945, Emp: 450, ▲5

Haydon Instrument, Waterbury 20, Conn., 4, 9, 10, 60, Tel: PLaza 6-2211



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.




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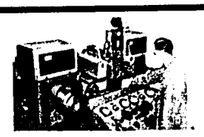
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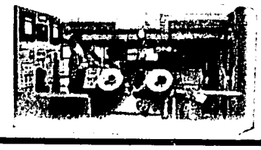
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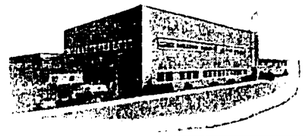


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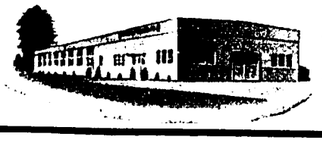
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Cleveland warehouse is a typical WBD regional headquarters



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Haydon Switch, Inc., 536 S. Leonard St., Waterbury 20, Conn., 72. Tel: PLaza 6-7441. Yr: 1953. Emp: 90

Hayes, Inc., C. I., 851 Wellington Ave., Cranston 10, R.I., 89, 92, 96. Tel: HOpkins 1-3400. Yr: 1905. Emp: 120

Hays Corp., The, 712 E. 8th St., Michigan City 47, Ind., 4, 38. Tel: TRiangle 2-5561. Yr: 1908. Emp: 250. ▲3

Hazeltine Electronics Div., Hazeltine Corp., 59-25 Little Neck Pkwy., Little Neck 62, N.Y., 1, 3, 4, 9, 11, 18, 21, 23, 27, 36, 39, 47, 50, 62, 64, 91. Tel: FAculty 1-2300. Yr: 1924. Emp: 3000. $51,000,000

Heath Company, Subsid. Daystrom Inc., Hilltop Rd., Benton Harbor, Mich., 2, 3, 5, 6, 7, 9, 11, 12, 14, 18, 22, 24, 25, 26, 28, 29, 32, 37, 38, 47, 56, 58, 61, 63, 80, 84. Tel: YUkon 3-3961. Yr: 1927. Emp: 500. ▲6

Hedin Tele-Technical Corp., 12 Carlton Ave., Wayne, N.J., 68. Tel: UN 4-1867

Hehn, Lester C., 30 Manorhaven Blvd., Pt. Washington, L.I., N.Y., 75, 94. Tel: POrt Washington 7-2676

Heinemann Electric Co., 105 Plum St., Trenton 2, N.J., 68, 72. Tel: EXport 4-1191. Yr: 1888. Emp: 500

Heinz Mueller Eng. Co., Inc., 4725 Iowa St., Chicago 51, Ill., 42, 60. Tel: ES 8-4761. Yr: 1952. Emp: 40. $100,000

Heinze Electric Co., 685 Lawrence St., Lowell, Mass., 30, 42, 60. Tel: GLenview 7-7556. Yr: 1901. Emp: 525

Heldor Mfg. Co., Inc., 238 Lewis St., Paterson, N.J., 51, 84, 87, 89, 91. Tel: ARmory 1-0900

Heli-Coil Corp., Shelter Rock Lane, Danbury, Conn., 91. Tel: PIoneer 3-7651. Yr: 1949. Emp: 280

Helko Products Co., Inc., 243 W. 55th St., New York 19, N.Y., 89. Tel: PLaza 7-3050. Yr: 1939. Emp: 12

Helwig Carbon Products, Inc., 2550 N. 30th St., Milwaukee 10, Wis., 91. Tel: HIlltop 2-7755. Yr: 1930. Emp: 117

Heminway & Bartlett Mfg. Co., The, 500 5th Ave., New York 36, N.Y., 91. Tel: LO 4-0880

Henry & Miller Industries, Inc., 675 Garfield Ave., Jersey City 5, N.J., 31, 81, 87, 88, 89, 91, 92, 94. Tel: HEnderson 4-4200. Yr: 1911. Emp: 65

Henschel Corp., 14 Cedar St., Amesbury, Mass., 4, 18, 30, 38, 58, 60. Tel: AMesbury 1103. Yr: 1919. Emp: 150

Heppner Mfg. Co., P.O. Box 608, Round Lake, Ill., 56. Tel: Klmball 6-2161. Yr: 1918. Emp: 175. $2,000,000

Hercon Electronics Corp., 181 Washington St., Newark, N.J., 46, 54, 104. Yr: 1955. Emp: 100

Hermaseal Co., Inc., The, 1010 N. Main St., Elkhart, Ind., 54. Tel: CO 4-1116. Yr: 1945. Emp: 20

**Hermes Electronics Co., 75 Cambridge Parkway, Cambridge 42, Mass., 9, 14, 21, 23, 33, 52. Tel: UNiversity 4-7200. Yr: 1955. Emp: 325. ▲35. $3,800,000**


**See ads on pages 266, 442**


Hermes Plastics, Inc., 151 W. 14th St., New York 11, N.Y., 89, 96, 99. Yr: 1938. Emp: 55

**Hermetic-Pacific Corp., 1232 Temple City Blvd., Rosemead, Calif., 46, 49, 54. Tel: GIbert 3-1757**


**See ad on page 450**


**Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 46, 49, 54, 73, 83, 86, 104. Tel: WYman 8-8080. Yr: 1945. ▲4**


**See ad on page 450**


Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., 555 N. 5th St., Garland, Tex., 30, 38, 43, 45, 47, 50, 51, 52, 63, 76, 82, 94. Tel: BR 6-5141. Yr: 1952. Emp: 500. ▲5. $3,500,000

Hevi-Duty Electric Co., P.O. Box 563, Milwaukee 1, Wis., 92. Tel: UP 1-9100. Yr: 1912. Emp: 500

**Hewlett-Packard Co., 1033 D Page Mill Rd., Palo Alto, Calif., 3, 5, 9, 10, 11, 21, 21, 25, 28, 29, 33, 36, 38, 40, 49, 52, 58, 60, 63, 83. Tel: DAvenport 6-7000. Yr: 1939. Emp: 2558. ▲200. $17,745,073**


**See ad on pages 3-18**


**Hexacon Electric Co., 181 W. Clay Ave., Roselle Park, N.J., 96. Tel: CHestnut 5-6200. Yr: 1932. Emp: 105. ▲1. $1,025,000**


**See ad on page 670**


**Heyman Manufacturing Co., Michigan Ave., Kenilworth 7, N.J., 91. Tel: CHestnut 5-2345. Yr: 1927. Emp: 60**


**See ad on page 613**


Hi-G, Inc., Bradley Field, Windsor Locks, Conn., 45, 52, 68, 76. Tel: NAtional 3-2181. Yr: 1953. Emp: 135. ▲1

Hi-Spec Electronics Corp., 7328 Ethel Ave., N. Hollywood, Calif., 68. Tel: POplar 5-5075. Yr: 1957. Emp: 16. $75,000

Hi-Test Chemical Corp., 722 64th St., Brooklyn 20, N.Y., 95. Tel: TErrace 6-5991

Hickok Electrical Instrument Co., The, 10514 Du Pont Ave., Cleveland 8, Ohio, 3, 4, 14, 25, 28, 36, 37, 58. Tel: LIberty 1-8060. Yr: 1910. Emp: 900. $5,000,000

High Vacuum Equipment Corp., 2 Churchill Rd., Hingham, Mass., 4, 11, 21, 92, 96. Tel: RIverview 9-2430. Yr: 1952. Emp: 70

High Voltage Engineering Corp., S. Bedford St., Burlington, Mass., 11, 19, 24, 57, 76, 83. Tel: BR 2-1313. Yr: 1946. Emp: 400. ▲14

Highland Design, Inc., 90 Magnolia Ave., Westbury, L.I., N.Y., 38, 45, 52, 63, 76, 89. Tel: ED 3-2933. Yr: 1947. Emp: 6. ▲1

Hilderbrand Co., John G., 45 Brighton St., Belmont 78, Mass., 64, 89, 94. Tel: IVanhoe 4-6240. Yr: 1952. Emp: 8. ▲1. $95,000

**Hill Electronics, Inc., 300 N. Chestnut St., Mechanicsburg, Pa., 21, 28, 33, 49, 52, 92. Tel: POplar 6-7611. Yr: 1951. Emp: 95. $900,000**


**See ad on page 428**


**Hillburn Electronic Products Co., 55 Nassau Ave., Brooklyn 22, N.Y., 45, 57, 68. Tel: STagg 2-3875**


**See ad on page 514**


Hillyer Corp., 331 Centennial Ave., Cranford, N.J., 4, 96. Tel: BRidge 6-8710. Yr: 1945. Emp: 35. ▲1. $70,000

Hinde & Dauch Div., West Virginia Pulp & Paper, 407 Decatur St., Sandusky, Ohio, 89, 91. Tel: MAin 5-6610. Yr: 1888. Emp: 3200

Hindle Transformer Co., Inc., Woods Church Rd., R. D. 3, Flemington, N.J., 45, 76. Tel: STate 2-5525

**Hirschmann Co., Inc., Carl, 30 Park Ave., Manhasset, L.I., N.Y., Importers, 96. Tel: MAnhasset 7-5300**


**See ad on page 671**


Hisonic, Inc., 11010 Johnson Drive., Shawnee, Kan., 45, 62, 76. Tel: HEdrick 2-9819. Yr: 1959. Emp: 12. $15,000

**Hitemp Wires, Inc., 1200 Shames Dr., Westbury, L.I., N.Y., 85, 93. Tel: EDgewood 3-4600. Yr: 1952. Emp: 250. $5,000,000**


**See ad on page 608**


Hoberman, Max, 60 Spruce St., Paterson 1, N.J., 88, 91. Tel: ARmory 8-3020

Hobson Bros., Inc., 1940 W. Lawrence Ave., Chicago 30, Ill., 16, 73, 98, 104. Tel: AVenue 3-3600

**Hoffman Co., P. R., 321 Cherry St., Carlisle, Pa., 19, 96. Tel: CHapel 3-2011. Yr: 1938. Emp: 78. ▲1. $815,000**


**See ad on page 429**


Hoffman Electron Tube Corp., 804 Newbridge Ave., Westbury, L.I., N.Y., Importers, 4, 6, 9, 14, 21, 24, 25, 28, 34, 40, 49, 63, 77, 78, 79, 83, 88, 96, 104. Tel: EDgewood 1-5600

Hoffman Electronics Corp., 3761 S. Hill St., Los Angeles 7, Calif., 1, 6, 9, 18, 27, 30, 31, 41, 66, 70, 75. Tel: RIchmond 7-1188. Yr: 1941. Emp: 3500. ▲150. $40,000,000

Hoffman Electronics Corp., Semiconductor Div., 1001 N. Arden Dr., El Monte, Calif., 9, 41, 66, 70. Tel: CUmberland 3-7191. Yr: 1954. Emp: 1000. ▲35

Hoffman Engineering Corp., 183 Sound Beach Ave., Old Greenwich, Conn., 63, 91, 94. Tel: NEptune 7-3557. Yr: 1955. Emp: 4. ▲1

Holden-Massey Corp., 142 Allen Blvd., Farmingdale, L.I., N.Y., 84, 87, 89. Tel: CHapel 9-2990. Yr: 1950. Emp: 56. $700,000

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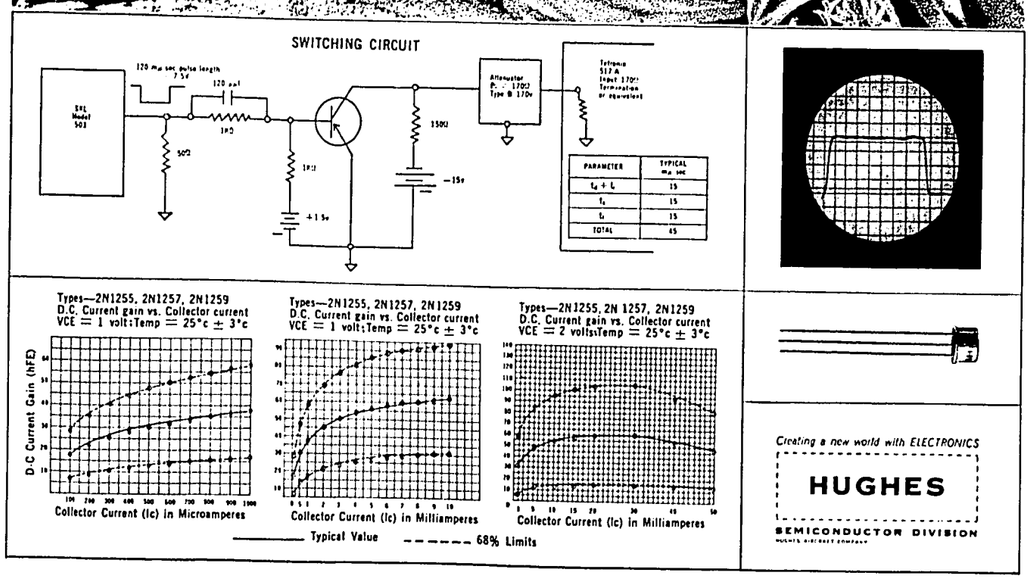
Here are the fastest switching p-n-p silicon mesa transistors ever developed. Look at these outstanding features: Typ. $f_T$ of 75MC... thin base region... low stored base charge... low $t_d$ $t_r$ $t_s$ $t_f$... $\beta$ of 1.5 min at 50MC... $\beta$ of 1.75 typ. at 50MC... low collector capacitance. These transistors have good high-level gain characteristics, exceptional low-level gain characteristics, plus high breakdown voltage. They give excellent performance at low voltages, and they are *outstanding* for high-voltage switching.*

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Holiday Transformer Corp., 1910 N. Elston, Chicago 22, Ill., 76, Tel: AL 2-8500, Yr: 1952, Emp: 60, $500,000

Hollingsworth Company, Solderless Terminal Div., P.O. Box 430, Phoenixville, Pa., 46, 73, Tel: WEllington 3-8947, Yr: 1948, Emp: 175

Holt Instrument Laboratories, P.O. Box 230, Oconto, Wis., 3, 14, 33, 36, 38, 47, 58, 63, 82, Tel: 163, 164, Yr: 1916, Emp: 55, ▲3, $175,000

Holtzer-Cabot Motor Div., National Pneumatic Co., Inc., 125 Armory St., Boston 19, Mass., 14, 30, 60, Tel: JA 4-7000, Yr: 1875, Emp: 500, ▲12, $1,000,000

Holub Industries, Inc., 413 De Kalb Ave., Sycamore, Ill., 91, 96, Tel: SYcamore 2161, Yr: 1946, Emp: 35

Homelite, Div. Textron, Inc., Riverdale Ave., Port Chester, N.Y., 63, Tel: WEstmore 9-3100, Yr: 1927, Emp: 1500, ▲1

Hooker Chemical Corp., Durez Plastics Div., 1941 Walck Rd., North Tonawanda, N.Y., 93, Tel: LUdlow 1860

Hoover Co., Ltd., The, Gage Ave. & Barton St., Hamilton, Ont., Canada, 47, 60, 63, Tel: LI 5-1151, Yr: 1917, Emp: 450, ▲1, $195,000

Hoover Electric Co., 2100 S. Stoner Ave., Los Angeles, 25, Calif., 4, 14, 30, 38, 39, 42, 47, 60, 92, Tel: BRadshaw 2-3125, Yr: 1915, Emp: 350

Hoover Electronics Co., 110 W. Timonium Rd., Timonium, Md., 4, 8, 9, 14, 18, 30, 33, 36, 38, 47, 51, 63, 64, 82, 89, 94, Tel: CLearbrook 2-4000, Yr: 1952, Emp: 85, ▲1

Hopkins Engineering Co., 12900 Foothill Blvd., San Fernando, Calif., 11, 43, 52, Tel: EMpire 1-8691, Yr: 1917, Emp: 124, ▲6

Horlick Co., Inc., William L., 266 Summer St., Boston 10, Mass., 47, 60, 63, Tel: HAncock 6-2180, Yr: 1922, Emp: 14, ▲1

Horwitron Electro-Medical Co., 4916 N. 12th St., Philadelphia 41, Pa., 19, Tel: GLadstone 5-9310

**Hoskins Manufacturing Co., 4457 Lawton Ave., Detroit 8, Mich., 57, 85, 97, Tel: TYler 5-2860, Yr: 1908, Emp: 300**

**See ad on page 172**

Hotwatt, Inc., 75 Maple St., Danvers, Mass., 92, Tel: SPring 4-3273

Houdaille Industries, Inc., Buffalo Hydraulics Div., 537 E. Delavan Ave., Buffalo 11, N.Y., 81, Tel: FIllmore 8000, Yr: 1948, Emp: 500

Houston Fearless Corp., 11801 W. Olympic Blvd., Los Angeles 64, Calif., 31, 39, 65, 94, Tel: BR 2-4331

**Houston Instrument Corp., P.O. Box 22231, Houston 27, Tex., 3, 14, 16, 38, Tel: MOhawk 7-7405, Yr: 1959, Emp: 18**

**See ad on page 298**

Howard Precision, Inc., 111 Roselle St., Linden, N.J., 89, 91, 101, Tel: WAbash 5-4100, Yr: 1949, Emp: 9

Howe Scale Co., The, Strongs Ave., Rutland, Vt., 4, 96, Tel: PRospect 5-5511, Yr: 1857, Emp: 700

Howell Instrument Co., 3479 W. Vickery, Fort Worth 7, Tex., 14, 58, 69, Tel: EDison 6-4818, Yr: 1954, Emp: 30

Hoyt Electrical Instrument Works, Inc., Burton-Rogers Sales Div., 12 Carleton St., Cambridge 42, Mass., 58, Tel: ELiot 4-1643, Yr: 1904, Emp: 225, $1,500,000

Huck Mfg. Co., 2180 Bellevue Ave., Detroit 7, Mich., 91, 96, Tel: WAlnut 3-4500, Yr: 1941, Emp: 603

Hudson Bay Co., Div. Labline, Inc., 3070 W. Grand Ave., Chicago 22, Ill., 4, 10, 14, Tel: SA 2-5151, Yr: 1911, Emp: 125

Hudson Lamp Company, 528 Elm St., Kearny, N.J., 62, Tel: WYman 1-4834, Yr: 1946, Emp: 250

**Hudson Tool & Die Co., Inc., 18-38 Malvern St., Newark 5, N.J., 84, 89, 91, Tel: MArket 4-1802**

**See ad on page 102**

**Hudson Wire Co., Magnet Wire Div., 981 Main St., Winsted, Conn., 85, Tel: FRontier 9-3311, Yr: 1931, Emp: 120**

**See ad on page 610**

**Hudson Wire Co., Ossining Div., 62 Water St., Ossining, N.Y., 85, Tel: WIlson 1-8500, Yr: 1902, Emp: 600, ▲6**

**See ad on page 610**

Hufco Industries, 2815 W. Olive Ave., Burbank, Calif., 68, Tel: VI 9-2118, Yr: 1947, Emp: 26, ▲1, $308,213

Huggins Laboratories, Inc., 999 E. Arques Ave., Sunnyvale, Calif., 21, 79, Tel: REgent 6-9330, Yr: 1952, Emp: 250, ▲7, $3,000,000

**Hughes Aircraft Co., Hughes Semiconductor Div., P.O. Box 278, Newport Beach, Calif., 17, 44, 66, 70, 72, Tel: LIberty 8-0671, Yr: 1953, Emp: 2500, ▲20**

**See ads on pages 188, 538**

Hughes Aircraft Co., Industrial Systems Div., International Airport, Los Angeles 45, Calif., 4, 23, 25, 46, 52, Tel: ORchard 0-1811, Yr: 1954, Emp: 150, ▲20, $2,000,000

Hughes Aircraft Co., Santa Barbara Research Center, Bldg. 316, Airport, Goleta, Calif., 4, 17, Tel: WO 7-2331

Hughes Aircraft Co., Vacuum Tube Products Div., 2020 Short St., Oceanside, Calif., 4, 9, 14, 24, 67, 72, 77, 78, 79, 96, Tel: SAratoga 2-2101, Yr: 1955, Emp: 100, ▲55, $5,500,000

Hughes-Treitler Mfg. Corp., 1015 39th St., Brooklyn 19, N.Y., 84, 87, 89, Tel: ULster 3-2950, Yr: 1947, Emp: 100, $900,000

**Hughey & Phillips, Inc., 3200 N. San Fernando Blvd., Burbank, Calif., 4, 39, 76, Tel: VIctoria 9-1101, Yr: 1942, Emp: 19, ▲2, $350,000**

**See ad on page 374**

**Hull Corporation, Davisville Rd., Hatboro, Pa., 4, 14, 89, 92, 96, Tel: OSborne 5-5000, Yr: 1951, Emp: 50, ▲3**

**See ad on page 673**

Humphrey, Inc., 2805 Canon St., San Diego 6, Calif., 4, 69, 75, Tel: ACademy 3-1651, Yr: 1947, Emp: 88, $1,800,000

Hunt Co., Philip A., Palisades Park, N.J., 95, Tel: WIndsor 4-4000, Yr: 1909, Emp: 200

**Hunt Corporation, 453 Lincoln St., Carlisle, Pa., 49, Tel: CHapel 9-2232, Yr: 1937, Emp: 155, $1,000,000**

**See ad on page 129**

Hunter Spring Co., Div. American Machine & Metals, Inc., 1 Spring Ave., Lansdale, Pa., 87, 91, 96, 104, Tel: LI 5-6815, Yr: 1916, Emp: 368

Hunter Tool Co., 9851 Alburtis Ave., Santa Fe Springs, Calif., 73, 96, Tel: OXford 2-7231, Yr: 1946, Emp: 50, $75,000

Huppert Co., K. H., 6840 Cottage Grove Ave., Chicago 37, Ill., 4, 14, 58, 84, 92, Tel: MI 3-4770, Yr: 1934, Emp: 45

Hycon Mfg. Co., 1030 S. Arroyo Parkway, Pasadena, Calif., 14, 17, 39, 40, 50, 52, 63, 83, Tel: MUrray 1-9381, Yr: 1948, Emp: 457, ▲10, $1,300,000

Hydel, Inc., 223 Crescent St., Waltham 54, Mass., 3, 4, 14, 38, 63, Tel: TW 3-8200, Yr: 1957, Emp: 30, ▲5, $100,000

Hydro-Aire Co., 3000 Winona Ave., Burbank, Calif., 4, 9, 30, 38, 47, 63, 64, 68, 76, Tel: VIctoria 9-1331

**Hydro Molding Co., Inc., 100 Sharron Ave., Plattsburgh, N.Y., 91, 98, Tel: 2598**

**See ad on page 644**

Hysol Corp., 322 Houghton Ave., Olean, N.Y., 89, 93, 95, 98, 99, Tel: OLean 2-2175, Yr: 1949, Emp: 103, ▲1

# I

I.D.E.A., Inc., 7900 Pendleton Pike, Indianapolis 26, Ind., 2, 6, 22, 52, 62, 80, Tel: LIberty 7-3581, Yr: 1945, Emp: 200, ▲2

IE Manufacturing, 325 N. Hoyne Ave., Chicago 12, Ill., 73, 84, 87, 89, 91, 96, Tel: HA 1-1480

**IMC Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 42, 50, 60, 72, 76, Tel: EDgewood 4-7070, Yr: 1951, Emp: 215, ▲4, $3,500,000**

**See ad on page 464**

I-T-E Circuit Breaker Co., Special Products Div., 601 E. Erie Ave., Philadelphia 34, Pa., 21, 27, 30, 39, 83, Tel: GArfield 6-5100, Yr: 1888, Emp: 10,000, ▲40, $10,000,000

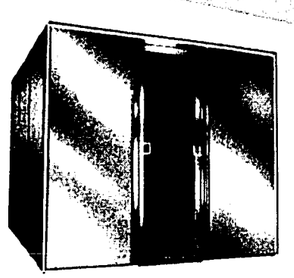
ITI Electronics, Inc., 369 Lexington Ave., Clifton, N.J., 1, 3, 4, 14, 23, 25, 28, 32, 36, Tel: GRegory 3-0900, Yr: 1947, Emp: 75, ▲4, $800,000

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

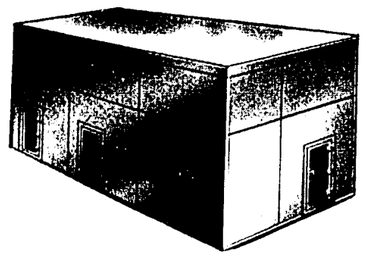
# Shielding, Inc.

# enclosure experts*

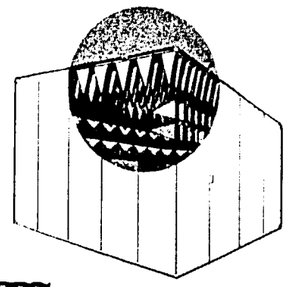
Experts [illegible]



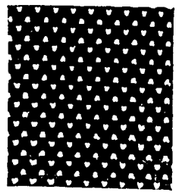
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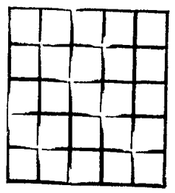
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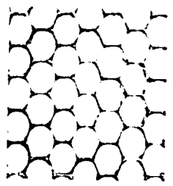


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Iconix, Inc., 945 Industrial Ave., Palo Alto, Calif., 4, 9, 10, 14, 19, 24. Tel: DAvenport 3-1411. Yr: 1955. Emp: 5. ▲2. $100,000

Ideal Electric & Mfg. Co., The, 300 E. 1st St., Mansfield, Ohio, 17, 60, 63. Tel: LA 2-3611. Yr: 1903. Emp: 190. $1500

Ideal Industries, Inc., 3307 Park Ave., Sycamore, Ill., 14, 96. Tel: SYcamore 2111. Yr: 1916. Emp: 250

**Ideal Precision Meter Co., 214 Franklin St., Brooklyn 22, N.Y., 58. Tel: EVergreen 3-6904. Yr: 1956. Emp: 155**

**See ad on page 160**

Ideas, Inc., 214 Ivinson Ave., Laramie, Wyo., 85, 91. Tel: FR 5-2597. Yr: 1955. Emp: 5

Hex Optical Co., 690 Portland Ave., Rochester 21, N.Y., 17, 34, 91. Tel: HAmilton 6-0700. Yr: 1911. Emp: 50

**Illinois Condenser Co., 1616 N. Throop St., Chicago 22, Ill., 13. Tel: EVerglade 4-4300**

**See ad on page 158**

Illinois Water Treatment Co., 840 Cedar St., Rockford, Ill., 4, 96. Tel: WOodland 3-9691. Yr: 1933. Emp: 110

**Illumitronic Engineering, 680 E. Taylor St., Sunnyvale, Calif., 15, 76, 83, 91, 99. Tel: REgent 9-2395. Yr: 1948. Emp: 27. ▲2. $100,000**

**See ads on pages 100, 692**

Image Instruments, Inc., 2300 Washington St., Newton Lower Falls 62, Mass., 4, 9, 38, 62, 94, 96. Tel: BIgelow 4-2256. Yr: 1958. Emp: 8. ▲1. $100,000

Impact-O-Graph Corp., The, 1900 Euclid Ave., Cleveland 15, Ohio, 14, 16. Tel: CHerry 1-5833. Yr: 1949. Emp: 7. $35,000

Intra Corporation, 11 University Rd., Cambridge 38, Mass., Importers, 9, 68. Tel: EL 4-1040. Yr: 1952. Emp: 2. $200,000

**Indiana Steel Products, Div. Indiana General Corp., 105 Elm St., Valparaiso, Ind., 57, 96. Tel: HOward 2-3131. Yr: 1908. Emp: 850**

**See ad on page 157**

Indikon Co., Inc., The, 76 Coolidge Hill Rd., Watertown 72, Mass., 4, 5, 11. Tel: WAtertown 4-2198. Yr: 1954. Emp: 15. ▲1

**Indium Corp. of America, The, 1678 Lincoln Ave., Utica 4, N.Y., 97, 101, 103. Tel: SWift 7-1630. Yr: 1934. Emp: 31. ▲3**

**See ad on page 685**

Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N.Y., 92, 96. Tel: EVergreen 4-3110. Yr: 1940. Emp: 125

Induction Motors of California, Div. IMC Magnetics Corp., 6058 Walker Ave., Maywood, Calif., 30, 60, 72. Tel: LUdlow 3-1785. Yr: 1956. Emp: 160

Inductor Engineering, Inc., 117 Schley Ave., Lewes, Del., 38, 45, 52, 76. Tel: LEwes 2411. Yr: 1956. Emp: 50. ▲1. $250,000

Industrial Accessories, Inc., Lme Rd., Matawan, N.J., 93. Tel: LOwell 6-0300. Yr: 1954. Emp: 25. ▲1

Industrial Acoustics Co., Inc., 341 Jackson Ave., New York 54, N.Y., 3, 84, 88, 94. Tel: CYpress 2-0180. Yr: 1949. Emp: 150

Industrial Components, Inc., 116 N.W. Canyon Rd., P.O. Box 308, Beaverton, Ore., 4, 10, 72, 88, 89, 92, 94. Yr: 1954. Emp: 8

Industrial Control Co., Central Ave. at Pine Lawn, Farmingdale, L.I., N.Y., 4, 5, 9, 14, 30, 38, 58, 64. Tel: MYrtle 4-3000

Industrial Development Labs., Inc., 982 River Rd., Edgewater, N.J., 5, 11, 19. Tel: WHitney 3-4084. Yr: 1945. Emp: 50. ▲1

Industrial Devices, Inc., 982 River Rd., Edgewater 5, N.J., 11, 55, 58, 62, 72, 89, 98. Tel: WHitney 3-4084. Yr: 1945. Emp: 50. ▲1

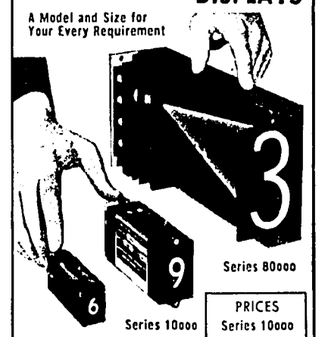
**Industrial Electronic Engineers, Inc., 5528 Vineland Ave., North Hollywood, Calif., 4, 62, 88. Tel: TRiangle 7-1144**

**See ads on pages 191, 173**


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INDUSTRIAL ELECTRONIC ENGINEERS, Inc.

5528 Vineland Avenue, North Hollywood, Calif.


For details, circle #157 on Reader Service Card

Industrial Electronic Hardware Corp., 109 Prince St., New York 12, N.Y., 46, 53, 55, 71, 72, 75, 98. Tel: ORegon 7-1931. Yr: 1943. Emp: 100

Industrial Electronic Rubber Co., 3945 Aurora Rd., Solon 39, Ohio, 83, 93, 94, 95, 98, 102. Tel: CHurchill 8-1333. Yr: 1953. Emp: 15. ▲1.

Industrial Engineering & Equipment Co., #24 Hanley Industrial Ct., St. Louis 17, Mo., 92. Tel: MI 7-3330. Yr: 1929. Emp: 150

Industrial Engravers, Inc., 2212 McDonald Ave., Brooklyn 23, N.Y., 16, 39, 91. Tel: HIckory 9-3200. Yr: 1953. Emp: 11. $110,000

Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, N.J., 5, 11, 14, 15, 69, 72. Tel: CEnter 9-6200. Yr: 1933. Emp: 175

Industrial Plastic Fabricators, Inc., Endicott St., Norwood, Mass., 42, 89, 91, 93, 95, 96, 99. Tel: NOrwood 7-3411. Yr: 1948. Emp: 25. $100,000

**Industrial Products-Danbury Knudsen Div., Amphenol-Borg Electronics Corp., 33 E. Franklin St., Danbury, Conn., 39, 46, 68, 72, 83. Tel: Pioneer 3-9272. Yr: 1949. Emp: 150**

**See ad on page 160**

Industrial Research Products, Inc., 9100 Belmont Ave., Franklin Park, Ill., 94. Tel: GLadstone 1-1320. Yr: 1947. Emp: 20. ▲3

Industrial Retaining Ring Co., 57 Cordier St., Irvington 11, N.J., 91. Tel: WAverly 6-5000. Yr: 1950. Emp: 54

Industrial Tectonics, Inc., 18301 S. Santa Fe, Compton, Calif., 91. Yr: 1945. Emp: 200

**Industrial Test Equipment Company, 55 E. 11th St., New York 3, N.Y., 3, 5, 14, 28, 30, 33, 38, 47, 63. Tel: GRamercy 3-1684. Yr: 1952. Emp: 25. ▲1**

**See ad on page 333**

Industrial Timer Corp., 1407 McCarter Hwy., Newark 4, N.J., 4, 9, 30, 68, 72. Tel: HU 4-5600. Yr: 1939. Emp: 125

Industrial Transformer Corp., 1001 N.W. 163rd Dr., North Miami 62, Fla., 5, 11, 52, 76. Tel: NA 1-0511. Yr: 1930. Emp: 225. ▲6. $1,500,000

Industrial Tubes, Inc., 321 Stevens St., Geneva, Ill., 67, 78, 88. Tel: CEnter 2-0300. Yr: 1951. Emp: 76. ▲3. $750,000

**Industrial Winding Machinery Corporation, 120 Wall St., Suite 3110, P.O. Box 62, New York 5, N.Y., Importers, 15, 96. Tel: WHitehall 3-1751**

**See ad on page 673**

Industro Transistor Corp., 35-10 36th Ave., Long Island City 6, N.Y., 11, 66, 70. Tel: EXeter 2-8300. Yr: 1953. Emp: 155. ▲11. $1,600,000

Industron Corp., 55 Needham St., Newton Highlands 61, Mass., 76, 92. Tel: DEcatur 2-1477. Yr: 1951. Emp: 30. ▲2. $400,000

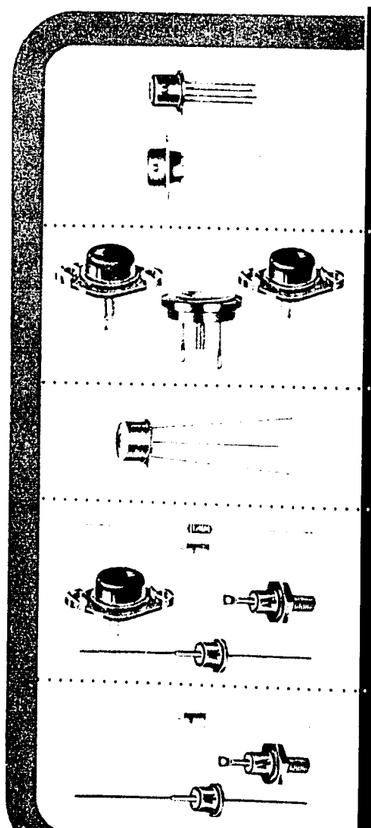


Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr. = Year of founding. Emp. = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

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**FOR TECHNICAL INFORMATION** contact your Motorola Semiconductor district office:

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| **BOSTON** 385 Concord Ave., Belmont 78, Mass. | IVanhoe 4-5070 |
| **CHICAGO 39,** 5234 West Diversey Avenue | AVenue 2-4300 |
| **DETROIT 27,** 13131 Lyndon Avenue | BRoadway 3-7171 |
| **LOS ANGELES** 1741 Ivar Avenue, Hollywood 28, Calif. | HOllywood 2-0821 |
| **MINNEAPOLIS 27,** 7731 6th Avenue North | LIberty 5-2198 |
| **NEW YORK** 1051 Bloomfield Ave., Clifton, N.J. from New York | GRegory 2-5300 WIsconsin 7-2980 |
| **ORLANDO** Knowel Building, Winter Park, Fla. | MIdway 7-2507 |
| **PHILADELPHIA** 130 South Easton Rd., Glenside, Pa. | TUrner 7-7020 |
| **SAN FRANCISCO** 1299 Bayshore Highway, Burlingame, Calif. | DIamond 2-3228 |
| **SYRACUSE** 101 South Salina | GRanite 4-3321 |
| **WASHINGTON** 8605 Cameron St., Silver Spring, Md. | JUniper 5-4485 |

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**Inertia Switch, Inc., 311 W. 43rd St., New York 36, N.Y., 58, 72, 75. Tel: JUdson 6-5880. Yr: 1958. Emp: 25. ▲2**

See ad on page 551

Information For Industry, Inc., 1000 Connecticut Ave. N.W., Washington 6, D.C., 100. Tel: STerling 3-4939. Yr: 1955. Emp: 21. ▲1

Infrared Industries, Inc., 62 Fourth Ave., Waltham 54, Mass., 4, 17. Tel: TW 3-5000. Yr: 1957. Emp: 130. ▲1

Inland Motor Corporation, 13 Walter St., Pearl River, N.Y., 60. Tel: PEarl River 5-4015

Insco Company, Div. Barry-Wright Corp., Hollis St., Groton, Mass., 4, 11, 30, 60. Tel: GIlbert 8-6358. Emp: 11

**Inso Electronic Products, Inc., 1200 Commerce Ave., Union, N.J., 85, 91, 99. Tel: MUrdock 6-1258. Yr: 1957**

See ad on page 612

Instant Circuits, 32-11 Francis Lewis Blvd., Flushing 58, N.Y., 28, 64. Tel: IN 3-3306. Yr: 1950. ▲1

Instron Engineering Corp., 2500 Washington St., Canton, Mass., 11, 91, 96. Tel: CAnton 6-2500. Yr: 1946. Emp: 101

Instru-Lee Corp., 520 Homestead Ave., Mount Vernon, N.Y., 30. Tel: MOunt Vernon 8-3751. Yr: 1951. Emp: 10

Instrument Development Laboratories, Inc., 65 Mechanic St., Attleboro, Mass., 1, 4, 9, 11, 17, 36, 72, 75. Tel: ATtleboro 1-3880. Yr: 1947. Emp: 230. ▲3. $1,000,000

Instrument Electronics Corp., P.O. Box 330, Port Washington, N.Y., 3, 11. Tel: POrt Washington 7-1212

Instrument Laboratories, 315 W. Walton Pl., Chicago 10, Ill., 3, 11, 38, 58, 88, 94. Tel: MIchigan 2-0123. Yr: 1944. Emp: 16

Instrument Resistors Co., 1306 Commerce Ave., Union, N.J., 69. Tel: MUrdock 6-1363. Yr: 1939. Emp: 25. $150,000

**Instrument Specialties Co., Inc., 281 Bergen Blvd., Little Falls, N.J., 91, 102. Tel: CLifford 6-3500. Yr: 1938. Emp: 160. $100,000**

See ad on page 616

Instruments For Industry, Inc., 101 New South Rd., Hicksville, L.I., N.Y., 1, 36, 38, 71. Tel: OVerbrook 1-7100. Yr: 1951. Emp: 175. ▲37. $2,500,000

Instruments of New England, P.O. Box 321, Waltham 54, Mass., 4, 11, 25, 30, 38, 88, 94. Tel: TWinbrook 3-4037. Yr: 1957. Emp: 12. ▲3. $150,000

Insulating Fabricators of New England, Inc., 69 Grove St., Watertown 72, Mass., 84, 89, 93, 99. Tel: WA 3-9300. Yr: 1939. Emp: 158. ▲1. $1,750,000

Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 11, Ill., 89, 91, 93, 95, 98, 99. Tel: CE 6-7320. Yr: 1927

Insulation Products Co., P.O. Box 5679, Pittsburgh 8, Pa., 89, 91, 93, 98. Tel: PEnhurst 1-2090. Yr: 1944. Emp: 5

Intelex Systems, Inc., 67 Broad St., New York 4, N.Y., 1, 17, 20, 26, 31, 32, 42, 49, 56, 60, 67, 68, 69, 70, 77, 79, 85. Tel: BOwling Green 9-3800. Yr: 1947. Emp: 80

Intercontinental Dynamics Corp., 170 Coolidge Ave., Englewood, N.J., 1, 11, 28. Tel: LOwell 7-3600. Yr: 1956. Emp: 37. $95,000

Intercontinental Electronics Corp., 1551 Franklin Ave., Mineola, L.I., N.Y., 6, 7, 27, 34, 36, 38, 45, 47, 50, 52, 63, 64, 73, 76, 82, 83, 85, 88, 94. Yr: 1956. Emp: 125. ▲8. $2,500,000

**Interelectronics Corp., 2132 Grand Concourse, New York 58, N.Y., 32, 36, 38, 41, 43, 45, 47, 63, 76, 82. Tel: LUdlow 4-6200. Yr: 1949. Emp: 10. ▲12. $1,200,000**

See ads on pages 355, 487

Interference Measurement Laboratory, Inc., 907 E. 51st St., Brooklyn 3, N.Y., 32, 94. Tel: INgersoll 9-1765. Yr: 1953. Emp: 10. ▲1. $62,000

Interference Testing & Research Lab., Inc., 150 Causeway St., Boston 14, Mass., 28, 30, 80, 88, 94. Tel: LAfayette 3-7826. Yr: 1952. Emp: 7. ▲1. $75,000

International Audio Stylus Corp., 107 Lake Ave., Tuckahoe, N.Y., 61. Tel: SPencer 9-1297. Yr: 1948. Emp: 10

International Business Machines Corp., 590 Madison Ave., New York 22, N.Y., 9, 26. Tel: PLaza 3-1900. Yr: 1911. Emp: 85,000. ▲1500. $1,300,000,000

International Business Machines Corp., Federal Systems Div., 1111 Connecticut Ave. N.W., Washington 6, D.C., 9

International Crystal Mfg. Co., Inc., 18 N. Lee, Oklahoma City, Okla., 1, 2, 22, 28, 38, 49, 71. Tel: CE 6-3741. Yr: 1951. Emp: 165. ▲1

**International Eastern Co., 801 Sixth Ave., New York 1, N.Y., 10, 89, 96. Tel: ALgonquin 5-5222**

See ad on page 675

International Electric Corporation, Div. International Tel. & Tel. Corp., Route 17, Paramus, N.J., 88, 94. Tel: COlfax 2-6800. Yr: 1958. Emp: 110

International Electric Industries, Inc., 168 Grand Ave., Brooklyn 38, N.Y., 16, 55, 85, 89, 98. Tel: NEvins 8-0211. Yr: 1946. Emp: 50. $150,000

International Electronic Industries, Inc., P.O. Box 9036, Melrose Branch, Nashville, Tenn., 13. Tel: CY 8-4111. Yr: 1953. Emp: 250. ▲1. $1,500,000

International Electronic Research Corp., ELIN Division, 145 W. Magnolia Blvd., Burbank, Calif., 11, 33, 38, 63. Tel: VIctoria 9-2481. Yr: 1957. Emp: 20. ▲3. $300,000

**International Electronic Research Corp., IERC Div., 135 W. Magnolia Blvd., Burbank, Calif., 71, 104. Tel: VIctoria 9-2481. Yr: 1951. Emp: 160. ▲3. $2,500,000**

See ad on page 702

International Electronics Corp., Mullard Products, 81 Spring St., New York 12, N.Y., 17, 48, 70, 77, 78, 79. Tel: WO 6-0790

International Electronics Mfg. Co., Greenwood Acres, 2nd St. Ext., Annapolis, Md. 3, 4, 28, 38, 52, 63, 94. Tel: COlonial 3-2661. Yr: 1950. Emp: 165. ▲8

International Equipment Co., 1284 Soldiers Field Rd., Boston 35, Mass., 96. Tel: ST 2-7900. Yr: 1901. Emp: 200

International Ferment Machinery Co., Route 17, Ramsey, N.Y., 63. Tel: SI 3-2791. Yr: 1944. Emp: 100. $3,000,000

**International Instruments, Inc., Box 2954, New Haven 15, Conn., 11, 58. Tel: FUlton 7-2515. Yr: 1947. Emp: 130. ▲2**

See ad on page 160

International Nickel Co., Inc., The, 67 Wall St., New York 5, N.Y., 97. Tel: WHitehall 4-1000. Emp: 500

International Physical Index, Inc., 1400 Park Ave., New York 35, N.Y., 100. Tel: LEhigh 4-3112. Yr: 1958. Emp: 15. ▲2

International Powder Metallurgy Co., 139 W. Main St., Ridgeway, Pa., 83, 89, 94, 97. Tel: PR 3-3125. Yr: 1948. Emp: 300. $1,000,000

International Pump & Machine Works, 31 Dorsa Ave., Livingston, N.J., 96. Tel: WYman 2-5900

International Radiant Corp., 577 E. 156th St., New York 55, N.Y., 11. Tel: CYpress 2-6000. Yr: 1948. Emp: 56

**International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 4, 11, 14, 66, 70, 82. Tel: ORegon 8-6281. Yr: 1947. Emp: 750. $10,870,038**

See ad on pages 118-119

International Register Co., 2620 W. Washington Blvd., Chicago 22, Ill., 4, 38, 72. Tel: VA 6-4242. Yr: 1891

International Research & Development Corp., 6150 Huntley Rd., P.O. Box 55, Worthington, Ohio, 11. Tel: TU 5-5576. Emp: 75

International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa., 66, 69, 75, 85, 99. Tel: WAlnut 2-3900. Yr: 1923. Emp: 1669. ▲1

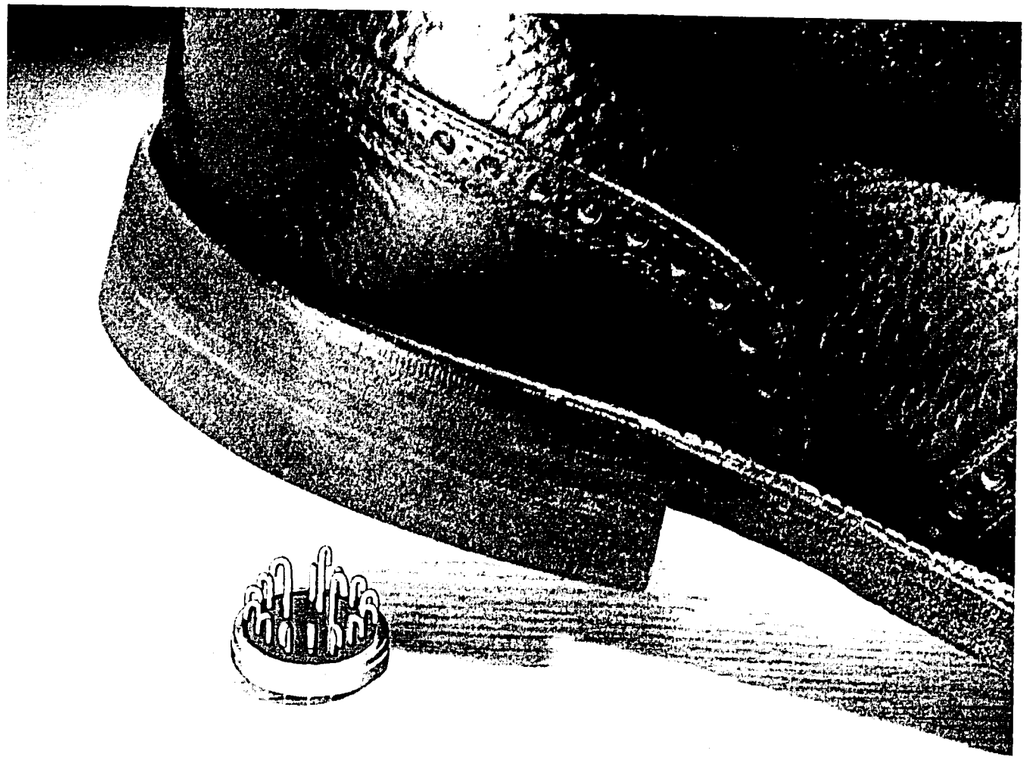
International Telephone & Telegraph Corp., ITT Components Div., 100 Kingsland Rd., Clifton, N.J., 13, 66, 70, 77, 78, 79. Tel: NOrth 7-3600. Yr: 1943. Emp: 1000

International Telephone & Telegraph Corp., ITT Federal Div., 100 Kingsland Rd., Clifton, N.J., 1, 4, 7, 9, 10, 12, 13, 15, 17, 18, 20, 21, 26, 27, 31, 33, 34. Tel: NOrth 7-3600. Emp: 10000

International Telephone & Telegraph Corp., ITT Industrial Products Div., 15191 Bledsoe St., San Fernando, Calif., 7, 11, 23, 25, 31, 38, 47, 63. Tel: EMpire 7-6161



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Y. – Year of founding. Emp – Total employees. ▲ – Number of IRE members. $ – Net radio-electronic sales during last fiscal year.



# A real heel might test a Fusite Terminal like this

## ...but he won't make it leak!



The adherence between glass and metal in a Fusite Hermetic Terminal is an easily demonstrated fact. There are several theories as to *why* our exclusive V-21M glass actually chemically bonds to the metal components. Cobalt and certain other metallic oxides in the glass oxidize the iron in the metal which is taken into solution. It is believed that through the solution of iron, a gradual decrease of the difference of thermal expansion between the glass and metal takes place at the glass-metal interface. This inter-fusion of the two dissimilar materials gives Fusite Terminals their ability to withstand great mechanical and thermal shock and still pass Statiflux tests for glass cracks, hydrostatic pressure tests and helium mass spectrometer leak detection.

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The combination of fusion and compression provides a terminal so rugged that leaker rejection rate of components into which our terminal is fabricated is practically nil, even when roughly handled and subjected to extreme temperature changes.

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Woodford Mfg. Co., Versailles, Kentucky.

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For details, circle #159 on Reader Service Card





International Telephone & Telegraph Corp., ITT Laboratories, 967 Commercial St., Palo Alto, Calif., 1, 8, 9, 13, 20, 26, 30, 39, 82, 91. Tel: DAvenport 1-0211, Yr: 1941, Emp: 1500, ▲1500, $67,000,000

International Telephone & Telegraph Corp., ITT Laboratories, 500 Washington Ave., Nutley 10, N.J., 1, 3, 4, 6, 7, 8, 9, 13, 14, 15, 17, 18, 20, 22, 24, 26, 27, 31, 36, 38, 39, 50, 63, 64, 66, 69, 70, 77, 78, 79, 85, 90, 91. Tel: NOrth 7-1100, Yr: 1940, Emp: 3695, ▲1000, $50,000,000

International Wire & Cable Co., 1065 N. Milwaukee Ave., Chicago 47, Ill., 85. Tel: BRunswick 8-2302, Yr: 1957, Emp: 40

International Wire Products Corp., 1 Greenwood Ave., Midland Park, N.J., 85, 89, 97. Tel: GIlbert 4-2151, Yr: 1945, Emp: 130, ▲3, $2,000,000

Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N.Y., 100. Tel: LE 2-1727, Yr: 1940, Emp: 50

Interstate Electronics Corp., 707 E. Vermont Ave., Anaheim, Calif., 6, 7, 9, 11, 19, 22, 24, 30, 34, 36, 38, 39, 40, 52, 63, 72, 81, 85, 87, 88, 89, 100, 102. Tel: PRospect 2-2222, Yr: 1956, Emp: 150, ▲120, $2,000,000

Invar Electronics Corp., 323 W. Washington, Pasadena, Calif., 3, 13, 36, 47, 63. Tel: MU 1-1851, Yr: 1958, Emp: 10, ▲2

Inventmeering, Inc., P.O. Box 360, Belmar, N.J., 88, 91. Tel: PRospect 5-6300, Yr: 1953, Emp: 10, ▲1, $200,000

Investment Casting Co., 60 Brown Ave., Springfield, N.J., 89. Tel: DRexel 6-6260, Yr: 1943, Emp: 95

Iron Fireman Mfg. Co., Electronics Div., 2838 S.E. 9th Ave., Portland 2, Ore., 1, 68. Tel: BElmont 1-6551, Yr: 1922, Emp: 550, ▲1, $5,000,000

Isochem Resins Co., 221 Oak St., Providence 9, R.I., 89, 93, 95, 99. Tel: JA 1-5763, Yr: 1958, Emp: 18, ▲2, $300,000

**Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 18, 77, 86, 91, 93, 98, 101. Tel: MIllington 7-0385, Yr: 1920, Emp: 30, ▲1, $150,000**

**See ad on page 620**

Isomet Corporation, 101 Commercial Ave., Palisades Park, N.J., 17, 24, 75, 90. Tel: Windsor 1-1100, Yr: 1950, ▲2

Isotope Developments, Ltd., Beenham Grange, Aldermaston Wharf, near Reading, Berkshire, England, 11, 21, 38, 58. Tel: Woodhampton 2121, Yr: 1950, Emp: 180, ▲1, $1,000,000

Isotopes Specialties Co., Div. Nuclear Corp. of America, 170 W. Providencia, Burbank, Calif., 15, 24, 89, 95. Tel: Victoria 9-2273, Yr: 1951, Emp: 21, ▲1

Itek Corp., 1605 Trapelo Rd., Waltham 54, Mass., 1, 9, 13, 16, 17, 25, 41, 62, 70, 88, 89, 91. Tel: TW 4-8700, Yr: 1957, Emp: 1100, ▲75

**Itemco, Inc., 16 Beechwood Ave., Port Washington, N.Y., 94. Tel: POrt Washington 7-8120**

**See ad on page 284**

# J

**J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 3, 14, 17, 33, 38, 58, 68, 72. Tel: STate 7-5825**

**See ads on pages 460, 546, 550**

JEM Electronics Corp., 745 Circle Ave., Forest Park, Ill., 4, 20, 75. Tel: PResident 1-8242, Yr: 1958, Emp: 25, ▲2, $300,000

**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 39, 44, 46, 50, 52, 56, 80, 83. Tel: DEwey 1-1000, Yr: 1929, Emp: 800, ▲15**

**See ad on pages 76-77**

JVM Microwave Co., 9300 W. 47th St., Brookfield, Ill., 21, 38, 39, 40, 52, 72, 83. Tel: HIlcrest 5-2000, Yr: 1952, Emp: 50, $1,000,000

Jackson Electrical Instrument Co., Inc., 12 McDonough St., Dayton 2, Ohio, 3, 11, 37. Tel: BAldwin 4-0362, Yr: 1934, Emp: 50, $250,000

Jacksonville Metal & Plastics Co., 575 Dora St., Jacksonville 1, Fla., 31, 87, 89, 91. Tel: EL 6-8331, Yr: 1959, Emp: 75

Jadtinger Mfg. Co., Inc., 1921 W. Hubbard St., Chicago 22, Ill., 63, 72. Tel: HAy 1-0990, Yr: 1949, Emp: 85, ▲1, $150,000

James Electronics, Inc., 1050 N. Rockwell, Chicago 18, Ill., 15, 17, 63, 76. Tel: COmedia 7-6333, Yr: 1949, Emp: 155, ▲2, $1,350,000

Jampro Antenna Co., 7300 13th Ave., Sacramento 20, Calif., 28, 39, 52, 83. Tel: GLadstone 1-1375, Yr: 1953, Emp: 37, ▲3, $200,000

Jan Hardware Mfg. Co., Inc., 8301 Queens Blvd., Long Island City 1, N.Y., 1, 11, 30, 35, 81, 91, 96, 98, 102, 104. Tel: EMpire 1-0300, Yr: 1948, Emp: 25

Janco Corp., 3111 Winona Ave., Burbank, Calif., 11, 53, 58, 72, 75, 91, 92, 93. Tel: VIllanwall 8-5792, Yr: 1947, Emp: 90

Jansen Electronics Mfg., Inc., 2285 University Ave., St. Paul 14, Minn., 23, 39. Tel: MIdway 6-7458, Yr: 1957, Emp: 15

Jansky & Bailey, Inc., 1339 Wisconsin Ave., Washington 7, D.C., 1, 3, 4, 7, 9, 11, 19, 22, 28, 31, 35, 39, 63, 88, 91, 100. Tel: FEderal 3-3300, Yr: 1930, Emp: 130, ▲60, $1,300,000

Japan Electric Industry, Div. Dempa Shinbun, Inc., 2 Kanda Matsuzumi-Cho, Chiyoda-Ku, Tokyo, Japan, 100. Tel: (Chicago) HO 1-1827, Yr: 1950, Emp: 200

Jarrell-Ash Co., 26 Farwell St., Newtonville 60, Mass., 14. Tel: DEcatur 2-2130

Jeffers Electronics Div., Speer Carbon Co., Hooper Ave., Du Bois, Pa., 13, 15, 63. Tel: DI Bois 2-1161, Yr: 1899, Emp: 2000, ▲10, $5,000,000

Jefferson Wire & Cable Corp., Pleasant Valley Rd., Sutton, Mass., 75. Tel: UNion 5-1111, Yr: Prel, Emp: 75

Jellif Mfg. Corp., Inverness Dr., Pequot Rd., Southport, Conn., 85. Tel: CY 9-0565, Yr: 1956, Emp: 185

Jennings Machine Corp., 34-2 Indiana St., Philadelphia 34, Pa., 96. Tel: DAvenport 6-2120

**Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 11, 13, 14, 58, 68, 72. Tel: CYpress 2-4025, Yr: 1942, Emp: 401, ▲6, $5,000,000**

**See ad on page 550**

Jensen Mfg. Co., Div. The Muter Co., 6323 S. Laramie Ave., Chicago 38, Ill., 46, 76. Tel: POrtsmouth 7-2600, Yr: 1927

**Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 28, 37, 40, 46, 52, 72, 83, 88. Tel: BAldwin 6-3156, Yr: 1948, Emp: 150, ▲25**

**See ad on pages 114-115**

Jetronic Industries, Inc., Main & Cotton Sts., Philadelphia 27, Pa., 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 14, 15, 20, 21, 22, 24, 25, 26, 36, 52, 55, 81, 85. Tel: IVy 8-2-7600, Yr: 1949, Emp: 400, ▲$3,075,000

**Jettron Products, Inc., 56 Route 10, Hanover, N.J., 46, 64, 71, 85. Tel: TUcker 7-0571, Yr: 1956, Emp: 15, $187,000**

**See ads on pages 113, 544**

Jobbins Electronics, 1150 Lochinvar Ave., Sunnyvale, Calif., 15, 50, 55, 63, 76. Tel: DAvenport 6-7110

Jocha Mfg. Co., Lutheran Ave., Wallingford, Conn., 46, 93. Tel: CO 9-2563

Johanson Mfg. Corp., P.O. Box 329, Boonton, N.J., 11. Tel: DEerfield 4-2626, Yr: 1945, Emp: 40

Johns Manville Co., 22 E. 40th St., New York 16, N.Y., 91, 93, 96. Tel: LE 2-7600, Yr: 1858, Emp: 22,000

Johns Manville Co., Dutch Brand Div., 2500 Woodlawn Ave. S., Chicago 49, Ill., 91, 93, 95, 99. Tel: SAginaw 1-1000

Johnson Co., E. F., Waseca, Minn., 2, 12, 22, 26, 31, 39, 41, 45, 46, 52, 62, 71, 91, 98. Tel: 990, Yr: 1923

Johnson Co., Inc., Gordon M., Hicksville-Massapequa Rd., Bethpage, L.I., N.Y., 100. Tel: WEIls 3-4000, Yr: 1955, Emp: 150, ▲3, $150,000

Johnson Co., Inc., K. W., 1823 Webster St., Dayton 1, Ohio, 81

Johnson & Hoffman Mfg. Corp., 31 E. 2nd St., Mineola, L.I., N.Y., 39, 91, 101. Tel: Pioneer 2-3333, Yr: 1949, Emp: 125, ▲4, $2,000,000

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr: Year of founding. Emp: Total employees. ▲: Number of IRE members. $: Net radio-electronic sales during last fiscal year.

Johnson Mfg. Co., Inc., 616 1st Ave. N., Mt. Vernon, Iowa, 103, Tel: 3651, Yr: 1909, Emp: 10

Jonathan Mfg. Co., 720 E. Walnut St., Fullerton, Calif., 87, 91, Tel: LAmbert 6-4651, Yr: 1954, Emp: 75

**Jones Div., Howard B., Cinch Mfg. Company, 1026 S. Homan Ave., Chicago 24, Ill., 46, 53, 55, 64, 71, 73, Tel: NEvada 2-2000**

**See ad on pages 46-47**

Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., 185 N. Main St., Bristol, Conn., 21, 23, 28, 39, 40, 49, 69, 80, 83, Tel: LUdlow 2-6388, Yr: 1947, Emp: 68, ▲2

Jones & Lamson Machine Co., Comparator Div., 161 Clinton St., Springfield, Vt., 4, 14, 96, Tel: TUrner 5-2121, Yr: 1835, Emp: 1600

Jonesville Paper Tube Corp., 474 Beck Rd., Jonesville, Mich., 91, 93, Tel: VIctor 9-2951, Yr: 1955, Emp: 22, $25,000

Jordan Controls, Inc., 3235 W. Hampton Ave., Milwaukee 9, Wis., 4, 30, 38, Tel: UP 1-9240, Yr: 1955, Emp: 26

Jordan Electronics, Div. Victoreen Instrument Co., 3025 W. Mission Rd., Alhambra, Calif., 4, 38, 47, 63, 68, 72, Tel: CUmberland 3-6125, Yr: 1952, Emp: 100, ▲1

Joy Manufacturing Co., Oliver Bldg., Pittsburgh 22, Pa., 42, Tel: GRant 1-2140, Yr: 1851, Emp: 4000

Joy Manufacturing Co., Electrical Products Div., 1201 Macklind, St. Louis 10, Mo., 46, 63, 72, Tel: MIssion 5-6670, Yr: 1851, Emp: 300

Julie Research Laboratories, Inc., 556 W. 168th St., New York 32, N.Y., 5, 9, 11, 14, 33, 40, 69, Tel: LOrraine 8-8700, Yr: 1948, Emp: 50, ▲2

# K

**K-F Development Co., 2606 Spring St., Redwood City 1, Calif., 69, Tel: EMerson 8-5670**

**See ad on page 525**

KLH Research & Development Corp., 30 Cross St., Cambridge 39, Mass., 56, Tel: KIrkland 7-3815, Yr: 1957

KTV Tower & Communication Equipment Co., P.O. Box 294, Sullivan, Ill., 39, Yr: 1956, Emp: 15, $60,000

K.V. Transformer Corp., 20 E. Franklin St., Danbury, Conn., 38, 45, 76, Tel: PIoneer 3-5531, Yr: 1945, Emp: 55, ▲2, $250,000

K-W Engineering Works, Pin Oak Ct., Butler, Wis., 39, 89, 94, Tel: SUnset 1-8616, Yr: 1943, ▲1

Kaar Engineering Corp., 2995 Middlefield Rd., Palo Alto, Calif., 1, 2, 12, 15, 18, 22, 26, 39, Tel: DAvenport 6-5050, Yr: 1935, Emp: 100, ▲4, $1,000,000

**Kahle Engineering Co., 3319 Hudson Ave., Union City, N.J., 49, 89, 92, 96, 104, Tel: UNion 7-6500, Yr: 1931, Emp: 70, ▲1**

**See ad on page 672**

Kahn & Co., Inc., P.O. Box 516, Hartford 1, Conn., 14, Tel: JAckson 9-8643, Yr: 1945, Emp: 65

**Kahn, Leonard R., 81 S. Bergen Pl., Freeport, L.I., N.Y., 88, Tel: FReeport 9-8800**

**See ad on page 628**

Kahn Research Laboratories, Inc., 81 S. Bergen Pl., Freeport, N.Y., 7, 31, 34, Tel: FReeport 9-8800, Yr: 1952, Emp: 27, ▲3

Kaiser Aircraft & Electronics, Kaiser Industries Corp., 850 San Antonio Rd., Palo Alto, Calif., 4, 9, 10, 14, 23, 24, 25, 29, 37, 38, 47, 88, Tel: DA 1-3320, Yr: 1954, Emp: 100, ▲12

Kaiser Electronics, Inc., 3 Monroe St., Union, N.J., 17, 47, 63, 82, Tel: MU 7-2525, Yr: 1957, Emp: 25, ▲3

Kaman Nuclear, Div. Kaman Aircraft Corp., Rusina Rd., Colorado Springs, Colo., 4, 9, 17, 19, 21, 24, 39, 40, 50, 63, 68, 78, 83, Tel: ME 4-2826, Yr: 1957, Emp: 53, ▲4, $234,000

Kanthal Corp., The, Amelia Pl., Stamford, Conn., 74, 85, 91, 92, 97, Tel: DAvis 5-2206, Yr: 1931, Emp: 1000, ▲1

Karg Laboratories, Inc., 30 Meadow St., South Norwalk, Conn., 6, 23, Tel: VOlunteer 6-3200, Yr: 1957, Emp: 8, ▲1, $150,000

Kartron, Inc., P.O. Box 472, Huntington Beach, Calif., 14, Yr: 1946, Emp: 5, ▲1

Kassel Industries, Inc., 100 S. Van Brunt St., Englewood, N.J., Importers, 85, 104, Tel: LOwell 7-3771, Yr: 1943

**Kato Engineering Co., 1420 First Ave., Mankato, Minn., 4, 47, 60, Tel: 8-2941, Yr: 1928, Emp. 160, ▲1**

**See ad on page 467**

**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 3, 7, 14, 21, 28, 36, 37, 38, 40, Tel: CApital 6-4000**

**See ad on page 330**

Kay-Townes Antenna Co., 1511 Dean Ave., Rome, Ga., 22, 38, 39, 58, Tel: 4-2631, Yr: 1948, Emp: 50

Kaynar Mfg. Co., Inc., Kaylock Division, Box 2001, Terminal Annex, Los Angeles 54, Calif., 91, Tel: SPruce 3-3070

**Kearfott Div., General Precision, Inc., Little Falls, N.J., 1, 4, 5, 9, 10, 11, 14, 21, 23, 27, 30, 38, 39, 40, 42, 47, 48, 52, 54, 58, 60, 63, 72, 75, 83, 86, 90, Tel: CLifford 6-4000, Yr: 1917, Emp: 6000**

**See ad on pages 120-121**

Kearfott Div., General Precision, Inc., Microwave Products, 14844 Oxnard St., Van Nuys, Calif., 9, 21, 27, 38, 39, 40, 72, 86, 89, Tel: STate 6-1760, Emp: 200, ▲30

Keil Engineering Products, Inc., 4356 Duncan Ave., St. Louis 10, Mo., 64, Tel: OLive 2-7005, Yr: 1955, Emp: 20, ▲2, $241,000

Keithley Instruments, Inc., 12415 Euclid Ave., Cleveland 6, Ohio, 5, 14, 38, 63, Tel: SWeetbriair 5-2666, Yr: 1946, Emp: 70, ▲14, $1,200,000

Keller, Jr., Hugo P., 50 E. 42nd St., New York 17, N.Y., 17, 49, 61, 91, 98, Tel: MUrray Hill 2-8450, Yr: 1853, $10,000

Kellogg Switchboard & Supply Co., Communications Div. of International Tel. & Tel. Corp., 6650 S. Cicero Ave., Chicago 38, Ill., 4, 8, 9, 10, 13, 14, 20, 22, 26, 31, 32, 35, 36, 38, 39, 40, 45, 52, 55, 59, 63, 64, 68, 71, 72, 84, 87, 88, 91, 96, 100, Tel: POrtsmouth 7-6900, Yr: 1897, Emp: 4000

Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif., 69, Tel: TR 3-3430, Yr: 1957, Emp: 100, $1,000,000

Kemet Co., Div. Union Carbide Corp., P.O. Box 6087, Cleveland 1, Ohio, 43, 101, 104, Tel: ACademy 6-3330, Yr: 1930, Emp: 225, ▲6

Kemlite Laboratories, Inc., 1819 W. Grand Ave., Chicago 22, Ill., 34, 39, Tel: TAylor 9-6050, Yr: 1935, Emp: 68, ▲5, $250,000

Kemtron Electron Products, Inc., 14 Prince Pl., Newburyport, Mass., 49, 66, 70, Tel: HOmestead 2-4464, Yr: 1948, Emp: 150, $1,000,000

Ken-Tron Corp., 397 Lynnway, Lynn, Mass., 46, 55, Yr: 1943, Emp: 125

Kendall Co., The, Polyken Sales Div., 309 W. Jackson Blvd., Chicago 6, Ill., 91, 93, Tel: WEbster 9-7100, Yr: 1927, Emp: 6000

Kendick Mfg. Co., 616 S. Lafayette St., Fort Wayne, Ind., 45, 69, 89, Tel: ANthony 1402, Yr: 1949, Emp: 14, $240,000

Kennedy & Co., D. S., 432 S. Main St., Cohasset, Mass., 39, 52, 83, 94, Tel: EVergreen 3-1206, Yr: 1945, Emp: 800, $15,000,000

Kennedy Industries, 1581 E. Charles St., Banning, Calif., 46, Tel: VIctor 9-4721, Yr: 1954, Emp: 30

Kenru Company, The, P.O. Box 121, Parsippany, N.J., 71, Tel: TU 7-2378, Yr: 1951, Emp: 7, ▲1, $11,350

Kent Corp., F. C., 135 Manchester Pl., Newark 4, N.J., 38, Tel: PLymouth 9-0200, Yr: 1915, Emp: 52, ▲3, $700,000

Kent Lighting Corp., 500 Johnson Ave., Brooklyn 37, N.Y., 84, 87, 89, Tel: HYacinth 7-5200, Yr: 1928, Emp: 75, $50,000

**Kepco, Inc., 131-42 Sanford Ave., Flushing 52, N.Y., 47, 63, Tel: INdependence 1-7000**

**See ad on page 484**

Kerreo, P.O. Box 4178, 4335 N. 61st St., Lincoln 7, Neb., 84, 89, 91, 98, Tel: IN 6-5105, Yr: 1941, Emp: 40





Kessler Co., Inc., Frank, 41-45 47th St., Long Island City 4, N.Y., 76, Tel: ST 4-0263

**Kester Solder Co., 4219 Wrightwood Ave., Chicago 39, Ill., 95, 96, 97, 103, Tel: BElmont 5-1601, Yr: 1899, Emp: 300, ▲1**

**See ad on page 700**

Keuffel & Esser Co., Adams & Third Sts., Hoboken, N.J., 64, Tel: OL 9-1100

Kewaunee Mfg. Co., Adrian, Mich., 14, Tel: CO 5-7131

Key Resistor Corp., 321 W. Redondo Beach Blvd., Gardena, Calif., 63, 64, 69, Tel: DAvis 3-5000, Yr: 1957, Emp: 75, ▲4, $500,000

Keystone Bolt & Nut Corp., 125 Church St., New York 7, N.Y., 91, Yr: 1922, Emp: 150

**Keystone Carbon Co., 1935 State St., St. Marys, Pa., 69, Tel: TE 4-1591**

**See ad on page 109**

Keystone Electronics Co., 65-67 7th Ave., Newark, N.J., 49, 52, Tel: HU 2-0630, Yr: 1950, Emp: 100, $1,000,000

Keystone Electronics Corp., 49 Bleeker St., New York 12, N.Y., 14, 46, 49, 55, 71, 73, 89, 91, Tel: GRamercy 5-4600, Yr: 1943, Emp: 30, $400,000

**Keystone Manufacturing Co., Div. of Avis Industrial Corp., 23338 Sherwood Ave., Warren, Mich., 84, Tel: SL 7-4400**

**See ad on page 600**

Keystone Products Co., 904 23rd St., Union, N.J., 38, 45, 52, 76, Tel: UNion 6-5400, Yr: 1948, Emp: 150, ▲3, $1,000,000

Kidco, Inc., P.O. Box 278, Medford, N.J., 69, Tel: OL 4-8491, Yr: 1959, Emp: 35, ▲1

Kidde & Co., Inc., Walter, 577 Main St., Belleville 9, N.J., 4, 9, 14, 17, 30, 38, 47, 63, 68, 69, 82, 89, 94, Tel: PLymouth 9-5000

Kidde Ultrasonic & Detection Alarms, Inc., 577 Brighton Rd., Clifton, N.J., 4, 23, 28, 38, 47, 63, Tel: GRegory 2-5000

Kilo Engineering Co., 2011 Third St., Laverne, Calif., 89, 91, Tel: LYcoming 3-4626, Yr: 1956, Emp: 23, $100,000

Kilovolt Corporation, 2 Manor House Square, Yonkers, N.Y., 63, Tel: YOnkers 9-3615, Yr: 1959, Emp: 3, ▲1

Kimble Glass Co., Subsid. Owens-Illinois Glass Co., P.O. Box 1035, Toledo 1, Ohio, 54, 77, 104, Tel: CHerry 2-6543

**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., Box 623, San Diego 11, Calif., 6, 7, 9, 14, 33, 38, 58, 63, Tel: BRowning 7-6700, Yr: 1945, Emp: 450, ▲35, $7,000,000**

**See ad on pages 110-111**

Kinetics Corporation, 410 S. Cedros, Solana Beach, Calif., 36, 47, 72, Tel: SKyline 5-1181, Yr: 1957, Emp: 115, ▲6, $1,000,000

King Laboratories, Inc., 127 Solar St., Syracuse 4, N.Y., 97, 104, Tel: GRanite 4-3359, Yr: 1931, Emp: 60, ▲1

King Radio Corp., 9700 W. 75th St., Merriam, Kan., 1, 22, 39, 63, Tel: HEdrick 2-8021, Yr: 1959, Emp: 25, ▲3, $110,000

**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 1, 3, 5, 28, 38, 39, 40, 46, 55, Tel: STillwater 3-5000, Yr: 1942, Emp: 285, $2,250,000**

**See ad on page 415**

Kingsley Machine Co., 805 Cahuenga Blvd., Hollywood 38, Calif., 89, 96, Tel: HOllywood 9-7243, Yr: 1923, Emp: 102

Kingston Electronics Div., Kingston Industries, Inc., North St., Medfield, Mass., 4, 14, 25, Tel: FLeetwood 9-4347, Yr: 1954, Emp: 12

**Kinney Manufacturing Div., The New York Air Brake Co., 3631 Washington St., Boston 30, Mass., 4, 14, 24, 96, Tel: JAmaica 2-7100, Yr: 1909, Emp: 430, ▲5, $700,000**

**See ad on page 35**

Kintronic Div., Chicago Aerial Industries, 10134 Pacific Ave., Franklin Park, Ill., 69, 72, 91, Tel: GLadstone 1-1830, Yr: 1925

Kip Electronics Corp., P.O. Box 562, Stamford, Conn., 62, 77, 78, 94, Tel: DAvis 5-1551, Yr: 1948, Emp: 60, ▲2

Kirchberger & Co., Inc., M., 250 Humphrey St., Englewood, N.J., 48, 86, 93, 104, Tel: LOwell 8-4555

Kirkland Co., The H. R., 10 King St., Morristown, N.J., 62, 69, Tel: JE 8-2777, Yr: 1930, Emp: 15

Kistler Instrument Corp., 15 Webster St., North Tonawanda, N.Y., 14, 75, Tel: JAckson 2099, Yr: 1955, Emp: 20, ▲3

Klein & Sons, Inc., Mathias, 7200 McCormick Road, Skokie, Chicago 45, Ill., 96, Tel: JUniper 8-6820, Yr: 1857, Emp: 200, $500,000

Kling Metal Spinning & Stamping Co., 245-247 Centre St., New York 13, N.Y., 89, Tel: CAnal 6-5580, Yr: 1914, Emp: 18, $136,000

Klipsch & Associates, Inc., P.O. Box 96, Hope, Ark., 56, Tel: PR 7-6751, Yr: 1946, Emp: 7, ▲1, $100,000

Knapic Electro-Physics, Inc., 936-40 Industrial Ave., Palo Alto, Calif., 17, 49, 101, Tel: DAvenport 1-5544, Yr: 1957, Emp: 150, ▲3

Knight Corp., Ewen, Oak & Pine Sts., East Natick, Mass., 1, 6, 9, 20, 27, 36, 38, 72, 83, 88, 94, Tel: OLympic 3-3300, Yr: 1951, Emp: 100, ▲10

Knight Electronics Corp., 210 S. Des Plaines, Chicago 6, Ill., 2, 3, 4, 5, 6, 14, 22, 25, 28, 31, 32, 37, 38, 58, 63, 80, Tel: FI 6-7474

**Knights Co., The James, 101 E. Church St., Sandwich, Ill., 23, 28, 33, 49, 50, 52, Tel: 2141, Yr: 1942, Emp: 325, ▲5, $3,000,000**

**See ad on page 430**

Knopp, Inc., 1307 66th St., Oakland 8, Calif., 45, 76, 83, 94, 96, Tel: OLympic 3-1661, Yr: 1928, Emp: 23, ▲1

Knowles Electronics, Inc., 10545 Anderson Pl., Franklin Park, Ill., 56, 59, Tel: GLadstone 5-3600, Yr: 1953

Koch & Sons, H., Box 127, Corte Madera, Calif., 39, 84, 89, Tel: WAbash 4-3510, Yr: 1909, Emp: 250, ▲1

Koito Electronics Co., Ltd., Noko Bldg., 4, 1-Chome, Jinbocho, Kanda, Chiyoda-Ku, Tokyo, Japan, 55, 56

Kollmorgen Optical Corp., 347 King St., Northampton, Mass., 4, 27, 30, 54, 83, 88, 89, 94, Tel: JU 4-0280

**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 4, 9, 10, 14, 30, 38, 64, 72, 75, Tel: TWining 9-5600, Yr: 1928, Emp: 5000, ▲6**

**See ad on page 268**

Kollsman Motor Corp., Mill St., Dublin, Pa., 30, 60, Tel: CHerry 9-3561, Yr: 1959, Emp: 112, ▲2, $3,000,000

Kolton Electric Mfg. Co., 123 New Jersey R.R. Ave., Newark 5, N.J., 53, 73, Tel: MItchell 2-4622

Kooltronic Fan Co., P.O. Box 504, Princeton, N.J., 42, Tel: JUniper 6-1466, Yr: 1955, Emp: 4, $100,000

Koppers Co., Inc., Plastics Div., Koppers Bldg., Pittsburgh 19, Pa., 93, 99, Tel: EXpress 1-3300

**Korfund Co., Inc., 221 Cantiague Rd., Westbury, L.I., N.Y., 14, 38, 58, 75, 81, 95, Tel: RAvenswood 9-7580, Yr: 1920, Emp: 100, ▲3, $500,000**

**See ad on page 587**

Korry Mfg. Co., 223 8th Ave. No., Seattle 9, Wash., 62, 89, 98, Tel: MAin 4-4066, Yr: 1938, Emp: 86, ▲2, $500,000

Kraus Electronics, Inc., 1405 University Ave., Palo Alto, Calif., 14, 38, 58, Tel: DA 3-0918, Yr: 1958, Emp: 10

Kreckman Co., Herb, Cresco, Pa., 39, Tel: LYndhurst 5-2212, Yr: 1953, Emp: 3, $80,000

**Krengel Mfg. Co., Inc., 227 Fulton St., New York 7, N.Y., 91, 96, Tel: COrtlandt 7-5714, Yr: 1896, Emp: 35, $210,000**

**See ad on page 645**

Kriss Electronics, Inc., 191-195 Oraton St., Newark 4, N.J., 77, Yr: 1954, Emp: 26, ▲1, $274,000

Krohn-Hite Corp., 580 Massachusetts Ave., Cambridge 39, Mass., 3, 38, 52, 63, Tel: UNiversity 4-1272, Yr: 1949, Emp: 80, ▲1, $700,000

Kroker Engineering & Development Co., 9917 Franklin Ave., Franklin Park, Ill., 42, 60, 88, 94, Tel: GL 5-3056, Yr, 1953, Emp: 2, $40,000

Krylon, Inc., Ford & Washington Sts., Norristown, Pa., 95, Tel: BR 9-1950, Yr: 1949, Emp: 140

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

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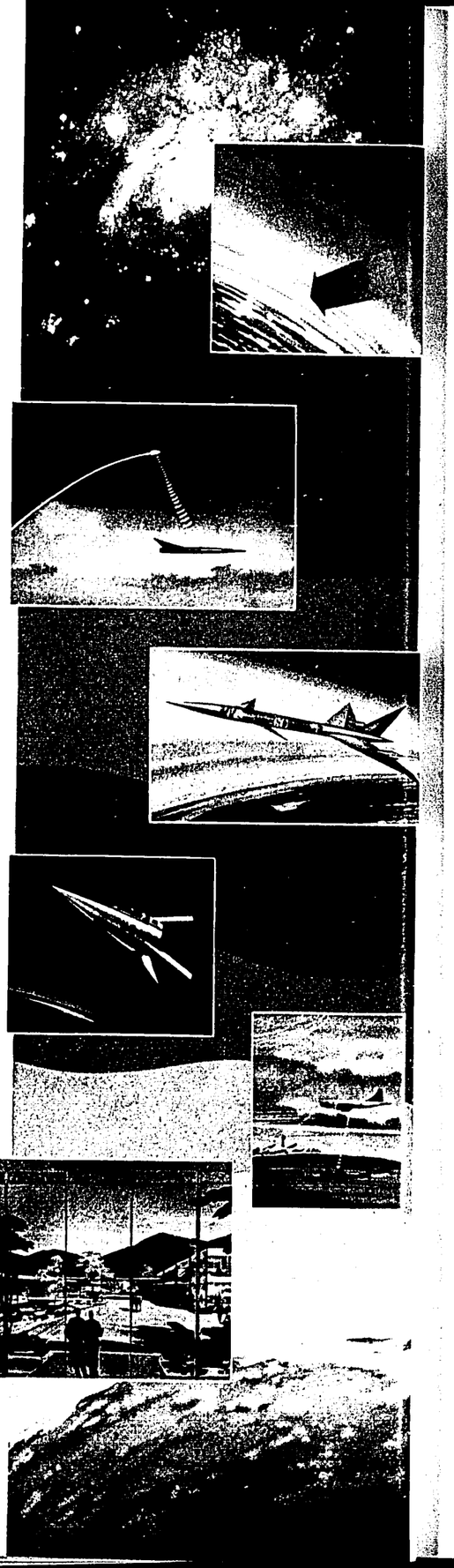
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**Krystinel Corp., Fox Island Rd., Port Chester, N.Y., 48, 86, Tel: WEstmore 7-5252, Yr: 1954, Emp: 18, ▲1, $100,000**

See ad on page 423

Kuhnke Elektrotechnische Fabrik, H., Malente Holstein, Germany, 68, 72, 82, Yr: 1928, Emp: 260, ▲1, $600,000

Kulite Semiconductor Products, Inc., 1030 Hoyt Ave., Ridgefield, N.J., 14, 70, 72, 75, 91, Tel: WHitney 5-3000, Yr: 1959, Emp: 10, ▲2, $10,000

Kulite Tungsten Co., 1040 Hoyt Ave., Ridgefield, N.J., 72, 85, 97, 102, 104, Tel: WHitney 5-3000, Yr: 1949, Emp: 30, ▲1, $100,000

**Kulka Electric Corp., 633-643 So. Fulton Ave., Mt. Vernon, N.Y., 46, 53, 71, 72, 73, 91, Tel: MOunt Vernon 4-4024, Yr: 1939, Emp: 250, ▲3**

See ads on pages 551, 558

**Kupfrian Manufacturing Corp., 157 Prospect Ave., Binghamton, N.Y., 47, 63, 76, 85, 91, Tel: RAymond 3-6126, Yr: 1950, Emp: 250, $750,000**

See ad on page 489

**Kurman Electric Co., Subsid. Crescent Petroleum Corp., 191 Newel St., Brooklyn 22, N.Y., 68, Tel: EVergreen 3-8000, Yr: 1928, Emp: 156, ▲1, $1,000,000**

See ad on page 514

Kurtston Electronics, 702 Bay St., Staten Island 4, N.Y., 3, 11, 19, 38, 55, 91, Tel: GIbraltar 8-8989, Yr: 1959, Emp: 6

Kurz-Kasch, Inc., 1421 South Broadway, Dayton 1, Ohio, 81, 89, 91, 98, Tel: BA 3-8161, Yr: 1916, Emp: 400, $1,100,000

Kuthe Laboratories, Inc., Subsid. International Tel. & Tel. Corp., 730 South 13th St., Newark 3, N.J., 67, 78, Tel: BIgelow 2-6000, Yr: 1941, Emp: 124, ▲1

Kwikheat Mfg. Co., 3732 San Fernando Rd., Glendale 4, Calif., 92, Tel: CHapman 5-2376, Yr: 1941, Emp: 15, $90,000

Kwikset Powdered Metal Products, 516 Santa Ana St., Anaheim, Calif., 45, Tel: KEystone 5-8111, Yr: 1948, Emp: 450

# L

L.A.B. Corp., 990 Onondaga St., Skaneateles, N.Y., 14, 94, 96, Tel: OVerbrook 5-5781, Yr: 1933, Emp: 45, $300,000

**LEL Inc., 75 Akron St., Copiague, N.Y., 1, 12, 18, 20, 22, 26, 27, 31, 36, 38, 63, 71, 80, Tel: AMityville 4-2200, Yr: 1952, Emp: 50, ▲4, $500,000**

See ad on page 365

LMB-Heeger, Inc., 2528 W. 9th St., Los Angeles 6, Calif., 84, 87, 95, 103, Tel: DUnkirk 7-6995, Yr: 1947, Emp: 18, $300,000

**Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 14, 19, 46, 55, 71, 73, 85, 89, 98, Tel: GRaceland 7-7900, Yr: 1947, Emp: 100**

See ad on page 454

Labko Scientific, Inc., 413 E. 14th, Stillwater, Okla., 64, 88, 91, Tel: FR 2-0352, Yr: 1956, Emp: 20, ▲4

Laboratory For Electronics, Inc., 1079 Commonwealth Ave., Boston 15, Mass., 1, 9, 10, 21, 23, 27, 28, 36, 38, 40, 45, 50, 64, 65, 76, 83, Tel: ALgonquin 4-1235, Yr: 1946, Emp: 2100, $20,110,000

Lacey Engineering & Mfg. Co., 115 So. Lombard, Oak Park, Ill., 38, 43, 46, 64, 71, 73, 89, 91, Tel: EUclid 6-3210, Yr: 1932, Emp: 30

Lake Manufacturing Co., 2323 Chestnut St., Oakland 7, Calif., 32, 38, Tel: TEmplebar 2-2198, Yr: 1925, Emp: 30, ▲1, $230,000

Lamb Electric Co., The, Div. American Machine & Metals, Inc., 627 Lake St., Kent, Ohio, 60, Tel: OR 3-3151, Yr: 1913, Emp: 900

**Lambda Electronics Corp., 11-11 131 St., College Point 56, N.Y., 63, Yr: 1948, Tel: INdependence 1-8500**

See ad on pages 19-26

Lamirair, Inc., 18530 So. Broadway, Gardena, Calif., 39, 93, Tel: FA 1-0515, Yr: 1957, Emp: 13, ▲1

Laminated Sheet Products Corp., 419 Neponset St., Norwood, Mass., 73, 89, 91, 98, Tel: NOrwood 7-3500, Yr: 1927, Emp: 65, $250,000

Laminated Shim Company, Inc., 43 Union St., Glenbrook, Conn., 87, 89, 92, 97, Tel: DA 5-2631, Yr: 1943, Emp: 150, $100,000

Lampkin Laboratories, Inc., Monitor Division, Bradenton, Fla., 23, 28, Tel: 6-1906, Yr: 1935, Emp: 20, ▲2

Lancaster Glass Corp., 226 West Main St., Lancaster, Ohio, 104, Tel: OLive 3-0311

Lance Antenna Corp., 1730-1802 First St., San Fernando, Calif., 39, Tel: EMpire 1-8645, Yr: 1945, Emp: 40, ▲2

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., 7444 W. Wilson Ave., Chicago 31, Ill., 1, 3, 4, 9, 12, 14, 19, 21, 22, 24, 38, 39, 47, 58, 60, 64, 68, 69, 72, 76, 85, 88, 89, 94, 100, Tel: UNderhill 7-7550, Yr: 1946, Emp: 2500, ▲97

Land-Air, Inc., Stepper Motors Div., 16226 So. Broadway, Gardena, Calif., 45, 57, 60, 68, 72, Tel: FAculty 1-5811, Yr: 1953, Emp: 100, $260,000

Landis & Gyr, Inc., 45 West 45th St., New York 36, N.Y., 9, 24, 36, 58, Tel: JUdson 6-4644

Landsberger Plastics Co., 550 Fifth Ave., New York 36, N.Y., 84, 89, 91, 98, Tel: PL 7-3638, Yr: 1955

Landsverk Electrometer Co., 611 Sonora Ave., Glendale 1, Calif., 19, 24, 89, 98, Tel: CHapman 5-6687, Yr: 1952, Emp: 100, ▲3, $1,200,000

Lansing Sound, Inc., James B., 3249 Casitas Ave., Los Angeles 39, Calif., 38, 75, Tel: NO 5-4101, Yr: 1946, Emp: 200, $3,000,000

Lansky Die Cutting Corp., 473 President St., Brooklyn 15, N.Y., 56, 89, 91, 94, Tel: UL 2-5346, Yr: 1925, Emp: 100

La Pointe Industries, Inc., 155 West Main St., Rockville, Conn., 1, 9, 14, 36, 38, 39, 44, 46, 52, 64, 72, 73, 83, 89, 91, 96, Tel: TR 5-3351, Yr: 1943, Emp: 200, $1,200,000

**Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 39, 43, 44, 48, 54, 86, 93, 98, Tel: LE Roy 385, Yr: 1916, Emp: 820, ▲2**

See ad on pages 62-63

Larson Instrument Co., 24 Orchard St., Tarrytown, N.Y., 4, 16, 68, Tel: MEdford 1-3119, Yr: 1954, Emp: 25

Lavelle Aircraft Corp., Sterling St., Newtown, Bucks County, Pa., 84, 87, 89, Tel: WOrth 8-3838, Yr: 1940, Emp: 200, $175,000

**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 1, 9, 10, 14, 21, 23, 25, 27, 28, 33, 40, 49, 58, 83, Tel: LOwell 6-2600, Yr: 1938, Emp: 410, ▲6, $5,500,000**

See ad on page 312

Lawrence Adhesive & Chemical Co., 19 So. Canal St., Lawrence, Mass., 89, 93, 94, 95, Tel: MUrdock 2-0839, Yr: 1950, Emp: 34, $200,000

**Leach Corporation, 18435 Susana Rd., Compton, Calif., 1, 4, 14, 29, 36, 38, 47, 60, 63, 68, 100, Tel: NEvada 6-1061, Yr: 1919, Emp: 875, ▲25**

See ad on page 514

**Leach Corporation, Leach Relay Div., 5915 Avalon Blvd., Los Angeles 3, Calif., 68, Tel: ADams 2-8221, Yr: 1919, Emp: 500, ▲6, $2,000,000**

See ad on page 514

Leach & Garner Co., Industrial Div., Leach & Garner Bldg., Attleboro, Mass., 85, 91, 97, 103, Tel: ATtleboro 1-1155

Leak Ltd., 80 Shore Road, Pt. Washington, L.I., N.Y., 38, 80, Tel: PO 7-7700

Lear, Incorporated, 3171 S. Bundy Dr., Santa Monica, Calif., 1, 3, 4, 9, 10, 12, 13, 14, 17, 18, 20, 26, 27, 30, 31, 35, 36, 38, 47, 58, 60, 63, 64, 72, 96, Tel: EXmont 1-7211, Yr: 1930, Emp: 5935, $87,002,197

Lear, Incorporated, 110 Ionia N.W., Grand Rapids 2, Mich., 1, 4, 14, 30, 38, 47, 58, 60, 88, Tel: GL 1-4542, Yr: 1930, Emp: 5100

Lectrohm, Inc., 5560 Northwest Highway, Chicago 30, Ill., 69, Tel: ROdney 3-1700, Yr: 1925, Emp: 450

Ledex, Incorporated, 123 Webster St., Dayton 2, Ohio, 60, 66, 68, 72, Tel: BA 4-9891, Yr: 1947, Emp: 320, ▲3

Lee Electric Inc., 566 52nd St., West New York, N.J., 33, 45, 72, 76, 91, Tel: UN 6-3656, Yr: 1950, Emp: 20, ▲1

Lee Electric & Mfg. Co., 2806 Clearwater St., Los Angeles 39, Calif., 38, 63, 68, Tel: NO 3-1295, Yr: 1946, Emp: 11

Lee Spring Co., Div. Leetronics, Inc., 30 Main St., Brooklyn 1, N.Y., 89, 91, Tel: ULster 5-7163

Leecraft Mfg. Co., Inc., 60 Greene St., New York 12, N.Y., 62, 71, Tel: WOrth 6-2855

Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa., 4, 5, 9, 11, 14, 16, 38, 43, 58, 69, 72, Tel: DAvenport 9-4900, Yr: 1899, Emp: 2900, ▲10

**Leesona Corp., P.O. Box 1605, Providence 1, R.I., 4, 14, 17, 24, 41, 43, 63, 75, 96, Tel: WIlliams 1-5200, Yr: 1893, Emp: 1500**

**See ad on page 674**

Lehigh Design Co., Inc., 62 Mulberry St., Newark 2, N.J., 88, 100, Tel: MItchell 2-3155, Yr: 1950, Emp: 485

Lehigh Structural Steel Co., 17 Battery Place, New York 4, N.Y., 39, Tel: WHitehall 4-1424, Yr: 1919, Emp: 500

Lektra Laboratories, 154 11th Ave., New York 11, N.Y., 4, 58, Tel: ALgonquin 5-2013, Yr: 1940, Emp: 30

Leland Airborne Products, Div. American Machine & Foundry, P.O. Box 128, Vandalia, Ohio, 4, 47, 58, 60, 63, 82, 96, Tel: TWinoaks 8-5881, Emp: 400

Lelanite Corp., P.O. Box 152, Webster, Mass., 89, Tel: 1969, Yr: 1957, Emp: 25

Lenkurt Electric Co., Inc., 1105 County Rd., San Carlos, Calif., 4, 8, 20, 21, 22, 26, 28, 35, 36, 47, 87, 88, 89, 94, 100, Tel: LYtell 1-8461, Yr: 1944, Emp: 1500, ▲35, $25,000,000

Lenz Electric Mfg. Co., 1751 N. Western Ave., Chicago 47, Ill., 85, Tel: AR 6-4454, Yr: 1901, Emp: 175

**Lepel High Frequency Labs., Inc., 55th St. & 37th Ave., Woodside 77, N.Y., 92, Tel: HAvemeyer 6-4580**

**See ad on page 654**

Lerco Electronics, Inc., 501 S. Varney St., Burbank, Calif., 46, 55, 73, 91, 98, Tel: VI 9-5556, Yr: 1949, Emp: 75, ▲3

Lessells & Associates, Inc., 916 Commonwealth Ave., Boston 15, Mass., 4, 14, 38, 58, 81, 88, 94, 96, 100, Tel: BEacon 2-2380, Yr: 1937, Emp: 23, ▲1, $13,500

Lettine Radio Mfg. Co., 62 Berkley St., Valley Stream, N.Y., 2, 6, 80, Tel: PYramid 1-9397, Yr: 1948, Emp: 2

**Levi, Leo, 80 Bennett Ave., New York 33, N.Y., 88, Tel: WAdsworth 7-7617**

**See ad on page 628**

Levin & Son, Inc., Louis, 3610 S. Broadway, Los Angeles 7, Calif., 96, Tel: ADams 3-7169, Yr: 1942, Emp: 30

Levinthal Electronic Products, Inc., 3180 Hanover St., Palo Alto, Calif., 1, 7, 17, 20, 21, 24, 26, 27, 28, 38, 63, 76, Tel: DAvenport 6-1640, Yr: 1953, Emp: 95, ▲6

Leviton Mfg. Co., Inc., 236 Greenpoint Ave., Brooklyn 22, N.Y., 53, 71, 72, 85, Tel: EVergreen 3-4500

Lewis Engineering Co., The, 339 Church St., Naugatuck, Conn., 14, 72, 75, 85, Tel: PArk 9-5253, Yr: 1932, Emp: 300, ▲2

Leyse Aluminum Co., Kewaunee, Wis., 91, Tel: 335, Yr: 1905, Emp: 200

Librascope Div., General Precision, Inc., 808 Western Ave., Glendale 1, Calif., 9, 16, 17, 30, 38, 60, Tel: CItrus 4-6541, Yr: 1937, Emp: 3600, ▲203

**Licon Div. of Illinois Tool Works, 6606 W. Dakin St., Chicago 34, Ill., 72, Tel: AVenue 2-4040, Yr: 1912, Emp: 2350**

**See ad on page 550**

**Lieco, Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 21, 39, 40, 72, 76, 80, 83, Tel: WAlnut 1-6300, Yr: 1951, Emp: 95, ▲6, $700,000**

**See ad on page 553**

Life Instrument Co., Inc., 260 Brook St., Franklin, Mass., 4, 45, 68, 75, 84, 98, Tel: Franklin 332W, Yr: 1955, Emp: 45, ▲2, $200,000

Light Electric Corp., 214 Lackawanna Ave., Newark 3, N.J., 45, 63, 76, Tel: HUmboldt 5-4111, Yr: 1935, Emp: 44, ▲1

Lignacraft, 66 Main St., Binghamton, N.Y., 88, Tel: RA 3-7563, Yr: 1954, Emp: 50

Lignes Telegraphiques et Telephoniques, 89 Rue de la Faisanderie, Paris XVI, France, 4, 17, 20, 21, 24, 35, 38, 39, 40, 43, 48, 49, 54, 70, 79, 83, 85, 86, 90

Lind Instruments, Inc., 357 Nassau St., Princeton, N.J., 24, 36, 72, 75, Yr: 1958

Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill., 49, 76, 82, 89, 92, Tel: MOnroe 6-3443

Lindgren & Associates, Inc., Erik A., 4515 N. Ravenswood Ave., Chicago 40, Ill., 14, Tel: LO 1-0408

Lindsay Div., International Steel Co., 1321 Edgar St., Evansville, Ind., 14, 84, 102, Tel: HA 5-3311, Yr: 1909, Emp: 675

Line Electric Co., 271 So. 6th St., Newark 3, N.J., 12, 45, 68, 72, 91, 98, Tel: HUmboldt 4-9400-1-2

Linell Engineering Corp., 3974 N. Avondale, Chicago 41, Ill., 45, 76, Tel: AVenue 3-0451

**Ling Electronics, Div. Ling-Temco Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 3, 14, 38, 56, 79, 96, Tel: PRospect 4-2900, Yr: 1946, Emp: 342**

**See ads on pages 247, 285**

Link Division, General Precision, Inc., Binghamton, N.Y., 4, 9, 14, 30, 38, 64, 89, Tel: RA 3-9311, Yr: 1929, Emp: 3000

Link Division, General Precision, Inc., Palo Alto Lab., P.O. Box 1318, Palo Alto, Calif., 1, 4, 9, 30, 38, 75, Yr: 1929, Emp: 220, ▲55

Lionel Corp., 28 Sager Pl., Irvington, N.J., 26

Lipps Engineering Co., Edwin A., 1511 Colorado Ave., Santa Monica, Calif., 65, Tel: EXbrook 3-0449, Yr: 1946, Emp: 15, ▲1, $100,000

Liquid Carbonic, Div. General Dynamics Corp., 135 So. La Salle St., Chicago 3, Ill., 92, 95, 96, 103, Tel: FInancial 6-8181, Yr: 1888, Emp: 450

Liquidometer Corp., The, 41-03 36th St., Long Island City 1, N.Y., 4, 5, 14, 30, 38, 46, 58, 68, 76, Tel: STillwell 4-1440, Yr: 1922, Emp: 905, ▲2

Littelfuse, Inc., 1865 Miner St., Des Plaines, Ill., 53, 72, Tel: VAnderbilt 4-1188, Yr: 1927

**Little Falls Alloys, Inc., 199 Caldwell Ave., Paterson 1, N.J., 85, 97, Tel: LAmbert 5-1014, Yr: 1943, Emp: 30, $500,000**

**See ad on page 613**

Little, Inc., Arthur D., 30 Memorial Dr., Cambridge 42, Mass., 88, 94, Tel: UNiversity 4-5770, Yr: 1886, Emp: 1150, ▲10

**Litton Engineering Laboratories, P.O. Box 949, Grass Valley, Calif., 86, 92, 94, 96, Tel: 1730, Yr: 1932, Emp: 68, ▲1, $300,000**

**See ad on page 674**

Litton Industries, Electron Tube Div., 960 Industrial Rd., San Carlos, Calif., 45, 77, 78, 79, 83, Tel: LYtell 1-8111, Yr: 1953, Emp: 1350

Litton Industries, Electronic Equipments Div., 336 N. Foothill Rd., Beverly Hills, Calif., 1, 9, 19, 85, Tel: BR 2-0661, Yr: 1953, Emp: 3800

Litton Industries, Maryland Div., 5009 Calvert Rd., College Park, Md., 1, 4, 16, 18, 20, 22, 23, 26, 27, 30, 36, 39, 52, 60, 63, 81, Tel: UNion 4-5678

Litton Industries, Potentiometer Div., 215 So. Fulton Ave., Mt. Vernon, N.Y., 69, Tel: MOunt Vernon 7-6607

Litton Industries, U.S. Engineering Co. Div., 13536 Saticoy St., Van Nuys, Calif., 38, 50, 55, 64, 69, 73, 89, 91, 98, 104, Tel: TRiangle 3-3520, Yr: 1943, Emp: 190

**Lockheed Aircraft Corp., California Div., Dept. 1810, 2402 N. Hollywood Way, Burbank, Calif., 17, 94, Tel: TRiangle 7-2711**

**See ad on page 198**

Lockheed Aircraft Corp., Electronics, Avionics & Industrial Products Div., 6201 E. Randolph St., Los Angeles 22, Calif., 14, 45, 47, 48, 49, 58, 63, 64, 65, 69, 72, 75, 76, 84, 86, 87, 89, Tel: OVerbrook 5-7070, Yr: 1960, Emp: 1200, $18,000,000





**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 9, 27, 29, 36, 38, 39, 64, 90, Tel: REgent 9-4321, Yr: 1954, Emp: 20,000, ▲600, $40,000,000**

**See ad on pages 112-113**

Lockheed Electronics Co., Stavid Division, U.S. Highway No. 22, Plainfield, N.J., 9, 14, 18, 20, 27, 36, 39, 76, 83, Tel: PL 7-1600, Yr: 1945, Emp: 1000, ▲25, $12,000,000

Loge Electronics, Inc., 2171 W. Washington Blvd., Los Angeles 18, Calif., 32, 38, 72, Tel: REpublic 4-9178, Yr: 1923, Emp: 27, ▲2

London Chemical Co., Inc., 1535 North 31st Ave., Melrose Park, Ill., 93, 95, 103, Tel: AU 7-9495

Loral Electronics Corp., 825 Bronx River Ave., New York 72, N.Y., 9, 21, 36, Tel: TIvoli 2-9500, Yr: 1948, Emp: 1600, $17,439,871

Lord Manufacturing Co., 1635 West 12th St., Erie, Pa., 81, 91, Tel: GLendale 6-8511, Yr: 1924, Emp: 1000

Low, Inc., M., Clary Electronic Systems, 44 Fulton St., New York 38, N.Y., 4, Tel: COrtlandt 7-5480

Lowell Mfg. Co., 3030 Laclede Station Rd., St. Louis 17, Mo., 56, 84, Tel: STerling 1-9058, Yr: 1945, Emp: 100, $1,000,000

Loyola Laboratories, P.O. Box 90074, Airport Station, Los Angeles 45, Calif., 19, Tel: OREgon 8-1686, Yr: 1956, Emp: 3, ▲1

Lubcke, Harry R., 2443 Creston Way, Hollywood 28, Calif., 88, Tel: HO 9-3266

Lucerne Products, Inc., Northfield, Ohio, 72, Tel: OL 3-6661, Yr: 1945, Emp: 25

Luhrs & Co., C.H., 297 Hudson St., Hackensack, N.J., 83, Tel: DIamond 2-4749, Yr: 1950, Emp: 1, ▲1

Luma Electric Equipment Co., The, 1607 Coining Dr., Toledo 12, Ohio, 92, 96, Tel: GReenwood 5-4168, Yr: 1920, Emp: 10, $100,000

**Lumatron Electronics, Inc., Dept. IR, 116-120 County Courthouse Rd., New Hyde Park, L.I., N.Y., 14, 21, 25, 38, 40, 50, Tel: PIoneer 7-3200, Yr: 1958, Emp: 60, ▲6**

**See ad on page 323**

Lumite Div., Chicopee Mills, Inc., 47 Worth St., New York, N.Y., 91, Tel: WOrth 6-1000, Yr: 1916, ▲2

**Luxo Lamp Corporation, Dock Street, Port Chester, N.Y., 59, 62, 96, Tel: WE 7-4433, Yr: 1953, Emp: 25**

**See ad on page 675**

Luzerne Rubber Co., Muirhead Ave., Trenton 7, N.J., 89, 93, Tel: EXport 2-4131, Yr: 1905, Emp: 160

Lynch Carrier Systems, Inc., 695 Bryant St., San Francisco 7, Calif., 4, 8, 35, 52, Tel: EXbrook 7-1471, Yr: 1945, Emp: 250, $2,600,000

Lynch Mfg. Co., R.H., 7831 E. Arroyo Dr., So. San Gabriel, Calif., 84, 87, Tel: ATlantic 0-3810, Yr: 1932, Emp: 14, $100,000

Lyons, Leonard J., 3710 Crestway Dr., Los Angeles 43, Calif., 88, 94, Tel: AXminster 1-5446

**Lytle Corp., 1404 San Mateo Blvd., S.E., Albuquerque, New Mexico, 29, 60, 64, 73, 84, 100, Tel: ALpine 5-8169, Yr: 1950, Emp: 500, ▲3**

**See ad on this page**

# M

MB Electronics, Div. Textron Electronics, Inc., P.O. Box 1825, New Haven 8, Conn., 3, 4, 9, 14, 18, 30, 38, 81, 96, Tel: FUlton 9-1511, Yr: 1938, Emp: 777

M.E.C., Inc., 796 Berry Rd., P.O. Box 577, Nashville 2, Tenn., 43, Tel: CYpress 8-3376, Yr: 1953, Emp: 65, ▲1, $172,190

**M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 10, 36, 38, 47, 63, 64, 94, Tel: GRamercy 3-5899, Yr: 1956, Emp: 8, ▲2**

**See ad on page 419**

M & G Metal Products Co., 1217 Webster Ave., Chicago 14, Ill., 72, 89, Tel: LIncoln 9-2100, Yr: 1945, Emp: 65, $127,000

**MM Enclosures, Inc., 111 Bloomingdale Rd., Hicksville, L.I., N.Y., 84, 87, 89, Tel: WEIls 1-1770, Yr: 1957, Emp: 40, $100,000**

**See ad on page 601**

M P Engineering Co., Fairfield 3, Conn., 32, 38, 51, 61, 84, 87, 88, 94, Tel: AMherst 8-2385, Yr: 1932, Emp: 17, ▲1, $62,700

Macallen Co., Inc., The, Bay Road, Newmarket, N.H., 93, Tel: OLdfield 9-5555, Yr: 1892, Emp: 400

Macarr, Inc., 4360 Bullard Ave., New York 66, N.Y., 63, 66, 96, Tel: FAirbanks 5-5510, Yr: 1955, Emp: 25, $200,000

Macdonald & Co., 1324 Ethel St., Glendale 7, Calif., 96, Tel: CItrus 1-6181, Yr: 1957, Emp: 5, $88,000

Machlett Laboratories, Inc., The, 1063 Hope St., Springdale, Conn., 78, 79, Tel: FI 8-7511, Yr: 1897, Emp: 1065, ▲15

Mackay, Inc., A. D., 198 Broadway, New York 38, N.Y., 48, 49, 85, 86, 94, 95, 97, 101, 104, Tel: BA 7-8532, Yr: 1926, Emp: 6, $10,000

MacKay Research Laboratories, P.O. Box 148A, Benson, Ariz., 77, 78, 79, Yr: 1945, Emp: 9, $60,000

MacLaren & Co., Inc., F.B., 6 W. 18th St., Huntington Station, L.I., N.Y., 4, 9, 16, 30, 38, 63, 64, 75, 94, Tel: HAmilton 3-4433, Yr: 1950, Emp: 8, $88,471

MacLeod & Hanopol, Inc., 10 Roland St., Charlestown 29, Mass., 5, 9, 14, 19, 33, 35, 85, 89, 94, Tel: MOnument 6-2171, Yr: 1949, Emp: 15, ▲1

Macmillan Co., 60 Fifth Ave., New York 11, N.Y., 100, Tel: ORegon 5-4000

Madigan Electronic Corp., 200 Stonehinge Lane, Carle Place, L.I., N.Y., 1, 4, 6, 7, 9, 12, 18, 20, 22, 26, 30, 31, 34, 36, 38, 39, 62, 63, 88, 94, 100, Tel: EDgewood 4-2500, Yr: 1947, Emp: 415, ▲30, $5,000,000

Magnaflux Corp., Subsid. General Mills, 7328 West Lawrence Ave., Chicago 31, Ill., 4, 14, 28, 57, 94, 96, Tel: UNderhill 7-8000, Yr: 1929, Emp: 400, ▲6

Magnasync Corp., 5546 Satsuma Ave., No. Hollywood, Calif., 9, 29, 34, 51, 65, 81, Tel: TR 7-5193, Yr: 1953, Emp: 50, ▲4, $500,000

Magnatran, Inc., 248 Schuyler Ave., Kearny, N.J., 14, 63, 76, Tel: WYman 1-6633, Yr: 1951, Emp: 100

Magnavox Co., The, 2131 Bueter Rd., Fort Wayne 4, Ind., 1, 6, 9, 14, 26, 27, 29, 43, 56, 60, 61, 64, 65, 80, Tel: EAsthrook 9721, Yr: 1911, Emp: 4712, $90,623,559

Magnavox Research Laboratories, 2829 Maricopa St., Torrance, Calif., 1, 9, 27, 36, 72, Tel: SPruce 5-3571

Magnecessories, P.O. Box 6960, Washington 20, D.C., 65, Tel: LOgan 7-1383, Yr: 1949, $5000

Magnecraft Electric Co., 3352 W. Grand Ave., Chicago 51, Ill., 68, Tel: EVerglade 4-6868, Yr: 1951, Emp: 100

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Magnet Wire Inc., 25 Walker St., New York 13, N.Y., 85, Tel: CAnal 6-0900

**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 4, 9, 14, 17, 30, 38, 47, 60, 63, 68, 72, 82, Tel: CYpress 2-6610**

**See ads on pages 252, 364, 418**

Magnetic Circuit Elements, Inc., 3722 Park Place, Montrose, Calif., 4, 30, 38, 45, 47, 52, 63, 76, 82, 88, Yr: 1957, Emp: 13, ▲1

Magnetic Controls Co., 6405 Cambridge St., Minneapolis 26, Minn., 4, 23, 38, 47, 63, Tel: WEst 9-4691, Yr: 1952, Emp: 125

**Magnetic Core Corp., John & Lawrence Sts., Newburgh, N.Y., 48, Tel: JOhn 1-5116, Yr: 1945, Emp: 44, ▲3, $300,000**

**See ad on page 422**

**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 4, 9, 14, 16, 24, 30, 38, 47, 58, 63, Tel: ROgers 9-5312, Yr: 1957, Emp: 15, ▲3, $75,000**

**See ad on page 364**

**Magnetic Metals Co., 2200 River Rd., Camden 1, N.J., 48, Tel: WOodlawn 4-7842, Yr: 1942, Emp: 485, ▲6**

**See ads on pages 422, 423, 425, 427**

Magnetic Powders, Inc., Subsid. Crane Co., Fairview Ave., Johnsonburg, Pa., 48, Tel: WO 5-2015

**Magnetico, Inc., 6 Richter Court, East Northport, L.I., N.Y., 4, 30, 38, 45, 47, 76, Tel: ANdrew 1-4502, Yr: 1955, Emp: 40, ▲3**

**See ad on page 366**

**Magnetics, Inc., Dept. P-80, P.O. Box 391, Butler, Pa., 38, 48, 63, 104, Tel: 7-3787, Yr: 1949, Emp: 357, ▲2, $4,812,000**

**See ad on page 424**

Magnetics Research Co., Inc., 255 Grove St., White Plains, N.Y., 4, 9, 10, 36, 37, 38, 45, 50, 61, 76, Tel: WH 9-9588, Yr: 1951, Emp: 50

Magtrol, Inc., 210 Seneca St., Buffalo 4, N.Y., 4, 14, 30, 60, Tel: MOhawk 7451, Yr: 1953, Emp: 61

Maico Electronics, Inc., 21 N. Third St., Minneapolis 1, Minn., 4, 9, 18, 19, 20, 24, 29, 30, 38, 58, 63, 64, 65, Tel: FE 9-7041

**Makepeace Div., D. E., Engelhard Industries, Inc., Attleboro, Mass., 46, 83, 91, Tel: ATtleboro 1-0089**

**See ad on page 170**

Malco Manufacturing Co., 4025 W. Lake St., Chicago 24, Ill., 46, 73, 83, 91, 96, Tel: VAn Buren 6-9300, Yr: 1946, Emp: 150

Malkin-Illion Co., 400 Coit St., Irvington 11, N.J., 84, 87, Tel: ESsex 2-3405, Yr: 1930, Emp: 60, $600,000

Mallory & Co., Inc., P. R., 28 S. Gray St., Indianapolis 6, Ind., 1, 4, 6, 7, 9, 18, 22, 26, 40, 41, 43, 45, 47, 55, 63, 64, 66, 68, 69, 70, 72, 80, 97, Tel: MElrose 6-5353, Yr: 1916, Emp: 5000, $68,000,000

Mamco Corp., 532 Fourth St., Racine, Wis., 42, 60, Tel: MElrose 4-1923, Yr: 1933, Emp: 270

Mandex Manufacturing Co., Inc., 2614 W. 48th St., Chicago 32, Ill., 71, 73, 89, 104, Tel: CL 4-4200, Yr: 1950, Emp: 133, $1,200,000

Mandrel Industries, Inc., 800 Welch Rd., Palo Alto, Calif., 1, 4, 15, 25, 30, 34, 84, 85, 87, 89, Tel: DA 1-2366, Yr: 1931, Emp: 900, $11,500,000

Mandrel Industries, Inc., P.O. Box 13243, Houston 19, Tex., 4, 9, 15, 63, 75, Tel: MOhawk 7-6561, Yr: 1956, Emp: 350, ▲10

Manhattan Physical Research Group, Inc., 556 W. 191st St., New York 40, N.Y., 88, 94, Tel: SW 5-3351, Yr: 1958, Emp: 10, ▲2

Manning, Maxwell & Moore, Inc., 250 E. Main St., Stratford, Conn., 4, 16, 26, 38, Tel: DRexel 8-8281

**Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 14, 20, 21, 27, 28, 33, 49, 63, 94, Tel: DAvis 5-1391, Yr: 1950, Emp: 170, ▲10**

**See ad on pages 96-97**

Manufacturers Engineering & Equipment Corp., York Rd. & Sunset Lane, Hatboro, Pa., 28, Tel: OSborne 5-3300, Emp: 50

Marantz Co., 25-14 Broadway, Long Island City 6, N.Y., 34, 38, 88, 89, 90, Tel: RA 1-6500

Marathon Electric Mfg. Corp., Wausau, Wis., 47, 60, 73, 82, Yr: 1913, Emp: 1500

Marblette Corp., The, 37-31 30th St., Long Island City 1, N.Y., 93, 95, 99, 100, 102, Tel: STillwell 4-8100

Marco Industries Co., 207 S. Helena St., Anaheim, Calif., 62, 72, Tel: KEystone 5-6037, Yr: 1948, Emp: 80

**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 3, 5, 6, 21, 23, 25, 28, 31, 33, 37, 40, 58, Tel: LOwell 7-0607, Yr: 1936, Emp: 1500, ▲20, $8,000,000**

**See ad on page 332**

Marconi's Wireless Telegraph Co., Ltd., 750 Third Ave., New York 17, N.Y., 1, 7, 9, 14, 18, 20, 22, 23, 26, 27, 28, 31, 33, 34, 35, 37, 38, 39, 46, 49, 50, 52, 56, 61, 63, 72, 76, 77, 78, 79, 88, 94, Tel: YUkon 6-9855

Marine Electric Corp., 600 4th Ave., Brooklyn 15, N.Y., 4, 18, 22, 32, 38, 45, 56, 57, 63, 76, 92, Tel: SOuth 8-8300, Yr: 1942, Emp: 150, ▲8, $800,000

Marine View Electronics, Inc., 88-06 Van Wyck Expwy., Jamaica 18, N.Y., 1, 3, 4, 14, 18, 27, 28, 32, 35, 38, 45, 53, 55, 63, 72, 73, 84, 87, 89, 91, Tel: AX 7-6900

Marion Instrument Div., Minneapolis-Honeywell Regulator Co., Grenier Field, Manchester, N.H., 14, 58, 68, 92, Tel: NAtional 5-6971, Yr: 1937, Emp: 470, ▲4, $4,200,000

**Mark Products Co., 5439 Fargo Ave., Skokie, Ill., 39, 83, 85, Tel: ORchard 5-1500, Yr: 1948, Emp: 30, ▲3**

**See ad on page 375**

**Markel & Sons, L. Frank, School Lane, Norristown, Pa., 85, 93, 99, Tel: BRoadway 2-8960, Yr: 1922, Emp: 240, $1,000,000**

**See ad on page 693**

Markem Machine Co., 150 Congress St., Keene 5, N.H., 96, Tel: ELmwood 2-1130, Yr: 1911, Emp: 300

Markite Corp., 155 Waverly Pl., New York 14, N.Y., 69, Tel: ORegon 5-1384, Yr: 1946, Emp: 325

Marlin-Rockwell Corp., 402 Chandler St., Jamestown, N.Y., 91, Tel: 61-541

Marquardt Corp., The, Pomona Division, 2709 N. Garey Ave., Pomona, Calif., 4, 9, 14, 21, 30, 35, 47, 50, 62, 64, 84, 91, 100, Tel: LYcoming 3-1311, Yr: 1946, Emp: 500, ▲12, $5,060,000

Marstan Electronics Corp., 204 Babylon Turnpike, Roosevelt, L.I., N.Y., 4, 8, 10, 11, 14, 17, 21, 23, 27, 28, 30, 33, 36, 38, 44, 45, 47, 58, 63, 68, 69, 72, 76, 82, 88, 89, 92, 94, 98, Tel: MAyfair 3-3400, Yr: 1959, Emp: 11, ▲3

Martin Co., The, Baltimore 3, Md., 1, 4, 9, 17, 20, 24, 27, 30, 38, 39, 40, 47, 50, 64, 75, 76, 83, 87, 98, Tel: MUrdock 7-3800, Emp: 34,000, ▲800, $200,000,000

Martindale Electric Co., P.O. Box 617, Edgewater Branch, Cleveland 7, Ohio, 14, 24, 58, 96, Tel: LAkewood 1-8567, Yr: 1917, Emp: 60

Maryland Lava Co., P.O. Box 305, Bel Air, Md., 48, 86, 93, 98, Tel: TE 8-4114, Yr: 1934, Emp: 55

Mason Instrument Co., P.O. Box 1681, G.P.O., New York 1, N.Y., 4, 17, Tel: MO 4-3069, Yr: 1954, Emp: 20

Masonware Co., Dexter Rd., East Providence 14, R.I., 65, 89, 91, Yr: 1908, Emp: 90

Massa Division, Cohu Electronics, Inc., 5 Fottler Rd., Hingham, Mass., 14, 15, 16, 18, 38, 59, 75, 96, Tel: RI 9-4800, Yr: 1945, Emp: 94, ▲5, $1,000,000

Mast Development Co., Inc., 2212 E. 12th St., Davenport, Iowa, 4, 9, 10, 14, 16, 25, 58, 63, 88, 89, 94, ▲1

**Master Engraving Studios, 135 Liberty St., New York 6, N.Y., 89, 91, Tel: WOrth 2-4230, Yr: 1955, Emp: 6**

**See ad on page 635**





Master Etching Corp., 50 Honeck St., Englewood, N.J., 84, 91, Tel: LOwell 9-0100, Yr: 1948, Emp: 150, $500,000

Master Specialties Co., 956 E. 108th St., Los Angeles 59, Calif., 62, 63, 68, 91, Tel: LOrain 4-4481, Yr: 1941, Emp: 65, ▲2, $95,000

Mastertone Recording Studios, Inc., 130 W. 42nd St., New York 36, N.Y., 34, Tel: WIsconsin 7-2940, Yr: 1953, Emp: 7, ▲1

Materials Electronic Products Corp., 990 Spruce St., Trenton 8, N.J., 101, Tel: EX 4-9600, Yr: 1959, Emp: 16

Materials for Electronics, Inc., 152-25 138 Ave., Jamaica 34, N.Y., 39, 43, 45, 52, 54, 55, 56, 71, 72, 76, 86, 91, 93, 95, 97, 101, 104, Tel: Fieldstone 1-1611, Yr: 1920, Emp: 900, ▲12

Materials Research Corp., 47 Buena Vista Ave., Yonkers, N.Y., 92, 94, 96, Tel: GR 6-3370, Yr: 1957, Emp: 47

Matthew Laboratories, 3344 Ft. Independence St., New York 63, N.Y., 38, 63, 82, Tel: KI 8-1011, Yr: 1952, Emp: 6

Matthews & Co., Jas. H., 3827 Forbes Ave., Pittsburgh 13, Pa., 9, 89, 91, 96, Tel: MUseum 1-8500

Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N.Y., 14, 25, 30, 38, 45, 94, Tel: STillwell 4-4600, Yr: 1935, Emp: 250, ▲4

Maurey Instrument Corp., 7917 S. Exchange Ave., Chicago 17, Ill., 69, 75, Tel: REgent 1-1717, Yr: 1954, Emp: 66

Maury & Associates, 10373 Mills Ave., Montclair, Calif., 39, 40, 52, 76, 83, Tel: NAtional 6-0441, Yr: 1957, Emp: 12, ▲1, $30,000

Maxson Corp., The W. L., Instruments Div., 475 Tenth Ave., New York 18, N.Y., 1, 3, 21, 38, 72, 75, Tel: LOngacre 5-1900, Yr: 1935, Emp: 1400, $1,000,000

Maxson Corp., The W. L., Unimax Switch Div., Ives Rd., Wallingford, Conn., 72, Tel: COlony 9-8701

Maxson Corp., The W.L., United Mfg. Co. Div., 41 Haig St., Hamden 14, Conn., 3, 14, 58, 84, Tel: CHestnut 8-4491, Yr: 1942, Emp: 115, ▲1

Mayberry Electronics Co., 111 South Oak St., Inglewood 1, Calif., 1, 3, 4, 9, 14, 28, 29, 30, 36, 38, 47, 63, 64, 68, 72, 88, 94, Tel: ORegon 8-4847, Yr: 1955, Emp: 10, ▲1, $100,000

**Mayberry, Len, 111 S. Oak St., Inglewood 1, Calif., 88, Tel: ORegon 8-4847**

**See ad on page 628**

**McCoy Electronics Co., Dept. P-10, Watts & Chestnut Sts., Mount Holly Springs, Pa., 49, 52, Tel: HUnter 6-3411, Yr: 1952, Emp: 165, $905,700**

**See ad on page 431**

McDowell Electronics, Inc., 105 Forrest St., Metuchen, N.J., 92, Tel: LIberty 8-9109

McGill Mfg. Co., Inc., Electrical Div., 909 N. Lafayette St., Valparaiso, Ind., 72, 91, Tel: HOward 2-2161, Yr: 1905, Emp: 700

**McGraw-Hill Book Co., Inc., Dept. IRE-60, 327 W. 41st St., New York 36, N.Y., 100, Tel: LOngacre 4-3000**

**See ad on page 694**

McGregor Electronic Industries, Inc., 132 First St., McGregor, Iowa, 56, 76, Tel: 682, Yr: 1953, Emp: 80, ▲1, $1,000,000

McIntosh Laboratory, Inc., 2 Chambers St., Binghamton, N.Y., 38, 80, Tel: RAymond 3-5191, Emp: 100, $1,700,000

McKenna Laboratories, 2503 Main St., Santa Monica, Calif., 14, 38, 96, Tel: EXbrook 9-8846, Yr: 1954, Emp: 11

McKiernan-Terry Corp., 100 Richards Ave., Dover, N.J., 4, 14, 18, 27, 30, 34, 38, 39, 83, 84, 88, 89, 96, Tel: FOxcroft 6-0371, Yr: 1895, Emp: 600, ▲5, $5,000,000

**McLean Engineering Laboratories, 70 Washington Rd., P.O. Box 228, Princeton, N.J., 42, Tel: WAlnut 4-4440, Yr: 1940, Emp: 45, ▲2**

**See ad on page 388**

McMillan Electronics Industries, Brownville Ave., Ipswich, Mass., 14, 39, 52, Tel: ELmwood 6-2926, Yr: 1950, Emp: 80, ▲3, $920,000

**Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 3, 5, 14, 28, 36, 37, 40, 58, 69, 94, Tel: DEerfield 4-2131, Yr: 1939**

**See ad on page 335**

**Measurements Research Co., Castor & Kensington Aves., Philadelphia 24, Pa., 14, Tel: JEfferson 5-3700**

**See ad on page 287**

Mechanical Engraving Co., Inc., 10 Van Cortlandt Ave. E., New York 68, N.Y., 73, 89, 91, Tel: LU 4-8600, Yr: 1890, Emp: 40, $200,000

Mechanical Products Inc., 1824 River St., Jackson, Mich., 20, 21, 72, Yr: 1942, Emp: 325

Mechatrol, Div. Servomechanisms, Inc., 1200 Prospect Ave., Westbury, L.I., N.Y., 10, 30, 38, 60, 63, 69, Tel: EDgewood 3-6000, Yr: 1946, Emp: 166

Medistor Instrument Co., 1443 Northlake Way, Seattle 3, Wash., 14, 19, 25, 33, 38, 94, Tel: MElrose 3-5145, Yr: 1957, Emp: 4, $24,000

Mel-Rain Corp., 2100 Fletcher Ave., Indianapolis 3, Ind., 40, 69, 72, Tel: ME 7-3531, Yr: 1953, Emp: 125, $1,000,000

Melabs, Inc., 3300 Hillview, Palo Alto, Calif., 1, 20, 21, 26, 27, 28, 38, 39, 40, 52, 72, 80, 83, 88, Tel: DA 6-9500, Yr: 1956, Emp: 155, ▲30, $2,600,000

Meller Co., Adolf, P.O. Box 702, Providence 1, R.I., 17, 49, 83, 104, Tel: DExter 1-3717, Yr: 1921, Emp: 30

Melody Master Mfg. Co., 2149-51 W. Roscoe St., Chicago 18, Ill., 12, 56, 59, Tel: LA 5-5559, Yr: 1944

Melpar, Inc., Special Products Dept., 3000 Arlington Blvd., Falls Church, Va., 3, 4, 9, 14, 16, 38, 39, 52, 63, 64, 75, 83, 89, 92, 93, 95, 96, Tel: JEfferson 4-6000, Yr: 1945, Emp: 5738, ▲276, $65,000,000

**Menlo Park Engineering, 711 Hamilton Ave., Menlo Park, Calif., 20, 21, 38, 45, 63, Tel: DAvenport 6-9080, Yr: 1954, Emp: 32, ▲2, $600,000**

**See ad on page 366**

Menlo Research Laboratory, 1627 Bay Rd., East Palo Alto, Calif., 14, 24, 88, Tel: DAvenport 3-4121, Yr: 1949, Emp: 100, ▲5

**Mepco, Inc., 35-37 Abbett Ave., Morristown, N.J., 69, Tel: JEfferson 9-2000, Yr: 1947, Emp: 230, ▲3**

**See ad on page 210**

**Merck & Co., Inc., Electronic Chemicals Div., Lincoln Ave., Rahway, N.J., 101, Tel: FUlton 1-5000, Yr: 1957, Emp: 300, ▲6**

**See ad on page 212**

Merco Products, Inc., 1298 Bethel Dr., Eugene, Ore., 92, Tel: DIamond 3-1022, Yr: 1956, Emp: 4

Mercoid Corp., The, 4201 W. Belmont Ave., Chicago 41, Ill., 4, 68, 72, 74, Tel: PEnsacola 6-2100, Yr: 1922, Emp: 400

Mercury Contacts, Inc., 1950 Neva Dr., Dayton 14, Ohio, 68, 72, Yr: 1952

Mercury Transformer Corp., 12950 Panama St., Los Angeles 66, Calif., 45, 76, Tel: UPton 0-8380, Yr: 1958, Emp: 50, ▲4, $180,000

Mergenthaler Linotype Co., 29 Ryerson St., Brooklyn 5, N.Y., 1, 9, 30, 38, 89, 94, Tel: ULster 5-0300, Yr: 1895, Emp: 2100, ▲10, $1,500,000

Meridian Metalcraft, Inc., 8739 S. Millergrove Dr., Whittier, Calif., 21, 39, 40, 49, 50, 52, 76, 80, 83, 84, 87, 89, 94, Tel: RA 3-1508, Yr: 1945, Emp: 115, ▲2, $1,000,000

Merit Coil & Transformer Corp., 2027 Sherman St., Hollywood, Fla., 45, 52, 76, Tel: WAbash 3-1536, Yr: 1924, Emp: 150, ▲10, $2,500,000

Merit Plating Co., Inc., 218 E. 141 St., New York 51, N.Y., 89, Tel: CYpress 2-6380, Yr: 1946

Merit Short Wave Diathermy Company, 2758 Whittier Blvd., Los Angeles 23, Calif., 19, 92, Tel: AN 1-7521, Yr: 1937, Emp: 5

**Merrimac Research & Development, Inc., 517 Lyons Ave., Irvington 11, N.J., 21, 40, 52, 76, 80, 83, 88, Tel: ESsex 1-1616, Yr: 1955, Emp: 26, ▲2, $175,000**

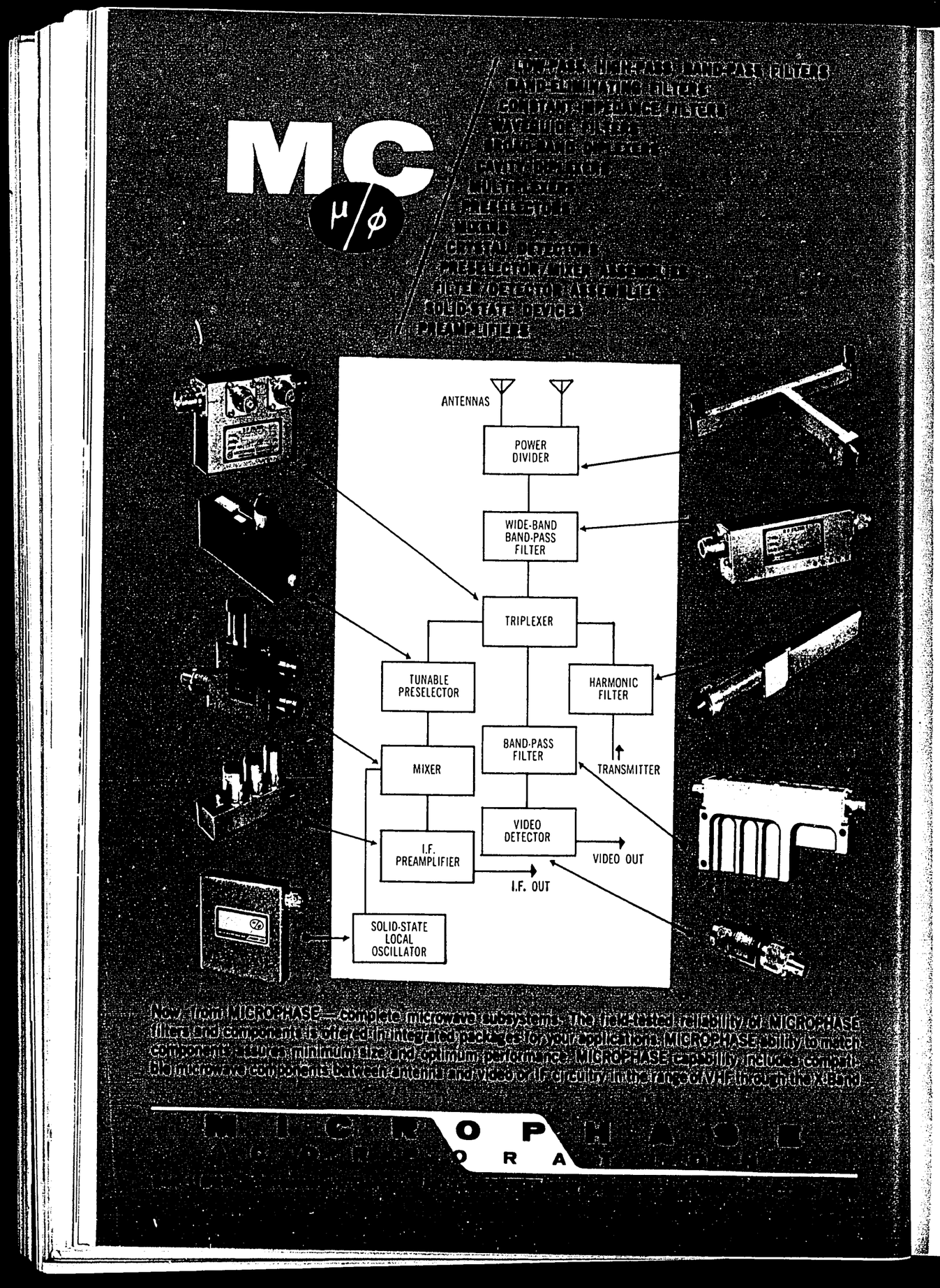
**See ad on page 381**

Mesa Plastics Co., 12270 Nebraska Ave., Los Angeles 25, Calif., 95, 99, Tel: BRadshaw 2-0259, Yr: 1950, Emp: 40

Metal Fabricators Corp., 63 Pond St., Waltham 54, Mass., 83, 84, 87, 88, 89, Tel: TWinbrook 3-6800, Yr: 1933, Emp: 230, ▲4, $1,500,000



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.







Metal Findings Corp., 152 W. 22nd St., New York 11, N.Y., 53, 89, 91, 104, Yr: 1931, Emp: 70

Metal Processing Co., Inc., 41 Canfield Rd., Cedar Grove, N.J., 89, Tel: CE 9-5378

**Metal Textile Corp., Div. General Cable Corp., 647 E. First Ave., Roselle, N.J., 72, 81, 85, 91, 102, 104, Tel: CHestnut 5-3000, Yr: 1923**


**See ad on page 552**


Metal & Thermit Corp., Rahway Ave., Rahway, N.J., 95, Tel: FUlton 1-3000, Emp: 1000

Metalcraft, Inc., 65-33 Austin St., Rego Park 74, N.Y., 81, 87, 89, Tel: TWining 6-3600, Yr: 1945, Emp: 80, $1,000,000

Metallized Products Co., Inc., 29 Knight St., Norwalk, Conn., 93, Tel: TEmple 8-4703, Yr: 1945, Emp: 30

Metalphoto Corp., 6811 Superior Ave., Cleveland 3, Ohio, 97, Tel: UTah 1-7575, Yr: 1954, Emp: 12

Metavac, Inc., 45-68 162nd St., Flushing 58, N.Y., 17, 40, 43, 69, 83, 102, Tel: HIckory 5-0400

Meter-Makers, Inc., 1101 W. Armitage, Chicago 14, Ill., 3, 14, 19, 33, 37, 58, 84, 88, 91, Tel: LI 9-5252, Yr: 1958, Emp: 4, ▲1

Meters Incorporated, 5353 N. Keystone Ave., Indianapolis 20, Ind., 14, 58, Tel: CLifford 5-3570, Yr: 1942

**Methode Manufacturing Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 46, 64, 71, 104, Tel: UNderhill 7-9600, Yr: 1947, Emp: 400**


**See ad on page 415**


Metrolog Corp., 169 N. Halstead St., Pasadena, Calif., 14, 63, Tel: MUrray 1-5194

Metrologie, Compagnie Generale de, Chemin de la Croix-Rouge, Annecy, France, 3, 5, 14, 21, 25, 28, 37, 58, 63, Tel: 8-60, Yr: 1936, Emp: 350, ▲1

Metron Instrument Co., 432 Lincoln St., Denver 3, Colo., 30, Tel: PEarl 3-3764, Yr: 1942, Emp: 43, $150,000

Metronics, Inc., 212 Park Ave., Plainfield, N.J., 89

Metropolitan Electronic & Instrument Co., 106 Fifth Ave., New York 11, N.Y., 14, 28, 37, 58, Tel: OR 5-1707

Mica Corporation, 4031 Elenda St., Culver City, Calif., 91, 99, Tel: UPton 0-6861, Yr: 1951, Emp: 45, $1,000,000

Mica Fabricating Co., 53 Central Ave., Rochelle Park, N.J., 43, 86, 89, 93, 98, 99, Yr: 1927, Emp: 60

Mica Insulator, Div. Minnesota Mining & Mfg. Co., 797 Broadway, Schenectady 1, N.Y., 93, 99, Tel: FRanklin 4-4191, Yr: 1893, Emp: 500, ▲2

Micamold Electronics Mfg. Corp., Div. General Instrument Corp., 65 Gouverneur St., Newark 4, N.J., 43, 50, 52, Tel: HU 5-2100, Yr: 1925, Emp: 1000

Micarta Fabricators, Inc., 5324 Ravenswood Ave., Chicago 40, Ill., 53, 62, 64, 71, 89, 91, 99, Tel: LOngbeach 1-9700, Yr: 1926, Emp: 120, $1,100,000

**Micro Instrument Co., 79 Trowbridge St., Cambridge 38, Mass., 21, 45, 76, 96, 99, 103, Tel: KIrkland 7-8660, Yr: 1936, Emp: 14, ▲1**


**See ad on page 674**


Micro Balancing, Inc., 191 Herricks Rd., Garden City Park, N.Y., 4, 96, Tel: PI 6-0851, Yr: 1945, Emp: 50, ▲1, $800,000

Micro-Circuits Co., New Buffalo, Mich., 95, Tel: NEw Buffalo 1163, Yr: 1948

Micro Gee Products, Inc., 6319 W. Slauson Ave., Culver City, Calif., 4, 14, 30, 38, Tel: EXmont 1-6719, Yr: 1953, Emp: 14, ▲2, $250,000

**Micro-Lectric Div., Micro Machine Works, Inc., 19 Debevoise Ave., Roosevelt, L.I., N.Y., 19, 69, 72, Tel: FReeport 8-3222, Yr: 1951, Emp: 26, $250,000**


**See ad on page 529**


Micro Switch, Div. Minneapolis-Honeywell Regulator Co., 11 W. Spring St., Freeport, Ill., 72, Tel: ADams 2-1122, Yr: 1937, Emp: 3000, ▲6

Micro Systems, Inc., 2925 E. Foothill Blvd., Pasadena, Calif., 17, 70, 75, Tel: SYcamore 5-5689, Yr: 1959, Emp: 8, ▲3

Microdot Inc., 220 Pasadena Ave., South Pasadena, Calif., 16, 68, 72, 76, 85, Tel: MUrray 2-3351, Yr: 1950, Emp: 225, ▲4, $2,250,000

**Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 40, 46, 52, 71, 76, 83, Tel: WYman 2-5700, Yr: 1950, Emp: 130**


**See ad on page 380**


Micromech Mfg. Co., Div. Sanford Mfg. Corp., 1020 Commerce Ave., Union, N.J., 49, 89, 96, Tel: MU 8-6323

Micromega Corp., 4131 Del Ray Ave., Venice, Calif., 38, 40, 52, 72, 76, 83, 88, 94, Tel: EXmont 1-7137, Yr: 1960, Emp: 15, ▲8

**Microphase Corp., 1 Seneca Pl., P.O. Box 1166R, Greenwich, Conn., 21, 40, 50, 52, 83, Tel: NOrmandy 1-6200, Yr: 1955, Emp: 75, ▲2**


**See ad on page 204**


Micro-sonics, Inc., Hingham Industrial Center, Hingham, Mass., 50, Tel: RIverview 9-3100

Microtech, Inc., Mill Dale Rd., Cheshire, Conn., 21, 38, 39, 40, 49, 52, 80, 83, 89, 94, Tel: BRowning 2-3234, Yr: 1957, Emp: 70, ▲2

**Microtran Co., Inc., 145 E. Mineola Ave., Valley Stream, N.Y., 76, Tel: LOcust 1-6050, Yr: 1951, Emp: 60, ▲5**


**See ad on page 568**


Microwave Associates, Inc., Northwest Industrial Park, Burlington, Mass., 21, 38, 40, 44, 49, 52, 70, 72, 79, 83, Tel: BRowning 2-3000, Yr: 1950, Emp: 501, $6,600,000

Microwave Chemicals Laboratory, Inc., 282 Seventh Ave., New York 1, N.Y., 17, 39, 48, 83, 86, 90, 94, Tel: WAtkins 4-6725

Microwave Development Laboratories, Inc., 92 Broad St., Wellesley, Mass., 20, 21, 31, 38, 39, 40, 52, 80, 84, 90, 92, 94, 96, Tel: CEdar 5-6252, Yr: 1948, Emp: 215, ▲5, $3,000,000

Microwave Electronic Tube Co., Inc., 76 Lafayette St., Salem, Mass., 14, 21, 27, 39, 40, 52, 79, 80, 83, Yr: 1959, Emp: 76, ▲3

Microwave Electronics Corp., 4061 Transport St., Palo Alto, Calif., 79, Tel: DAvenport 1-1770, Yr: 1959, Emp: 44, ▲3, $100,000

**Microwave Services, Inc., 1475 Broadway, New York 36, N.Y., 88, Tel: BRyant 9-8517, Yr: 1952, Emp: 15, ▲10**


**See ad on page 629**


**Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 5, 14, 63, Tel: DRexel 6-7130, Yr: 1957, Emp: 25, ▲1, $189,000**


**See ad on page 182**


Mid-West Metal Products, Inc., 150 E. Donovan Rd., Kansas City 15, Kansas, 84, 87, Tel: MAyfair 1-1930, Yr: 1956, Emp: 75, $750,000

Middlesex Paper Tube Co., 315 Chelmsford St., Lowell, Mass., 93, Tel: GLenview 7-7687, Yr: 1919, Emp: 70

Midget Louver Co., 648 Wall St., Norwalk, Conn., 84, Tel: VO 6-2312, Yr: 1948, Emp: 10

Midland Manufacturing Co., 3155 Fiberglas Rd., Kansas City 15, Kan., 49, 52, Tel: FInley 2-7950

Midwest Research Institute, 425 Volker Blvd., Kansas City 10, Mo., 91, Tel: LOgan 1-0202, Yr: 1944, Emp: 270, ▲20

Midwestern Instruments, Inc., Hst & Sheridan, P.O. Box 7186, Tulsa 18, Okla., 9, 14, 16, 29, 30, 36, 38, 65, Tel: RI 7-4331, Yr: 1950, Emp: 175, ▲15, $5,400,000

Milford Rivet & Machine Co., 857 Bridgeport Ave., Milford, Conn., 91, Tel: TRinity 8-4631

Milgo Electronic Corp., 7620 N.W. 36th Ave., Miami 47, Fla., 4, 9, 10, 16, 24, 30, 36, Tel: OXford 1-1220, Yr: 1955, Emp: 249, $3,500,000

**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 2, 10, 14, 25, 30, 38, 44, 45, 46, 50, 55, 63, 71, 73, 86, 91, 93, 94, 98, 102, 104, Tel: DAvenport 4-4108, Yr: 1938**


**See ad on page 402**


Miller Co., J.W., 5917 S. Main St., Los Angeles 3, Calif., 39, 45, 52, 73, 76, 80, 86, 91, Tel: ADams 3-4294, Yr: 1924, Emp: 75, ▲2, $1,100,000

Miller Co., L. C., 717 Monterey Pass Rd., Monterey Park, Calif., 89, 92, 96, 104, Tel: AN 8-3611, Yr: 1955, Emp: 35, $110,000

Miller Company, Sanford, 11 Lynch St., Brooklyn 11, N.Y., 45, 63, 66, 76, Tel: ULster 8-2817, Yr: 1950, Emp: 6, $150,000

Miller Dial & Name Plate Co., 4400 Temple City Blvd., El Monte, Calif., 81, 87, 89, 91, 96, Tel: CU 3-5111, Yr: 1937, Emp: 180

Miller Electric Manufacturing Co., Inc., 718 S. Bounds St., Appleton, Wis., 66, 96, Tel: REgent 4-9821, Yr: 1929, Emp: 400, ▲1

Miller-Harris Instrument Co., 1134 S. First St., Milwaukee 4, Wis., 4, 58, 72, Tel: EV 3-7256, Yr: 1941, Emp: 60

Miller Labs., August E., 9226 Hudson Blvd., N. Bergen, N.J., 28, 49, Tel: UNion 9-2142, Yr: 1925, Emp: 15

Millipore Filter Corp., Bedford, Mass., 96, Tel: CR 4-8800, Yr: 1954, Emp: 100, ▲2, $100,000

Millitest Corp., 88 Madison Ave., Hempstead, L.I., N.Y., 5, 11, 14, 58, Tel: IVanhoe 9-9672

Millivac Instruments, Div. Cohu Electronics, Inc., 2315 Second Ave., Carman, Schenectady 3, N.Y., 3, 5, 14, 38, 47, Tel: ELgin 5-6550, Yr: 1947, Emp: 40, ▲1

Milman Engineering Co., Inc., 1831 Pontius Ave., Los Angeles 25, Calif., 62, 96, Tel: GRanite 3-0616, Yr: 1953, Emp: 10, $230,000

Milro Controls Co., Inc., 280 Midland Ave., Saddle Brook, N.J., 4, 30, 38, 45, 47, 63, 66, 76, 82, 88, 96, Tel: SWarthmore 1-1850, Yr: 1955, Emp: 20, $120,000

Miltronics Co., 3733 N. 7th St., Milwaukee 6, Wis., 4, 38, 61, 88, 89, Tel: FRanklin 2-8100, Yr: 1955, Emp: 4, ▲1, $100,000

Milwaukee Resistor Co., 700 W. Virginia St., Milwaukee 4, Wis., 69, Tel: BR 1-9900, Yr: 1944, Emp: 85, $200,000

Minatron Corp., 8 Cliveden St., Belle Mead, N.J., 75, 76, Tel: FLanders 9-6100, Yr: 1952, ▲2

Minco Products, Inc., 740 Washington Ave. N., Minneapolis 1, Minn., 4, 58, 69, 75, 92, Tel: FEderal 8-6753, Yr: 1956, Emp: 25, $150,000

Mincom Division, Minnesota Mining & Manufacturing Co., 2049 S. Barrington Ave., Los Angeles 25, Calif., 29, 36, Tel: BRadshaw 2-9971, Yr: 1956, Emp: 115, ▲2

Miniature Electronic Components Corp., 21 Plymouth St., Holbrook, Mass., 69, Tel: WOodlawn 3-7717, Yr: 1956, Emp: 50

Miniature Precision Bearings, Inc., Precision Park, Keene, N.H., 91, Tel: ELmwood 2-0310, Yr: 1941, Emp: 100, $7,000,000

Minicord Corp. of America, 1913 Atlantic Ave., Atlantic City, N.J., 18, 29, 58, 65, 102, Tel: 2-0188, Yr: 1954, Emp: 138

Minneapolis-Honeywell Regulator Co., Boston Div., 40 Life St., Boston 35, Mass., 4, 30, 38, 47, 60, 75, Tel: ALgonquin 4-5200, Yr: 1885, Emp: 1000

Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Wayne & Windrim Aves., Philadelphia 44, Pa., 4, 9, 14, 16, 17, 30, 36, 38, 47, 58, 84, 87, Tel: DA 9-8300, Yr: 1885

Minneapolis-Honeywell Regulator Co., Ceramics Laboratory, 1885 Douglas Dr., Minneapolis 22, Minn., 54, 75, 86, 93, Tel: LIberty 5-1661

Minneapolis-Honeywell Regulator Co., Datamatic Div., 60 Walnut St., Wellesley Hills 81, Mass., 9, Yr: 1885

Minneapolis-Honeywell Regulator Co., Fall River Div., 21 Penn St., Fall River, Mass., 4, 16, 55, 63, 75, Tel: OSborne 8-8331, Yr: 1885, Emp: 32,000

Minneapolis-Honeywell Regulator Co., Industrial Systems Div., 10721 Hanna St., Laurel, Md., 3, 9, 14, 24, 29, 36, 65, Tel: GRanite 4-6700, Yr: 1946, Emp: 375, ▲13

Minneapolis-Honeywell Regulator Co., Military Products Group, 2747 4th Ave. S., Minneapolis 8, Minn., 1, 4, 9, 14, 17, 18, 27, 30, 35, 38, 47, 60, 72, 75, 82, 84, 87, 89, Tel: FEderal 2-5225, Yr: 1885, Emp: 32,000

Minneapolis-Honeywell Regulator Co., Rubicon Instruments, Ridge Ave. at 35th St., Philadelphia 32, Pa., 5, 11, 14, 33, 58, Tel: BA 5-3737, Yr: 1921, Emp: 150

Minneapolis-Honeywell Regulator Co., Semiconductor Products Div., 1015 S. Sixth St., Minneapolis 4, Minn., 17, 70, Tel: FEderal 2-5225

Minneapolis-Honeywell Regulator Co., Twin Cities, 2753 Fourth Ave. S., Minneapolis 8, Minn., 4, 30, 38, 63, 68, 74, 75, Tel: FEderal 2-5225, Yr: 1885, Emp: 13,000

Minnesota Mining & Mfg. Co., Chemical Div., 900 Bush Ave., St. Paul 6, Minn., 93, 95, 99, Tel: PRospect 6-8511

Minnesota Mining & Mfg. Co., Magnetic Products Div. and Electrical Products Div., 900 Bush Ave., St. Paul 6, Minn., 9, 29, 48, 65, 86, 91, 93, 95, 99, Tel: PRospect 6-8511, Yr: 1922, Emp: 19,000

Minnesota Rubber Co., 3630 Wooddale Ave., Minneapolis 16, Minn., 74, 81, 91, 93, 98, Tel: WEst 9-6781, Yr: 1946, Emp: 450

Miratel, Inc., 1080 Dionne St., St. Paul 13, Minn., 4, 6, 12, 23, 34, 38, 63, 64, 80, Tel: HUmboldt 8-5536, Yr: 1954, Emp: 40, ▲2, $500,000

Miskella Infra-Red Co., The, E. 73rd & Grand Ave., Cleveland 4, Ohio, 92, Tel: HEnderson 1-2210

Missile Systems Corp., 11949 Vose St., N. Hollywood, Calif., 7, 20, 22, 26, 38, 84, 85, 87, Tel: POplar 5-9011, Yr: 1956, Emp: 62, ▲1

Missimers Incorporated, 3737 San Fernando Rd., Glendale 4, Calif., 14, 84, 92, Tel: CHapman 5-8471, Yr: 1932, Emp: 60, ▲1, $325,000

Missouri Research Laboratories, Inc., 2109 Locust St., St. Louis 3, Mo., 9, 21, 28, 30, 38, 45, 91, Tel: CHestnut 1-7875, Yr: 1946, Emp: 150, $500,000

Mitchell Electronics Corp., 58 Marbledale Rd., Tuckahoe, N.Y., 45, 76, 89, Tel: WOodbine 1-4001, Yr: 1957, Emp: 12

Mitchell Industries, Inc., P.O. Box 17, Mineral Wells, Tex., 1, 39, 52, 59, 96, Tel: FA 5-4747, Yr: 1948, Emp: 55, ▲1, $500,000

Mitchell-Rand Mfg. Corp., 51 Murray St., New York 7, N.Y., 93, 95, 99, Tel: COrtlandt 7-9261, Yr: 1901, Emp: 50

**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 43, 44, 46, 48, 54, 64, 66, 70, 73, 76, 77, 86, 91, 93, 98, 104, Tel: WAverly 6-2250, Yr: 1953, Emp: 60**

**See ad on page 452**

**Mittelmann, Eugene, 549 W. Washington Blvd., Chicago 6, Ill., 4, 30, 88, 92, 94, Tel: CEntral 6-2983**

**See ad on page 629**

Mobay Chemical Co., Penn Lincoln Pkwy., W., Pittsburgh 5, Pa., 91

Mobil Electronics, Inc., Div. Radionic Labs., Inc., 1111 State Rd. 67 E., Anderson, Ind., 4, 12, 22, 52, 84, 87, 89, Yr: 1946, Emp: 18

Model Rectifier Corp., 1675 Utica Ave., Brooklyn 34, N.Y., 47, 63, 69, Tel: CLoverdale 8-6800, Yr: 1947, Emp: 40

Modelectric Products Corp., Asbury Park, N.J., 4, 45, 57, 72, 76, 85, 89, Tel: PRospect 4-2519, Yr: 1945, Emp: 25, ▲1, $183,000

Modern Design, Div. H. C. Schloer, Inc., Vestal Pkwy., Vestal, N.Y., 3, 4, 6, 9, 10, 11, 14, 32, 38, 50, 64, 80, 82, 88, 89, 94, 96, 100, Tel: STillwell 5-9901, Yr: 1943, Emp: 200, ▲3, $600,000

Modern Laboratory Equipment Co., 1811 First Ave., New York, N.Y., 14, 74, 92, 94, Tel: TR 6-4700, Yr: 1951, Emp: 15

Modine Mfg. Co., 1500 DeKoven Ave., Racine, Wis., 96, Tel: MElrose 3-2411

**Moeller Instrument Co., Inc., Electronics Div., 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 4, 9, 21, 30, 38, 58, 82, Tel: VIrginia 9-2100, Yr: 1864, Emp: 150, ▲3**

**See ad on page 588**

Mohawk Business Machines Corp., 944 Halsey St., Brooklyn 33, N.Y., 25, 29, 76, Tel: GLenmore 5-9570, Yr: 1949, Emp: 250, $1,600,000

Molded Fiber Glass Sheet Co., 4301 Benefit Ave., Ashtabula, Ohio, 93, 99, Yr: 1950, Emp: 45

Molding Corporation of America, 40 Church St., Pawtucket, R.I., 46, 53, 54, 73, 91, 93, 94, 98, Tel: PA 6-2100, Yr: 1929, Emp: 20

Mole-Richardson Co., 937 N. Sycamore Ave., Hollywood 38, Calif., 34, Tel: OLdfield 4-3660, Yr: 1927, Emp: 40





Molectronics, A Minneapolis-Moline Subsid., 1717 N. Potrero Ave., S. El Monte, Calif., 10, 14, 23, 25, Tel: CUmberland 3-8101, Yr: 1958, Emp: 50, ▲4, $150,000

Molecu-Wire Corp., Rt. 537, Scobeyville, N.J., 85, Tel: LIberty 2-1200, Yr: 1958, Emp: 75, ▲2, $1,000,000

Molex Products Co., 9515 Southview Ave., Brookfield, Ill., 62, 64, 68, 71, 72, 73, 98, Tel: HUnter 5-5881

Molly Corp., 230 N. Fifth St., Reading, Pa., 91, Tel: FRanklin 6-7413, Yr: 1948, Emp: 50

Moloney Electric Co., 5390 Bircher Blvd., St. Louis 20, Mo., 48, 52, 63, 76, Tel: EVergreen 3-3300, Yr: 1896, Emp: 1700

Mona Industries, Inc., P.O. Box 1786, Paterson 17, N.J., 95, Tel: ARmory 4-8220, Yr: 1951, Emp: 25, $45,000

Monadnock Mills, 1977-1st Ave., San Leandro, Calif., 46, 91, 98, 99, 104, Tel: ELgin 7-3700, Yr: 1913, Emp: 145, ▲1

Monarch Electric Corp., 118 E. First St., Jamestown, N.Y., 53, Tel: JAmestown 3-1565, Yr: 1909, Emp: 80

Monitor Products Co., 815 Fremont Ave., S. Pasadena, Calif., 36, 49, Tel: MUrray 2-1174, Yr: 1930, Emp: 83, ▲2, $650,000

Monroe Calculating Machine Co., Inc., Div. Litton Industries, 60 Main St., San Francisco 5, Calif., 9, 10, 29, 36, Tel: DOuglas 2-7328, Yr: 1912, Emp: 9000

Monroe Calculating Machine Co., Inc., Div. Litton Industries, 555 Mitchell St., Orange, N.J., 9, 29, Tel: ORange 3-6600, Yr: 1912, Emp: 4689

Monsanto Chemical Co., 800 N. Lindbergh Blvd., St. Louis 66, Mo., 95, Tel: WYdown 3-1000

Montek Associates, Inc., 4675 S. State St., Salt Lake City 7, Utah, 4, 9, 10, 17, 30, 38, 63, 64, 69, 75, 82, 91, Tel: AM 2-2464, Yr: 1955, Emp: 40

Moody Machine Products Co., Inc., 42-46 Dudley St., Providence 5, R.I., 96, Tel: GAspee 1-3317, Yr: 1940, Emp: 17

Mooradian High Frequency Labs., 13 E. Fort Lee Rd., Bogota, N.J., 19, Tel: DIamond 2-2115, Yr: 1937

Moore Associates, Inc., 2600 Spring St., Redwood City, Calif., 4, 8, 9, 20, 23, 35, 36, Tel: EMerson 9-0204

Moran Instrument Corp., 170 E. Orange Grove Ave., Pasadena 3, Calif., 27, 29, 30, 63, Tel: SY 6-7158

Morecroft Design Engineering, J. H., 5524 Goss Canon Ave., La Crescenta, Calif., 88, 94, Tel: CH 8-5524

Morris Co., J. L., 394 Elm St., Southbridge, Mass., 91, 96, Tel: POrter 4-4394, Yr: 1920, Emp: 40

Morris, Jr., Fred W., 11600 Fairway Dr., Los Altos, Calif., 88, Tel: WHitecliff 8-3928

Morrow Radio Mfg. Co., 2794 Market St., Salem, Ore., 2, 12, 22, 31, Tel: EMpire 3-6952

Morse Co., Frank W., 354 Congress St., Boston 10, Mass., 55, 71, Tel: HAncock 6-5398, Yr: 1895, Emp: 23

Mosaic Fabrication, Inc., Foster St., Southbridge, Mass., 101, Tel: PO 4-1014, Yr: 1958, Emp: 10, ▲1, $10,000

Moseley Co., F. L., 409 N. Fair Oaks Ave., Pasadena, Calif., 4, 9, 14, 15, 16, 30, 38, 47, 58, Tel: SYcamore 2-1176, Yr: 1951, Emp: 130, ▲3, $2,293,922

Mosinee Paper Mills Co., Mosinee, Wis., 93, Tel: OXbow 3-2111, Yr: 1910, Emp: 550

Mosler Research Products, Inc., 9 South St., Danbury, Conn., 4, 12, 22, 38, Tel: Pioneer 3-6766, Yr: 1903, Emp: 75, ▲2

Mosley Electronics, Inc., 4610 N. Lindbergh, Bridgeton, Mo., 39, 46, 49, 71, Tel: PE 1-3036, Yr: 1946, Emp: 85, ▲2

Mossman, Inc., Donald P., P.O. Box 265, Brewster, N.Y., 72, 85, 89, Tel: BRewster 9-3725, Yr: 1941, Emp: 97

Motor Generator Corp., Box DM-124, Troy, Ohio, 60, Tel: FE 2-1223

Motorescarch Co., 1500 Junction Ave., Racine, Wis., 60, 63, Tel: ME 2-5131, Yr: 1946, Emp: 65, $300,000

Motorola Aviation Electronics, Inc., 3302 Airport Ave., Santa Monica, Calif., 1, 4, 18, 30, 38, 39, 52, 56, 59, 63, 76, 80, Tel: EXbrook 1-7116, Yr: 1960, Emp: 425, ▲1

Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Ill., 1, 6, 7, 8, 9, 12, 14, 20, 22, 23, 26, 27, 28, 31, 39, 52, 59, 61, 70, Tel: SPaulding 2-6500, Yr: 1929, Emp: 13,000

Motorola, Inc., Military Electronics Div., 8201 E. McDowell Rd., Phoenix, Ariz., 1, 4, 9, 12, 13, 15, 17, 18, 20, 22, 23, 26, 27, 30, 31, 36, 38, 39, 40, 46, 48, 49, 64, 70, 71, 76, 80, 83, 86, 89, 90, 93, 94, 101, 102, Tel: WH 5-4311, Yr: 1928, Emp: 15,500, ▲22, $290,000,000

**Motorola Semiconductor Products, Inc., 5005 E. McDowell Rd., Phoenix, Ariz., 66, 70, Tel: BRidge 5-4411, Yr: 1955, Emp: 1500, ▲68, $290,000,000**

**See ad on page 192**

Motson Co., J. Frank, 1717 Bethlehem Pike, Flourtown, Pa., 62, 89, Tel: CHestnut Hill 7-1900, Yr: 1932, Emp: 41, $100,000

Moxness Products, Inc., 1914 Indiana St., Racine, Wis., 91, 93, 98, Tel: MElrose 7-4425, Yr: 1922, Emp: 150, $200,000

Moyen Co., C. P., 8157 Monticello Ave., Skokie, Ill., 95, Tel: OR 3-6866, Yr: 1930, Emp: 5, $75,000

**Mucon Corp., 9 St. Francis St., Newark 5, N.J., 43, Tel: MItchell 2-1476, Yr: 1950**

**See ad on page 392**

Mueller Electric Co., 1583 E. 31st St., Cleveland 14, Ohio, 55, Tel: PRospect 1-5225, Yr: 1908, Emp: 110

Mueller Eng. Co., Inc., See: Heinz Mueller Eng. Co., Inc.

Muirhead & Co., Ltd., Beckenham, Kent, England, 3, 4, 5, 11, 13, 14, 16, 29, 30, 33, 38, 40, 43, 58, 60, 68, 69, Tel: BECkenham 4888, Yr: 1880

Muirhead Instruments, Inc., 111 Lexington Ave., New York 17, N.Y., 3, 4, 5, 11, 13, 14, 30, 33, 38, 40, 43, 44, 60, 68, 69, 72, 98, Tel: MUrray Hill 2-8131

Mullenbach Div., Electro Machinery Mfg. Co., Electronic Dept., 2100 E. 27th St., Los Angeles 58, Calif., 43, 75, 86, Tel: LUdlow 2-5331, Yr: 1954, Emp: 30, ▲1

Multi-Amp Electronic Corp., 465 Lehigh Ave., Union, N.J., 11, 63, 68, 72, Yr: 1950, Emp: 20, ▲1

Multi Products Co., 21470 Coolidge Hwy., Oak Park 37, Mich., 2, 4, 12, 18, 22, 63, Tel: JOrdan 6-2377, Yr: 1948, Emp: 100, ▲2, $1,000,000

Multicore Sales Corp., 80 Shore Rd., Port Washington, L.I., N.Y., 103, Tel: POrt Washington 7-7700

Multitone of Canada, Ltd., 130 Merton St., Toronto 7, Ont., Canada, Importers, 4, 19, 22, 32, 38, Tel: HUdson 1-0731

Munzig International, Inc., 212 S. Western Ave., Los Angeles 4, Calif., Importers, 2, 3, 5, 6, 9, 11, 12, 14, 18, 19, 22, 25, 29, 32, 33, 38, 39, 41, 43, 44, 47, 48, 52, 56, 58, 59, 61, 65, 68, 69, 70, 72, 75, 76, 77, 86, Tel: DUnkirk 2-1276, Yr: 1959, ▲2

Murata Mfg. Co., Ltd., Hino-Oka, Yamashina, Higashiyama, Kyoto, Japan, 33, 43, 44, 52, 86, 93, Tel: KOtari 236, Yr: 1944, Emp: 1500, ▲2, $4,167,500

Murdoch Laboratories, Div. Blackstone Corp., 921 Port Washington Blvd., Port Washington, L.I., N.Y., 96, Tel: POrt Washington 7-7717

Murdock Corp., The, 158 Carter St., Chelsea, Mass, 56, 73, 91, Tel: CHelsea 3-0076, Yr: 1896, Emp: 40

Mured Incorporated, P.O. Box 286, Danbury, Conn., 38, Tel: Pioneer 3-4028, Yr: 1952, Emp: 10, $50,000

Murray Mfg. Corp., 1250 Atlantic Ave., Brooklyn 16, N.Y., 72, Tel: PResident 1-8000, Yr: 1899, Emp: 600

Murray Plastics Co., 10 River Rd., New Hamburg, N.Y., 93, 99, Tel: AXminister 7-2913

Muter Division, Muter Company, The, 1255 S. Michigan Ave., Chicago 5, Ill., 43, 44, 45, 69, 72, 76, Tel: WA 2-8800, Yr: 1930, Emp: 1490, ▲10, $13,500,000

**Mycalex Corporation of America, 126 Clifton Blvd., Clifton, N.J., 54, 64, 86, 93, 99, 102, Tel: PR 9-8866**

**See ad on page 658**

Mycalex Electronics Corp., 125 Clifton Blvd., Clifton, N.J., 36, 72, Tel: PR 9-8866

Mycalex Tube Socket Corp., 125 Clifton Blvd., Clifton, N.J., 71, Tel: PR 9-8866

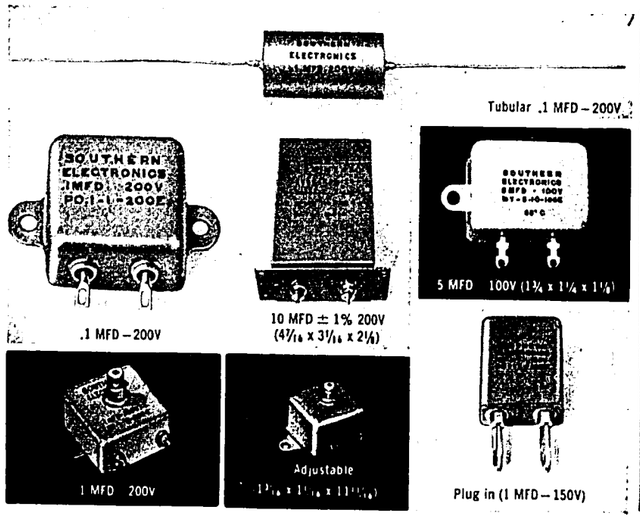
Mykroy, Inc., 645 Wheeling Rd., Wheeling, Ill., 71, 73, 86, 89, 93, 99, Tel: LEhigh 7-0280, Yr: 1943, Emp: 30, $800,000



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

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- Insulation Resistance as HIGH as 1 x 10¹²
- Dielectric Absorption as LOW as .0001
- Dissipation Factor as LOW as .0002
- Temperature Coefficient . . . 100PPM per °C
- Stability as close as .05% drift in 1 yr.
- Voltage Derating . . . none to 170°F
- Hermetically sealed for ordering accuracy!

also available:

- Many other case styles or mounting brackets
- Any capacitance from .001 to 50 MFD (incl. special values)
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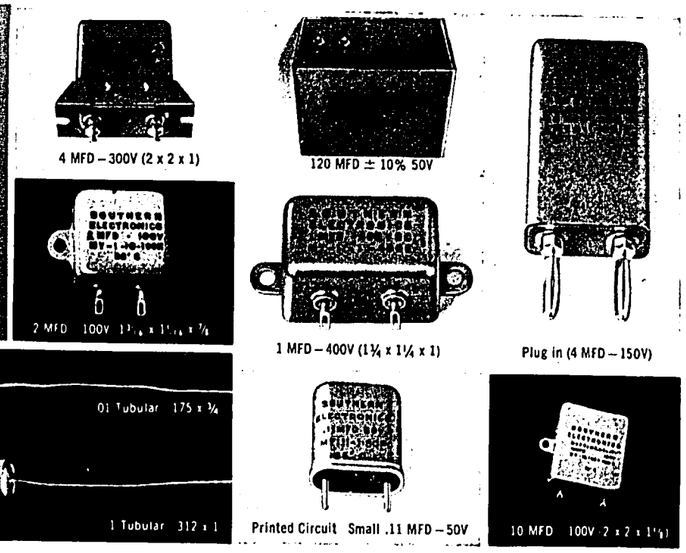
## 2. POLYESTER

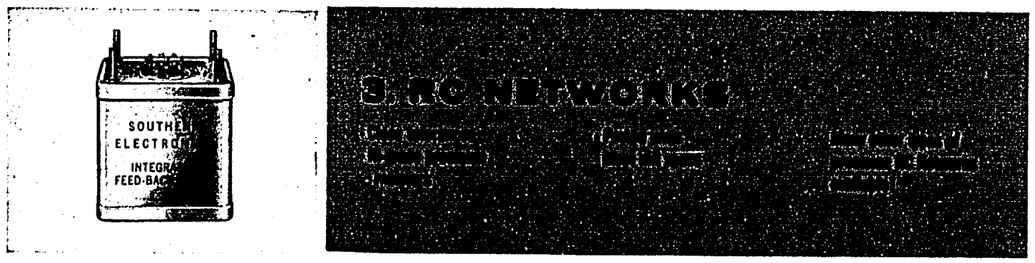
with these outstanding properties:

- Tolerances as close as 1%
- Insulation Resistance as HIGH as 1 x 10¹²
- Dielectric Absorption as LOW as .001
- Dissipation Factor as LOW as .010
- Temperature Coefficient . . . 500 PPM per °C
- Stability as close as .5% drift in 1 yr.
- Voltage Derating . . . none to 125°C
- Hermetically sealed for ordering accuracy!

also available:

- Many other case styles or mounting brackets
- Any capacitance from .001 to 10 MFD (incl. special values)
- Voltages from 50 to 1000




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My-stik Adhesive Products, Inc., 2635 N. Kildare Ave., Chicago 39, Ill., 91, 93, Tel: SPaulding 2-1600, Yr: 1932, Emp: 500

Mytron, Inc., 362 Middlesex Ave., N. Wilmington, Mass., 3, 21, 38, 39, 40, 49, 72, 80, 83, 89, Tel: PArkview 9-1455

# N

NJE Corporation, 20 Boright Ave., Kenilworth, N.J., 63, Tel: BRidge 2-6000, Yr: 1955, Emp: 150

**N R C Equipment Corp., Dept. RE-A, 160 Charlemont St., Newton 61, Mass., 4, 14, 92, 96, Tel: DEcatur 2-5800, Yr: 1940, Emp: 250, ▲5**

See ad on page 676

N.R.K. Mfg. & Engineering Co., 4601 W. Addison St., Chicago 41, Ill., 39, 40, 52, 75, 76, 83, Tel: SPring 7-2970, Yr: 1942, Emp: 110, ▲1, $2,000,000

Nacimco Products, P.O. Box 248, Old San Diego Station, San Diego, Calif., 4, 5, 47, 63, 75, Tel: BRowning 6-3020, Yr: 1956, Emp: 35, ▲3, $300,000

Nameplates, Inc., 421 E. 101st St., Brooklyn 36, N.Y., 91, Yr: 1953, Emp: 25

Naniloa Corporation, P.O. Box 2791, Station B, Toledo 6, Ohio, 4, 9, 10, 23, 24, 30, 32, 36, 38, 63, 64, 75, 94, Tel: CHerry 1-8065, Yr: 1956, Emp: 18, ▲3, $10,000

Narda Microwave Corp., The, 118 Herricks Rd., Mineola, N.Y., 5, 20, 21, 39, 40, 52, 63, 76, 80, 83, Tel: Pioneer 6-4650, Yr: 1953, Emp: 175, ▲25

Narmco Materials Div., Narmco Industries, Inc., Subsid. Telecomputing Corp., 600 Victoria St., Costa Mesa, Calif., 93, 95, Tel: LIberty 8-4092, Yr: 1941, Emp: 800

Narrow Fabric Co., The, P.O. Box 742, Reading, Pa., 91, 93, Tel: FRanklin 6-2891

Nashua Corp., 44 Franklin St., Nashua, N.H., 16, Tel: TUxedo 3-7711, Yr: 1818, Emp: 1250

National Aeronautical Corp., Commerce Dr., Fort Washington, Pa., 1, 39, Tel: MItchell 6-2900, Yr: 1945, Emp: 308, ▲10, $6,410,000

National Cash Register Co., The, S. Main & K Sts., Dayton 9, Ohio, 48, Tel: BA 6-1411

National Cash Register Co., The, Electronics Div., 1401 E. El Segundo Blvd., Hawthorne, Calif., 9, Tel: PLymouth 7-1811, Yr: 1881, Emp: 364, ▲35

National Ceramic Co., 500 Southard St., Trenton 2, N.J., 48, 77, 86, 93, Tel: EXport 4-5373, Yr: 1906, Emp: 85, $500,000

National Cine Equipment, Inc., 209 W. 48th St., New York 36, N.Y., 34, 59, Tel: CIrcle 6-0318-9, Yr: 1948, Emp: 11

National Coil Co., P.O. Box 1237, Sheridan, Wyo., 45, 52, 76, Tel: OR 4-7644, Yr: 1950, Emp: 43, $210,000

National Company, Inc., 61 Sherman St., Malden 48, Mass., 1, 3, 9, 14, 18, 20, 21, 22, 26, 28, 31, 33, 35, 36, 38, 78, 88, 89, 94, 100, Tel: DAvenport 2-7950, Yr: 1944, Emp: 935, ▲175, $12,800,000

National Electronics, P.O. Box 1237, Sheridan, Wyo., 4, 14, 58, Tel: OR 4-7644, Yr: 1958, Emp: 11

**National Electronics, Inc., Subsid. Eitel-McCullough, Inc., 628 North St., Geneva, Ill., 78, Tel: GEnter 2-7000, Yr: 1947, Emp: 125, ▲5, $2,500,000**

See ad on page 576

National Instrument Laboratories, Inc., 858 Exarts St. N.E., Washington 18, D.C., 4, 14, 63, Tel: NOrth 7-7582, Yr: 1951, Emp: 15, ▲1, $250,000

National Lead Co., 111 Broadway, New York 6, N.Y., 97, 103, Tel: RE 2-9100

National Moldite Co., Inc., 250 South St., Newark 5, N.J., 39, 48, 57, 72, 86, 91, 98, Tel: MItchell 2-6860, Yr: 1944, Emp: 75, $750,000

National Multi-Products Co., 6335 N Broadway, Chicago 40, Ill., 55, 73, 85, 89, 91, Tel: AM 2-4781, Yr: 1949, Emp: 25

**National Radio Co., Inc., Subsidiary of National Co., Inc., 37 Washington St., Melrose 76, Mass., 1, 2, 6, 18, 31, 33, 41, 45, 48, 71, 85, 86, 91, 98, Tel: NOrmandie 5-4800**

See ad on page 614

National Radio Research Labs., 74 W. 68th St., New York 23, N.Y., 91, Tel: TRafalgar 7-1143, Yr: 1943, Emp: 8, ▲2

National Research Corp., Metals Div., 70 Memorial Dr., Cambridge 42, Mass., 97, 104, Tel: ELiot 4-5100, Yr: 1940, Emp: 400, ▲15, $100,000

National Scientific Laboratories, Inc., 2010 Massachusetts Ave. N.W., Washington 6, D.C., 3, 4, 8, 9, 11, 25, 36, 38, 52, 63, 64, 88, 94, Tel: HUdson 3-4030, Yr: 1948, Emp: 220, ▲50, $2,000,000

National Semiconductor Corp., P.O. Box 443, Danbury, Conn., 63, Tel: Pioneer 3-7621, Yr: 1960, Emp: 180

National Semiconductors, Ltd., 230 Authier St., Montreal 9, P.Q., Canada, 70, Tel: RI 4-2946, Yr: 1958, Emp: 12, ▲2

National-Standard Co., 601 N. 8th, Niles, Mich., 85, Tel: MUtual 3-8100, Yr: 1907, Emp: 2000

National Standard Electronics, Inc., 2 East End Ave., New York 21, N.Y., 4, 14, 17, 19, 24, 30, 33, 88, 94, 96, Tel: RHinelander 4-4100, Yr: 1959, Emp: 20

**National Tel-Tronics Corp., 53 St. Cassimir Ave., Yonkers, N.Y., 46, 53, 55, 73, 89, 93, 99, Tel: YOnkers 8-6100, Yr: 1947, Emp: 100, ▲1, $850,000**

See ad on page 559

National Ultrasonic Corp., 111 Montgomery Ave., Irvington 11, N.J., 14, 38, 88, 91, 96, Tel: ESsex 1-0550, Yr: 1958, Emp: 25, ▲2

National Union Electric Corp., Electronics Div., 1201 E. Bell St., Bloomington, Ill., 77, 78, Tel: 7-6011, Yr: 1929, Emp: 1500, ▲2, $250,000

National Vulcanized Fibre Co., Maryland Ave. & Beech St., Wilmington 99, Del., 89, 91, 93, 99, Tel: OLympia 5-6471, Yr: 1922, Emp: 1800, $3,150,000

Natvar Corporation, 211 Randolph Ave., Woodbridge, N.J., 91, 93, 99, Tel: FUlton 8-8800, Yr: 1941, Emp: 175, ▲3

**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 4, 9, 10, 14, 21, 24, 28, 35, 64, 94, Tel: HOward 5-7700, Yr: 1951, Emp: 60, ▲2, $500,000**

See ad on page 498

**Naybor Laboratories, Inc., E. V., 26 Manorhaven Blvd., Port Washington, N.Y., 68, 72, 83, Tel: POrt Washington 7-1300, Yr: 1953, Emp: 15, ▲1, $126,000**

See ad on page 517

Neff Instrument Corp., 2211 E. Foothill Blvd., Pasadena, Calif., 38, 63, 64, Tel: SY 5-4308, Yr: 1956, Emp: 30, ▲2, $260,000

Nelson Vacuum Pump Co., 2133 Fourth St., Berkeley 10, Calif., 96, Tel: THornwall 8-2277, Yr: 1926, Emp: 6, $5000

Nems-Clarke Co., Div. Vitro Corp. of America, 919 Jesup-Blair Dr., Silver Spring, Md., 1, 6, 28, 31, 35, 36, 55, 76, Tel: JUniper 5-1000, Yr: 1909, Emp: 600, ▲20, $7,000,000

Neptune Electronics Co., 30 W. 15th St., New York 11, N.Y., 1, 4, 5, 11, 32, 38, 39, 40, 43, 52, 55, 63, 69, 72, 91, Tel: CHelsea 3-8130, Yr: 1945, Emp: 20, ▲1, $250,000

**Nesor Alloy Products Co., 666 Passaic Ave., West Caldwell, N.J., 85, Tel: CA 8-0100, Emp: 105**

See ad on page 613

Network Industries, Inc., P.O. Box 397, Bayonne, N.J., 5, 14, 17, 15, 63, 72, Tel: HEmlock 7-3929, Yr: 1958, Emp: 26, ▲2, $325,000

Networks Electronic Corp., 11806 Oxnard St., Van Nuys, Calif., 9, 17, 38, 46, 47, 54, 63, 68, Tel: STate 2-3111, Yr: 1953, Emp: 111

Neutronic Associates, Inc., 32 Tennessee Ave., New York, N.Y., 63, Tel: IV 9-9810

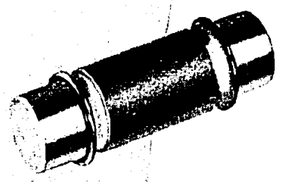
Nevada Air Products Co., P.O. Box 1090, Reno, Nev., 6, 39, 42, 84, 89, Tel: FA 2-9121, Yr: 1950, Emp: 300, ▲2

Nevada Antenna Co., P.O. Box 530, Colusa, Calif., 39, 52, Tel: GLenview 8-4191

**Use the Reader Service Card at the back of this book for information on advertised products**



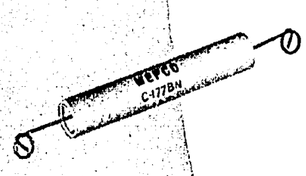

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EXTERNAL METER MULTIPLIERS (JAN-R-29) — The answer to that special requirement in the design of kilovolt panel meters, for transmitters and power supplies, where an accuracy of .5% or closer is required.




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CARBON FILM (MIL-R-10509C) — For that important application where precision and stability at a reasonable price is a must.



NETWORKS — Completely packaged resistor assemblies. Ideal for usage as attenuator summing or dividing networks. Can be manufactured to your specifications or designed to fit your requirements.

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**MEPCO INC.**

For details, circle #144 on Reader Service Card




New Departure Div., General Motors Corp., 269 N. Main St., Bristol, Conn., 91, Tel: LUdlow 2-6371, Yr: 1889, Emp: 7000

New England Electrical Works, Inc., 365 Main St., Lisbon, N.H., 85, Tel: 8-6620, Yr: 1898, Emp: 30, $150,000

New England Etching Co., Inc., 25 Spring St., Holyoke, Mass., 84, 89, 91, Tel: JEfferson 2-9182

New England Instrument Co., 1334 Main St., Waltham, Mass., 69, Tel: TWinbrook 9-8370, Yr: 1957, Emp: 95, $1,000,000

New England Laminates Co., Inc., 481 Canal St., Stamford, Conn., 89, 99, Tel: DAvis 4-4181, Yr: 1955, Emp: 94, $1,300,000

New England Scientific Instruments Co., 238 Main St., Cambridge 42, Mass., 5, 14, 25, 33, 43, 58, Tel: KI 7-1997, Yr: 1956, Emp: 7, $20,000

New England Transformer Co., Inc., 47 McGrath Hwy., Somerville 43, Mass., 76, Tel: SOmerset 6-6100

New Hampshire Ball Bearings, Inc., Route 202, Peterborough, N.H., 91, Tel: WAlnut 4-3311, Yr: 1946, Emp: 1000

**New Hermes Engraving Machine Corp., 154 W. 14th St., New York 11, N.Y., 89, 91, 96, 99, Tel: WAtkins 4-7373**

**See ad on page 677**

New London Instrument Co., P.O. Box 189, New London, Conn., 1, 3, 9, 14, 17, 21, 23, 28, 33, 36, 38, 40, 49, 63, Tel: GIbson 3-8451, Yr: 1950, Emp: 29, ▲4, $300,000

New Rochelle Thermatool Corp., 320 Main St., New Rochelle, N.Y., 92, 94, 96, Tel: NEw Rochelle 2-5555, Yr: 1950, Emp: 65, ▲2

**New York Air Brake Co., Kinney Manufacturing Div., 3631 Washington St., Boston 30, Mass., 4, 14, 24, 96, Tel: JAmaica 2-7100, Yr: 1909, Emp: 430, ▲5, $700,000**

**See ad on page 35**

New York Coil Co., 40-48 Second Ave., Phoenixville, Pa., 45, 76, 89, Tel: WEllington 3-3114, Yr: 1903, Emp: 100, $200,000

New York Solder Co., Inc., 684 E. 133rd St., New York 54, N.Y., 103, Tel: CYpress 2-3740, Yr: 1929, Emp: 25

New York Testing Laboratories, Inc., 47 West St., New York 6, N.Y., 94, Tel: BOwling Green 9-6220, Yr: 1919, Emp: 40, ▲2

New York Transformer Co., Inc., Third Ave., Alpha, N.J., 11, 45, 52, 63, 76, Tel: GL 4-1143, Yr: 1938, Emp: 400

Newark Controls Co., 15 Ward St., Bloomfield, N.J., 4, 11, 14, 72, Tel: PIlgrim 8-2971, Yr: 1930





Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif., 6, 29, 32, 38, 61, 80, Tel: HOllywood 9-5381, Yr: 1937

Newcomb Spring Corp., 77 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 72, 89, 91, 104, Yr: 1886, Emp: 50, $250,000

Newton Co., The, 55 Elm St., Manchester, Conn., 4, 9, 30, 72, Tel: MItchell 3-1543, Yr: 1947, Emp: 75, ▲3, $100,000

**Ney Company, J. M., Maplewood Ave., Bloomfield, Conn., 46, 72, 85, 97, 98, 103, Tel: CHapel 2-2281 (Hartford, Conn.), Yr: 1812, Emp: 300**

**See ad on page 687**

Nicad Division, Gould-National Batteries, Inc., 172 Pleasant St., Easthampton, Mass., 41, Tel: EAsthampton 1200, Yr: 1928, Emp: 125

Nichols & Clark, Inc., 321 Newburyport Trnpk., Hathorne, Mass., 38, Tel: SPring 4-3300, Yr: 1938, Emp: 35, ▲1

Nichols, Ltd., R. H., 4544 Dufferin St., Toronto, Ont., Canada, Importers, 4, 5, 11, 14, 16, 19, 24, 28, 30, 33, 36, 38, 58, 60, 63, 66, 82, 89, 92, 94, 96, Tel: MElrose 3-8190, Yr: 1928, Emp: 85, ▲1

**Nielsen Hardware Corp., 770 Wethersfield Ave., Hartford 1, Conn., 91, Tel: JAckson 2-8145, Yr: 1912, Emp: 150**

**See ad on page 648**

Nilsen Mfg. Co., 21 N. Church St., Addison, Ill., 3, 4, 9, 28, 30, 44, 50, 75, 76, Tel: KIngswood 3-6800, Yr: 1923

Nilsson Electrical Laboratory, Inc., 103 Lafayette St., New York 13, N.Y., 14, Tel: CAnal 6-1648, Yr: 1919, Emp: 30

Nippon Electric Co., Ltd., Affil. International Tel. & Tel. Corp., Shiba-Mita, Tokyo, Japan, 1, 4, 6, 7, 8, 9, 10, 12, 13, 17, 18, 20, 22, 23, 26, 27, 31, 32, 34, 35, 36, 39, 41, 43, 59, 66, 67, 68, 70, 71, 72, 77, 78, 79, 96, Tel: 451-5221, Yr: 1899, Emp: 9000, ▲14, $50,000,000

Noble & Westbrook Mfg. Co., The, 20 Westbrook St., E. Hartford 8, Conn., 96, Tel: BU 9-2717, Yr: 1906, Emp: 46

**Noesting Pin Ticket Co., Inc., 728 E. 136th St., New York 54, N.Y., 73, 89, 91, 104, Tel: MO 9-6465**

**See ads on pages 559, 647, 705**

Non-Linear Systems, Inc., Box 728, Del Mar, Calif., 4, 9, 14, 47, 62, 69, Tel: SKyline 5-1134, Yr: 1952, Emp: 220, ▲5

Nonotuck Mfg. Co., Water St., Holyoke, Mass., 85, Tel: JE 4-0271, Yr: 1937, Emp: 112

Norrich Plastics Corp., 206 Babylon Tnpke., Roosevelt, L.I., N.Y., 39, 46, 55, 71, 83, 85, 86, 89, 91, 93, 98, 99, 104, Tel: MA 3-3100

**Norrman Labs., Ernst, Williams Bay, Wis., 3, 4, 14, 25, 28, 33, 94, Tel: CIrcle 5-5516, Yr: 1934**

**See ad on page 350**

North American Electronics, Inc., 71 Linden St., West Lynn, Mass., 66, 70, 72, Tel: LYnn 8-4800, Yr: 1957, Emp: 75

North American Philips Co., Inc., Elmet Div., Lisbon Rd., Lewiston, Me., 85, 97, Tel: STate 4-5178

**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 3, 4, 14, 25, 28, 30, 38, 47, 58, 68, 76, Tel: OVerbrook 1-8600, Yr: 1954, Emp: 65**

**See ad on page 286**

North Electric Co., 553 S. Market St., Galion, Ohio, 4, 9, 10, 18, 32, 38, 45, 46, 55, 57, 68, 72, 73, 85, Tel: HO 8-2120, Yr: 1881, Emp: 1800, ▲15, $20,000,000

**North Hills Electronics, Inc., Alexander Pl., Glen Cove, L.I., N.Y., 14, 45, 52, 63, 76, 82, Tel: ORiole 1-5700, Yr: 1953, Emp: 50, ▲6**

**See ads on pages 405, 445, 588**

**North Shore Nameplate, Div. Anodyne, Inc., 214-27 Northern Blvd., Bayside 61, N.Y., 84, 91, Tel: BAyside 4-4000, Yr: 1953, Emp: 70**

**See ad on page 603**

Northeast Scientific Corp., 30 Wetherbee St., Acton, Mass., 21, 63, Tel: COlonial 3-7706, Yr: 1953, Emp: 15, ▲1

**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 4, 9, 10, 14, 21, 23, 24, 33, 36, 58, 84, 87, Tel: NAtional 2-6485, Yr: 1945, Emp: 180, ▲6, $1,500,000**

**See ad on pages 27-30**

Northern Electronic & Vacuum Industries, P.O. Box 105, St. Sauveur des Morts, P.Q., Canada, 4, 9, 17, 24, 88, Tel: CA 7-2629

**Northern Engineering Laboratories, 372 Wilmot Ave., Burlington, Wis., 33, 49, 75, Tel: ROckwell 3-3591, Yr: 1954, ▲2**

**See ad on page 433**

Northern Engraving & Mfg. Co., Fourth & Vine Sts., La Crosse, Wis., 84, 89, 91, Tel: 4-6000

Northern Plastics Corp., La Crosse, Wis., 89, 93, 99, Tel: LA Crosse 4-6070, Yr: 1945, Emp: 225

**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 1, 2, 3, 4, 8, 13, 18, 23, 26, 35, 36, Tel: WAtkins 9-9117, Yr: 1946, Emp: 100, $5,000,000**

**See ad on pages 36-39**

Northrop Corp., Nortronics Div., Precision Products Dept., Norwood, Mass., 4

Northwest Industries, Ltd., P.O. Box 517, Municipal Airport, Edmonton, Alberta, Canada, 84, 88, 89, 91, 100, Tel: GL 5-3161, Yr: 1946, Emp: 600, ▲1

Northwest Plastics, Inc., 65 E. Plato Ave., St. Paul 7, Minn., 89, 91, 98, Tel: CA 7-6686, Yr: 1937, Emp: 240

Norton Associates, Inc., 240 Old Country Rd., Hicksville, N.Y., 9, 65, Tel: OVerbrook 1-6181, Yr: 1955, ▲1

Norton Company, 1 New Bond St., Worcester 6, Mass., 48, 86, 92, 93, 95, 96, 97, 102, Tel: SWift 8-2511, Yr: 1885, Emp: 4750

Norttronics Co., Inc., 1015 S. 6th St., Minneapolis 4, Minn., 38, 65, Tel: FEderal 9-7417, Yr: 1955, Emp: 80, ▲3

Nothelfer Winding Labs., Inc., 220 Ewingsville Rd., Trenton, N.J., 45, 48, 76, 82, Tel: TUxedo 2-2500, Yr: 1935, Emp: 55, ▲2, $750,000

Nuclear-Chicago Corp., 333 Howard Ave., Des Plaines, Ill., 14, 24, 58, Tel: VAnderbilt 7-4156, Yr: 1946, Emp: 300, ▲20

Nuclear Corp. of America, Instrument & Research Div., 2 Richwood Pl., Denville, N.J., 24, 86, 90, Tel: OAkwood 7-4200, Yr: 1955, Emp: 200, ▲5

Nuclear Development Laboratory, P.O. Box 7034, Kansas City 13, Mo., 24, 78, Tel: DElmar 3-7692, Yr: 1948, Emp: 2, $50,000

Nuclear Electronics Corp., 2925 N. Broad St., Philadelphia 32, Pa., 1, 3, 4, 14, 18, 22, 23, 24, 28, 36, 38, 63, 80, 91, Tel: BAldwin 6-2300, Yr: 1956, Emp: 175, ▲1

Nuclear Measurements Corp., 2460 N. Arlington Ave., Indianapolis 18, Ind., 24, Tel: LIberty 6-2415, Yr: 1948, Emp: 45

Nucleonic Corp. of America, 196 Degraw St., Brooklyn 31, N.Y., 24, 78, Tel: MAin 4-7370, Yr: 1949, Emp: 75, ▲4

Nucleonic Products Co., Inc., 1601 Grande Vista Ave., Los Angeles 23, Calif., 66, 69, 70, 82, Tel: AN 2-1187, Yr: 1953, $1,000,000

Nugent Electronics Co., Inc., 802 E. 8th St., New Albany, Ind., 16, 71, Tel: WH 5-0211, Yr: 1955, Emp: 42, $96,000

Numberall Stamp & Tool Co., Huguenot Park, Staten Island 12, N.Y., 96, Tel: YUkon 4-0822, Yr: 1930, Emp: 30

Nutone, Inc., Madison and Red Bank Rds., Cincinnati 27, Ohio, 32, Tel: BR 1-6500

Nutron Mfg. Co., Inc., 67 Monroe Ave., Staten Island 1, N.Y., 63, Tel: GIbraltar 7-3229, Yr: 1957, Emp: 20, ▲1

Nylogrip Products, 570 Pleasant St., Watertown 72, Mass., 89, 91, Tel: WAlnut 6-0100, Yr: 1956, Emp: 20

Nylok Corp., The, 611 Industrial Ave., Paramus, N.J., 91, Tel: COlfax 1-9100, Emp: 200

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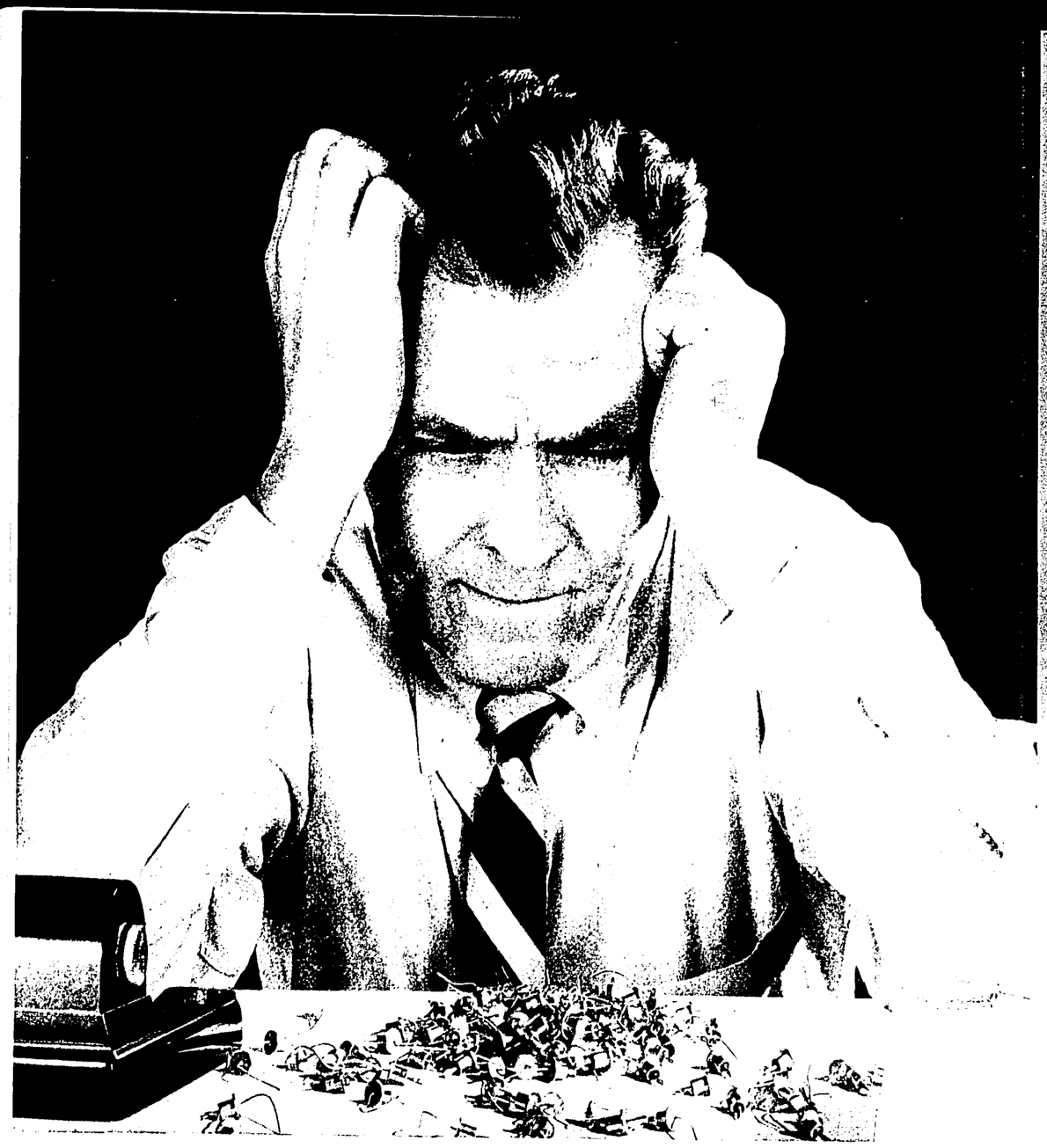
**Oak Manufacturing Co., Dept. R, 1260 N. Clybourn, Chicago 10, Ill., 44, 47, 68, 72, 80, Tel: MOhawk 4-2222, Emp: 2000**

**See ads on pages 86-87**

Offner Electronics, Inc., 3900 River Rd., Schiller Park, Ill., 14, 16, 19, 30, 38, Tel: GLadstone 1-0050, Yr: 1939, ▲3



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.



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One cause for low yields may be due to the use of compensated silicon crystals. With such compensated material, impurities can change from crystal to crystal and such changes are undetectable with standard control techniques.

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BASE BORON CONTENT BELOW ONE ATOM OF BORON PER SIX BILLION SILICON ATOMS



Ohio Carbon Co., Elec, 12563 Berea Rd., Cleveland 11, Ohio, 69, 72, Tel: CLearwater 2-6100, Yr: 1946, Emp: 126, ▲1

Ohio Crankshaft Co., 5300 Harvard Ave., Cleveland 5, Ohio, 4, 32, 92, 96, Tel: DIamond 1-2300

Ohio Semiconductors, Inc., 1045 W. Third Ave., Columbus 12, Ohio, 33, 40, 47, 58, 63, 64, 65, 75, 82, 101, Tel: HUdson 6-9561, Yr: 1956, Emp: 50, ▲2

Ohmart Corp., Elec, P.O. Box 67, Sta. B, Cincinnati 22, Ohio, 21, 58, Tel: PArkway 1-2302, Yr: 1950, Emp: 30, ▲2

**Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 11, 39, 40, 13, 45, 68, 69, 70, 72, 76, 82, Tel: ORchard 5-2600, Yr: 1925, Emp: 750**

**See ad on pages 78-79**

Ohmweve Co., Inc., Elec, 43 Darex St., West Hartford 10, Conn., 39, 69, 92, Tel: AD 2-1104, Yr: 1942, Emp: 7, $10,000

Oilgear Co., Elec, Servocontrol Div., 260 Bear Hill Rd., Waltham 54, Mass., 4, 30, 38, Tel: TW 4-6973, Yr: 1920, Emp: 500

Okonite Co., Elec, 220 Passaic St., Passaic, N.J., 85, Tel: PR 7-0400, Yr: 1838, Emp: 2200, ▲2

Olcen Corp., Gunnar V., 215 E. 42nd Ave., Bayside 61, N.Y., 39, Tel: BAyside 9-3092

Olympic Instruments, Inc., Vashon, Wash., 96, Tel: HOward 3-5611, Yr: 1946, Emp: 5

Olympic Radio & Television, Div. Siegler Corp., 3101 33th Ave., Long Island City 1, N.Y., 1, 4, 6, 9, 13, 23, 29, 30, 94, Tel: EX 2-5230, Yr: 1955, Emp: 1200, ▲62, $30,333,000

Omega Mfg. Inc., 224 Washington Ave., New York 57, N.Y., 6, 15, 76, 82, Tel: OX 7-2939, Yr: 1950, Emp: 24, $150,000

Oman & Sons, Inc., D. W., 2545 University Ave. S.E., Minneapolis 14, Minn., 63, Tel: FE 2-1155, Yr: 1926, Emp: 500

**Opad Electric Co., 13-8 Walker St., New York 13, N.Y., 1, 11, 15, 17, 58, 63, 66, 68, 76, 82, 94, 96, Tel: WOrth 6-0380, Yr: 1917**

**See ad on page 183**

Optical Coating Laboratory, Inc., 2789 Giffen Ave., Santa Rosa, Calif., 17, 95, Tel: HIberty 5-6110

Optimized Devices, Inc., 864 Franklin Ave., Thornwood, N.Y., 11, Tel: ROgers 9-6110

OPTOmechanisms, Inc., 216 E. 2nd St., Mineola, L.I., N.Y., 1, 4, 23, 25, 28, 30, 65, Tel: Pioneer 6-5576, Yr: 1951, Emp: 36, ▲1

Oregon Electronic Mfg. Co., 2165 S.E. 6th Ave., Portland 14, Ore., 39, 63, Tel: BE 6-9292, Yr: 1953, Emp: 15, ▲1, $100,000

Ott Industries, Div. Ampex Corp., 934 Charter St., Redwood City, Calif., 65, Tel: EMerson 9-1691, Yr: 1948, Emp: 250

**Ortho Filter Corp., 7 Paterson St., Paterson 1, N.J., 38, 40, 45, 52, 76, Tel: MUlberry 4-5858, Yr: 1916, Emp: 152, ▲2, $900,000**

**See ad on page 141**

Ortho Somp Instruments, Inc., 60 Mechanic St., New Rochelle, N.Y., 61, Tel: NE 7-7300

Orthonix, Inc., P.O. Drawer 8247, Orlando, Fla., 2, 9, 13, 19, 31, 32, 36, 64, Tel: CH 4-1636, Yr: 1959, Emp: 51, ▲4, $150,000

Orvx Company, 14301 Ventura Blvd., Sherman Oaks, Calif., 96, Tel: TR 5-1874, Yr: 1956, Emp: 5

Osborne Electronics Sales Corp., 212 S.E. Hawthorne Blvd., Portland 14, Ore., 1, 2, 12, 14, 17, 19, 22, 23, 26, 27, 36, 38, 45, 47, 52, 63, 76, Tel: BE 2-0161, Yr: 1948, Emp: 300, ▲1, $2,500,000

Osborne Transformer Corp., 3854 Mitchell Ave., Detroit 7, Mich., 14, 56, Tel: TOwnsend 8-0700, Yr: 1952, Emp: 25, ▲1, $120,000

**Oster Mfg. Co., John, Avionic Div., 1 Main St., Racine, Wis., 30, 58, 60, Tel: MElrose 7-1145, Yr: 1924, Emp: 1200**

**See ad on page 166**

**Ostlund, E. M., P.O. Box 158, Andover, N.J., 26, 38, 88, 94, Tel: PArkway 9-6635**

**See ad on page 629**

Otis Elevator Co., Defense & Industrial Div., 35 Riverson St., Brooklyn 5, N.Y., 1, 4, 9, 17, 25, 30, 38, 52, 63, 68, 82, 84, 87, 88, Tel: UNion 5-6300, Yr: 1898, Emp: 29,000, ▲165

Ottinger Corp., 3705 48th Ave., Long Island City 1, N.Y., 1, 30, 33, 45, 63, 66, 72, 94, Tel: EMI 4-1552, Yr: 1953, Emp: 12, ▲2

Owen Laboratories, Inc., 55 Benson Pl., Pasadena, Calif., 11, 33, 38, 63, 94, Tel: MUrray 1-6901, Yr: 1953, Emp: 30, ▲1, $70,000

Oxford Electric Corp., 3911 S. Michigan Ave., Chicago 53, Ill., 15, 56, 62, 76, Tel: ATlantic 5-6161, Yr: 1930, Emp: 1150, $10,301,930

Ozalid Div., General Aniline & Film Corp., Ansco Rd., Johnson City, N.Y., 96, Tel: SWarthmore 7-2301

# P

P.B.R. Manufacturing Co., H & Luzerne Sts., Philadelphia 24, Pa., 14, 84, 87, 89, Tel: GArfield 6-0932, Yr: 1947, Emp: 57, $200,000

**PCA Electronics Incorporated, 16799 Schoenborn St., Sepulveda, Calif., 50, 76, Tel: EMpire 2-0761, Yr: 1950, Emp: 150, ▲1, $1,250,000**

**See ad on page 570**

PLK Labs, Inc., 3023 Davenport St., Palo Alto, Calif., 12, 34, 65, 78, 79, 104, Tel: DAvenport 1-2337, Yr: 1956, Emp: 18, ▲2

PIC Automation Controls, Div. General Controls Co., 5063 McCormick Blvd., Skokie, Ill., 4, 10, 38, 58, 72, Tel: HIckory 3-2424

PIC Design Corp., 127 Atlantic Ave., East Rockaway, N.Y., 4, 56, 77, 84, 91, Tel: FYnbrook 3-6750, Yr: 1954

**PRD Electronics, Inc., Subsidiary of Harris-Intertype Corp., 202 Tillary St., Brooklyn 1, N.Y., 19, 21, 40, 63, 80, 83, Tel: ULster 2-6300, Yr: 1944, Emp: 360, ▲32, $5,000,000**

**See ad on pages 68-69**

PSP Engineering, Co., Div. IMC Magnetics Corp., 6052 Walker Ave., Maywood, Calif., 52, Tel: LOrain 4-4455, Yr: 1956, Emp: 100

Pace Controls Corp., 661 Hampton Ave., Newport Beach 94, Mass., 1, 56, Tel: HIllcrest 2-2211

Pace Electrical Instrument Co., Inc., 5301 St. Glendale 25, L.I., N.Y., 1, 4, 8, Tel: DAvenport 6-3022, Yr: 1951, Emp: 50, $500,000

Pace Engineering, Co., 1365 Sutro St., North Hollywood, Calif., 24, 25, Tel: HRunch 7-1436, Yr: 1956, Emp: 10, ▲1, $100,000

Pacific Automation Products, Inc., 1600 Air Way, Glendale 1, Calif., 14, 23, 33, 38, 39, 45, 63, 64, 73, 85, 89, Tel: CHapman 5-3666, Yr: 1955, Emp: 500, ▲3, $11,000,000

Pacific Electro Nucleat Corp., 9520 Jefferson Blvd., Culver City, Calif., 21, Tel: VErmont 7-1111

Pacific Instrument Co., 9226 E. 12th St., Oakland, Calif., 5, 11, 15, 52, 63, 76, Tel: KEllogg 2-2015, Yr: 1955, Emp: 11, ▲3, $500,000

Pacific Magnetic Corp., Electronic Center, Roundland, Calif., 38, 45, 76, Tel: Olive pia 7-2635, Yr: 1946, Emp: 30, ▲2, $500,000

Pacific Mercury Electronics, Thomas Organ Co., 3345 Hawxenhurst, Sepulveda, Calif., 6, 9, 12, 18, 36, 38, 63, 84, 93, Yr: 1946, Emp: 1500, $20,000,000

Pacific Relays, Inc., 1395 Sutton St., Van Nuys, Calif., 63, Tel: ST 2-2500, Yr: 1953, Emp: 32, $500,000

Pacific Resistor Co., 2320 Pontius Ave., Los Angeles 64, Calif., 69, Tel: GRanite 7-0711, Yr: 1956, Emp: 30, ▲2, $200,000

Pacific Semiconductors, Inc., 10451 W. Jefferson Blvd., Culver City, Calif., 11, 59, 70, Tel: UPton 0-8331, Yr: 1954, Emp: 120

Pacific Technical Co., 2047 Sawtelle Blvd., Los Angeles 25, Calif., 19, 63, 94, Tel: GRanite 7-0155

Pacific Transducer Corp., 11336 W. Pico Blvd., Los Angeles 64, Calif., 14, 24, 64, 91, Tel: GR 8-1151, Yr: 1946, Emp: 15



Numbers after address show the product and service classes to which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory see pink sheets preceding catalog section. Yr: Year of founding. Emp: Total employees. ▲: Number of IRE members. $: Net radio-electronic sales during last fiscal year.

Packard Bell Computer Corp., 1905 Armacost Ave., Los Angeles 25, Calif., 9, 15, 36, 38, 64, Tel: GRanite 8-4247, Yr: 1957, Emp: 180, ▲20

Packard Bell Electronics Corp., 12333 W. Olympic Blvd., Los Angeles 64, Calif., 1, 6, 7, 9, 14, 23, 24, 27, 29, 43, 46, 48, 50, 52, 54, 58, 63, 64, 75, 76, 84, 85, 86, 88, 89, 93, 102, Tel: BRadshaw 2-6141, Yr: 1926, Emp: 2993, ▲93, $16,608,062

Packard Bell Electronics, Service Division, 1920 S. Figueroa St., Los Angeles 7, Calif., 7, 23, 34, 37, 88, Tel: RI 9-1454, Yr: 1926, Emp: 400, $5,000,000

Page Communications Engineers, Inc., Subsid. Northrop Corp., 2001 Wisconsin Ave. N.W., Washington 7, D.C., 88, 94, Tel: FE 7-7600, Yr: 1947, Emp: 750, ▲60

Painton & Co. Limited, Bembridge Dr., Kingsthorpe, Northampton, England, 40, 45, 46, 55, 69, 71, 72, 91, 101, Tel: NOrthampton 3-4251, Yr: 1935, Emp: 800

Paktron Division, Illinois Tool Works, 1321 Leslie Ave., Alexandria, Va., 43, 64, 69, 86, 94, Tel: KIng 8-4400, Yr: 1954, Emp: 120, ▲8, $1,000,000

Palmer Instruments, 1017 Mission St., South Pasadena, Calif., 33, 88, 89, Tel: MUrray 2-1194, Yr: 1945, Emp: 15

Palnut Co., The, Glen Rd., Mountainside, N.J., 91, Tel: ADams 3-3300

Palomar Scientific Corp., 4039 Transport St., Palo Alto, Calif., 1, 4, 9, 72, 75, 94, Tel: DAvenport 3-9005, Yr: 1960, Emp: 10, ▲2

Pam Associates, Inc., 7315 Harford Rd., Baltimore 14, Md., 3, 4, 14, 15, 18, 27, 38, 58, 75, 81, 88, 89, 91, 96, 102, Tel: HIlltop 4-6195, Yr: 1959, Emp: 10, $90,000

Pan American Trade Development Corp., 2 Park Ave., New York 16, N.Y., Importers, 49, Tel: MUrray Hill 6-7960

Pancro Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif., 95, Tel: NO 1-2141, Yr: 1933, Emp: 6

Panduit Corp., 14461 Waverly Ave., Midlothian, Ill., 91, Tel: HIlltop 5-3134 (Chicago)

Panellit, Div. Information Systems, Inc., 7401 N. Hamlin Ave., Skokie, Ill., 62, 64, 84, 88, Tel: ORchard 5-2500, Yr: 1944, Emp: 330

**Panob Corp., 49 Beech St., Port Chester, N.Y., 89, 91, 98, Tel: WEstmore 9-3066, Yr: 1953, Emp: 22, ▲1**

**See ad on page 689**

**Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., 3, 14, 21, 23, 28, 35, 36, 58, Tel: OWens 9-4600, Yr: 1938, Emp: 130, ▲20**

**See ad on page 334**

**Par-Metal Products Corp., 32-42 49th St., Long Island City 3, N.Y., 84, 87, Tel: AStoria 8-8905, Yr: 1926, Emp: 75**

**See ad on page 626**

Par Products Corp., 602 Colorado Ave., Santa Monica, Calif., 19, 25, 34, Tel: EXbrook 4-4219, Yr: 1948, Emp: 10

**Paramount Paper Tube Corp., 618 S. Lafayette St., Fort Wayne 2, Ind., 91, Tel: ANthony 4197, Yr: 1933, Emp: 30**

**See ad on page 647**

Paramount Products Co., Inc., 759 Ramsey Ave., Hillside 5, N.J., 89, 104, Tel: MU 8-8150, Yr: 1945, Emp: 13

Paraplegics Mfg. Co., Inc., 10068 Franklin Ave., Franklin Park, Ill., 4, 38, 47, 50, 63, 64, 85, 89, Tel: GLadstone 5-1697, Yr: 1951, Emp: 115, $497,000

Park Nameplate Co., Inc., 34-10 Linden Pl., Flushing 54, N.Y., 91, Tel: FLushing 9-7000, Yr: 1954

Parke Mathematical Laboratories, Inc., Bedford Rd., Carlisle, Mass., 88, 94, Tel: EMerson 9-3818

**Parke, Nathan Grier, Bedford Rd., Carlisle, Mass., 88, Tel: EMerson 9-3818**

**See ad on page 629**

Parker-Kalon, Div. General American Transportation Corp., 1 Peekay Dr., Clifton, N.J., 91, Tel: GRegory 1-1000, Yr: 1923, Emp: 500

**Parker Seal Co., 10567 Jefferson Blvd., Culver City, Calif., 83, 89, 91, 93, 98, Tel: VErmont 9-1161, Yr: 1924, Emp: 1000, ▲1**

**See ad on page 650**

Parks Laboratory, Henry Francis, 7544 23rd Ave. N.E., Seattle 15, Wash., 4, 58, 63, 94, Tel: LAkeview 3-4832, Yr: 1933, Emp: 20, ▲1

Parkway Specialties Co., 22519 Plymouth, Detroit 39, Mich., 56, 72, 84, 91, 93, 99, Yr: 1955

Parsons Company, The Ralph M., Electronics Div., 151 S. DeLacey, Pasadena, Calif., 4, 21, 33, 36, 39, 50, 52, 63, Tel: MUrray 1-0461, Yr: 1952, Emp: 190

Partlow Corp., 245 Campion Rd., New Hartford, N.Y., 4, 58, 74, Tel: SW 7-2222, Yr: 1919, Emp: 125

Partridge Transformers, Ltd., Roebuck Rd., Chessington, Surrey, England, 45, 76, Tel: ELmbridge 6737, Yr: 1933, Emp: 105, $350,000

Parzen, Benjamin, 34-01 38th Ave., Long Island City 1, N.Y., 88, 94, Tel: EX 2-5200

Pascol Div., Illinois Tool Works, 3155 W. El Segundo Blvd., Hawthorne, Calif., 72, Tel: OR 8-4931

Pastoriza Associates, Inc., James, 285 Columbus Ave., Boston 16, Mass., 9, 14, 38, 50, 63, 88, 94, Tel: COmmonwealth 6-1919, Yr: 1957, Emp: 10, ▲3, $55,000

Patent Button Co. of Tennessee, Inc., The, Century St., Knoxville 21, Tenn., 24, 89, 98, Tel: 2-9621, Yr: 1933, Emp: 150

Patterson, Inc., Wayne D., 807 Yale St., Los Angeles 12, Calif., 9, 14, 36, 38, 88, Tel: MA 6-2708, Yr: 1949, Emp: 6, ▲1, $2000

Patterson Moos Research, Div. Leesona Corp., 90-28 Van Wyck Expwy., Jamaica 18, N.Y., 4, 14, 17, 24, 43, 75, Tel: AXtel 7-4400, Yr: 1893, Emp: 1500

Patwin, Div. The Patent Button Co., Waterbury 20, Conn., 62, Tel: PLaza 6-3636, Yr: 1876, Emp: 20, $50,000

Paul & Stein Bros., Inc., F. H., 235 Fifth Ave., New York 16, N.Y., 85, 93, 97, 99, 102, Tel: MU 4-6370, Yr: 1913, Emp: 16, ▲1, $1,000,000

Pearce-Simpson, Inc., 3950 N.W. 28th St., Miami 42, Fla., 9, 14, 18, 22, 26, 36, 39, 59, 75, 84, 87, 89, 91, 98, Tel: NE 3-6976, Yr: 1949, Emp: 250, ▲1, $1,200,000

**Pearson Electronics, Inc., 707 Urban Lane, Palo Alto, Calif., 14, 76, Tel: DAvenport 6-7285**

**See ad on page 571**

Peck Spring Co., The, 89 Whiting St., Plainville, Conn., 89, 91, Tel: SHerwood 7-2767, Yr: 1917, Emp: 160

Peck, Stow & Wilcox Co., The, 217 Center St., Southington, Conn., 96, Yr: 1785, Emp: 200

Pee Wee Molding Corp., 1720 Atlantic Ave., Brooklyn 13, N.Y., 72, 91, 98, Tel: PR 4-3441

Peeco Corp., 2760 Whittier Blvd., Los Angeles 23, Calif., 92, 95, 96, Tel: AN 9-4164, Yr: 1952, Emp: 5

Peer, Incorporated, 2624 Shelby St., Dallas 19, Tex., 1, 7, 18, 20, 24, 26, 27, 28, 31, 35, 36, 63, Tel: LA 6-8353, Yr: 1960, Emp: 5, ▲3

Peerless Electrical Products Div., Ling-Temco Electronics, Inc., 6920 McKinley Ave., Los Angeles 1, Calif., 45, 51, 63, 76, Tel: PL 8-4175, Yr: 1935, Emp: 168, $1,167,800

Pegasus Laboratories, Inc., 3500 W. Eleven Mile Rd., Berkeley, Mich., 4, 14, 30, 38, 39, 63, 88, 94, 96, Tel: LIncoln 6-3636, Yr: 1953, Emp: 40, $160,000

**Pelley Co., The, 37 Hurley St., Cambridge, Mass., 64, Tel: UNiversity 4-9788**

**See ad on page 502**

Pendar Inc., 14744 Arminta St., Van Nuys, Calif., 62, 68, 69, 72, Tel: TR 3-3136, Yr: 1946, Emp: 50

Penn-East Engineering Corp., P.O. Box 240, Kutztown, Pa., 38, 52, 76, Tel: OVerbrook 3-7308, Emp: 36, ▲1

Penn Engineering & Mfg. Corp., Box 311, Doylestown, Pa., 91, Tel: ROger 6-8853, Yr: 1942, Emp: 35, ▲1

Penn Fibre & Specialty, Co., Inc., 2036 E. Westmoreland St., Philadelphia 34, Pa., 89, 91, 93, 99, 102, 104, Tel: REgent 9-5642, Yr: 1937, Emp: 21, $300,000

Penn Keystone Corp., 100 Hawkins St., Derby, Conn., 46, 47, 58, 62, 63, 64, 68, 72, Tel: REgent 4-3301, Yr: 1956, Emp: 70, $700,000





Penn Resistor Corp., 526 N. Broad St., Lansdale, Pa., 52, 69, Tel: ULysses 5-7516, Yr: 1958, Emp: 14, ▲1, $45,300

Penn-Transformer Corp., P.O. Box 149, Bellefonte, Pa., 45, 65, Tel: ELgin 5-4747, Yr: 1946, Emp: 66, $610,000

Pennsylvania Fluorocarbon Co., Inc., 1115 N. 38th St., Philadelphia 4, Pa., 89, 91, 93, 99, Tel: EVergreen 6-0603, Yr: 1955, Emp: 48

Pennsylvania Testing Lab., Inc., Doylestown, Pa., 14, 21, 39, 63, Tel: DI 3-1800, Yr: 1947, Emp: 5, $100,000

Pennsylvania Tool & Mfg. Co., The, 130 S. Hartman St., York, Pa., 89, 94, 96, Tel: 8-1855, Yr: 1919, Emp: 55, $75,000

Pennwood Numechron Co., 7249 Frankstown Ave., Pittsburgh 8, Pa., 9, 10, 33, 58, Tel: FRemont 1-4200

Penta Laboratories, Inc., 312 N. Nopal St., Santa Barbara, Calif., 67, 78, 79, Tel: WOodland 5-4581, Yr: 1951, Emp: 105, ▲1

**Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 93, 97, 102, Tel: EVerglade 4-2122, Yr: 1939, Emp: 386, ▲6**

**See ad on page 698**

Performance Measurements Co., 15120 3rd Ave., Detroit 3, Mich., 14, 30, 58, 63, 82, 94, Tel: TO 9-6100, Yr: 1951, Emp: 30, ▲4, $501,000

Perkin-Elmer Corp., Vernistat Div., Emerald St., Norwalk, Conn., 69, 76, Tel: VIctor 7-2411, Yr: 1938, Emp: 50, ▲2

Perkin Engineering Corp., 345 Kansas St., El Segundo, Calif., 27, 45, 47, 63, 76, 82, Tel: ORegon 8-7215, Yr: 1932, Emp: 200, ▲30, $3,000,000

Perkins Machine & Gear Co., Circuit Ave., W. Springfield, Mass., 30, 96, Tel: REpublic 7-4751, Yr: 1926, Emp: 385

Perma-Power Co., 3100 N. Elston, Chicago 18, Ill., 4, 82, Tel: KEystone 9-7171, Yr: 1928, ▲3

Permacel, U. S. Highway #1, New Brunswick, N.J., 91, 93, 95, Tel: CHarter 7-7900, Yr: 1932, Emp: 500

**Permag Corp., 88-06 Van Wyck Expwy., Jamaica 18, N.Y., 57, 89, Tel: OLympia 7-1818, Yr: 1946, Emp: 45**

**See ad on page 458**

Permoflux Products Co., 4101 San Fernando Rd., Glendale 4, Calif., 38, 47, 56, 59, 61, 63, 76, Tel: CHapman 5-5135

Permonite Mfg. Co., 910 West Jackson Blvd., Chicago 7, Ill., 46, 49, 53, 55, 71, 72, 73, 89, 91, 99, Tel: SEeley 8-2220, Yr: 1953,, Emp: 248, ▲7, $1,475,000

Perry, Donald B., Sunset, Me., 88, Tel: Diamond 8-2385

**Peschel Electronics, Inc., Towners, R.F.D. #1, Patterson, N.Y., 4, 14, 17, 21, 47, 63, 76, 94, Tel: TRinity 8-3251, Yr: 1949, Emp: 11**

**See ad on page 289**

Pesco Products Div., Borg-Warner Corp., 24700 N. Miles Rd., Bedford, Ohio, 42, 47, 60, 63, 94, 96, Tel: MOntrose 2-2100, Yr: 1933, Emp: 1500, ▲11

Peter Partition Corp., 124 Boerum Pl., Brooklyn 1, N.Y., 89, Tel: TRiangle 5-4033, Yr: 1945, Emp: 90

Petersen Radio Co., Inc., 2800 W. Broadway, Council Bluffs, Iowa, 49, Tel: 32 2-2760, Yr: 1934, Emp: 28, ▲1

Pettinos Graphite Corp., Charles, 1 East 42nd St., New York 17, N.Y., 95, Tel: MU 7-7337, Yr: 1899

Pfister Aluminum Corp., 54 West Allendale Ave., Allendale, N.J., 97, Tel: OLiver 2-5220, Yr: 1950, Emp: 175

Phalo Plastics Corp., 530 Boston Turnpike, Shrewsbury, Mass., 55, 85, Tel: VIking 4-4021, Yr: 1944, Emp: 450

Phaostron Instrument & Electronic Co., 151 Pasadena Ave., South Pasadena, Calif., 14, 58, 68, 69, Tel: CI 5-1471

Phelps Dodge Copper Products Corp., 300 Park Ave., New York 22, N.Y., 46, 50, 83, 85, 91, 97, Tel: PLaza 1-3200, Yr: 1834, Emp: 1500

Phelps Dodge Copper Products Corp., Inca Manufacturing Div., 4400 New Haven Ave., Fort Wayne 1, Ind., 85, Tel: EAstbrook 0511, Emp: 700

Philadelphia Insulated Wire Co., 333 New Albany Rd., Moorestown, N.J., 85, Tel: BElmont 5-6700, Yr: 1820, Emp: 121

Philadelphia Scientific Glass Co., 468 W. Paletown Rd., Quakertown, Pa., 41, 68, 72, 74, Tel: KEystone 6-4203, Yr: 1947, Emp: 15

Philamon Laboratories, Inc., 90 Hopper St., Westbury, L.I., N.Y., 3, 33, 36, 52, Tel: EDgewood 3-1700

**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 9, 11, 14, 25, 30, 38, 50, 63, 64, 88, 94, 100, Tel: COmmonwealth 6-5375, Yr: 1946**

**See ad on page 270**

Philco Corporation, Tioga & C Sts., Philadelphia 34, Pa., 1, 3, 6, 7, 9, 14, 17, 20, 22, 23, 26, 27, 28, 31, 34, 36, 38, 45, 50, 70, 77, 80, 101, Tel: NEbraska 4-5100, Yr: 1892, Emp: 20,000

Philco Corporation, Government & Industrial Group, 4700 Wissahickon Ave., Philadelphia 44, Pa., 1, 4, 6, 7, 8, 9, 13, 14, 17, 18, 20, 22, 23, 25, 26, 27, 34, 36, 38, 45, 50, 63, 70, 77, 83, Tel: VIctor 3-4000

**Philco Corporation, Lansdale Div., Dept. 504, Church Rd., Lansdale, Pa., 70, 77, 78, 83, 94, Tel: ULysses 5-4681, Yr: 1947**

**See ad on pages 31-34**

Philips Electronic Instruments, 750 S. Fulton Ave., Mt. Vernon, N.Y., 3, 4, 5, 10, 11, 14, 15, 16, 19, 21, 24, 25, 27, 28, 30, 38, 40, 58, 63, 76, 78, 92, 96, Tel: MO 4-4500, Yr: 1942, Emp: 350

Philips Electronics Industries, Ltd., 116 Vanderhoof Ave., Toronto 12, Ont., Canada, 1, 3, 4, 5, 8, 9, 10, 14, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 29, 30, 31, 33, 35, 36, 37, 38, 43, 44, 45, 47, 48, 49, 52, 56, 57, 58, 60, 63, 66, 67, 68, 69, 70, 71, 72, 73, 75, 77, 78, 79, 80, 86, 92, 96, Tel: HU 7-5161

Philips Laboratories, Div. North American Philips Co., Inc., Irvington-on-Hudson, N.Y., 24, 48, 51, 79, 104, Tel: LYric 1-8400, Yr: 1945

Phillips Control Corp., 59 W. Washington St., Joliet, Ill., 68, Tel: SAratoga 3-3131, Yr: 1946, Emp: 500

Philmore Mfg. Co., Inc., 130-01 Jamaica Ave., Richmond Hill 18, N.Y., 1, 2, 6, 18, 22, 28, 45, 55, 56, 71, 72, Tel: HIckory 1-5000, Yr: 1921, Emp: 45, ▲2, $1,000,000

Phoenix Precision Instrument Co., Inc., 3803-05 N. 5th St., Philadelphia 40, Pa., 4, 17, 30, Tel: BA 8-7417, Yr: 1945, Emp: 55, $150,000

**Photo Chemical Products Co., 999 Stewart Ave., Garden City, L.I., N.Y., 16, 73, 89, Tel: PIoneer 1-6500**

**See ad on page 636**

Photo-Crystals, Inc., 15 S. First St., Geneva, Ill., 4, 39, 40, 68, 70, 72, 75, Tel: GEneva 7150

Photobell Co., Inc., 43 Vesey St., New York 7, N.Y., 4, 17, 38, 75, Tel: WOrth 2-6739

**Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 9, 30, 54, 60, 64, 69, 71, 73, Tel: ORiole 6-8000, Yr: 1951, Emp: 350, ▲15, $4,000,000**

**See ad on page 500**

Photocon Research Products, 421 N. Altadena Dr., Pasadena, Calif., 10, 14, 38, 59, 75, Tel: SYcamore 2-4131, Yr: 1946, Emp: 95, $1,000,000

Photomation, Inc., 96 S. Washington Ave., Bergenfield, N.J., 4, 38, 75, Yr: 1930, Emp: 21, $300,000

Photron Instrument Co., 6516 Detroit Ave., Cleveland 2, Ohio, 14, 15, 16, 25, 36, 38, 58, Tel: ATlantic 1-7020, Yr: 1941

**Physics Research Laboratories, Inc., P.O. Box 555, Hempstead, L.I., N.Y., 5, 11, 14, 58, 66, 69, Tel: IVanhoe 3-8299**

**See ad on page 288**

Pickard & Burns, Inc., 240 Highland Ave., Needham 94, Mass., 4, 33, 39, Tel: HIllcrest 4-3345, Yr: 1945, Emp: 122, ▲19, $1,594,396

Pickering & Co., Inc., Sunnyside Blvd., Plainview, L.I., N.Y., 34, 45, 56, 61, 72, 75, Tel: OVerbrook 1-0200, Yr: 1948, Emp: 150, ▲5

Piezo Crystal Co., 265 Pomfret St., Carlisle, Pa., 49, Tel: CHapel 9-2151, Yr: 1958, Emp: 145

Piezo Products Co., Whitney St., Sherborn, Mass., 88, 94, Tel: TRinity 9-9497

Pilot Chemicals, Inc., 36 Pleasant St., Watertown 72, Mass., 49, 95, Tel: WAtertown 4-7775, Yr: 1950



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Pioneer Gen-E-Motor Corp., 5841 W. Dickens, Chicago 39, Ill., 63, 96, Yr: 1925, $1,000,000

Pioneer Machine Works, Inc., 6136 Adam St., West New York, N.J., 96, Tel: UNion 3-3838, Yr: 1946, Emp: 5

Pioneer Scientific Corp., 645 St. Paul St., Rochester 2, N.Y., 14, Tel: LOcust 2-3000

Pitometer Log Corp., 237 Lafayette St., New York 12, N.Y., 4, 21, 28, 33, 38, 40, 80, 83, 94, Tel: CAnal 6-7250, Yr: 1927, Emp: 125, ▲12

Pittman Electrical Developments Co., P.O. Box 150, Sellersville, Pa., 60, Tel: ALpine 7-2433, Yr: 1933, Emp: 35

Pittsburgh Lectrodryer Div., McGraw-Edison Co., P.O. Box 1766, Pittsburgh 30, Pa., 96, Tel: GRant 1-8782

Pix Manufacturing Co., 75 Hudson St., Newark 3, N.J., 89, 104, Tel: HUmboldt 4-5400, Emp: 110

Planer, Ltd., G. V., Windmill Rd., Sunbury-on-Thames, Middlesex, England, 94, Tel: 2266

Planet Instrument, Inc., 616 S. Lafayette, Fort Wayne, Ind., 30, Tel: E-1495

**Planet Mfg. Corp., 225 Belleville Ave., Bloomfield, N.J., 43, Tel: PIlgrim 3-2874, Yr: 1949, Emp: 150, $1,000,000**

**See ad on page 395**

Plasteck, Inc., P.O. Box 551, Poteau, Okla., 10, 62, 71, 84, 89, 91, 98, 99, Tel: 705, Yr: 1945, Emp: 100

Plastic Associates, 2900 S. Coast Blvd., Laguna Beach, Calif., 91, 93, 95, Yr: 1958, Emp: 6, $100,000

**Plastic Capacitors, Inc., 2620 N. Clybourn Ave., Chicago 14, Ill., 43, Tel: DIversey 8-3735, Emp: 90**

**See ad on page 396**

Plastic Wire & Cable Corp., The, East Main St., Jewett City, Conn., 85, Tel: DR 6-4411, Yr: 1943, Emp: 490, ▲1

Plastics & Electronics Corp., 699 Humboldt Pkwy., Buffalo 8, N.Y., 17, 70, 72, 75, 91, 94, Tel: SUmmer 1630, Yr: 1951, Emp: 20, ▲2, $100,000

**Plastoid Corporation, 42-61 24th St., Long Island City 1, N.Y., 85, Tel: STillwell 6-6200, Yr: 1941, Emp: 350, ▲2**

**See ad on page 615**

Plectron Corp., Overton, Neb., 3, 19, 22, 26, 28, 98, Yr: 1955, Emp: 40, ▲2, $100,000

Plug-In Instruments, Inc., 1416 Lebanon Rd., Nashville 10, Tenn., 4, 9, 30, 38, 47, 63, 64, 68, 87, 89, 91, Tel: AL 4-8829, Yr: 1958, Emp: 50, ▲3, $150,000

Poinsettia Co., Inc., 112 Cedar Ave., Pitman 6, N.J., 89, Tel: LUther 9-7666, Yr: 1936, Emp: 20, ▲1, $160,000

Point Consulting Co., Box 8656, Pittsburgh 21, Pa., 88, Tel: FA 7-5338, Yr: 1948

Polacoat, Inc., 9750 Conklin Rd., Blue Ash 42, Ohio, 17, Tel: SY 1-1300, Yr: 1946, Emp: 45, $500

**Polarad Electronics Corp., 43-20 34 St., Long Island City 1, N.Y., 1, 14, 18, 21, 28, 39, 52, 63, 79, 80, Tel: EXeter 2-4500, Emp: 700**

**See ad on pages 107-108**

Polaris Engineering Corp., 5317 Cottage Grove Ave., Chicago 15, Ill., 77, Yr: 1955, Emp: 30, ▲1

**Pollak Corp., Joseph, 75-95 Freeport St., Boston 22, Mass., 68, 72, Tel: AVenue 2-9550, Yr: 1909, Emp: 250**

**See ad on page 554**

Poly-Kote, Inc., 82 Chestnut St., N. Attleboro, Mass., 89, Tel: MYrtle 9-8332, Yr: 1959, Emp: 5, $1500

Poly-Scientific Corp., Rt. 460 North, Blacksburg, Va., 36, 46, 72, 89, Tel: PRescott 2-8212, Yr: 1953, Emp: 275, ▲3, $1,500,000

Polydoroff & Assoc., W. J., Carry Bldg., 927-15th St., Washington 5, D.C., 39, 48, 50, 52, 76, 80, Tel: EM 2-2734

Polymer Corp. of Pennsylvania, The, 2140 Fairmont Ave., Reading, Pa., 48, 89, 91, 93, 95, 98, 99, Tel: FRanklin 6-5791, Yr: 1946, Emp: 474, ▲3, $750,000

Polyphase Instrument Co., East Fourth St., Bridgeport, Pa., 38, 45, 50, 52, 64, 75, 76, Tel: BRoadway 9-4660, Yr: 1948, Emp: 125

Polytron Engineering Inc., 32 W. Biddle St., Baltimore 1, Md., 63, Tel: SAratoga 7-6116, Yr: 1952, Emp: 8

Pomona Electronics Co., Inc., 1126 W. Fifth Ave., Pomona, Calif., 55, 71, 91, Tel: NAtional 2-4950, Yr: 1952, Emp: 25

Poole Instruments Inc., 150 Express St., Dallas 21, Tex., 14, 96, Yr: 1938, Emp: 30, ▲1

Popper & Sons, Inc., 300 Park Ave. S., New York 10, N.Y., 96, Tel: OR 4-5500

Porcelain Products Co., 225 N. Patterson St., Carey, Ohio, 48, 86, 93, Tel: EXport 6-2211, Yr: 1892, Emp: 150, $50,000

**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 20, 21, 38, 39, 40, 52, 64, 72, 83, Tel: WEstmore 9-4092, Yr: 1952, Emp: 30, ▲1**

**See ad on page 592**

Porter Co., Inc., H. K., National Electric Div., Porter Bldg., Pittsburgh 19, Pa., 85, Tel: EXpress 1-1800, Yr: 1905, Emp: 1250

Porter Co., Inc., H. K., Peerless Electric Div., 1401 W. Market St., Warren, Ohio, 42, Tel: EXpress 3-1551

Porter Co., Inc., H. K., Riverside-Alloy Metal Div., 1 Pavilion Ave., Riverside, N.J., 85, 97, Tel: HObart 1-3000, Yr: 1853, Emp: 1000

Potter Aeronautical Corp., Rt. #22, Union, N.J., 4, 9, 10, 47, 69, 75, Tel: MUrdock 6-3010, Yr: 1937, Emp: 235, ▲8, $600,000

**Potter & Brumfield, Div. American Machine & Foundry Co., Princeton, Ind., 68, Tel: FUlton 5-5251, Yr: 1933, Emp: 1300, ▲8**

**See ad on page 516**

Potter Co., The, 1950 Sheridan Rd., N. Chicago, Ill., 43, 52, 63, Tel: DExter 6-4350, Yr: 1928, Emp: 155, $1,230,000

Potter Instrument Co., Inc., Sunnyside Blvd., Plainview, L.I., N.Y., 4, 9, 10, 14, 29, 36, 37, 61, 65, Tel: OV 1-3200, Yr: 1942, Emp: 300, ▲46

**Power Designs, Inc., 1700 Shames Dr., Westbury, L.I., N.Y., 17, 47, 63, 82, Tel: EDgewood 3-6200**

**See ad on page 486**

Power Sources, Inc., South Ave., Burlington, Mass., 47, 63, Tel: BRowning 2-3610, Yr: 1956, Emp: 35, ▲5

Powers Co., J. J., 818 N. 22nd Ave., P.O. Box 254, Melrose Park, Ill., 84, Tel: FIllmore 5-3500, Emp: 10, $125,000

Powertron Ultrasonics Corp., Patterson Pl., Roosevelt Field, L.I., N.Y., 4, 14, 18, 38, 75, 76, 96, Tel: Pioneer 1-3220, Yr: 1959, Emp: 30, ▲3, $50,000

Precise Electronics & Development Corp., 2 Neil Ct., Oceanside, L.I., N.Y., 3, 5, 6, 9, 11, 14, 17, 18, 25, 26, 28, 32, 37, 38, 40, 45, 50, 52, 63, 76, 80, 88

**Precise Measurements Co., Millbrook Lane, P.O. Box 172, Flemington, N.J., 14, 17, 63, 76, Tel: STate 2-3000, Yr: 1950, Emp: 10**

**See ad on page 488**

Precision Apparatus Co., Inc., Subsid. Pacotronics, Inc., 70-31 84th St., Glendale 27, L.I., N.Y., 3, 14, 25, 28, 37, Tel: DAvenport 6-3982, Yr: 1932, Emp: 150, $1,750,000

Precision Circuits, Inc., 705 S. Fulton Ave., Mount Vernon, N.Y., 64, Tel: MOunt Vernon 4-3737, Yr: 1957, Emp: 100, ▲1, $1,000,000

Precision Crystal Laboratory, 2223 Warwick Ave., Santa Monica, Calif., 49, 52, Tel: EXbrook 4-7004, Yr: 1946, Emp: 3, $50,000

Precision Electronics, Inc., 9101 King St., Franklin Park, Ill., 6, 14, 32, 38, 80, Tel: GLadstone 5-5350, Yr: 1946, Emp: 85, ▲2, $1,000,000

Precision Electronics, Inc., 48 Merrick Rd., Rockville Centre, N.Y., 45, 76, Tel: ORiole 8-4182, Yr: 1958, Emp: 14

Precision Electroplating Co., 519 S. Oakley Blvd., Chicago 12, Ill., 89, Tel: SE 3-5855, Yr: 1904, Emp: 35

Precision, Inc., 4748 France Ave. N., Minneapolis, Minn., 45, 60, 69, 76, 84, 89, Tel: JUniper 8-9141, Yr: 1919, Emp: 60

Precision Instrument Co., 1011 Commercial St., San Carlos, Calif., 9, 29, 36, 51, 65, 83, Tel: LYtell 1-4441, Yr: 1957, Emp: 100, ▲20





Precision Lapping Co., Inc., 34 Clinton Ave., Valley Stream, N.Y., 17, 54, 96, Tel: LO 1-2770

Precision Line Inc., 63 Main St., Maynard, Mass., 69, Tel: TW 7-2151, Yr: 1955, Emp: 15, ▲1

Precision Mechanisms Corp., 577 Newbridge Ave., East Meadow, L.I., N.Y., 4, 9, 30, 72, Tel: IV 3-8955, Yr: 1947, Emp: 12, $250,000

Precision Metal Products Co. of Malden, Inc., 41 Elm St., Stoneham 80, Mass., 73, 86, 89, 91, 93, 99, Tel: SToneham 6-3650, Yr: 1948, Emp: 80, $800,000

Precision Microwave Corp., Main St., Millis, Mass., 21, 40, 52, 76, 80, 83, 91, Tel: DAvis 6-3635, Yr: 1959, Emp: 50, ▲1, $185,000

**Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 89, 91, 93, 99, Tel: ARmitage 6-5200, Yr: 1939, Emp: 200, ▲2, $2,500,000**

**See ad on page 649**

**Precision Resistor Co., Inc., 121 U. S. Hwy. #22, Hillside, N.J., 69, Tel: WAverly 6-3036**

**See ad on page 531**

**Precision Scientific Co., 3749 W. Cortland St., Chicago 47, Ill., 14, 96, Tel: CApitol 7-2660, Yr: 1920, Emp: 300, $250,000**

**See ad on page 677**

Precision Specialties, Inc., P.O. Box 118, Pitman, N.J., 9, 30, 88, 89, Tel: LUther 9-0815, Yr: 1955, Emp: 12, $150,000

Precision Tube Co., Inc., Church Rd. & Wissahickon Ave., North Wales, Pa., 83, 85, 91, 97, 104, Tel: OXbow 9-4806, Yr: 1932, Emp: 125

Preis Engraving Machine Co., H. P., 651 U. S. Hwy. #22, Hillside 5, N.J., 96, Tel: MUrdock 6-7736, Yr: 1923, Emp: 15

Premax Products Div., Chisholm-Ryder Co., Inc., College & Highland Aves., Niagara Falls, N.Y., 39, Tel: BUtler 5-9186, Yr: 1920, Emp: 250

**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 20, 21, 38, 39, 40, 52, 64, 72, 83, Tel: WEstmore 9-8900, Yr: 1940, Emp: 200, ▲3**

**See ad on page 383**

**Premier Metal Products Co., 337 Manida St., New York 59, N.Y., 84, 87, Tel: WYandotte 1-6600, Yr: 1948**

**See ad on page 602**

Premier Research Laboratories, Inc., 83-89 Seventh Ave., New York 11, N.Y., 49, 92, Tel: ALgonquin 5-0700, Yr: 1931, Emp: 30

Prentice-Hall, Inc., Englewood Cliffs, N.J., 100, Tel: WIndsor 7-1000, Yr: 1913, Emp: 2000, ▲1

Prescott Television Co., 7706 Melrose Ave., Los Angeles 46, Calif., 6, 23, 29, 34, Tel: WEbster 3-7193, Yr: 1949, Emp: 22, $76,000

**Presin Co., 2014 Broadway, Santa Monica, Calif., Importers, 4, 9, 10, 29, 43, 68, 75, Tel: EXbrook 3-9738, Yr: 1950, Emp: 10, ▲1**

**See ad on page 519**

Pressman Associates, Inc., 7803 Farnsworth St., Philadelphia 15, Pa., 88, Tel: DE 3-8064

Pressteel Co., 9705 E. Garvey Ave., El Monte, Calif., 84, Yr: 1940, Emp: 35, $300,000

Prestole Corp., 1345 Miami St., Toledo 5, Ohio, 91, Tel: OXford 1-2465, Yr: 1947, Emp: 175, ▲2, $10,000

**Price Electric Corp., 316 Church St., Frederick, Md., 68, Tel: MOnument 3-5141, Yr: 1920, Emp: 400, ▲4**

**See ad on page 519**

Printed Motors, Inc., 30 Rockefeller Plaza, New York 20, N.Y., 30, 60

Printloid, Inc., 44-05 10th St., Long Island City 1, N.Y., 89, Tel: EMpire 1-1770, Yr: 1936, Emp: 25

Pro'oscope Co., Inc., 8 Sagamore Hill Dr., Port Washington, N.Y., 3, 14, 23, 25, 28, 36, Tel: POrt Washington 7-8150

Process & Instruments, 15 Stone Ave., Brooklyn 33, N.Y., 4, 14, 19, 57, 94, Tel: GL 2-8380, Yr: 1945, Emp: 15, ▲3

Prodelin, Inc., 307 Bergen Ave., Kearny, N.J., 39, 46, 85, Tel: WYman 1-8600, Yr: 1945, Emp: 75, ▲3

Production Engineering Corp., 173 Sargent Ave., Clifton, N.J., 89, Tel: GRegory 3-5161, Yr: 1939, Emp: 14

Production Research Corp., Subsid. Radio Condenser Co., Claremont Ave., Thornwood, N.Y., 1, 3, 4, 9, 12, 14, 15, 17, 18, 20, 21, 22, 26, 36, 52, 58, Tel: ROgers 9-2766, Yr: 1950, Emp: 28, ▲9, $78,856

**Production Tool & Fixture Co., 37 W. Main St., Oyster Bay, L.I., N.Y., 96, Tel: OYster Bay 6-0009**

**See ad on page 678**

**Profile Electronics, Inc., 6 Bridge St., Concord, N.H., 45, 95, Tel: CApitol 4-1232, Yr: 1957, Emp: 11, $36,000**

**See ad on page 404**

Progressive Tool & Die Co., 530 Boston Turnpike, Shrewsbury, Mass., 88, 89, 96, Tel: VIking 4-4431, Yr: 1928, Emp: 60, $260,000

Prototype Transformer Corp., 1 Henry St., Bloomfield, N.J., 43, 45, 63, 76, Tel: PIlgrim 8-8080, Yr: 1951, Emp: 42, ▲5, $350,000

Publication Engineering Consultants, 93 Nassau St., New York 38, N.Y., 88, 100, Tel: WOrth 2-6835, Yr: 1951, Emp: 14, ▲1

Pulse Engineering, Inc., 560 Robert Ave., Santa Clara, Calif., 45, 52, 64, 76, Tel: CH 8-6040, Yr: 1951, Emp: 90, ▲4, $1,000,000

Pulse Techniques, Inc., 1411 Palisade Ave., W. Englewood, N.J., 38, 51, 52, Tel: TEaneck 7-2575

Pye Corp. of America, 1149 Raritan Ave., Highland Park, N.J., 22, 32, Tel: COrtlandt 7-1930, Yr: 1954, Emp: 12, ▲1, $250,000

Pye Telecommunications, Ltd., Ditton Works, Newmarket Rd., Cambridge, England, 6, 7, 8, 12, 18, 20, 21, 22, 25, 26, 35, 38, 39, Tel: TEVersham 3131, Yr: 1946, Emp: 1150

Pyle-National Co., The, 1334 N. Kostner Ave., Chicago 51, Ill., 14, 16, Tel: DIckens 2-6300, Yr: 1897, Emp: 850

Pyramid Electric Co., Orange St., Darlington, S.C., 43, Tel: EXpress 3-3821, Yr: 1947, Emp: 700, ▲2, $7,000,000

Pyramid Instrument Corp., 630 Merrick Rd., Lynbrook, L.I., N.Y., 14, 58, Yr: 1948, Emp: 250, ▲2

Pyro-Electric, Inc., P.O. Box 152, Winnetka, Ill., 74, 75, Tel: HIllcrest 6-6200, Yr: 1957, Emp: 20, ▲1, $50,000

**Pyrocircuits Div., Microtron, Inc., 6 Manhasset Ave., Port Washington, L.I., N.Y., 64, 69, 72, 86, 89, Tel: POrt Washington 7-3949, Yr: 1956, ▲1**

**See ad on page 502**

Pyroferric Co., Inc., 621 East 216th St., New York 67, N.Y., 48, Tel: OLinville 1-3930, Yr: 1935

Pyrofilm Resistor Co., Inc., U. S. Hwy. #46, Parsippany, N.J., 69, Tel: DEerfield 4-8203, Yr: 1953, Emp: 25

Pyromet Co., 595 Industrial Rd., San Carlos, Calif., 89, 94, Tel: LY 1-7161, Yr: 1950, Emp: 35

Pyrometer Instrument Co., Inc., 92 Portland Ave., Bergenfield, N.J., 4, 14, 58, Tel: DUmont 4-5140, Yr: 1925, Emp: 30, ▲1

# Q

Q-Circuits Div., Etching Corp. of Calif., 1208 Howard St., San Francisco 3, Calif., 61, 91, Tel: MArket 1-7670, Yr: 1950, Emp: 38, $250,000

Q.O.S. Corp., 621 E. 216th St., New York 67, N.Y., 17, 48, Tel: OL 4-3930

QVS Inc., 20 North 15th St., East Orange, N.J., 58, Tel: ORange 3-3996, Yr: 1945, Emp: 50, ▲2

Quality Components, Inc., St. Marys, Pa., 43, 48, 91, 98, Tel: TE 4-2817

Quality Name Plate, Inc., P.O. Box 341, Ridgewood, N.J., 91, Tel: GIlbert 4-5392

Quam-Nichols Co., 234 East Marquette Rd., Chicago 37, Ill., 45, 56, 76, Tel: HU 8-5800, Yr: 1930, Emp: 350

Quan-Tech Laboratories, Inc., 60 Parsippany Blvd., P.O. Box 187, Boonton, N.J., 3, 14, 38, 58, 63, Tel: DEerfield 4-8500, Yr: 1957, Emp: 20, ▲2, $125,000



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Quantametric Devices, Inc., P.O. Box 1107, Binghamton, N.Y., 4, 9, 14, 38, Tel: RAymond 3-6787, Yr: 1955, Emp: 5, $50,000

Quartzite Processing, Inc., 6 Holyoke St., Malden 50, Mass., 39, 48, 86, 89, Tel: DUnkirk 9-8793, Yr: 1957, Emp: 11, $98,000

Quick Charge Div., Line Scale Co., Inc., 3737 N.W. 37th St., Oklahoma City 12, Okla., 96, Tel: WIndsor 6-3307, Yr: 1935, Emp: 30, $25,000

# R

RCA Victor Co., Ltd., 1001 Lenoir St., Montreal 30, Quebec, Canada, 1, 6, 7, 12, 13, 14, 18, 21, 23, 26, 27, 28, 29, 31, 32, 34, 37, 38, 39, 45, 52, 59, 61, 63, 65, 70, 76, 77, 78, 79, 80, 84, 88

REF Manufacturing Corp., 393 Jericho Tpke., Mineola, L.I., N.Y., 4, 14, 34, 63, 84, 87, 89, Tel: PIoneer 2-8100, Yr: 1910, Emp: 325

R-J Audio Products, Inc., 80 Shore Rd., Port Washington, L.I., N.Y., 84, Tel: POrt Washington 7-7700

RMS Associates, Inc., 805 Mamaroneck Ave., Mamaroneck, N.Y., 3, 4, 5, 14, 38, 64, Tel: OWens 8-5802, Yr: 1945, Emp: 14, ▲1, $200,000

**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 1, 6, 20, 27, 28, 38, 45, 47, 63, 76, 89, 94, Tel: DAvenport 1-1130, Yr: 1954, Emp: 45, ▲10, $500,000**

**See ad on page 243**

Racal Engineering Ltd., Western Rd., Bracknell, Berkshire, England, 6, 9, 10, 14, 21, 22, 26, 28, 31, 35, 39, 47, 52, 63, 64, 84, 87, 88, Tel: BRacknell 941, Yr: 1950, Emp: 750, $3,000,000

Racon Electric Co., Inc., 1261 Broadway, New York 1, N.Y., 56, 57, 59, Tel: MU 4-6258, Yr: 1922, Emp: 40, ▲1

Radar Design Corp., P.O. Box 38, Pickard Dr., Syracuse 11, N.Y., 21, 38, 39, 40, 52, 83, 102, Tel: GLenview 4-4418, Yr: 1956, Emp: 25, ▲1, $192,000

**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 14, 21, 23, 28, 39, 40, 52, 72, 76, 77, 83, Tel: OVerbrook 1-5600**

**See ad on page 314**

Radar Relay, Inc., 2322 Michigan Ave., Santa Monica, Calif., 62, 72, Tel: EXbrook 4-2230, Yr: 1954, Emp: 60

Radex Corp., 2076 Elston Ave., Chicago 14, Ill., 42, 60, 96, Tel: ARmitage 6-6900, Yr: 1940, Emp: 70, ▲2, $200,000

Radian Laboratories, Inc., P.O. Box 454, Mineola, L.I., N.Y., 54, Tel: PIoneer 2-6364, Yr: 1958, Emp: 10, ▲2, $15,000

Radiation Dynamics, Inc., 1800 Shames Dr., Westbury, L.I., N.Y., 24, 63, Tel: EDgewood 4-3990, Yr: 1958, Emp: 20, ▲1

Radiation Electronics Co., 5600 W. Jarvis, Chicago 48, Ill., 4, 14, 17, 38, 70, 75, 76, 94, 101, Tel: SPring 5-2400, Yr: 1957, Emp: 19, ▲4, $115,000

Radiation Incorporated, Melbourne, Fla., 1, 9, 27, 36, Tel: PArkway 3-1511, Yr: 1950, Emp: 1450, $14,005,734

Radiation Instrument Development Lab., Inc., 5737 S. Halsted St., Chicago 21, Ill., 9, 10, 14, 24, 38, 63, 102, Tel: TRiangle 3-2315, Yr: 1950, Emp: 60, ▲4

Radio City Products Co., Inc., Centre & Glendale Sts., Easton, Pa., 1, 3, 5, 14, 21, 28, 31, 38, 84, 87, 88, Tel: BLackburn 8-9122, Yr: 1932, Emp: 100, ▲4, $500,000

Radio Condenser Co., Davis & Copewood Sts., Camden 3, N.J., 4, 30, 44, 52, 80, Tel: EMerson 5-5500, Yr: 1924, Emp: 1500, ▲12, $12,341,077

**Radio Cores, Inc., 9540 S. Tulley Ave., Oak Lawn, Ill., 48, Tel: GArden 2-3353, Yr: 1947, Emp: 100, ▲2**

**See ad on page 425**

Radio Corp. of America, Front & Cooper Sts., Camden, N.J., 3, 7, 10, 12, 15, 18, 20, 21, 22, 23, 26, 27, 28, 29, 31, 32, 34, 37, 38, 39, 45, 49, 51, 52, 55, 56, 59, 61, 65, 72, 80, 83, 84, 87, 88, Tel: WOodlawn 3-8000, Yr: 1919, Emp: 80,000

Radio Corp. of America, Astro-Electronic Products Div., P.O. Box 800, Princeton, N.J., 1, 9, 17, 94, Tel: WAlnut 4-2700, Yr: 1958, Emp: 350, ▲150

Radio Corp. of America, Defense Electronic Products, Front & Cooper Sts., Camden, N.J., 1, 4, 6, 7, 9, 12, 13, 14, 17, 18, 20, 22, 26, 27, 29, 31, 32, 34, 35, 36, 37, 38, 39, 41, 48, 56, 59, 61, 63, 70, 77, 78, 79, 80, 88, 100, 101, Tel: WOodlawn 3-8000

**Radio Corp. of America, Electron Tube Div., Section 1-22-Q, 415 S. 5th St., Harrison, N.J., 3, 14, 25, 28, 37, 38, 41, 48, 58, 65, 66, 67, 70, 75, 77, 78, 79, 104, Tel: HUmboldt 5-3900**

**See ad on pages 54-55**

**Radio Corp. of America, Semiconductor & Materials Div., Section 1-22-NN, Rt. 202, Somerville, N.J., 9, 43, 48, 64, 66, 70, Tel: RAndolph 2-3200**

**See ad on pages 56-57**

Radio Development & Research Corp., Div. Bogue Electric Mfg. Co., 100 Pennsylvania Ave., Paterson 3, N.J., 4, 14, 38, 45, 47, 60, 63, 66, 70, 75, 76, 82, 84, 96, Tel: LAmbert 5-2200, Yr: 1892, Emp: 480, $10,000,000

Radio Engineering Laboratories, Inc., 29-01 Borden Ave., Long Island City 1, N.Y., 1, 2, 3, 6, 7, 20, 22, 26, 31, 38, 52, 63, 76, 80, Tel: STillwell 6-2100, Yr: 1922

Radio Engineering Products, 1410 Stanley St., Montreal, Canada, 3, 8, 35, 38, 46, 52, 55, 68, 72, 73, Yr: 1918, Emp: 1300, ▲12, $7,500,000

**Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 8, 14, 35, 36, 63, 69, 87, 91, 96, Tel: DEerfield 4-3100, Yr: 1922, Emp: 160, ▲4, $2,000,000**

**See ad on page 290**

Radio Industries, Inc., 666 Garland Pl., Des Plaines, Ill., 43, 45, 66, 76, Tel: VAnderbilt 7-4402, Yr: 1945, Emp: 500

Radio Industries, Inc., 1307 Central Ave., Kansas City 2, Kan., 1, 22, 31, 39, Yr: 1947, Emp: 25, ▲2, $250,000

Radio Mfg. Co., Inc., 65 Eucalyptus Lane, Santa Barbara, Calif., 86, 90, 104, Tel: WOodland 9-0419

Radio Materials Co., 3325 N. California Ave., Chicago 18, Ill., 43, Tel: IRving 8-3600, Yr: 1947, Emp: 1000, ▲6

**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 1, 6, 7, 8, 18, 20, 22, 23, 26, 27, 28, 31, 32, 35, 36, 66, Tel: EVergreen 8-6000, Yr: 1922, Emp: 1000, ▲100**

**See ad on page 506**

Radio Specialty Mfg. Co., 2023 S.E. 6th Ave., Portland 14, Ore., 12, 28, Tel: BE 2-8123, Yr: 1932, Emp: 35, ▲1

Radiometer, 72 Emdrupvej, Copenhagen NV, Denmark, 3, 5, 14, 16, 23, 25, 28, 37, 38, 58, Tel: SQ 5000, Yr: 1935, Emp: 300

**Radionics, Inc., 76 Cambridge St., Burlington, Mass., 14, 28, 30, 38, 63, 88, 89, 94, Tel: BRowning 2-1233, Yr: 1953, Emp: 15, ▲1, $100,000**

**See ads on pages 291, 343**

Railroad Electronic Labs. of Omaha, Inc., 6614 Blondo St., Omaha 4, Neb., 4, 10, 26, 32, 35, 36, 38, 45, 52, 63, 76, Tel: 55 6-1513, Yr: 1954, Emp: 3, ▲1, $45,000

Railway Communications, Inc., 9351 E. 59th St., Raytown 33, Mo., 3, 6, 8, 21, 25, 31, 45, 52, 76, Tel: FLeming 3-2100, Yr: 1946, Emp: 20, ▲1, $500,000

Ram Chemicals, Inc., 210 E. Alondra Blvd., Gardena, Calif., 95, Tel: FAculty 1-0710, Yr: 1955, Emp: 6, ▲1, $8,000

Ram Meter, Inc., 1100 Hilton Rd., Ferndale, Detroit 20, Mich., 4, 9, 10, 14, 19, 30, 58, 75, 89, Tel: LIncoln 7-1000, Yr: 1936, Emp: 50, $400,000

Ramage & Miller, Inc., 3221 Florida Ave., Richmond, Calif., 14, 21, 27, 28, 38, 45, 63, 88, 94, Tel: BEacon 4-7061, Yr: 1953, Emp: 11, ▲4, $250,000

Ramyr Mfg. Co., 1779 N. Main St., Los Angeles 31, Calif., 63, 96, Tel: CApitol 3-1071, Yr: 1952, Emp: 20, $500,000

Randall, Inc., Douglas, 6 Pawcatuck Ave., Westerly, R.I., 45, Tel: LY 5-5757, Yr: 1950, Emp: 200

Rank Cintel, Ltd., Worsley Bridge Rd., London S.E. 26, England, 3, 4, 5, 9, 10, 14, 19, 23, 24, 25, 28, 34, 36, 37, 38, 45, 63, 64, 70, 76, 77, 78, 82, 84, 88, 94, Tel: HIther Green 4600, Yr: 1926, Emp: 600, $3,000,000





Ransom Research, Inc., 374 West 8th St., Box 269, San Pedro, Calif., 4, 9, 10, 63, Tel: TErminal 2-1128, Yr: 1955, Emp: 20, ▲1, $152,583

Rantec Corporation, 23999 Ventura Blvd., Calabasas, Calif., 21, 38, 39, 40, 52, 72, 80, 83, Tel: DIamond 7-5416, Yr: 1956, Emp: 100, ▲30, $1,500,000

**Rapid Electric Co., Inc., 2881 Middletown Rd., New York 61, N.Y., 38, 63, 66, 76, Tel: TAlmadge 8-2200, Yr: 1946, Emp: 85**

**See ad on page 493**

Rapid Electroplating Process, Inc., 1114 S. Wabash Ave., Chicago 5, Ill., 96, Yr: 1928, Emp: 19, $14,000

Rapid Specialties Co., 325 W. Huron St., Chicago 10, Ill., 55, Tel: DElaware 7-1410, Yr: 1945, Emp: 5

Rattray & Co., George, Div. Hardwick, Hindle, Inc., 116-08 Myrtle Ave., Richmond Hill 18, N.Y., 69, Tel: VIrginia 6-8250

Rauland Corp., The, 4245 N. Knox Ave., Chicago 41, Ill., 70, 77, 78, 79, Tel: MUlberry 5-5000, Yr: 1927, Emp: 550, ▲20

**Raway Bearing Co., Inc., 141-5 Chrystie St., New York 2, N.Y., 91, Tel: WAlker 5-8150, Yr: 1946, Emp: 6, $100,000**

**See ad on page 651**

**Rawson Electrical Instrument Co., Inc., 118 Potter St., Cambridge 42, Mass., 3, 14, 28, 33, 58, Tel: KIrkland 7-4041, Yr: 1918, Emp: 20, ▲1, $500,000**

**See ad on page 461**

Ray, Daisley Company, Inc., 585 W. Hoffman Ave., Lindenhurst, N.Y., 84, 87, 89, 92, Tel: TUrner 4-5520, Yr: 1855, Emp: 48

Ray-O-Vac Co., 212 E. Washington Ave., Madison 10, Wis., 41, 96, Tel: AL 5-7201, Yr: 1906, Emp: 300

Ray Proof Corp., 843 Canal St., Stamford, Conn., 14, Tel: DAvis 5-2201, Yr: 1930, $60,000

Raybestos-Manhattan, Inc., Manheim, Pa., 89, 93, 99, Tel: MOhawk 5-2211

Raychem Corp., Oakside at Northside, Redwood City, Calif., 50, 85, 93, 96, 98, 99, Tel: EMerson 9-3376, Yr: 1957, Emp: 250, $3,500,000

Raymond Engineering Laboratory, Inc., Smith St., Middletown, Conn., 27, 29, 30, Tel: DIamond 7-5611, Yr: 1938, Emp: 250, ▲3, $3,000,000

Raypar, Inc., 7800 W. Addison St., Chicago 34, Ill., 45, 46, 63, 76, Tel: TUxedo 9-3700, Yr: 1946, Emp: 150, ▲2, $1,250,000

Raytheon Co., Commercial Apparatus & Systems Div., 1415 Providence Tpke., Norwood, Mass., 1, 3, 18, 20, 27, 38, 39, 45, 52, 63, 75, 76, 82, 96, Tel: NOrwood 7-6700

Raytheon Co., Equipment Div., 1089 Washington St., West Newton, Mass., 1, 9, 12, 17, 18, 20, 22, 26, 27, 75, Tel: DEcatur 2-7700, Yr: 1923, Emp: 41,000, $494,000,000

Raytheon Co., Industrial Components Div., 49 Chapel St., Newton 58, Mass., 3, 9, 52, 53, 55, 62, 64, 67, 76, 77, 78, 79, 89, 91, 94, 98, Tel: BIgelow 4-7500, Yr: 1926, Emp: 2500, $18,000,000

Raytheon Co., Microwave & Power Tube Div., Foundry Ave., Waltham 54, Mass., 17, 48, 72, 79, 83, 86, Tel: TWinbrook 9-8400, Yr: 1923, Emp: 41,000, $494,000,000

Raytheon Co., Missile Systems Div., 520 Winter St., Waltham 54, Mass., 94, Tel: TWinbrook 9-8000, Yr: 1923, Emp: 41,000, $494,000,000

Raytheon Co., Receiving Tube Div., 465 Centre St., Quincy, Mass., 101, Tel: GRanite 9-5300, Yr: 1923, Emp: 41,000, $494,000,000

Raytheon Co., Semiconductor Div., 215 First Ave., Needham Heights 94, Mass., 9, 64, 66, 70, Tel: HIllcrest 4-6700, Yr: 1950, Emp: 41,000, $494,000,000

Raytheon Co., Special Microwave Devices Operation, 130 Second Ave., Waltham 54, Mass., 38, 48, 72, 83, Tel: TWinbrook 9-8080

Rea Magnet Wire Co., Inc., 3610 E. Pontiac St., Fort Wayne 4, Ind., 85, 96, Tel: ANthony 5201, Yr: 1933, Emp: 770

Rectico, Inc., 963 Frelinghuysen Ave., Newark 12, N.J., 66, 89, 94, Tel: BIgelow 3-8738, Yr: 1955, Emp: 11, $180,000

Red Devil Mfg. Co., 1412 N. Ogden Ave., Chicago 13, Ill., 91, Tel: MI 2-5161, Yr: 1945, Emp: 12

Red Point Corp., 105 W. Spazier Ave., Burbank, Calif., 4, 14, 58, 89, 96, Tel: TIllornwall 2-1895, Yr: 1944, Emp: 12, $175,000

Redman Electronics Corp., 92 Prospect St., Thompsonville, Conn., 45, 50, 76, Tel: RIverview 5-8024, Yr: 1950, Emp: 12, ▲1, $61,000

Redmond Inc., Subsid. Controls Co. of America, 201 Monroe St., Owosso, Mich., 42, 45, 60, 63, Yr: 1925

Reed & Prince Mfg. Co., 1 Duncan Ave., Worcester 1, Mass., 91, Tel: PL 3-2931, Yr: 1886, Emp: 700

Reed Research, Inc., 1018 Potomac St. N.W., Washington 7, D.C., 94, Tel: FE 3-7000, Yr: 1945, Emp: 68, ▲3

Reeve Electronics, Inc., 609 W. Lake St., Chicago 6, Ill., 92, 96, Tel: RAndolph 6-9755, Yr: 1945, Emp: 40, $150,000

**Reeves-Hoffman, Div. of Dynamics Corp. of America, 145 Cherry St., Carlisle, Pa., 9, 21, 28, 36, 49, 52, 60, Tel: CHapel 3-5929, Yr: 1947, Emp: 350, ▲5, $3,000,000**

**See ad on page 432**

Reeves Instrument Corp., East Gate Blvd., Garden City, L.I., N.Y., 1, 4, 9, 14, 27, 30, 38, 39, 64, 75, 83, 91, Tel: PIoneer 6-8100, Yr: 1945, Emp: 1600

Reeves Soundcraft Corp., Great Pasture Rd., Danbury, Conn., 65, 88, Tel: PIoneer 3-7601

Rego Insulated Wire Co., 830 Monroe St., Hoboken, N.J., 39, 85, Tel: OL 6-2020

Reichhold Chemicals, Inc., 525 North Broadway, White Plains, N.Y., 93, 95, 99, Tel: WHite Plains 8-6200, Yr: 1925

Rek-O-Kut, Inc., 38-19 108th St., Corona 68, N.Y., 29, 32, 34, 38, 56, 61, 65, 75, Tel: DEfender 5-3500, Yr: 1939, Emp: 125, ▲1, $200,000

Relays, Inc., 162 W. 83rd St., New York 24, N.Y., 68, Tel: TR 3-4500, Yr: 1952, Emp: 68, ▲1

Remington Rand Univac, 315 Park Ave. South, New York 10, N.Y., 9, Tel: SP 7-8000, Yr: 1927, Emp: 5000

Remington Rand Univac, Military Div., Univac Park, St. Paul 16, Minn., 9, Tel: MIdway 8-2451, Yr: 1946, Emp: 3600, ▲100

Remler Co., 2101 Bryant St., San Francisco 10, Calif., 18, 32, 56, 59, 84, 87, 89, 91, 98, 104, Tel: VAlencia 4-3435, Yr: 1918, Emp: 100, ▲3

Renbrandt, Inc., 6 Parmelee St., Boston 18, Mass., 30, Tel: HI 5-8910, Yr: 1951, Emp: 25

Reon Resistor Corp., 155 Saw Mill River Road, Yonkers, N.Y., 69, Tel: YOnkers 5-9850, Yr: 1952, Emp: 133, ▲1, $1,500,000

Republic Aviation Corp., Conklin St., Farmingdale, L.I., N.Y., 9, 14, 27, 39, 63, 83, 84, 89, 93, 95, 96, 99, Tel: CHapel 9-1100, Yr: 1932, Emp: 15,000, ▲100, $500,000

Republic Electronic Industries Corp., 111 Gazza Blvd., Farmingdale, L.I., N.Y., 1, 3, 4, 5, 6, 7, 9, 10, 14, 17, 19, 20, 21, 25, 27, 28, 30, 32, 33, 36, 38, 39, 63, 64, 66, 75, 82, 88, 94, Tel: CHapel 9-1414, Yr: 1951, Emp: 75, ▲10, $1,000,000

Republic Foil, Inc., 55 Triangle St., Danbury, Conn., 97, Tel: PIoneer 3-2731, Yr: 1945, Emp: 150, $3,250,000

Republic Lens Co., Inc., 31 East 169th St., New York 52, N.Y., 17, 49, 91, Tel: CYpress 3-2790, Yr: 1939, Emp: 13

Rescon Electronics Corp., 151 Bear Hill Rd., Rte. 128, Waltham 54, Mass., 4, 14, 77, 78, Tel: TWinbrook 9-8600, Yr: 1956, Emp: 20, ▲4, $200,000

Resdel Engineering Corp., 330 So. Fair Oaks Ave., Pasadena, Calif., 1, 6, 9, 10, 20, 21, 27, 28, 36, 38, 58, 80, 83, Tel: MUrray 1-7689

Rese Engineering, Inc., 731 Arch St., Philadelphia 6, Pa., 9, 14, 21, 38, 96, Tel: WAlnut 2-5841, Yr: 1953, Emp: 80, ▲8

Research Chemicals, Div. Nuclear Corp. of America, 170 W. Providencia, Burbank, Calif., 86, 90, 97, 102, Tel: VIctoria 9-6276, Yr: 1946, Emp: 40, ▲2



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Research, Inc., P.O. Box 6164, Edina Branch, Minneapolis 24, Minn., 4, 9, 14, 30, 38, 47, 58, 75, 88, 92, 94, 96, Tel: WEst 5-2156, Yr: 1952, Emp: 100, $1,500,000

Research Industrial Laboratory of Electronics, Roslyn, Pa., 4, 14, 16, 19, 24, 38, 58, 63, 68, 88, 94, Tel: TU 4-8098, Yr: 1950, Emp: 11, $50,000

Resin Consultants & Mfg. Co., Inc., 132 Nassau St., New York 38, N.Y., 89, 93, 95, 99, Tel: BE 3-5587, Yr: 1959, Emp: 9

Resinite Corp., 6980 N. Central Park Ave., Chicago 45, Ill., 89, 91, 93, 99

Resistance Products Co., 914 So. 13th St., Harrisburg, Pa., 69, Tel: CEdar 6-5081, Yr: 1947, Emp: 410, ▲2, $1,911,287

Resistors, Inc., 5226 W. 26th St., Chicago 50, Ill., 69, Tel: OLympic 2-7555, Yr: 1945, Emp: 50

Resitron Laboratories, Inc., 2908 Nebraska Ave., Santa Monica, Calif., 14, 17, 19, 43, 45, 54, 63, 67, 68, 76, 77, 78, 79, 83, 86, 93, 104, Tel: EXbrook 3-5217, Yr: 1953, Emp: 22, ▲2, $150,000

Reuter-Stokes Electronic Components, Inc., 2149 Hamilton Ave., Cleveland 2, Ohio, 17, 24, Tel: TOwer 1-7620, Yr: 1956, Emp: 16, $100,000

Revcor, Inc., 251 Edwards St., Carpentersville, Ill., 42, 46, Tel: HAzel 6-4818, Yr: 1948, Emp: 150, ▲1

Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N.Y., 97, Tel: MU 9-6800, Yr: 1801, Emp: 7800

Revere Corp. of America, Subsid. Neptune Meter Co., North Colony Rd., Wallingford, Conn., 4, 14, 58, 72, 75, 85, Tel: COlony 9-7701, Yr: 1942, Emp: 450

**Rex Rheostat Co., 149 Babylon Turnpike, Roosevelt, L.I., N.Y., 69, 96, Tel: FReeport 9-1030, Yr: 1939, Emp: 4, $60,000**

**See ad on page 531**

Reynolds Wire Div., National-Standard Co., 809 East Second St., Dixon, Ill., 85, Tel: ATlantic 3-1411, Yr: 1902, Emp: 3000, $300,000

Rheem Califone Corp., 1020 N. La Brea Ave., Hollywood 38, Calif., 29, 32, 61, Tel: HO 2-2353, Yr: 1946, Emp: 150

**Rheem Semiconductor Corp., Dept. C-1, 350 Ellis St., P.O. Box 1327, Mountain View, Calif., 66, 70, Tel: YOrkshire 8-9211, Yr: 1959, Emp: 700**

**See ad on pages 94-95**

Rho Engineering Co., 2242 Sepulveda Blvd., Los Angeles 64, Calif., 46, 63, 69, 89, Tel: GR 7-4741

Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn., 4, 68, 72, Tel: JAckson 2-4265, Yr: 1930, Emp: 200, ▲2, $50,000

Richards Co., Inc., Arklay S., 83 Winchester St., Newton Highlands 61, Mass., 58, 74, 75, 86, Tel: LAsalle 7-4385, Yr: 1938, Emp: 25

Richardson-Allen Corp., 116-15 Fifteenth Ave., College Point 56, N.Y., 47, 63, 96, Tel: FLushing 3-2858

Richardson Co., The, 2749 Lake St., Melrose Park, Ill., 84, 89, 93, 99, Tel: MAnsfield 6-8900, Yr: 1858, Emp: 2000

**Richco Plastic Co., 3722 W. North Ave., Chicago 47, Ill., 91, Tel: BElmont 5-2646, Yr: 1954, Emp: 10**

**See ad on page 651**

Richfield Coined Products Co., 720 Broad St., Clifton, N.J., 54, 89, 91, Tel: GRegory 3-4381, Yr: 1945, Emp: 54, ▲1

Richmond Engineering Co., Inc., 19 Concord St., South Norwalk, Conn., 45, 76, 84, 87, Tel: TEmple 8-0667, Yr: 1952, Emp: 70, $300,000

Rider Publisher, Inc., John F., 116 West 14th St., New York 11, N.Y., 100, Tel: OR 5-5020, Yr: 1928, Emp: 75

Riester & Thesmacher Co., The, 1526 West 25th St., Cleveland 13, Ohio, 84, 87, 89, Tel: CHerry 1-0154, Yr: 1900, Emp: 150, $600,000

Riggs Nucleonics Corp., Subsid. International Electronic Research Corp., 135 W. Magnolia Blvd., Burbank, Calif., 24, Tel: VIctoria 9-2481, Yr: 1956, Emp: 190. ▲3, $100,000

Rimak, Inc., 10929 Vanowen St., N. Hollywood, Calif., 53, 59, 73, 84, 87, 88, 89, 91, 101, Tel: TR 7-5526, Yr: 1951, Emp: 100, $500,000

Rinco, Inc., 7962 S.E. Powell, Portland 6, Ore., 5, 11, 43, 69, Tel: PRospect 4-3259, Yr: 1957, Emp: 25, ▲1, $150,000

**Ripley Co., Inc., 1 Factory St., P.O. Box 31, Middletown, Conn., 42, Tel: DIamond 6-6679, Yr: 1937, Emp: 67, ▲1**

**See ad on page 387**

Riverbank Laboratories, Dept. of Engineering, P.O. Box 65, Geneva, Ill., 15, 33, 47, 52, 63, 94, Tel: CEnter 2-2207

Riverside Plastics Corp., Miller Road, Hicksville, L.I., N.Y., 39, 89, Tel: WEIls 1-8010

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 1, 3, 5, 7, 9, 11, 14, 23, 26, 27, 28, 30, 31, 33, 35, 36, 38, 39, 40, 43, 44, 45, 47, 48, 50, 51, 52, 63, 64, 66, 68, 69, 76, 80, 89, 94, Tel: LOckwood 5-4578, Yr: 1951, Emp: 125, ▲8, $1,700,000**

**See ad on page 324**

Roberts Electronics, Inc., 829 N. Highland Ave., Hollywood 38, Calif., 29, 61, Tel: HO 2-6331, Yr: 1957, Emp: 12

Robertshaw-Fulton Controls Co., A & I Div., Santa Ana Fwy. at Euclid Ave., Anaheim, Calif., 4, 8, 16, 49, 58, 85, Tel: KEystone 5-8151, Yr: 1952, Emp: 522, ▲8

Robertshaw-Fulton Controls Co., Fulton Sylphon Div., P.O. Box 400, Knoxville 1, Tenn., 4, 14, 74, 91, Tel: 4-1641, Yr: 1904, Emp: 1400

Robertson Electric Co., Inc., 126 S. Elmwood Ave., Buffalo 2, N.Y., 46, 54, 84, 85, 89, 98, Tel: MO 3433, Yr: 1895, Emp: 150, ▲1, $500,000

Robinette Co., W. C., 802 Fair Oaks Ave., South Pasadena, Calif., 4, 30, 38, 88, 94, Tel: MU 2-1591, Yr: 1939

Robins Industries Corp., 36-27 Prince St., Flushing 54, N.Y., 55, 65, 81, 87, 89, 95, 98, 100, Tel: HIckory 5-7200, Yr: 1954, Emp: 20, $500,000

Robinson Machine Co., Inc., 286 Preakness Ave., Paterson 2, N.J., 96, Tel: AR 4-8405, Yr: 1958, Emp: 14, $10,000

Robinson Technical Products, Inc., Teterboro Air Terminal, Teterboro, N.J., 81, 96, Tel: ATlas 8-2500, Yr: 1942, ▲4

Rockbar Corp., 650 Halstead Ave., Mamaroneck, N.Y., 56, 61, Tel: OWens 8-7300

Rockbestos Wire & Cable Co., Div. Cerro de Pasco Corp., Nicoll & Canner Sts., New Haven 4, Conn., 85, Tel: STate 7-1141, Yr: 1920, Emp: 350

Rockland Insulated Wire Co., 36 Main St., Haverstraw, N.Y., 85, Tel: HAverstraw 9-3103, Yr: 1956

Rockwell Engineering Co., 2153 E. 45th St., Indianapolis 5, Ind., 4, 30, 88, 94, Tel: CLifford 1-9453

Rodale Mfg. Co., Inc., 6th & Minor Sts., Emmaus, Pa., 46, 53, 71, 72, Tel: WOodring 5-9071

Rodé Inc., 5R Green St., Woburn, Mass., 83, Tel: WEIls 3-3580, Yr: 1946, Emp: 55

Rodney Associates, Inc., 855 Sixth Ave., New York 1, N.Y., 88, 100, Tel: WIsconsin 7-5716, Yr: 1955, Emp: 100, ▲10, $800,000

Roebling's Sons Div., John A., Colorado Fuel & Iron Corp., 640 S. Broad St., Trenton 2, N.J., 85, Tel: EXport 6-6511, Yr: 1841, Emp: 5000

**Rogan Brothers, Inc., 3009 N. Monticello, Skokie, Ill., 91, 98, Tel: ORchard 5-1233, Yr: 1937, Emp: 30**

**See ad on page 690**

Rogers Electronic Corp., 43-49 Bleecker St., New York 12, N.Y., 45, 76, Tel: GR 7-8820, Yr: 1939, Emp: 30, ▲1

Rogers Mfg. Co., Dayton, 2824 13th Ave. S., Minneapolis 7, Minn., 42, 64, 73, 84, 87, 89, 91, 98, Tel: TAylor 5-2471, Yr: 1928, Emp: 350, $100,000

**Rohde & Schwarz, P.O. Box 275, 111 Lexington Ave., Passaic, N.J., Importers, 3, 5, 6, 7, 11, 14, 21, 23, 26, 28, 31, 33, 35, 37, 38, 39, 40, 43, Tel: PRescott 3-8010**

**See ad on page 246**

Rohn Manufacturing Co., 116 Limestone, Bellevue, Peoria, Ill., 39, 91, Tel: 7-8416





Rola Co., The, 2530 Superior Ave., Cleveland 14, Ohio, 45, 56, 76, Tel: PR 1-4242, Yr: 1929, Emp: 503, ▲3, $1,969,700

Rollan Electric Co., 8233 S. Princeton Ave., Chicago 20, Ill., 39, 76, 96, Tel: RAdcliff 3-4000, Yr: 1945, Emp: 200, ▲1, $1,500,000

Roller-Mike, Inc., 110 Wall St., New York 5, N.Y., 88, 96, Tel: WHitehall 3-5792, Yr: 1938, Emp: 10, ▲2, $150,000

Romar Plastics, Inc., 1313 E. Main St., St. Charles, Ill., 84, 89, 91, 93, Tel: JUno 6-6571, Yr: 1954, Emp: 125, $700,000

Rome Cable, Division of Alcoa, 421 Ridge St., Rome, N.Y., 85, Tel: ROme 3000, Yr: 1936, Emp: 2500

Ronson Metals Corp., Cerium Metals & Alloys Div., 55 Manufacturers Pl., Newark 5, N.J., 48, 86, 97, 104, Yr: 1915, Emp: 42

Rosan, Incorporated, 2901 West Coast Hwy., Newport Beach, Calif., 91, Tel: LIberty 8-5533, Yr: 1947, Emp: 230, ▲1

Rosemount Engineering Co., 4900 W. 78th St., Minneapolis 20, Minn., 4, 19, 72, 75, 88, Tel: WAlnut 7-7711, Yr: 1956, Emp: 175, ▲10, $1,500,000

Rosenberg Associates, Paul, 100 Stevens Ave., Mount Vernon, N.Y., 88, 94, Tel: MOunt Vernon 7-8010, Yr: 1945

Rosenberg Bros. & Co., 100 Landing Ave., Smithtown, N.Y., 89, 93, 99, Tel: ANdrew 5-2200, Yr: 1922, Emp: 100

**Rosenberg, Paul, 100 Stevens Ave., Mount Vernon, N.Y., 88, Tel: MOunt Vernon 7-8010**

**See ad on page 629**

**Rosenthal, Myron M., 19 Brookline Dr., North Massapequa, N.Y., 88, Tel: PErshing 5-2501, Yr: 1955, Emp: 6, ▲3**

**See ad on page 629**

Ross & Associates, Donald, 7908 Bonhomme St., St. Louis 5, Mo., 88, 94, Tel: PArkview 5-2212

Rostan Corporation, 5660 59th St., Maspeth 78, L.I., N.Y., 39, Tel: TWining 4-7558, Yr: 1946, Emp: 10

Rotary Devices Corp., 40 Jay St., Englewood, N.J., 4, 9, 46, 72, 83, 89, Tel: LO 9-0433

**Rotating Components, Inc., 267 Green St., Brooklyn 22, N.Y., 14, 30, 42, 60, Tel: EVergreen 9-3490, Yr: 1955, Emp: 100**

**See ad on page 389**

Rototest Laboratories, Inc., 2803 Los Flores Blvd., Lynwood, Calif., 14, 28, 88, 94, 96, Tel: NEvada 6-9238

Rotron Mfg. Co., Inc., 7-9 Schoonmaker Lane, Woodstock, N.Y., 42, 72, Tel: ORiole 9-2401, Yr: 1948, Emp: 375, ▲3

Roulements Miniatures S.A., Bienne, Switzerland, 91

Round Hill Associates, Inc., 665 5th Ave., New York 22, N.Y., 94, Tel: PL 2-9648

Rountree, J. G., P.O. Box 9044, Austin 17, Tex., 88, Tel: GL 2-3073

Rowan Controller Co., The, 2313-2315 Homewood Ave., Baltimore 18, Md., 3, 14, 21, 58, 68, 72, 73, 84, 89, Tel: BElmont 5-7118, Yr: 1917, Emp: 500, ▲20

Rowe Engravers, 262 E. 16th St., Paterson 4, N.J., 64, 89, Tel: MUlberry 4-1426, Yr: 1905, Emp: 12, $150

Rowe Industries, 1700 Wayne St., Toledo 9, Ohio, 18, 23, 39, 45, 61, Tel: EVergreen 2-5666, Yr: 1934, Emp: 57, ▲3, $100,000

Royal Electric Corp., Div. International Tel. & Tel. Corp., 95 Grand Ave., Pawtucket, R.I., 46, 53, 55, 72, 85, Tel: PAwtucket 2-8600, Yr: 1932, Emp: 1350

Royal McBee Corporation, Westchester Ave., Port Chester, N.Y., 9, Tel: WE 7-3000

## Code Numbers TELL YOU

**what each company does or makes. The numbers after each address refer you to the 104 product and service classes, in which detailed information on the firm will be found.**

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| **PRODUCTS AND SERVICES** | |
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**For complete listings of over 900 major and minor products listed in the "Products and Services" sections of this Directory, see the pink section preceding page 1.**

Rubatex, Div. Great American Industries, Inc., Bedford, Va., 93, Tel: JUstice 6-2611, Yr: 1936, Emp: 700

Rubber & Asbestos Corp., 225 Belleville Ave., Bloomfield, N.J., 95, 97, Tel: PIlgrim 8-1300, Yr: 1913, Emp: 185

Ruckelshaus Laboratories, Inc., John G., 110 Pomeroy Rd., Madison, N.J., 39, 69, 94, Tel: FRontier 7-1879

Rucker Co., The, 4700 San Pablo Ave., Oakland 8, Calif., 14, 39, 96, Tel: OL 3-5221, Yr: 1941, Emp: 120

Ruge Associates, Inc., Arthur C., 21 Elm Ave., Hudson, N.H., 4, 5, 17, 58, 75, Tel: TUxedo 2-5195, Yr: 1955, Emp: 58, ▲1, $230,000

Runzel Cord & Wire Co., 4723-31 Montrose St., Chicago 41, Ill., 85, Tel: MU 5-7100, Yr: 1931, Emp: 125

Rust Industrial Co., Inc., The, 130 Silver St., Manchester, N.H., 4, 15, 16, 23, 36, Tel: NAtional 3-3596, Yr: 1948, Emp: 30, $500,000

Rutherford Electronics Co., 8941 Lindblade St., Culver City, Calif., 14, 21, Tel: UP 0-7393, Yr: 1951, Emp: 80, ▲5

Ryan Electronics, Div. Ryan Aeronautical Co., P.O. Box 2308, San Diego 12, Calif., 1, 9, 14, 23, 27, 30, 39, 47, 52, 63, 64, 76, 82, 83, 94, Tel: BRowning 7-6150, Yr: 1957, Emp: 2000

Rypinski Co., C. A., 2005 N. Fair Oaks Dr., Pasadena, Calif., 52, Tel: MUrray 1-4423, Yr: 1958, Emp: 33, ▲3, $200,000

Rytron Co., Inc., 7303 Lankershim Blvd., North Hollywood, Calif., 38, 45, 50, 52, 76, Tel: TRiangle 7-0863, Yr: 1954, Emp: 100, ▲3

# S

S & A Electronics, Inc., 1025 Nevada, Toledo 5, Ohio, 39, Yr: 1950, Emp: 20, $500,000

S & B Machine & Tool Co., Inc., 52 Edison Pl., Newark 2, N.J., 38, 84, 89, 94, 96, 104, Tel: MArket 3-2795, Yr: 1948, Emp: 14, ▲1, $25,000

SNC Mfg. Co., Inc., P.O. Box 277, Oshkosh, Wis., 45, 76, Tel: BEverley 1-7370, Yr: 1946, Emp: 100, ▲1

Safe Flight Instrument Corp., 4 Water St., White Plains, N.Y., 58, Tel: WH 6-9500, Yr: 1948, Emp: 60, ▲2

Safeway Heat Elements, Inc., Middlefield St., Middletown, Conn., 92, Tel: DIamond 6-6601, Yr: 1942, Emp: 115, ▲1

Sag Harbor Industries, Box R, Sag Harbor, N.Y., 45, 57, 68, 76, 85, 91, Tel: SAg Harbor 5-0440, Yr: 1947, Emp: 65, $500,000

**Sage Electronics Corp., Country Club Rd., East Rochester, N.Y., 69, Tel: LUdlow 6-8010, Yr: 1948, Emp: 60, ▲1, $500,000**

**See ad on page 532**

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

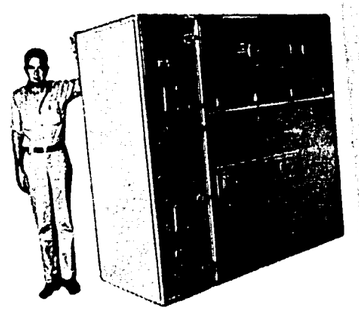
Skydyne, Inc

# CASE HISTORY

The total background of Skydyne's 20 years of pioneering in the design and manufacture of transit and operational cases, consoles and benches is expressed in every unit produced — whether specially engineered, or part of a modified standard line.

## SANDWICH MATERIAL FIELD AND MOBILE TRANSIT CASES

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**FEATURES**

- Integrated structural frame
- Panels bonded to frame members
- No limitation on size or design
- Sandwich panel types to meet individual requirements
- Shock absorbed by entire case.

## MOLDED FIBERGLASS HAND PORTABLE INSTRUMENT CASES



Skydyne molded fiberglass hand portable instrument cases are available in 16 standard sizes — each capable of modification to meet individual requirements. Interior packing or mounting devices are custom-designed for protective cushioning. Molded fiberglass cases were developed by Skydyne to house and protect all types of portable optical, electric and electronic instruments and equipment. Cases meet all applicable MIL-T-945A and MIL-T-108C specifications

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- Standard sizes, which can be modified for specific uses
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Skydyne, Inc

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Sage Laboratories, Inc., 3 Huron Dr., E. Natick Industrial Park, Natick, Mass., 21, 38, 39, 40, 49, 52, 83, Tel: OLympic 3-0844, Yr: 1955, Emp: 40, ▲3, $550,000

St. John X-Ray Laboratory, Califon, N.J., 91, Tel: CAlifon 49, Yr: 1925

St. Marys Carbon Co., State St., St. Marys, Pa., 91, Tel: TErminal 4-2841, Yr: 1939, Emp: 155

Sams & Co., Inc., Howard W., 1720 E. 38th St., Indianapolis 6, Ind., 91, 100, Tel: CLifford 3-6141, Yr: 1946, Emp: 417, ▲3, $5,250,000

San Diego Scientific Corp., 3131 Midway Dr., San Diego 10, Calif., 36, 72, Tel: ACademy 3-7156, Yr: 1957, Emp: 12, ▲2, $20,000

San Fernando Electric Mfg. Co., 1509 First St., San Fernando, Calif., 11, 43, 52, 69, Tel: EMpire 1-8681, Yr: 1951, Emp: 175

**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 16, 19, 23, 25, 36, 38, 65, 75, Tel: TWinbrook 4-6300, Yr: 1917, Emp: 1000, $15,100,000**


See ad on pages 64-65


Sanders Associates, Inc., 95 Canal St., Nashua, N.H., 4, 9, 28, 30, 39, 40, 42, 52, 64, 71, 75, 76, 83, 85, Tel: TUxedo 3-3321, Yr: 1951, Emp: 1330, $10,500,000

Sangamo Electric Co., Springfield, Ill., 4 9, 11, 16, 29, 38, 43, 45, 47, 50, 52, 58, 60, 63, 64, 69, 72, 73, 75, 76, Tel: KIngswood 4-6111, Yr: 1899, Emp: 5000, ▲7, $25,000,000

Sanial Laboratories, 16 Overland Pl., Huntington, L.I., N.Y., 88, Tel: HAmilton 3-6170

Santa Anita Engineering Co., 2451 E. Colorado Blvd., Pasadena, Calif., 84, Tel: MUrray 1-7441, Yr: 1946, Emp: 50, $125,000

Sargeant & Wilbur Heat Treating Corp., 170 York Ave., Pawtucket, R.I., 89, Tel: PA 3-5900, Yr: 1951, Emp: 20

Sargent Electric Co., 630 Merrick Rd., Lynbrook, N.Y., 72, Tel: Lynbrook 3-5600

Sarkes Tarzian, Inc., Semiconductor Div., 415 N. College Ave., Bloomington, Ind., 66, Tel: EDison 2-1435, Yr: 1946, Emp: 500, ▲10, $25,000,000

Sartron, Inc., 14 N. Main St., Newberg, Ore., 38, 45, 52, 76, Tel: JEfferson 8-3191, Yr: 1958, Emp: 25, $200,000

Satellite Corp. of America, Chewonki Rd., Wiscasset, Me., 39, 81, Tel: TUxedo 2-7311, Yr: 1956, Emp: 32, ▲1, $75,000

Sauereisen Cements Co., 1045 N. Canal St., Pittsburgh 15, Pa., 95, Tel: STerling 1-2323, Yr: 1899, Emp: 16

Saville Ra Tele Nics Labs., P.O. Box 501, Covington, Ky., 88, 94, Yr: 1925

Savoy Electronics, Inc., 1314 N.E. 17th Court, Box 7127, Fort Lauderdale, Fla., 18, 21, 24, 39, 49, 52, 58, Tel: LOgan 6-8416, Yr: 1937, Emp: 25, ▲1, $115,000

Savoy Electronics, Inc., P.O. Box 581, Griffin, Ga., 49, Yr: 1943, Emp: 75, ▲1, $500,000

**Saxton Products, Inc., 4320 Park Ave., New York 57, N.Y., 39, 56, 83, 85, Tel: WEllington 3-6400, Yr: 1952, Emp: 54**


See ad on page 615


Scaico Controls, Inc., P.O. Box 41, Delanco, N.J., 4, 72, 74, 92, Tel: HObart 1-4717, Yr: 1945, Emp: 50

Scala Radio Co., 2814 Nineteenth St., San Francisco 10, Calif., 39, Tel: VAlencia 6-2898, Yr: 1948

Schaevitz Engineering, P.O. Box 505, Camden 1, N.J., 3, 4, 9, 14, 15, 18, 21, 28, 36, 38, 45, 46, 48, 52, 63, 75, 76, 84, 89, 96, Tel: NOrmandy 2-8000, Yr: 1945, Emp: 220, ▲5

Schaffer Air Industries, Inc., 290 N. Henry St., Brooklyn 22, N.Y., 14, 84, 89, Tel: EVergreen 3-5300, Yr: 1949, Emp: 20, $50,000

Schauer Mfg. Corp., 4500-4 Alpine Ave., Cincinnati 42, Ohio, 47, 63, 66, 96, Tel: SYcamore 1-3030, Yr: 1907

Scherma Mfg. Co., Inc., F. A., 424 Broome St., New York 13, N.Y., 68, Tel: WAlker 5-2677

Schirmer National Alarm Co., 20 West Side Ave., Bergenfield, N.J., 4, 38, Tel: DUmont 5-1200, Yr: 1948, Emp: 12, $130,000

Schmit Engineering Co., 4062 Fabian Way, Palo Alto, Calif., 88, 96, Tel: DA 1-3376, Yr: 1957, Emp: 10, $67,000

Schoene Electronics Laboratory, 915 Washington Ave., Evansville 13, Ind., 14, 38, 58, 63, 94, Tel: HArrison 3-4312, Yr: 1937, Emp: 9, ▲2

Schulmerich Carillons, Inc., Carillon Hall, Sellersville, Pa., 38, 61, Tel: Alpine 7-2771, Yr: 1910, Emp: 85

Schutter Microwave Corp., 80 E. Montauk Highway, Lindenhurst, L.I., N.Y., 40, 83, Tel: TUrner 8-5200

Schuyler Manufacturing Corp., 84 Porete Ave., N. Arlington, N.J., 85, 91, 102, 104, Tel: WYman 1-2094, Yr: 1954, Emp: 27

Schweitzer Div., Peter J., Kimberly-Clark Corp., Lee, Mass., 98, Tel: Lee 7

Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill., 76, 96, Yr: 1941, Emp: 500, $20,000

Scientific-Atlanta, Inc., 2162 Piedmont Rd. N.E., Atlanta 9, Ga., 4, 9, 16, 21, 28, 30, 39, 63, 83, Tel: TRinity 5-7291

Scientific Components, Inc., 30 S. Salsipuedes, Santa Barbara, Calif., 46, 64, Tel: WOodland 6-1585

Scientific Electronic Labs., 868 Bergen St., Newark 8, N.J., 46, 54, 72, 78, 104, Tel: MI 3-8675, Yr: 1949, Emp: 31, ▲1, $250,000

Scientific Engineering Laboratories, 1510 Sixth St., Berkeley 10, Calif., 4, 14, 92, 96, Tel: LA 6-2772, Yr: 1958, Emp: 25, ▲2, $250,000

Scientific Radio Products, Inc., 2303 W. Eighth St., Loveland, Colo., 49, 52, Tel: NOrmandy 7-2261, Yr: 1950, Emp: 100, ▲2, $400,000

Scientific Radio Service, 4301 Sheridan St., University Park, Hyattsville, Md., 49, Tel: WArfield 7-0535, Yr: 1925, Emp: 1

Scientific Wood Cabinet Co., 32-34 Newark St., Newark 3, N.J., 84, Tel: HUmboldt 5-4300, Yr: 1934, Emp: 35

Scopes Company, Inc., The, P.O. Box 56, Monsey, N.Y., 5, 14, 25, 58, 77, Tel: ELmwood 6-6339, Yr: 1957, Emp: 18, ▲8, $130,000

Scott, Inc., H. H., 111 Powder Mill Rd., Maynard, Mass., 3, 4, 6, 14, 28, 38, 52, 61, 80, Tel: TWin Oaks 7-8801, Yr: 1947, Emp: 275, ▲7

Scott Instrument Labs., Inc., 17 E. 48th St., New York 17, N.Y., 14, Yr: 1957, Emp: 8

Scully, Inc., 62 Walter St., Bridgeport 8, Conn., 29, Tel: EDison 4-5300, Yr: 1919, Emp: 10, ▲1, $200,000

Sealectro Corp., 139 Hoyt St., Mamaroneck, N.Y., 46, 55, 71, Tel: OWens 8-5600, Yr: 1952, Emp: 180, ▲10

Sealol Inc., Providence 5, R.I., 91, Tel: STuart 1-4700, Yr: 1940, Emp: 325

Sealtron Corp., Reading Rd. at Amity, Cincinnati 15, Ohio, 46, 54, Tel: VAlley 1-7411

Seco Electronics, Inc., 5015 Penn Ave. S., Minneapolis 19, Minn., 14, 63, Tel: WAlnut 6-4515, Emp: 13

Secode Corp., 555 Minnesota St., San Francisco 7, Calif., 4, 9, 18, 22, 23, 36, 38, 52, 63, Tel: MA 1-2643, Yr: 1927, Emp: 125, ▲7

**Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 85, 89, 95, 97, 103, Tel: WHite Plains 9-4757, Yr: 1948, Emp: 40, ▲1**


See ad on page 615


**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 3, 9, 22, 23, 38, 41, 46, 68, Tel: HOpkins 7-3200, Yr: 1857, Emp: 300, ▲2**


See ads on pages 385, 519


Seg Electronics Co., Inc., 1778 Flatbush Ave., Brooklyn 10, N.Y., 7, 38, 51, 59, 88, 94, Tel: CLoverdale 2-4117, Yr: 1948, Emp: 10, $120,000

Segal, Edward, 132 Lafayette St., New York 13, N.Y., 96, Tel: WOrth 6-3935, Yr: 1943, Emp: 25

Seiscor, Div. Seismograph Service Corp., Box 1590, Tulsa, Okla., 1, 9, 12, 15, 16, 22, 38, 58, 84, 87, 88, 89, 94, Tel: RIverside 3-1381

Sel-Rex Corp., 75 River Rd., Nutley 10, N.J., 47, 63, 66, 82, 88, 89, 94, 96, 97, Tel: NO 7-5200, Yr: 1944, Emp: 175

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# STEMCO THERMOSTATS

RANK FIRST
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PRECISION TEMPERATURE CONTROL

In today's military and commercial projects, you can't afford to overlook any one of these important areas: Reliability, Size, Availability, Economy.

And because Stevens is in production now on the largest number of different types and styles of bimetal thermostats, all these advantages are yours automatically when you specify Stemco thermostats.

1st in Reliability. Proven designs, latest production techniques, most stringent inspection procedures.

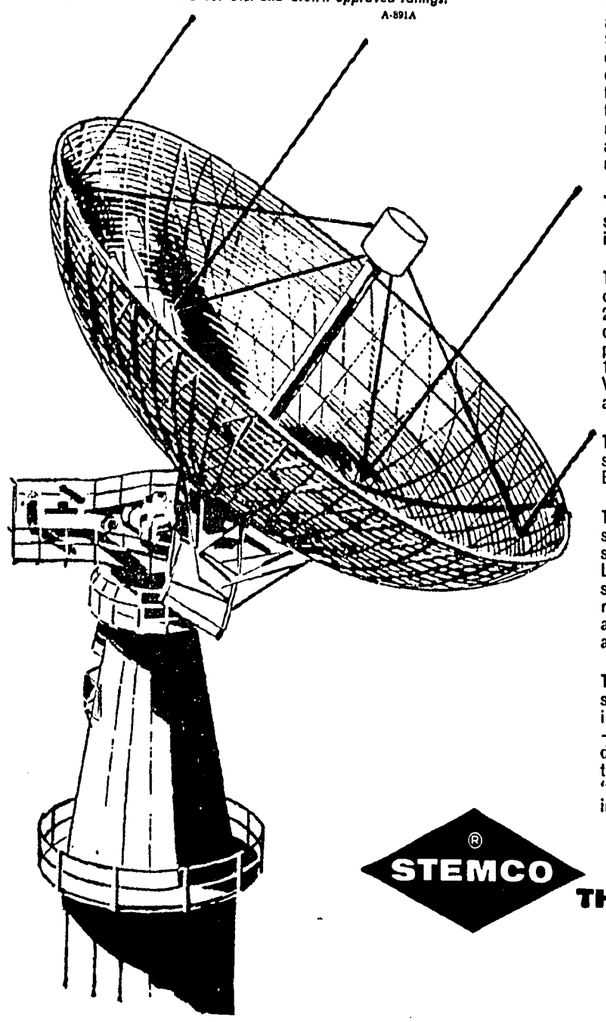
1st in Size. Stemco thermostats score in compactness and lightness without sacrificing performance.

1st in Availability. Tooling for most types is in existence. Flexibility of design cuts lead time on other types.

1st in Economy. Mass production of many standard Stemco types with hundreds of terminal arrangements and mounting brackets cuts your costs.

*Refer to Guide 400EO for U.L. and C.S.A. approved ratings.

A-891A





**TYPE A* semi-enclosed.** Bimetal disc type snap action thermostats; give fast response to temperature changes. Can be made to open on rise or close on rise. Single-throw with double make and break contacts. Operation from -20 to 300°F. Lower or higher temperatures on special order. Average non-inductive rating 13.3 amps, 120 VAC; 4 amps, 230 VAC and 28 VDC. Various mountings and terminals available. Bulletin 3000.

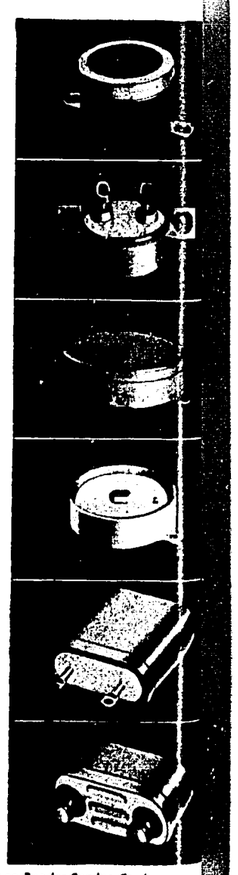
**TYPE A hermetically sealed.** Electrically similar to semi-enclosed Type A. Various mountings, including brackets, available. Bulletin 3000.

**TYPE MX hermetically sealed.** Snap acting bimetal disc type units to open on temperature rise. 2 to 6°F differentials as standard. 1 to 4°F differentials available on special order. Depending on duty cycle, normal rating 3 amps, 115 VAC and 28 VDC for 250,000 cycles. Various terminals, mountings and brackets available. Bulletin 6100.

**TYPE MX semi-enclosed.** Construction and rating similar to MX hermetically sealed type. Bulletin 6100.

**TYPE M-hermetically sealed.** Bimetal disc type, snap acting thermostats. Also available in semi-enclosed. Operation from -20 to 300°F. Lower and higher temperatures available on special order. Depending on application, rated non-inductive 10 amps, 120 VAC; 3 amps, 28 VDC. Various terminals, wire leads and brackets available. Bulletin 6000.

**TYPE C hermetically sealed.** Also semi-enclosed styles. Small, positive acting with electrically independent bimetal strip for operation from -10 to 300°F. Rated at approximately 3 amps, depending on application. Hermetically sealed type can be furnished as double thermostat "alarm" type. Various terminals and mountings. Bulletin 5000.



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® STEMCO THERMOSTATS

STEVENS *manufacturing company, inc.*
P.O. Box 1007, Mansfield, Ohio



Selas Corporation of America, Dresher, Pa., 92, 96, Tel: MI 6-6600, Yr: 1910, Emp: 530

**Semi-Alloys, Inc., 550 S. Fulton Ave., Mount Vernon, N.Y., 89, 97, 101, 103, 104, Tel: MOunt Vernon 4-2800, Yr: 1959, Emp: 18**

**See ad on page 697**

Semi-Elements, Inc., Saxonburg Blvd., Saxonburg, Pa., 17, 24, 41, 48, 49, 52, 66, 70, 89, 90, 97, 101, 104, Tel: FLanders 2-2548, Yr: 1957, Emp: 35, ▲3, $100,000

**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 4, 14, 17, 49, 63, 66, 67, 70, 72, 88, 101, Tel: CRestview 4-8542, Yr: 1958, Emp: 40, ▲3, $400,000**

**See ad on page 507**

Semimetals, Inc., 133-20 91st Ave., Richmond Hill 18, N.Y., Importers, 101, Tel: AXtel 7-0200, Yr: 1956, Emp: 15

**Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N.Y., 3, 5, 14, 33, 58, 63, Tel: BEverly 5-2300, Yr: 1927, Emp: 160, ▲2, $2,000,000**

**See ad on page 292**

Sequoia Wire & Cable Co., Subsid. Anaconda Wire & Cable Co., 2201 Bay Rd., Redwood City, Calif., 85, Tel: EMerson 9-0331, Yr: 1950

Serdex, Inc., 12 Bowdoin Square, Boston 14, Mass., 14, 58, Tel: CApital 7-7160, Yr: 1946, Emp: 100

Serfass Corp., Div. Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia 18, Pa., 4, 5, 58, 61, 96, Tel: CHestnut Hill 7-8000, Yr: 1937, Emp: 230, ▲5, $750,000

Servo Consultants, Ltd., 80 Shore Rd., Port Washington, L.I., N.Y., 14, 16, 28, Tel: PO 7-7700

Servo Corp. of America, 111 New South Rd., Hicksville, L.I., N.Y., 1, 9, 14, 16, 17, 18, 21, 30, 36, 38, 39, 75, Tel: WElls 8-9700, Yr: 1953, Emp: 500

Servo Development Corp., 567 Main St., Westbury, L.I., N.Y., 10, 30, 84, Tel: EDgewood 3-4144, Yr: 1957, Emp: 5, ▲1

Servo-Tek Products Co., 1086 Goffle Rd., Hawthorne, N.J., 4, 14, 30, 38, 58, 60, 63, 68, Tel: HAwthorne 7-3100, Yr: 1915, Emp: 52, $500,000

Servodyne Corp., 74 Lawley, Boston 22, Mass., 4, 38, 63, 76, 88, 92, Tel: AVenue 2-0600, Yr: 1960, Emp: 3, ▲1

Servomechanisms, Inc., 12500 Aviation Blvd., Hawthorne, Calif., 4, 9, 14, 23, 24, 30, 36, 38, 47, 52, 58, 60, 63, 64, 75, 76, Tel: ORegon 8-7841, Yr: 1946, Emp: 1100

Servonic Instruments, Inc., 610 Terminal Way, Costa Mesa, Calif., 4, 69, 75, Tel: MIdway 6-2427, Yr: 1953, Emp: 120, ▲2

Servospeed Div., Electro Devices, Inc., 4 Godwin Ave., Paterson, N.J., 4, Tel: ARmory 4-8989, Yr: 1949, Emp: 22, ▲1, $339,000

Setchell-Carlson, Inc., New Brighton, St. Paul 12, Minn., 6, 23, 38, Tel: ME 3-3131, Yr: 1936, Emp: 260, ▲2

Shakeproof Div., Illinois Tool Works, St. Charles Rd., Elgin, Ill., 73, 91, Tel: SHerwood 1-7900, Yr: 1923, Emp: 500

**Shalleross Mfg. Co., 20 Preston St., Selma, N.C., 5, 11, 14, 33, 38, 40, 45, 50, 52, 58, 63, 69, 72, Tel: WOodlawn 5-2341, Yr: 1929, Emp: 400**

**See ad on page 258**

Shamban & Co., W. S., 11617 W. Jefferson Blvd., Culver City, Calif., 93, 99, Tel: UPton 0-6877

Shampaine Scientific Co., 615 E. 1st Ave., Roselle, N.J., 84, Tel: CH 5-3140

Shanda Labs., 96 Harrison Ave., Jersey City, N.J., 95, 103, Tel: DE 3-0836

Sheffield Corp., The, Subsid. The Bendix Corp., Box 893, Dayton 1, Ohio, 4, 14, 75, 96, Tel: CL 4-5377, Yr: 1906, Emp: 1500, ▲4

Sheltered Workshops, Inc., 2521 5th St., Santa Monica, Calif., 64, 84, 85, 89, Tel: EXbrook 9-7741, Yr: 1951, Emp: 75, $150,000

Shepard Laboratories, Inc., Broad St. at Park Ave., Summit, N.J., 4, 9, 14, 24, 30, 65, 72, 88, 94, Tel: CRestview 3-5255, Yr: 1944, Emp: 40, ▲2, $500,000

Shepherd Industries, Inc., 103 Park Ave., Nutley 10, N.J., 9, 29, 36, 65, Tel: NOrth 7-0055, Yr: 1959, Emp: 95, ▲6, $250,000

Sherman Industrial Electronics Co., Box 813, State College, Pa., 92, Tel: ADams 8-0061, Yr: 1930, Emp: 10, $75,000

Sherman Mfg. Co., H. B., 22 Barney St., Battle Creek, Mich., 46, Tel: WOodward 4-7101, Yr: 1906, Emp: 350

**Sherold Crystals, Inc., Truman Rd. & McGee Trafficway, Kansas City 8, Mo., 49, Tel: VIctor 2-9792**

**See ad on page 433**

Sherwood Electronic Labs., Inc., 4300 N. California Ave., Chicago 18, Ill., 6, 38, 56, 80, Tel: IRving 8-7300, Yr: 1955, Emp: 125, ▲3, $2,000,000

**Shielding, Inc., 514 N. Read Ave., Riverton, N.J., 14, 102, Tel: TAlmadge 9-1433, Yr: 1952, Emp: 62**

**See ad on page 190**

Shipley Company, Inc., Walnut St., Wellesley 81, Mass., 95, Tel: CEdar 7-0550, Yr: 1957, Emp: 15, ▲1

**Shockley Transistor, Unit of Clevite Transistor, Stanford Industrial Park, Palo Alto, Calif., 70, Tel: DAvenport 1-2121**

**See ad on page 540**

Shores Laboratories, P.O. Box 227, East Patchogue, L.I., N.Y., 88, 94, Tel: GRover 5-2522, Yr: 1936, Emp: 5

Shurite Meters, 130 Wallace St., New Haven 8, Conn., 58, Tel: STate 7-5826, Yr: 1939, Emp: 140

Sibley Company, The, Haddam, Conn., 64, Tel: DIamond 5-4523, Yr: 1913, Emp: 70, $500,000

Sickles Div., F. W., General Instrument Corp., 165 Front St., Chicopee, Mass., 39, 44, 45, 50, 52, 63, 64, 76, 80, 94, Tel: REpublic 3-6621, Yr: 1923, Emp: 2000

Sier-Bath Gear & Pump Co., Inc., 9252 Hudson Blvd., North Bergen, N.J., 30, 96, Tel: UN 9-3000

Sierra Electronic Corp., Div. Philco Corp., 3885 Bohannon Dr., Menlo Park, Calif., 3, 14, 20, 21, 23, 24, 25, 28, 36, 38, 39, 52, 83, Tel: DAvenport 6-2060, Yr: 1947, Emp: 194, ▲19, $2,250,000

**Sierra Research Corp., P.O. Box 22, Buffalo 25, N.Y., 1, 4, 9, 27, 30, 36, 38, 39, 94, Tel: NF 2-8823, Yr: 1957, Emp: 34, ▲5, $750,000**

**See ads on pages 271, 356, 662**

Sifco Metachemical, Inc., Subsid. The Steel Improvement & Forge Co., 935 E. 63rd St., Cleveland 3, Ohio, 96, Tel: MU 5-9427

Sightmaster Corp., 50 Aleppo St., Providence 9, R.I., 53, 69, 72, Tel: TEmple 1-6200, Yr: 1948, Emp: 100, ▲1, $500,000

Sigma Electronics Research Corp., 15735 Ambaum Blvd., Seattle 66, Wash., 1, 11, 20, 21, 22, 23, 27, 28, 38, 39, 40, 45, 49, 52, 58, 63, 64, 72, 76, 80, 83, 88, 89, 94, Tel: CHerry 3-2337, Yr: 1959, Emp: 15, ▲2, $100

Sigma Engineering Service, Inc., 26 W. Warren Rd., P.O. Box 44, Custer City, Pa., 96, Tel: 2-2241

**Sigma Instruments, Inc., 31 Pearl St., South Braintree 85, Mass., 14, 60, 62, 68, 72, Tel: VIctor 3-5000**

**See ad on page 518**

Signal Equipment Co., Inc., 2706 3rd Ave., Seattle 1, Wash., 14, 38, 63, Tel: MAin 4-4712, Yr: 1948, Emp: 18, ▲1, $251,000

Signal Indicator Corp., 42 Stewart Ave., Brooklyn 37, N.Y., 46, 62, 71, Tel: HYacinth 7-5020, Yr: 1937, Emp: 100, ▲4

Signal Transformer Co., Inc., 1661 McDonald Ave., Brooklyn 30, N.Y., 45, 76, Tel: ES 6-0615, Yr: 1956, Emp: 20, ▲1, $200,000

Signalite Inc., 37-41 Neptune Hwy., Neptune, N.J., 62, 78, Tel: PRospect 5-2490, Yr: 1951, Emp: 130, ▲1

**Silicon Transistor Corp., 150 Glen Cove Rd., Carle Place, L.I., N.Y., 70, Tel: Pioneer 2-4100, Yr: 1958, Emp: 100, ▲3**

**See ad on page 542**

Silicone Seals, Inc., 3694 Milwaukee Ave., Chicago 41, Ill., 46, 54, 89, Tel: AVenue 2-3787, Yr: 1954, Emp: 34, ▲1

Sillcocks-Miller Co., The, 400 W. Parker Ave., Maplewood, N.J., 16, 17, 24, 38, 48, 58, 64, 84, 89, 91, 93, 94, 98, 99, 100, 104, Tel: SO 2-6171, Yr: 1910, Emp: 125, $100,000

Simmonds Precision Products, Inc., 105 White Plains Rd., Tarrytown, N.Y., 1, 4, 5, 11, 14, 18, 58, Tel: MEdford 1-7500, Yr: 1937, Emp: 584, $250,000

Simmons Fastener Corp., N. Broadway, Albany 1, N.Y., 91, Tel: HO 2-5431, Yr: 1945, Emp: 120

Simonds Saw & Steel Co., Ohio St., Lockport, N.Y., 57, Tel: LO 3-5921

Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass., 85, Tel: KIrkland 7-9000

**Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 3, 14, 25, 28, 37, 58, 68, Tel: EStebrook 9-1121**

**See ad on page 462**

Simpson Mfg. Co., Inc., Mark, 32-28 49th St., Long Island City 3, N.Y., 6, 32, 38, 80, Tel: YE 2-3400, Yr: 1918, Emp: 100, ▲6, $1,300,000

Sims Co., Inc., S. Paul, 22 E. 17th St., New York 3, N.Y., 100, Tel: CHelsea 2-6218

Sinclair Radio Labs, Inc., 412 Chamber of Commerce Bldg., Buffalo, N.Y., 17, 18, 39, 40, 52, 76, 80, 83, 88, 94, Tel: WAshington 4700, Yr: 1951, Emp: 25, ▲7, $300,000

Singer Mfg. Co., 915 Pembroke St., Bridgeport 8, Conn., 4, 17, 38, 72, Tel: FO 6-3201

Sioux Radio Products, 100 Douglas Ave., Yankton, S.D., 39, 45, 76, Tel: NOrth 5-3507, Yr: 1951, Emp: 60

Sittler Corp., 18 N. Ada St., Chicago 7, Ill., 62, 85, 91, Tel: SEeley 3-4616, Yr: 1913, Emp: 20, $50,000

Sivers Laboratory, Box 42018, Stockholm 42, Sweden, 21, 40, 63, 68, 72, 76, 80, 83, Tel: 18 03 50, Yr: 1951, ▲1

Skiatron Electronics & Television Corp., 180 Varick St., New York 14, N.Y., 1, 9, 10, 14, 18, 25, 27, 38, 77, 89, 94, Tel: WAtkins 4-7060, Yr: 1948, Emp: 40, ▲10

**Skydyne, Inc., River Rd., Port Jervis, N.Y., 84, Tel: 3-2241, Yr: 1938, Emp: 130, ▲2**

**See ad on page 222**

Skysweeper, Inc., P.O. Box 368, McHenry, Ill., 45, 63, 76, 85, Tel: 1090, Yr: 1953, Emp: 150

Slaughter Co., College & Young, Piqua 25, Ohio, 4, 14, Tel: PRospect 3-5936

Slip Ring Co. of America, 3612 W. Jefferson Blvd., Los Angeles 16, Calif., 46, 72, 73, 89, 91, Tel: REpublic 5-0253, Yr: 1950, Emp: 100

Sloan Company, The, 7704 San Fernando Rd., Sun Valley, Calif., 4, 9, 58, 62, 68, 71, 72, Yr: 1957, Emp: 75

**Sloan, Gardner H., 1 Story St., Cambridge 38, Mass., 88, Tel: ELiot 4-0766**

**See ad on page 630**

Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill., 60, Tel: AR 6-6900, Yr: 1941, Emp: 75

Smallwood, Ltd., S. G., 391-397 King St. E., Kitchener, Ont., Canada, 45, 76, Tel: SHerwood 5-9583, Yr: 1945, Emp: 120, ▲2, $460,000

Smith Electronics, Inc., 8200 Snowville Rd., Brecksville, Ohio, 39, 88, 94, Tel: JAckson 6-4386, Yr: 1934, Emp: 25, ▲10, $750,000

Smith-Florence, Inc., 4228 23rd West, Seattle 33, Wash., 3, 14, 33, 38, 47, 58, 63, 64, Tel: AT 4-0170, Yr: 1959, Emp: 16, ▲3

Smith, Inc., Herman H., 2326 Nostrand Ave., Brooklyn 10, N.Y., 46, 53, 55, 62, 71, 72, 73, 85, 86, 91, 98, Tel: CL 3-7900

Smith Mfg. Co., Inc., E. C., Forrest & Hector Sts., Conshohocken, Pa., 4, 55, 74, 75, 85, 86, 93, 97, Tel: TAylor 8-4790, Yr: 1956, Emp: 20, $300,000

Smith Mfg. Co., J. & H., Little Britain Rd., Newburgh, N.Y., 4, 39, 62, 72, 83, Tel: JOhn 1-8800, Yr: 1940, Emp: 80, ▲1

Sodeco, Geneva, Switzerland, 10

Sola Electric Co., Div. Basic Products Corp., 4633 W. 16th St., Chicago 50, Ill., 63, 76, 82, Tel: BIshop 2-1414, Yr: 1929, Emp: 500, ▲8

Solar Systems, Inc., 8241 N. Kimball Ave., Skokie, Ill., 4, 17, 38, 41, 70, 72, Tel: ORchard 6-2040, Yr: 1960, Emp: 10, ▲3

Solartron Electronic Group, Ltd., The, Thames Ditton, Surrey, England, 3, 4, 5, 9, 14, 21, 25, 29, 30, 36, 38, 40, 47, 58, 63, 75, Tel: EMberbrook 5522, Yr: 1947, Emp: 1700, ▲10, $10,000,000

Solartron, Inc., 1742 S. Zeyn St., Anaheim, Calif., 3, 9, 14, 25, 38, 75, Tel: PRospect 2-2652, Yr: 1957

Solatron, Inc., 126 Jackson St., Cambridge 40, Mass., 88, 94, Yr: 1959, Emp: 8, ▲4

**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 1, 2, 4, 12, 14, 22, 23, 27, 28, 36, 38, 47, 64, 75, 88, Tel: EMpire 4-2271, Yr: 1957, Emp: 9, ▲2**

**See ad on page 420**

**Solid State Products, Inc., 1 Pingree St., Salem, Mass., 66, 70, Tel: PIoneer 5-2900, Yr: 1958, Emp: 75, ▲6**

**See ad on page 506**

**Solitron Devices, Inc., 67 S. Lexington Ave., White Plains, N.Y., 66, 70, Tel: WHite Plains 6-7591**

**See ad on page 506**

Somerset Radiation Laboratory, Inc., 192 Central Ave., Stirling, N.J., 2, 21, 33, 45, 52, 83, Yr: 1959, Emp: 25, ▲5

Sonotone Corp., Box 200, Elmsford, N.Y., 38, 41, 56, 59, 61, 67, 77, Tel: LY 2-9600, Yr: 1929, Emp: 2500

Sony Corp., 514 Broadway, New York 12, N.Y., 70, Tel: WOrth 8-0800, Yr: 1946, Emp: 3000, ▲5

**Sorensen & Co., Inc., Subsid. Raytheon Co., Richards Ave., Norwalk, Conn., 14, 47, 63, 82, Tel: TEmple 8-6571, Yr: 1942, Emp: 481, ▲9**

**See ad on page 490**

Sorensen Industrial Electronic Co., Route 10, Dover, N.J., 1, 2, 4, 9, 12, 14, 18, 19, 22, 31, 32, 34, 39, 45, 63, 68, 84, 87, 89, 97, Tel: DOver 6-3905

Soroban Engineering, Inc., P.O. Box 1717, Melbourne, Fla., 9, 29, 36, 84, Tel: PArkway 3-7221, Yr: 1954, Emp: 179, ▲4, $1,250,000

Sorrels-Johnson Corp., 363 Rantoul Ave., Beverly, Mass., 19, 56, 68, Tel: WAlker 7-1010

SoundScriber Corp., The, 6 Middletown Ave., North Haven, Conn., 1, 29, 65, Tel: STate 7-2125, Yr: 1940, Emp: 500, ▲2, $1,038,238

South River Metal Products Co., Inc., 377-379 Turnpike, South River, N.J., 39, 85, 89, Tel: CLifford 4-5252, Yr: 1946, Emp: 80

Southco Div., South Chester Corp., Lester, Pa., 91, Tel: LEhigh 4-1800, Yr: 1945

**Southern Electronics Corp., 150 W. Cypress Ave., Burbank, Calif., 11, 43, 44, Tel: VIctoria 9-3193, Yr: 1951, Emp: 70, ▲1, $500,000**

**See ad on page 208**

Southwest Products, Inc., Route 4, P.O. Box 90, San Antonio, Tex., 4, 9, 58, 88, 89, 94, 96, Tel: GEneral 2-5266, Yr: 1953, Emp: 18, $85,000

Southwest Research Institute, 8500 Culebra Rd., San Antonio 6, Tex., 94, Tel: GE 2-5221, Yr: 1947, Emp: 500, ▲15

Southwestern Industrial Electronics Co., 10201 Westheimer Rd., Houston 27, Tex., 1, 3, 4, 5, 9, 14, 15, 16, 17, 18, 29, 30, 33, 36, 38, 40, 45, 47, 50, 52, 58, 59, 63, 65, 75, 76, 82, Tel: HOmestead 5-3471, Yr: 1945, Emp: 900

Southwire Co., Fertilla St., Carrollton, Ga., 85, Tel: TErrace 2-6311, Yr: 1950, Emp: 300

Space Electronics Corp., 930 Air Way, Glendale 1, Calif., 1, 9, 15, 22, 26, 27, 36, 38, 39, 64, 89, 94, Tel: CH 5-7651, Yr: 1958, Emp: 125, ▲30, $850,000

Sparta Mfg. Co., Div. U. S. Ceramic Tile Co., Dover, Ohio, 89, 93, 98, 99, Tel: 4-2389, Yr: 1951, Emp: 50

**Spaulding Fibre Co., Inc., 310 Wheeler St., Tonawanda, N.Y., 89, 91, 93, 99, Tel: JAckson 2000, Yr: 1873, Emp: 1875, ▲2**

**See ad on page 657**

Spaulding Products Co., 550 W. Barner St., Frankfort, Ind., 39, Tel: FRankfort 4494, Yr: 1953, Emp: 35

Spec-Tronics, 13942 Saticoy, Van Nuys, Calif., 9, 47, 64, 89, Tel: TR 3-4732, Yr: 1959, Emp: 60, $250,000

Special Instruments Laboratory, Inc., 312 West Vine Ave., Knoxville 2, Tenn., 4, 18, 24, 30, 34, Yr: 1952, Emp: 28





Specialties, Inc., Skunks Misery Rd., Syosset, L.I., N.Y., 4, 38, 69, 75, 94, Tel: WAlnut 1-2315

**Specialty Automatic Machine Corp., 80 Cambridge St., Rt. 3A, Burlington, Mass., 83, Tel: BRowning 2-0800, Yr: 1918, Emp: 45, $200,000**

**See ad on page 595**

Specialty Electronics Development Corp., 115 Eileen Way, Syosset, L.I., N.Y., 1, 3, 8, 12, 14, 16, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 31, 32, 35, 36, 38, 39, 40, 46, 63, 64, 82, 83, 84, 87, 88, 89, 91, Tel: WAlnut 1-5200, Yr: 1951, Emp: 250, ▲5, $1,000,000

**Specific Products, P.O. Box 425, 21051 Costanso, Woodland Hills, Calif., 6, 39, 63, Tel: DI 0-3131, Yr: 1951, Emp: 10, ▲2**

**See ad on page 259**

Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., 250 E. 3rd St., Mount Vernon, N.Y., 1, 4, 17, 26, 38, 39, 63, 94, Tel: MO 8-1378, Yr: 1958, Emp: 17, ▲10

Spectracoat, Inc., 248 Harbor Blvd., Belmont, Calif., 17, Tel: LY 1-0358, Yr: 1958, Emp: 9, $60,000

Spectralab Instruments, 608 Fig Ave., Monrovia, Calif., 1, 14, 20, 28, 33, 36, 37, 38, 52, 80, 83, 91, Tel: ELliott 9-3208

Spectrol Electronics Corp., 1704 S. Del Mar Ave., San Gabriel, Calif., 4, 9, 30, 38, 47, 63, 69, 72, 75, Tel: ATlantic 7-9761, Yr: 1955, Emp: 450, ▲6

Spectronic Plating Co., Inc., 652 Hudson St., New York 14, N.Y., 89, Tel: ALgonquin 5-8677, Yr: 1946, Emp: 75, ▲1, $200,000

Spectrum Instruments, Inc., P.O. Box 61, Steinway Station, Long Island City 3, N.Y., 3, 52, Tel: AStoria 8-8033, Yr: 1953

Speer Carbon Co., Onondaga Electronics Div., 1810 W. Fayette St., Syracuse 1, N.Y., 43, 69, Tel: HO 8-6261, Yr: 1959, Emp: 250, ▲2, $1,135,000

Speer Carbon Co., Speer Resistor Div., Bradford, Pa., 69, 91, Tel: FOrest 8-7108, Yr: 1899, Emp: 2000, ▲10, $5,946,758

**Spellman High Voltage Co., 3029 Webster Ave., New York 67, N.Y., 63, 76, Tel: KIngsbridge 7-0306, Yr: 1948, Emp: 7**

**See ad on page 493**

Spencer-Kennedy Laboratories, Inc., 1320 Soldiers Field Rd., Boston 35, Mass., 6, 7, 21, 38, 40, 46, 52, 84, Tel: ALgonquin 4-5400, Yr: 1948, Emp: 80, ▲8, $950,000

Sperry Electronic Tube Div., Sperry Rand Corp., P.O. Box 652, Gainesville, Fla., 79, Tel: FR 2-0411, Yr: 1954, Emp: 600, ▲49, $7,000,000

Sperry Gyroscope Co., Div. Sperry Rand Corp., Great Neck, L.I., N.Y., 1, 4, 9, 14, 27, 60, 76, 79, Tel: FIeldstone 7-3600, Yr: 1910, Emp: 17,400

Sperry Gyroscope Co., Sunnyvale Development Center, 294 Commercial St., Sunnyvale, Calif., 1, 4, 9, 20, 27, 36, 94, Tel: REgent 9-2344, Yr: 1956, Emp: 190, ▲25, $3,500,000

Sperry Gyroscope Co. of Canada, Ltd., P.O. Box 710, Montreal, P.Q., Canada, 4, 9, 18, 24, 27, 30, 38, 45, 58, 63, 64, 70, 75, 79, Tel: RI 7-5561, Yr: 1950, Emp: 443, ▲15, $3,900,000

**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 21, 38, 39, 40, 52, 63, 72, 76, 80, 83, 94, Tel: REdwood 6-4161, Yr: 1958, Emp: 830, $15,000,000**

**See ad on pages 100-101**

Sperry Piedmont Co., Div. Sperry Rand Corp., Route 29 N., Charlottesville, Va., 4, 9, 14, 16, 18, 27, 30, Tel: CHarlottesville 3-6111, Yr: 1956, Emp: 950, ▲30, $15,000,000

Sperry Products Co., Div. Howe Sound Co., 831 N. Lake St., Burbank, Calif., 14, 78, 88, 94, 96, Tel: VIctoria 9-1291, Yr: 1936, Emp: 30, ▲2, $250,000

Sperry Products Co., Div. Howe Sound Co., Shelter Rock Rd., Danbury, Conn., 14, T-1, Pioneer 8-3581, Yr: 1928, Emp: 400

Sperry Semiconductor Div., Sperry Rand Corp., Main St., Norwalk, Conn., 70, Tel: VO 6-1641, Yr: 1956, Emp: 300, $3,000,000

Sphere Co., Inc., The, 25 Amity St., Little Falls, N.J., 46, 54, 73, Tel: CL 6-2550, Yr: 1952, Emp: 17, $180,000

Spicer Electronics Co., 2088 Villa St., Pasadena, Calif., 69, Tel: SYcamore 6-9746, Yr: 1960, Emp: 15

Spilsbury & Tindall Ltd., 120 E. Cordova St., Vancouver 4, B.C., Canada, 18, 22, 26, 31, Tel: MUtual 4-4131, Yr: 1913, Emp: 55, ▲3, $600,000

Spincraft, Inc., 4122 W. State St., Milwaukee 8, Wis., 89, 101, Tel: DIvision 2-0730, Yr: 1919, Emp: 125

Spirling Products Co., Inc., Henrietta & Duffy Sts., Hicksville, L.I., N.Y., 39, Tel: WElls 1-6550

**Spittal, William R., 90 Magnolia Ave., Westbury, L.I., N.Y., 88, Tel: BAldwin 3-8885**

**See ad on page 630**

Spivey, Inc., James S., 4908 Hampden Lane, Washington 14, D.C., 1, 5, 25, 32, 38, Tel: OLiver 6-8608, Yr: 1946, Emp: 40, ▲2

Sprague Electric Co., 235 Marshall St., North Adams, Mass., 9, 10, 11, 14, 28, 38, 43, 52, 61, 69, 70, 76, Tel: MOhawk 3-5311, Yr: 1926, Emp: 6500, $56,000,000

Springer Aircraft Radio Corp., Route 11, P.O. Box 330, Indianapolis 19, Ind., 1, Tel: FLeetwood 6-2690, Yr: 1932, Emp: 4, $60,000

Spruce Pine Mica Co., Inc., P.O. Box 456, Spruce Pine, N.C., 93, Tel: POplar 5-1241

Sta-Warm Electric Co., 260 N. Chestnut St., Ravenna, Ohio, 92, 96, Tel: AXminster 6-6462, Yr: 1922, Emp: 460

Stackpole Carbon Co., Stackpole St., St. Marys, Pa., 43, 48, 57, 69, 72, 86, Tel: TE 4-1521, Yr: 1906, Emp: 3000

**Stafford Mfg. Co., Inc., 133 58th St., Brooklyn 20, N.Y., 84, 87, 91, Tel: HYacinth 2-6000, Yr: 1847, Emp: 125, $350,000**

**See ad on page 652**

Stahlin Bros., Inc., 500 Maple St., Belding, Mich., 84, 89, Yr: 1935, Emp: 60

Stainless, Inc., North Wales, Pa., 39, Tel: OXbow 9-1871

Stancil-Hoffman Corp., 921 N. Highland Ave., Hollywood 38, Calif., 29, 31, 47, 60, 63, 65, Tel: HOllywood 4-7461, Yr: 1949, Emp: 47, ▲2

**Standard Cabinet Co., Inc., 53 Washington Ave., Carlstadt 5, N.J., 14, Tel: GEneva 8-1500, Yr: 1945, Emp: 18, ▲1**

**See ad on page 293**

Standard Coil Products (Canada) Ltd., 37 Drummond St., Mimico 11, Ontario, Canada, 80, Tel: CL 9-7651, Yr: 1955, Emp: 100, $1,000,000

Standard Condenser Corp., 3719 N. Clark St., Chicago 13, Ill., 43, Tel: EAstgate 7-5440

Standard Controls, Inc., 1130 Poplar Pl., Seattle 44, Wash., 75, Tel: EAst 4-8888, Yr: 1952, Emp: 27, $250,000

Standard Electric Time Co., The, 89 Logan St., Springfield 2, Mass., 4, 14, 17, 55, 58, 91, Tel: RE 2-1112, Yr: 1884, Emp: 500

Standard Electrical Products Co., 2240 E. Third St., Dayton 3, Ohio, 4, 38, 45, 46, 48, 63, 68, 72, 76, 82, Tel: CLearwater 3-1191, Yr: 1945, Emp: 100, $3,200,000

Standard Electronics, Div. Reeves Instrument Corp., Lakewood Rd., Farmingdale, N.J., 7, 38, 39, 45, 48, 63, 76, Tel: WEbster 8-6671, Yr: 1951, Emp: 100, ▲1

Standard Kollsman Industries, Inc., 2085 N. Hawthorne, Melrose Park, Ill., 80, Tel: FIlmore 4-5680, Yr: 1935, Emp: 7500, $80,000,000

Standard Metals Corp., 262 Broad St., North Attleboro, Mass., 83, 85, 91, 97, 103, Tel: MY 5-9395, Yr: 1945, Emp: 65, $220,000

Standard Plastics Co., Inc., 62 Water St., Attleboro, Mass., 89, Tel: ATtleboro 1-4040, Yr: 1936, Emp: 100

Standard Pressed Steel Co., P.O. Box 693, Jenkintown, Pa., 43, 84, 91, Tel: TUrner 4-7300, Yr: 1903, Emp: 3280

Standard Record Mfg. Co., 70 N. San Gabriel Blvd., Pasadena, Calif., 65, Tel: MUrray 1-0537, Yr: 1938, Emp: 18, ▲1, $225,000



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Standard Rectifier Corp., 620 E. Dyer Rd., Santa Ana, Calif., 66, Tel: KImberly 5-8241

Standard Screw Co., 2701 Washington Blvd., Bellwood, Ill., 91, Tel: EStebrook 8-7400, Yr: 1872

Standard Telephones & Cables Ltd., Connaught House, 63 Aldwych, London, W.C. 2, England, 1, 3, 4, 5, 6, 7, 8, 9, 15, 17, 18, 20, 21, 26, 27, 31, 32, 34, 36, 38, 39, 40, 43, 45, 47, 48, 49, 51, 55, 56, 59, 63, 66, 67, 68, 69, 70, 76, 77, 78, 79, 82, 83, 85, 92, Tel: HOlborn 8765

Standard Winding Co., Inc., 44-62 Johnes St., Newburgh, N.Y., 39, 45, 76, Tel: JOhn 1-1541, Yr: 1937, Emp: 135

Standard Wire & Cable Co., 3440 Overland Ave., Los Angeles 34, Calif., 85, Tel: UPton 0-4617, Yr: 1946, Emp: 43, $1,350,000

Stanford Research Institute, Menlo Park, Calif., 94, Tel: DAvenport 6-6200

Stanwyck Coil Co., E., 75 Carson Ave., Newburgh, N.Y., 39, 45, 46, 52, 76, 89, Tel: JOhn 1-3030

Staples-Hoppmann, Inc., 500 E. Monroe Ave., Alexandria, Va., 19, 34, 81, 88, Yr: 1955, Emp: 30, $20,000

Star Porcelain Co., The, 49 Muirhead Ave., Trenton 9, N.J., 48, 86, 93, 98, Tel: EXport 2-3154, Yr: 1899, Emp: 250

Star Precision Devices, Mountainville, N.Y., 55, 91, 96, Tel: KEllogg 4-2511

Starling Corp., 2047 Sawtelle Blvd., Los Angeles 25, Calif., 19, 29, 89, Yr: 1959, Emp: 50, ▲1

State Testing Laboratory, Inc., 226 Knowlton St., Bridgeport 8, Conn., 14, 28, 63, 88, 89, 94, 95, 99, Tel: EDison 4-4079

States Company, The, 19 New Park Ave., Hartford 6, Conn., 14, 39, 69, 73, Tel: ADams 3-6232, Yr: 1911, Emp: 60

Staver Co., Inc., The, 41 N. Saxon Ave., Bay Shore, N.Y., 53, 54, 62, 74, 89, 91, 103, 104, Tel: MOhawk 5-3620, Yr: 1940, Emp: 63

Steafix, 17, Rue Francoeur, Paris 18, France, 43, 50, Tel: ORN 59-89, Yr: 1945, Emp: 310, $1,500,000

Steel Co., Herman D., 225 Lafayette Bldg., Philadelphia 6, Pa., Importers, 55, 58, 91, Tel: WAlnut 5-2867, Yr: 1920

Steel Heddle Mfg. Co., 2100 W. Allegheny Ave., Philadelphia 32, Pa., 85, 91, 97, Tel: BAldwin 8-2460, Yr: 1898, Emp: 500, $300,000

Steel Protection & Chemical Co., Inc., Bridge St., Mooresville, Ind., 89, Tel: MOoresville 102, Yr: 1939, Emp: 12

Stelma, Inc., 200 Henry St., Stamford, Conn., 3, 9, 10, 23, 35, 36, 63, 68, 72, Tel: DAvis 5-4161, Yr: 1951, Emp: 250, ▲50, $1,500,000

Stencilgraph Designs, 61 Beekman St., New York 38, N.Y., 89, Tel: WOrth 4-2016, Yr: 1950, Emp: 2

Stephens Trusonic, Inc., 8538 Warner Dr., Culver City, Calif., 14, 56, 59, 75, 96, Tel: UPton 0-6671, Yr: 1947, Emp: 40, $993,000

Stereatronics, Inc., 300 Ellis Rd., Weston 93, Mass., 3, 4, 9, 10, 14, 17, 32, 38, 58, 63, 88, 94, Tel: TWinbrook 4-6071, Yr: 1954, Emp: 2, ▲1, $32,000

**Sterling Components, Div. of Sterling Precision Corp., 5 Sintsink Dr. East, Port Washington, L.I., N.Y., 14, 30, Tel: POrt Washington 7-8200, Yr: 1845, Emp: 500**

**See ad on page 343**

Sterling Transformer Corp., 510 Driggs Ave., Brooklyn 11, N.Y., 45, 76, Tel: STagg 2-4200, Yr: 1952, Emp: 65, ▲3

**Stevens-Arnold, Inc., 7 Elkins St., South Boston 27, Mass., 47, 68, Tel: TUxedo 4-1311, Yr: 1945, Emp: 250, ▲2**

**See ad on page 421**

**Stevens Manufacturing Co., Inc., P.O. Box 1007, Mansfield, Ohio, 72, 74, Tel: TUxedo 4-1311, Yr: 1945, Emp: 250, ▲2**

**See ad on page 224**

**Stevens Manufacturing Co., Inc., George, Pulaski Rd. at Peterson, Chicago 30, Ill., 10, 96, Tel: JUniper 8-1300, Yr: 1943, Emp: 50**

**See ad on page 679**

Stevens Products, Inc., 86-88 Main St., East Orange, N.J., 89, 93, 98, 99, Tel: ORange 2-2140, Yr: 1935, Emp: 55

Stevens Walden, Inc., 475 Shrewsbury St., Worcester 1, Mass., 84, 89, 91, 96, Tel: SWift 9-4111, Yr: 1897, Emp: 220, $300,000

Steward Mfg. Co., D. M., E. 36th & Jerome Ave., Chattanooga, Tenn., 48, 57, 86, 90, 91, 93, Tel: TAylor 1-1561, Yr: 1876, Emp: 150, ▲1

**Stewart Corp., F. W., 4311-13 Ravenswood Ave., Chicago 13, Ill., 30, 91, Tel: GRaceland 2-6600**

**See ad on page 653**

Stewart Stamping Co., 630 Central Park Ave., Yonkers 4, N.Y., 73, 89, 91, 101, Tel: YO 5-0816, Yr: 1936, Emp: 180, ▲1

**Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 5, 14, 58, Tel: REctor 2-8163, Yr: 1918, Emp: 25, $250,000**

**See ad on page 462**

Stich Chemicals, Inc., 20 Vesey St., New York 7, N.Y., 14, 67, 95, 97, Tel: WO 4-4265

**Stimpson Co., Inc., Edwin B., 77 Franklin Ave., Brooklyn 5, N.Y., 73, 89, 91, Tel: ULster 5-3131**

**See ad on page 652**

Stocker & Yale, Inc., 40 Green St., Marblehead, Mass., 4, 15, 62, 96, Tel: NE 1-0038, Yr: 1952, Emp: 65, ▲1

**Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif., 21, 28, 40, 55, Tel: HOllywood 4-9292, Yr: 1941, Emp: 125, ▲10, $1,750,000**

**See ads on pages 336, 382**

Stokes Corp., F. J., 5500 Tabor Rd., Philadelphia 20, Pa., 14, 21, 42, 49, 89, 91, 92, 95, 96, Tel: CUmberland 9-0100, Yr: 1895, Emp: 1000, $2,000,000

Stone City Products Co., 1206 7th, Bedford, Ind., 81, 89, 91, 93, Tel: BRowning 5-3373

Strand Engineering Co., 1351 N. Main St., Ann Arbor, Mich., 4, 9, 14, 24, 27, 38, 39, 47, 72, 83, Tel: NOrmandy 2-3127, Yr: 1955, Emp: 60, ▲15, $1,000,000

Strand Labs., Inc., 294 Centre St., Newton 58, Mass., 14, 28, 33, 38, 63, Tel: WOodward 9-8890, Yr: 1956

Strandberg Engineering Labs., Inc., 225 Summit Ave., Greensboro, N.C., 4, 58, 89, Tel: BR 4-1651, Yr: 1950, Emp: 22, ▲1, $209,000

Strat-O-Seal Mfg. Co., 3039 W. Fullerton Ave., Chicago 47, Ill., 14, 54, 73, Tel: HUmboldt 9-1282, Yr: 1951, Emp: 14, ▲2, $62,000

Strempel Instrument Corp., R. D. #1, Lake George, N.Y., 4, 14, Tel: GLens Falls 2-8098, Yr: 1953, Emp: 10

Stromberg-Carlson Div., General Dynamics Corp., 100 Carlson Rd., Rochester 3, N.Y., 1, 4, 6, 9, 18, 20, 21, 22, 26, 27, 28, 31, 36, 38, 45, 46, 55, 56, 61, 62, 63, 64, 68, 72, 73, 75, 80, Tel: HUbbard 2-2200, Yr: 1891, Emp: 7800, ▲150

Stromberg-Carlson San Diego, Div. General Dynamics Corp., 1895 Hancock St., San Diego 12, Calif., 9, 13, 101, Tel: CYpress 8-8331, Yr: 1955, Emp: 600

Struthers-Dunn, Inc., Lambs Rd., Pitman, N.J., 68, Tel: LUther 9-7500, Yr: 1919, Emp: 495

Studebaker-Packard Corp., Gering Plastics Div., N. 7th St. & Monroe Ave., Kenilworth, N.J., 99, Tel: BRidge 6-2900

Sturrup, Inc., 50 Silver St., Middletown, Conn., 9, 18, 38, 45, 50, 89, 94, Tel: DIamond 6-9681, Yr: 1951, Emp: 40, ▲1, $270,000

Sturtevant Co., P. A., Addison, Ill., 14, 96, Tel: TErrace 4-2000, Yr: 1936, Emp: 65

Subminiature Instruments Corp., 3705 Sunnyside Dr., Riverside, Calif., 69, 72, 75, Tel: OVerland 4-7133, Yr: 1959, Emp: 10, ▲1

Sullivan Ltd., H. W., 80 Shore Rd., Port Washington, L.I., N.Y., 5, 11, 28, 33, 40, 43, 44, 69, Tel: PO 7-7700

Summers & Mills, Inc., 911 W. Commerce, Dallas 8, Tex., 9, 14, 15, 28, Tel: RI 1-4246, Yr: 1958, Emp: 16, ▲3, $150,000

Summit Coil Co., 4 Claremont Rd., Bernardsville, N.J., 45, 76, Tel: BE 8-0744, Yr: 1950, Emp: 20, $120,000





Sun Dial Corp., P.O. Box 326, Caldwell, N.J., 16, 89, 91, Tel: CA 6-4331, Yr: 1945, Emp: 60, ▲1, $450,000

Sun Electric Corp., Instrument Div., 6323 Avondale Ave., Chicago 31, Ill., 58, Tel: NEwcastle 1-6000

Sunbank Electronics, Inc., 2516 N. Ontario St., Burbank, Calif., 71, 91, Tel: VI 9-1191, Yr: 1958, Emp: 40, $600,000

Sunshine Scientific Instrument, 1810 Grant Ave., Philadelphia 15, Pa., 4, 11, 13, 14, 16, 21, 25, 28, 33, 37, 38, 58, 64, 84, 89, 94, Tel: ORchard 3-5600, Yr: 1947, Emp: 30, $300,000

Superex Electronics Corp., 4-6 Radford Pl., Yonkers, N.Y., 2, 6, 39, 45, 48, 55, 76, 86, Tel: YOnkers 5-6906, Yr: 1950, Emp: 100, ▲4

Superior Cable Corp., P.O. Box 480-A, Hickory, N.C., 85, Tel: DIamond 5-4161, Yr: 1955, Emp: 300, ▲2, $300,000

**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 4, 30, 34, 46, 55, 60, 63, 69, 73, 76, 78, 82, Tel: LUdlow 2-9561**

**See ads on pages 412, 468, 494, 572, 586**

Superior Flux & Mfg. Co., 1536 St. Clair Ave., Cleveland 14, Ohio, 103, Tel: SUperior 1-9373, Yr: 1932, Emp: 6, $70,000

**Superior Instruments Co., 2435 White Plains Rd., New York 67, N.Y., 14, 37, 58, Tel: TUlip 2-6880, Yr: 1935, Emp: 110, $1,100,000**

**See ad on page 295**

Superior Porcelain Co., 931½ Market St., Parkersburg, W.Va., 77, 86, 98, Tel: GArfield 8-9871

**Superior Steatite & Ceramic Corp., 89 W. Forest Ave., Englewood, N.J., 48, 86, 93, 104, Tel: LOwell 8-1555, Yr: 1910**

**See ad on page 621**

Superior Tube Co., 2500 Germantown Ave., Norristown, Pa., 91, 104, Tel: BRoadway 5-2070, Yr: 1931, Emp: 1200, ▲2

Supreme Electronics Corp., Subsid. Hickok Electrical Instrument Co., Greenwood, Miss., 3, 14, 58, 69, Tel: GLadstone 3-6212, Yr: 1927, Emp: 200, ▲2

Surface Conduction, Inc., Paramount Bldg., 1501 Broadway, New York 36, N.Y., 88, Tel: LO 5-5535, Yr: 1953, Emp: 3, $10,000

**Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass., 85, 93, 99, Tel: EMpire 5-6331**

**See ad on page 616**

Swift Textile Metalizing & Laminating Corp., 10 Love Lane, Hartford 1, Conn., 39, 91, 95, 97, 102, Tel: JA 2-1181, Yr: 1952, ▲1

Swiss Jewel Co., 225 Lafayette Bldg., Philadelphia 6, Pa., Importers, 49, 61, 91, 93, Tel: WAlnut 5-2867, Yr: 1920

**Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 46, 55, 72, 85, 98, Tel: SPring 4-1515, Yr: 1946, Emp: 340, ▲1**

**See ad on page 554**

Sylvania Electric Products Inc., 730 3rd Ave., New York 17, N.Y., 1, 4, 6, 9, 18, 24, 27, 38, 40, 45, 61, 64, 66, 67, 70, 72, 77, 79, 83, 95, 97, 101, 104, Tel: JU 6-2424, Yr: 1901, Emp: 30,000, ▲1500

Sylvania Electric Products Inc., Chemical & Metallurgical Div., Towanda, Pa., 17, 49, 85, 97, 101, 104, Tel: ANdrew 5-2121

Sylvania Electric Products Inc., Data Systems Operations, 189 B St., Needham 94, Mass., 9, 29, 36, 50, 64, Tel: HIllcrest 4-3940

**Sylvania Electric Products Inc., Electronic Tubes Div., Dept. 4310, 1100 Main St., Buffalo, N.Y., 77, 78, 79, Tel: ELmwood 7993**

**See ad on pages 50-51**

Sylvania Electric Products Inc., Parts Div., 12 Second Ave., Warren, Pa., 53, 71, 85, 89, 98, 104, Tel: WArren 3220

Sylvania Electric Products Inc., Semiconductor Div., 100 Sylvan Rd., Woburn, Mass., 70, Tel: WE 3-3500, Yr: 1950, Emp: 1130, ▲120

Sylvania Electric Products Inc., Special Products Div., 1740 Broadway, New York 19, N.Y., 45, 47, 57, 76, Tel: JU 6-2424

**Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 1, 14, 27, 38, 40, 72, 79, 94, Tel: YOrkshire 8-6211**

**See ad on pages 48-49**

Sylvania Electric Products Inc., Sylvania Electronic Systems Div., 63 Second Ave., Waltham 54, Mass., 1, 4, 6, 7, 9, 18, 20, 22, 27, 39, 45, 64, 94, Tel: TWinbrook 4-9770, Yr: 1901, Emp: 7000

Synthane Corp., 12 River Rd., Oaks, Pa., 89, 91, 93, 99, Tel: GLendale 2-2211, Yr: 1929, Emp: 730, $2,400,000

Synthetic Mica Co., 20 Passaic Ave., Caldwell Township, N.J., 93, 94, 99, Tel: CA 6-4020

**Syntron Co., Semiconductor Div., 83 Lexington Ave., Homer City, Pa., 47, 63, 66, 70, Tel: GRidley 9-8011, Yr: 1921, Emp: 800, ▲10, $2,700,000**

**See ad on page 506**

**Syntronic Instruments, Inc., 100 Industrial Rd., Addison, Ill., 45, Tel: KIngswood 3-6444, Yr: 1949, Emp: 35, $350,000**

**See ad on page 404**

Systems Inc., 2400 Diversified Way, Orlando, Fla., 1, 14, 20, 21, 27, 28, 39, 40, 52, Tel: GA 4-6538, Yr: 1956, Emp: 60, ▲13, $150,000

Systems Laboratories Corporation, 14852 Ventura Blvd., Sherman Oaks, Calif., 9, 88, 94, Tel: STate 9-0501

Systron-Donner Corp., 950 Galindo St., Concord, Calif., 3, 9, 10, 14, 16, 21, 28, 29, 33, 36, 47, 58, Tel: MUlberry 2-3650, Yr: 1956, Emp: 100, ▲6, $1,200,000

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TMC (Canada) Ltd., R.R. No. 5, Ottawa, Ont., Canada, 2, 3, 6, 18, 22, 26, 28, 31, 34, 35, 39, 76, 84, 88, Yr: 1950, Emp: 75, ▲5

TRAK Electronics, Div. CGS Laboratories, 59 Danbury Rd., Rt. 7, Wilton, Conn., 9, 21, 36, 45, 52, 76, 83, 89, 94

TRG, Incorporated, 2 Aerial Way, Syosset, L.I., N.Y., 1, 4, 9, 17, 18, 21, 23, 24, 27, 33, 38, 39, 49, 52, 63, 72, 83, 86, 88, 90, 101, 102, Tel: OVerbrook 1-6900, Yr: 1953, Emp: 150, ▲35, $2,000,000

T T Electronics, Inc., P.O. Box 180, Culver City, Calif., 45, 52, 63, 76, Tel: UPton 0-3213, Yr: 1957, Emp: 8, ▲2, $100,000

Taber Instrument Corp., 111 Goundry St., North Tonawanda, N.Y., 38, 47, 58, 75, Tel: LUdlow 8900, Yr: 1941, Emp: 80, ▲3

Taffet Electronics, Inc., 27-05 Brooklyn-Queens Expwy. West, Woodside 77, N.Y., 3, 14, 28, 39, 40, 84, 87, 89, Tel: RAvenswood 1-3500, Yr: 1946, Emp: 100, ▲3, $1,270,000

Talk-A-Phone Co., 5013 N. Kedzie Ave., Chicago 25, Ill., 32, Tel: KEystone 9-1100

Tally Register Corp., 1310 Mercer St., Seattle 9, Wash., 9, 16, 65, 72, Tel: MAin 4-0760, Yr: 1919, Emp: 85, ▲5, $120,000

Tamar Electronics, Inc., 2045 W. Rosecrans Ave., Gardena, Calif., 1, 39, 46, 52, 85, Tel: DAvis 3-9110, Yr: 1952, Emp: 277, ▲4, $532,194

Tandberg of America, Inc., 8 Third Ave., Pelham, N.Y., Importers, 29, 56, 59, Tel: PElham 8-0772

Tansitor Electronics, Inc., West Rd., Bennington, Vt., 43, Tel: 5474, Yr: 1955, Emp: 200, $1,500,000

Tap-A-Line Mfg. Co., P.O. Box 563, Pompano Beach, Fla., 64, Tel: WE 3-3262, Yr: 1953, Emp: 4, $100,000

Tape Cable Corp., 790 Linden Ave., Rochester 10, N.Y., 85, Tel: LUdlow 6-0330, Yr: 1956, Emp: 18, ▲1

Tapeswitch Corp. of America, 229-24 Linden Blvd., Cambria Heights 11, N.Y., 4, 72, 98, Yr: 1957

Tapetone Inc., 10 Ardlock Pl., Webster, Mass., 2, 6, 31, 47, Tel: WEbster 1727, Yr: 1955, Emp: 18, ▲2, $92,000

**Taurus Corp., 8 Coryell St., Lambertville, N.J., 9, 55, 72, 73, 91, Tel: EXport 7-1571, Yr: 1956**

**See ad on page 558**

Taylor Electric Inc., 15400 Dale, Detroit 23, Mich., 89, 99, Tel: KEnwood 5-2500, Yr: 1952, Emp: 15, $200,000

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members $ = Net radio-electronic sales during last fiscal year.

Taylor-Emmett Controls, Inc., 557 E. Tallmadge Ave., Akron 10, Ohio, 4, 10, Tel: JEfferson 5-1515, Yr: 1945, Emp: 35, ▲1, $125,000

Taylor Fibre Co., Box 471, Norristown, Pa., 84, 89, 91, 93, 99, Tel: CHestnut Hill 8-1100, Yr: 1891, Emp: 525

Teca Corp., 80 Main St., White Plains, N.Y., 19, Tel: WH 6-4593, Yr: 1953, Emp: 13, ▲2

Tech-Art Plastics Co., 111 Ridgedale Ave., Morristown, N.J., 53, 73, 84, 89, 93, 98, Tel: JE 8-5100, Yr: 1891, Emp: 125, ▲1, $500,000

**Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N.J., 5, 40, 58, 72, Tel: WIndsor 4-2221**

**See ad on page 555**

Tech-Ohm Resistor Corp., 36-11 33rd St., Long Island City 6, N.Y., 69, Tel: STillwell 6-2274, Yr: 1952, Emp: 80

**Technic, Inc., P.O. Box 965, Providence 1, R.I., 89, 95, 96, 97, Tel: ST 1-6100, Yr: 1939, Emp: 25, ▲1, $2,000,000**

**See ad on page 686**

Technical Advertising Associates, Cheltenham, Pa., 100, Yr: 1948, Emp: 5, ▲1

**Technical Appliance Corp., 1 Taco St., Sherburne, N.Y., 39, 40, 46, 52, 76, 83, Tel: ORchard 4-2211, Yr: 1934, Emp: 215, ▲7, $3,650,000**

**See ad on page 376**

Technical Associates, 140 West Providencia Ave., Burbank, Calif., 24, Tel: VIctoria 9-5838, Yr: 1939, Emp: 50, ▲3

Technical Ceramics & Lava Corp., 85 Fifth Ave., Paterson 4, N.J., 43, 44, 48, 54, 77, 86, 91, 93, 98, 104, Tel: ARmory 1-0163

Technical Communications, Inc., 130 S. La Brea Ave., Los Angeles 36, Calif., 100, Tel: WEbster 8-2878, Yr: 1955, Emp: 10, ▲1

Technical Devices Co., 11212 Playa Ct., Culver City, Calif., 96, Tel: UPton 0-3751, Yr: 1952, Emp: 26, $160,000

Technical Industries Corp., 389 N. Fair Oaks Ave., Pasadena, Calif., 4, 14, 24, 30, 46, 54, 58, 75, 85, 86, 93, Tel: MUrray 1-5644, Yr: 1959, Emp: 23, $150,000

Technical Information Corp., 41 Union Sq., New York 3, N.Y., 88, 100, Tel: WAtkins 4-2111, Yr: 1956, Emp: 12, ▲1

**Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 2, 13, 22, 26, 28, 31, 35, 39, 80, Tel: OWens 8-4800, Yr: 1932, Emp: 325, ▲25, $7,500,000**

**See ads on pages 344, 345**

Technical Measurement Corp., 441 Washington Ave., North Haven, Conn., 9, 14, 15, 24, 63, Tel: CEdar 9-2501, Yr: 1955, Emp: 70, ▲8, $1,200,000

Technical Products Co., 6670 Lexington Ave., Los Angeles 38, Calif., 3, 16, Tel: HOllywood 4-8121, Yr: 1932, Emp: 250, ▲5

Technical Publishing House, 4 Tyler Rd., Lexington 73, Mass., 91, 100, Tel: VOlunteer 2-8998, Yr: 1953, Emp: 4, ▲2

Technical Research Group, Inc., Microwave & Antenna Dept., 9 Union Sq., Somerville 43, Mass., 21, 39, 83, Tel: MOnument 6-8680, Yr: 1952, Emp: 140, ▲20, $2,000,000

**Technical Sales Corp., Subsidiary of Graphic Controls Corp., 189 Van Rensselaer St., Buffalo 10, N.Y., 16, Tel: MAdison 7500, Yr: 1939, Emp: 450, ▲1, $3,000,000**

**See ad on page 298**

Technical Service Corp., 917-19 S. Third, Louisville 3, Ky., 84, Tel: JUniper 7-8176

Technical Tape Corp., 240 North Ave., New Rochelle, N.Y., 91, 93, Tel: BEverly 5-1000, Yr: 1947, Emp: 380

Technical Wire Products, Inc., 48 Brown Ave., Springfield, N.J., 72, 91, 102, Tel: DR 6-3010, Yr: 1958, ▲2

Technicraft Co., 1156 Commonwealth Ave., Boston 34, Mass., 89, 91, 93, 95, 96, 97, Yr: 1946, Emp: 3

Technicraft Div., Electronic Specialty Co., Thomaston-Waterbury Rd., Thomaston, Conn., 21, 39, 40, 52, 80, 83, 85, Tel: ATlas 3-4317, Yr: 1949, Emp: 182, ▲12, $3,500,000

Technique Associates, Div. Duncan Electric Co., Inc., 1413 N. Cornell Ave., Indianapolis 2, Ind., 4, 14, 58, Tel: ME 1-4904, Yr: 1954, Emp: 8, ▲1

Techniques Inc., 40 Jay St., Englewood, N.J., 61, 89, Tel: LO 9-5333, Yr: 1954, Emp: 20, $160,000

Technisonic Studios, Inc., 1201 Brentwood Blvd., St. Louis 17, Mo., 29, 51, Tel: PArkview 7-1055, Yr: 1929, Emp: 12, ▲1

Technitrol Engineering Co., Inc., 1952 E. Allegheny Ave., Philadelphia 34, Pa., 9, 13, 29, 36, 45, 50, 76, Tel: GA: 6-9105, Yr: 1947, Emp: 200, ▲20

Technograph Printed Electronics, Inc., 920 Northwest Blvd., Winston-Salem, N.C., 64, 94, Tel: PArk 3-0767, Yr: 1951, Emp: 5, ▲1, $200,000

Technology Instrument Corp., 531 Main St., Acton, Mass., 1, 2, 3, 4, 5, 9, 12, 14, 16, 18, 22, 28, 30, 33, 38, 47, 58, 69, 72, 75, 89, 91, 94, 98, Tel: COlonial 3-7711, Yr: 1946, Emp: 700, $6,400,000

Technology Instrument Corp. of Calif., 850 Lawrence Dr., Newbury Park, Calif., 14, 30, 69, 75, 94, Tel: HUdson 5-2165, Yr: 1954, Emp: 165, ▲2, $1,230,000

Techron Corp., 20 Simmons St., Boston 20, Mass., 64, Tel: HIghlands 5-2150, Yr: 1951, Emp: 27, $180,000

Tektronix, Inc., P.O. Box 831, Portland 7, Ore., 3, 14, 23, 25, 28, 38, 73, Tel: CYpress 2-2611

Tel-Instrument Electronics Corp., 728 Garden St., Carlstadt, N.J., 7, 14, 28, 37, 38, 63, 82, Tel: WEbster 3-1600, Yr: 1947, Emp: 50, ▲5, $600,000

Tel-Labs., Inc., 1050 Second St., Manchester, N.H., 5, 11, 14, 69, 84, 89, 91, Tel: NA 3-5711, Yr: 1949, Emp: 75, $300,000

**Telcon, Inc., Dept. E611, P.O.Box 216, Pacific Palisades, Calif., 46, 48, 85, Tel: GLadstone 4-4043, Yr: 1959, Emp: 2, ▲1**

**See ad on page 617**

Tele Coil Co., 2733 Saunders St., Camden 5, N.J., 45, 50, 52, 76, Tel: EMerson 5-7528, Yr: 1946, Emp: 25

Telechrome Mfg. Corp., 28 Ranick Dr., Amityville, L.I., N.Y., 1, 2, 3, 4, 5, 6, 8, 9, 10, 20, 24, 25, 30, 31, 33, 34, 35, 36, 37, 38, 45, 46, 47, 52, 58, 62, 63, 64, 68, 72, 75, 76, 82, 88, 94, Tel: LIncoln 1-3600, Emp: 197

Telecomputing Corp., 915 N. Citrus Ave., Los Angeles 38, Calif., 4, 9, 10, 18, 20, 21, 27, 36, 38, 39, 41, 43, 44, 50, 60, 68, 72, 88, 89, 91, 93, 94, 96, Tel: HO 4-3171, Yr: 1912, Emp: 3000, $15,000,000

Telecomputing Corp., Cook Batteries, 3850 Olive St., Denver 7, Colo., 41, Tel: DUdley 8-4836, Yr: 1955, Emp: 90

Telecomputing Corp., Data Instruments Div., 12838 Saticoy St., North Hollywood, Calif., 9, 10, 14, 36, Tel: TR 7-8181, Yr: 1947, Emp: 3000, $36,000,000

Telecomputing Corp., Electronic Components Div., 14706 Arminta St., Van Nuys, Calif., 38, 43, 45, 50, 52, 60, 68, 76, Tel: TRiangle 3-1340, Yr: 1955, Emp: 70, ▲2, $500,000

Telecomtrol Corp., 20 Diller Ave., Newton, N.J., 4, 7, 14, 20, 26, 34, 36, 38, 83, 88, 94, Tel: DUpont 3-2650, Yr: 1958, Emp: 19, ▲2, $70,000

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 1, 3, 4, 5, 9, 11, 13, 14, 18, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 36, 38, 44, 47, 51, 61, 63, 64, 75, 76, 88, 89, 102, Tel: YE 2-8600, Yr: 1948, Emp: 475, ▲40, $5,000,000**

**See ad on page 338**

Telectron, Div. Elliot & Evans, 3991 S.W. 12th Terr., Ft. Lauderdale, Fla., 4, 76, Tel: JA 4-8361, Yr: 1933, Emp: 220

Telegraph Condenser Co., Ltd., The, North Acton, London, W. 3, England, 11, 38, 43, 44, 48, 52, 53, 54, 64, 75, 86, 93, Tel: ACOrn 0061, Yr: 1906, Emp: 2500

Telemeter Magnetics, Inc., P.O. Box 329, Culver City, Calif., 9, 36, 48, Yr: 1953, Emp: 400, ▲45, $4,500,000

Telephonics Corp., Park Ave., Huntington, L.I., N.Y., 1, 12, 18, 32, 38, 55, 56, 59, 63, 94, Tel: HAmilton 3-6200, Yr: 1934, Emp: 490, ▲12, $5,500,000





Telerad Mfg. Corp., 1440 Broadway, New York 18, N.Y., 1, 7, 20, 21, 28, 39, 40, 52, 63, 80, 83, Tel: BRyant 9-0892, Yr: 1945, Emp: 175, ▲1, $1,700,000

Telesis Co., The, 14 Commerce St., Newark 2, N.J., 88, Tel: MArket 3-1155

Television Development Corp., 469 Jericho Tpke., Mineola, L.I., N.Y., 91, Tel: PIoneer 7-3900, Yr: 1950, Emp: 20, ▲1

**Television Utilities Corp., Div. of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 1, 4, 6, 7, 13, 23, 26, 38, 63, Tel: TWining 8-1000, Yr: 1948, Emp: 85, ▲3**

**See ad on page 260**

Television Zoomar Corp., 500 Fifth Ave., New York 36, N.Y., 31, Tel: BR 9-5835, Yr: 1947, Emp: 45

Telewave Laboratories, Inc., 13-20 31th St., Long Island City 1, N.Y., 69, Tel: EXeter 2-4500

**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 4, 9, 11, 14, 17, 29, 36, 38, 45, 52, 56, 59, 63, 64, 72, 75, 76, 83, 85, 89, 91, 94, 98, Tel: MIdway 6-7211, Yr: 1936, Emp: 465, ▲10, $5,700,000**

**See ads on pages 456, 556**

Telkor, Inc., P.O. Box 186, Elyria, Ohio, 4, 35, 38, 39, 47, 60, 63, 84, 87, 89, 91, Yr: 1929, Emp: 8, $30,000

**Telonic Engineering Corp., 773 Broadway, Laguna Beach, Calif., 3, 21, 28, 37, 40, 52, 83, Tel: HYatt 4-7581, Yr: 1956, Emp: 30, ▲2**

**See ad on page 71**

**Telonic Industries, Inc., 60 N. First Ave., Beech Grove, Ind., 3, 28, 37, 40, 52, Tel: STate 7-7241, Yr: 1956, Emp: 46, ▲3, $450,000**

**See ad on page 70**

Telrex Labs., Rt. 35, Asbury Park, N.J., 39, Tel: PRospect 5-7252, Yr: 1947, Emp: 30, ▲2

**Teltronics, Inc., 277 Main St., Nashua, N.H., 3, 9, 14, 27, 28, 30, 38, 47, 50, 63, 64, 88, 89, 94, Tel: TUxedo 2-6264, Yr: 1959, Emp: 5, ▲4**

**See ad on page 337**

Temco Electronics, Div. Ling-Temco Electronics, Inc., P.O. Box 6191, Dallas 22, Tex., 1, 4, 9, 21, 23, 27, 30, 36, 38, 39, 47, 63, 83, Tel: BRoadway 6-7111, Yr: 1946, Emp: 6000, ▲100

Tempel Steel Co., 1939 Bryn Mawr Ave., Chicago 26, Ill., 97, Tel: ARdmore 1-8100, Yr: 1945, Emp: 325, $5,000,000

Temperature Engineering Corp., 1800 Union Landing Rd., Riverton, N.J., 4, 14, 58, 74, 81, 89, 92, 96, Tel: TA 9-3880, Yr: 1956, Emp: 96, $600,000

Tempil Corp., 132 West 22nd St., New York 11, N.Y., 95, Tel: ORegon 5-6610, Yr: 1940, Emp: 30

Templeman Co., The D. R., 8 Park St., Plainville, Conn., 91, Yr: 1938, Emp: 28, $100,000

Tempo Instrument, Inc., P.O. Box 338, Hicksville, L.I., N.Y., 4, 9, 10, 14, 68, Tel: OVerbrook 1-2280, Yr: 1957, Emp: 80, ▲4, $1,500,000

Ten Bosch, Inc., M., 80 Wheeler Ave., Pleasantville, N.Y., 9, 14, 38, Tel: ROgers 9-3000

Tenatronics Ltd., 1011 Power Ave., Cleveland 14, Ohio, 39, 69, Tel: SUperior 1-7136, ▲1

Tennalab, 417-419 S. Tenth St., Quincy, Ill., 39, Tel: BA 2-0237, Yr: 1950, Emp: 4, ▲1, $100,000

Tenney Engineering, Inc., 1090 Springfield Road, Union, N.J., 14, Tel: MU 6-7870, Yr: 1932, Emp: 225

Tensitron, Inc., P.O. Box 185, Harvard, Mass., 96, Tel: GLadstone 6-3511, Yr: 1935, Emp: 18, $50,000

Tensolite Insulated Wire Co., Inc., West Main St., Tarrytown, N.Y., 85, Tel: MEdford 1-2300, Yr: 1950, Emp: 200

Tensor Electric Development Co., Inc., 1873 Eastern Pkwy., Brooklyn 33, N.Y., 1, 3, 6, 14, 18, 32, 38, 40, 45, 50, 76, Tel: HYacinth 5-9200, Yr: 1919, Emp: 45, ▲1

Terado Co., 1068 Raymond Ave., St. Paul 8, Minn., 47, 68, Tel: MIdway 6-2868

Tetrad Co., Inc., The, 62 St. Mary St., Yonkers, N.Y., 61, 91, Tel: YOnkers 3-1474, Yr: 1947, Emp: 150

Tevco Insulated Wire, 108 E. Prospect, Burbank, Calif., 85, Tel: VIctoria 9-5574, Yr: 1951, Emp: 50

Texas Capacitor Co., Div. K-C-K Corp., 4310 Langley Road, Houston 16, Tex., 43, Tel: HI 2-2581, Yr: 1952, Emp: 20, ▲2, $160,000

Texas Crystals, 1000 Crystal Dr., Fort Myers, Fla., 19, Tel: WE 6-2100, Yr: 1956, Emp: 24, $250,000

Texas Instruments Incorporated, Apparatus Div., 6000 Lemmon Ave., Dallas 9, Tex., 1, 4, 9, 14, 17, 18, 20, 21, 22, 23, 26, 27, 30, 31, 32, 33, 36, 39, 47, Tel: FLeetwood 7-5111, Yr: 1930, Emp: 15,000, $193,000,000

Texas Instruments Incorporated, Geosciences & Instrumentation Div., 3609 Buffalo Speedway, Houston 6, Tex., 4, 14, 15, 16, 23, 29, 58, 63, Tel: JAckson 6-1411

Texas Instruments Incorporated, Metals & Controls Div., 34 Forest St., Attleboro, Mass., 46, 68, 72, 74, 85, 89, 91, 97, 103, Tel: ATtleboro 1-2800

**Texas Instruments Incorporated, Semiconductor-Components Div., 13500 N. Central Expwy., Dallas, Tex., 43, 66, 69, 70, 101, Tel: ADams 5-3111**

**See ad on page 394**

Thermal American Fused Quartz Co., 18-20 Salem St., Dover, N.J., 93, 104, Tel: FOxcroft 6-2807, Yr: 1955, Emp: 40

**Thermal Controls, Inc., 41 River Rd., North Arlington, N.J., 4, 46, 53, 54, 68, 72, 74, Tel: WY 8-8080, Yr: 1945, Emp: 300, ▲6, $2,000,000**

**See ad on page 450**

Thermal Wire of America, Keeler's Bay, South Hero, Vt., 85, 104, Tel: South Hero 241, Yr: 1958, Emp: 40

Thermax Wire Corp., 304 E. 45th St., New York 17, N.Y., 85, Tel: MUrray Hill 9-7120, Yr: 1956, Emp: 30

Thermo Electric Co., Inc., 109 5th St., Saddle Brook, N.J., 4, 14, 38, 58, 72, 75, 82, Tel: HUbbard 9-5800, Yr: 1941, Emp: 400

Thermo Electron Engineering Corp., 171 Harvey St., Cambridge, Mass., 63, 94, Tel: ELiot 4-7508, Yr: 1956, Emp: 52, ▲2, $250,000

ThermoCal, Inc., 1631 Colorado Ave., Santa Monica, Calif., 4, 8, 58, 68, 72, 74, Tel: EXbrook 3-9841

Thermo-en, Inc., 375 Fairfield Ave., Stamford, Conn., 67, 77, 78, Tel: DAvis 5-1321, Yr: 1951, ▲2

Theta Instrument Corp., 520 Victor St., Saddle Brook, N.J., 3, 4, 14, 28, 58, 91, Tel: HU 7-3508, Yr: 1955, Emp: 35, ▲5

**Thomas & Betts Co., Inc., The, 36 Butler St., Elizabeth 1, N.J., 46, 73, 91, Tel: ELizabeth 4-1321, Yr: 1895, Emp: 3000**

**See ad on page 414**

Thomas Electronics, Inc., 118 Ninth St., Passaic, N.J., 4, 14, 63, 77, 95, 104, Tel: GRegory 3-4010, Yr: 1949, Emp: 1000, $18,000,000

Thomas Instrument Co., Silver Rock, Phoenix, N.Y., 19, 96, Tel: OWens 5-5134, Yr: 1937, Emp: 10, $15,000

Thomas Mold & Die Co., Box 126, Wooster, Ohio, 39, Tel: AN 2-5911, Yr: 1935, Emp: 30, $300,000

**Thomas & Skinner, Inc., 1120 East 23rd St., Indianapolis 7, Ind., 48, 57, Tel: WAlnut 3-2501, Yr: 1920, Emp: 260**

**See ads on pages 425, 427, 458**

Thomas & Sons, Inc., William, 1063 Slocum Ave., Ridgefield, N.J., 89, 104, Tel: WHitney 3-5500, Yr: 1944, Emp: 50, $100,000

Thompson-Bremer & Co., Div. American Machine & Foundry Co., 228 No. La Salle St., Chicago 1, Ill., 73, 91, Tel: FRanklin 2-6858, Yr: 1914, Emp: 110

Thompson & Co., John L., 1118-22nd St., N.W., Washington 7, D.C., 4, 9, 88, 89, 94, 100, Tel: FEderal 7-4200, Yr: 1945, Emp: 300, ▲10

Thompson Fiber Glass Co., H. I., 1733 Cordova St., Los Angeles 7, Calif., 39, 89, 92, 93, 99, Tel: RE 3-9161, Yr: 1944, Emp: 550



Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Thompson Ramo Wooldridge Inc., 8433 Fallbrook Ave., Canoga Park, Calif., 6, 7, 9, 14, 17, 18, 20, 21, 23, 27, 28, 32, 34, 36, 38, 39, 40, 43, 50, 56, 58, 70, Tel: DIamond 6-6000, Yr: 1958, Emp: 25,000, ▲1000

Thompson Ramo Wooldridge Inc., Dage Television Div., West 10th St., Michigan City, Ind., 1, 7, 9, 23, 34, 88, Tel: TR 4-3251, Yr: 1952, Emp: 130, ▲15, $2,000,000

Thompson Ramo Wooldridge Inc., Tapco Group, 23555 Euclid Ave., Cleveland 17, Ohio, 1, 4, 9, 10, 13, 16, 19, 20, 26, 27, 30, 36, 38, 39, 47, 52, 60, 63, 68, 72, 82, 83, Tel: IVanhoe 1-7500, Yr: 1901, Emp: 23,000

Thompson-Ramo-Wooldridge Products Co., The, 202 North Canon Dr., Beverly Hills, Calif., 9, Tel: BRadshaw 2-8892, Yr: 1958, Emp: 120

Thomson Mfg. Co., Judson L., Sawyer Road, Waltham 54, Mass., 72, 73, 91, 96, Yr: 1885

Thor Ceramics, Inc., 225 Belleville Ave., Bloomfield, N.J., 46, 48, 54, 86, 91, 93, 98, 99, 101, Tel: PIlgrim 3-7797, Yr: 1918, Emp: 80, ▲1

Thordarson-Meissner, 7th & Bellmont Sts., Mount Carmel, Ill., 38, 45, 76, Tel: MOunt Carmel 1200, Yr: 1895, Emp: 500, $5,600,000

**Three Point One Four Corporation, 24 Woodworth Ave., Yonkers, N.Y., 41, 73, Tel: GReenleaf 6-4440**

See ad on page 387

Thwing-Albert Instrument Co., Penn St. & Pulaski Ave., Philadelphia 44, Pa., 14, 58, Tel: GErmantown 8-5719, Yr: 1900, Emp: 125

Tibbetts Industries, Inc., Colcord Ave., Camden, Me., 59, Tel: CEdar 6-3366, Yr: 1945, Emp: 115, $1,000,000

Times Wire & Cable Co., 358 Hall Ave., Wallingford, Conn., 85, Tel: COlony 9-3381, Yr: 1918, Emp: 135

Timmerman Products, Inc., Dept. 16, P.O. Box 6688, Cleveland 1, Ohio, 91, Tel: SH 1-9300, Yr: 1870, Emp: 800

Todd Electric Co., Inc., 6 Brook St., Yonkers, N.Y., 45, 76, Tel: YO 3-8850, Yr: 1952, Emp: 100, ▲2, $1,000,000

Tocco Metal Products, Inc., 70 Marbledale Rd., Tuckahoe 7, N.Y., 84, 87, 91, Tel: FAirbanks 4-5882, Yr: 1936, Emp: 26, $265,000

Topatron Inc., 912 E. Ojai Ave., Ojai, Calif., 14, 84, 87, 102, Tel: MIlton 6-1600, Yr: 1952, Emp: 25

Topflight Corp., 160 E. 9th Ave., York, Pa., 91, Tel: YOrk 8-1511, Yr: 1912, Emp: 90

Topic Inc., Natick Industrial Centre, Natick, Mass., 43, 52, Tel: OLympic 3-6113, Yr: 1956, Emp: 50, ▲1, $250,000

Topper Mfg. Co., Inc., 84-56 Parsons Blvd., Jamaica 32, N.Y., 14, 19, 45, 46, 50, 52, 64, 85, 86, 89, 93, 94, 98, Tel: AXtel 7-5742, Yr: 1945, Emp: 60, ▲1, $30,000

Topping Electronics Ltd., F. V., 94 Laird Drive, Toronto 17, Ont., Canada, 1, 12, 18, 22, 26, 28, 35, 38, 39, 45, 47, 52, 58, 63, 64, 66, 76, Tel: HU 7-1516, Yr: 1955, Emp: 30, ▲4, $300,000

Torngren Co., Inc., C. W., 236 Pearl St., Somerville 45, Mass., 39, 89, Tel: MOnument 6-3250, Yr: 1924, Emp: 56, $250,000

Torocoil Company, 1211 N. Chestnut Ave., Arlington Heights, Ill., 11, 45, 76, Yr: 1949, Emp: 4, $15,000

Toroidal Components Co., 1374 E. Walnut St., Pasadena, Calif., 9, 45, 76, Tel: SYcamore 5-7123, Yr: 1955, Emp: 12

Toroids Unlimited, Inc., 3830 Terrace St., Philadelphia 28, Pa., 45, 76, Tel: IVy Ridge 2-7178, Yr: 1960, Emp: 8

**Torotel, Inc., 5512 East 110th St., Kansas City 34, Mo., 30, 38, 45, 47, 52, 63, 76, Tel: SOuth 1-6314, Yr: 1946, Emp: 55, ▲1, $148,300**

See ad on page 405

Torrington Co., The, 59 Field St., Torrington, Conn., 48, 73, 91, 101, Tel: HUnter 2-4441, Yr: 1866, Emp: 6000

Torrington Mfg. Co., The, Specialty Blower Div., 100 Franklin Drive, Torrington, Conn., 42, Tel: HUnter 2-4422, Yr: 1885, Emp: 1000, ▲1, $300,000

Torsion Balance Co., The, 35 Monhegan St., Clifton, N.J., 72, Tel: GRegory 3-6900, Yr: 1887, Emp: 150, $60,000

Torwico Electronics Inc., 1090 Morris Ave., Union, N.J., 4, 23, 38, 45, 47, 52, 54, 63, 68, 76, Tel: ELizabeth 4-5650, Yr: 1951, Emp: 130, ▲1, $1,250,000

**Tower Construction Co., 2725 Hawkeye Dr., Sioux City 2, Iowa, 20, 39, Tel: 5-7653, Yr: 1945, Emp: 121, ▲3, $2,000,000**

See ad on page 378

Townsend Co., P.O. Box 71, Ellwood City, Pa., 91, 96, Yr: 1816, Emp: 1000

Tracerlab Inc., 1601 Trapelo Rd., Waltham 54, Mass., 4, 10, 14, 19, 24, 25, 63, 78, Tel: TWinbrook 4-6600, Yr: 1946, Emp: 1000, $5,000,000

Trancoa Chemical Corp., 312 Ash St., Reading, Mass., 101, Tel: REading 2-3900, Yr: 1957

Trans Electronics, Inc., 7349 Canoga Ave., Canoga Park, Calif., 14, 47, 63, Tel: DIamond 0-3333, Yr: 1951, Emp: 50

Trans-Lux Corp., 625 Madison Ave., New York 22, N.Y., 34, Tel: PLaza 1-3110, Yr: 1922, Emp: 100

Trans-Sil Corp., 55 Honeck St., Englewood, N.J., 47, 49, 63, 66, 70, 101, Tel: LOwell 7-1720, Yr: 1957, Emp: 50, ▲3, $10,000

Trans-Sonics, Inc., Route 128, Burlington, Mass., 5, 14, 58, 63, 75, Tel: BRowning 2-1000, Yr: 1948, Emp: 170, ▲10

Trans-Tech, Inc., P.O. Box 103, Rockville, Md., 48, 86, 90, 93, 94, 95, 102, 101, Tel: GArden 4-9220, Yr: 1955, Emp: 17, ▲1, $200,000

Transco Products, Inc., 12210 Nebraska Ave., Los Angeles 25, Calif., 39, 40, 52, 68, 72, 83, Tel: BR 2-5687, Yr: 1946, Emp: 175, ▲4, $1,500,000

Transdyne Corp., 43 Albertson Ave., Albertson, L.I., N.Y., 14, 27, 63, Tel: PIoneer 1-4990, Yr: 1956, Emp: 50, ▲3, $200,000

Transelectric Mfg. Co., Hopewell Road, Oxford, Pa., 32, 68, Tel: OXford 265, Yr: 1951, Emp: 25, ▲1

Transformer Design, Inc. of Milwaukee, 7377 N. 76th St., Milwaukee 23, Wis., 45, 52, 76, Tel: FLagstone 3-8017, Yr: 1954, Emp: 10, ▲1, $130,000

Transformer Specialty Co., 1400 Mill Creek Rd., Gladwyne, Pa., 38, 63, 76, Tel: MIdway 9-4360, Yr: 1951, Emp: 4, ▲1, $25,000

Transformer Technicians, Inc., 2608 N. Cicero Ave., Chicago 39, Ill., 45, 52, 63, 76, 82, Tel: NAtional 2-8140, Yr: 1951, Emp: 83, ▲2, $800,000

Transformers, Inc., 200 Stage Rd., Vestal, N.Y., 5, 11, 38, 45, 52, 63, 69, 76, Tel: PIoneer 8-3311, Yr: 1951, Emp: 100, ▲1, $1,000,000

Transistor Applications, Inc., 103 Broad St., Boston 10, Mass., 45, 88, 89, 91, Tel: HA 6-1791, Yr: 1956, Emp: 9, ▲2, $120,000

Transistor Devices, Inc., 626 Schuyler Ave., Kearny, N.J., 14, 63, 68, Tel: WYman 8-8108, Yr: 1952, Emp: 8, ▲1, $30,000

**Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 9, 14, 38, 45, 62, 63, 64, 72, Tel: WEst 9-6751, Yr: 1957, Emp: 50, ▲2, $330,000**

See ad on page 472

Transistor Specialties, Inc., Terminal Dr., Plainview, N.Y., 4, 9, 10, 14, 17, 24, 47, 63, 64, Tel: WElls 5-8700, Yr: 1959, Emp: 25, ▲5

Transitron Electronic Corp., 168-182 Albion St., Wakefield, Mass., 44, 60, 70, 72, Tel: CRystal 9-1500, Yr: 1952, Emp: 5000, ▲20

Transval Electronics Corp., 2030 Maple Ave., El Segundo, Calif., 17, 47, 63, 64, 75, 84, 87, 89, 94, Tel: EA 2-5120, Yr: 1948, Emp: 435, ▲50

Trenton Transformer Corp., P.O. Box 568, Trenton, N.J., 45, 63, 76, Tel: OW 5-3151, Yr: 1951, Emp: 40

**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 4, 8, 28, 35, 38, 64, 68, 72, 88, 94, Tel: LOwell 7-3810**

See ad on page 520

Tresco, Inc., 3824-28 Terrace St., Philadelphia 28, Pa., 76, Tel: IVyridge 3-1383

Tri-Dex Co., P.O. Box 1207, Lindsay, Calif., 45, 73, 85, 89, 94, Tel: LIndsey 2-4051, Yr: 1951, Emp: 7





Tri-Point Plastics, Inc., 175 I.U. Willets Rd., Albertson, L.I., N.Y., 55, 83, 99, Tel: MAyfair 1-5800, Yr: 1951, Emp: 125

Tri-Tronics Co., 2607 St. Charles Rd., Bellwood, Ill., 4, 38, 68, Tel: LInden 4-7010, Yr: 1952, Emp: 6

Triad Transformer Corp., Div. Litton Industries, 4055 Redwood Ave., Venice, Calif., 15, 45, 76, Tel: UPton 0-5381, Yr: 1943, Emp: 500, $4,200,000

Tricon Mfg. Co., 8008 S. Wallace St., Chicago 20, Ill., 72, 85, 89, 91, 92, 97, 103, 104, Tel: AB 4-0600, Yr: 1945, Emp: 25

**Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 46, 55, 56, 72, 73, 84, 85, Tel: EMpire 2-3700, Yr: 1922, Emp: 85, ▲1, $625,000**

See ad on page 454

Trinity Equipment Corp., Route #281, Cortland, N.Y., 4, 74, 91, 96, Tel: SKyline 6-7535, Yr: 1941, Emp: 105

**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 3, 4, 9, 14, 23, 25, 30, 36, 38, 58, 64, 94, Tel: OVerbrook 1-0400, Yr: 1954, Emp: 64, ▲1, $1,120,000**

See ad on page 294

**Trionics Corp., P.O. Box 548, Madison 1, Wis., 38, 43, 48, 49, 54, 64, 69, 75, 82, 86, 90, 93, 94, 95, Tel: CEdar 8-2616, Yr: 1957, Emp: 33, ▲3, $103,500**

See ad on page 663

**Triplett Electrical Instrument Co., 286 Harmon Road, Bluffton, Ohio, 14, 36, 37, 58, Tel: 3231, Yr: 1932, Emp: 740, ▲2**

See ad on page 174

Tronex Inc., 10th & G Sts., Millville, N.J., 54, 86, Tel: TAylor 5-1750, Yr: 1943, Emp: 350, ▲3, $1,000,000

Trott Electronics, Inc., 412 Smith St., Rochester 8, N.Y., 4, 14, 24, 38, 47, 63, 88, 94, Tel: HAmilton 6-0150, Yr: 1950, Emp: 18, ▲1, $150,000

Trought Associates Inc., 116 Greylock Ave., Belleville 9, N.J., 88, 94, 104, Tel: PLymouth 1-0330, Yr: 1946, Emp: 25, $120,000

Tru-Connector Corp., 416 Union St., Lynn, Mass., 46, Tel: LYnn 8-9379, Yr: 1951, Emp: 34, $494,000

**Tru-Ohm Products, Div. Model Engineering & Manufacturing, Inc., 2800 N. Milwaukee Ave., Chicago 18, Ill., 69, Tel: EVerglade 4-2646, Emp: 400**

See ad on page 533

Trygon Electronics, Inc., 111 Pleasant Ave., Roosevelt, L.I., N.Y., 63, Tel: FR 8-2800, Yr: 1959, Emp: 25, ▲3, $300,000

Tubular Rivet & Stud Co., Weston Ave., Quincy 70, Mass., 72, 73, 91, 96, Tel: PResident 3-1776, Yr: 1893, Emp: 750

Tuck Mfg. Co., 19 Ellis Ave., W. Bridgewater, Mass., 91, 96, Tel: JU 3-1188, Yr: 1852

Tucor, Inc., 18 Marshall St., South Norwalk, Conn., 14, 77, 78, 79, Tel: TE 8-7591, Yr: 1959, Emp: 40, ▲6

Tullamore Electronics Corp., 6726 S. Ashland Ave., Chicago 36, Ill., 9, 14, 24, 38, 58, 63, Tel: PR 8-4700

**Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 24, 47, 62, 66, 67, 68, 70, 77, 78, 79, Tel: HUmboldt 2-4200**

See ad on pages 74-75

Tur-Bo Jet Products Co., Inc., 424 S. San Gabriel Blvd., San Gabriel, Calif., 45, Tel: CUmberland 3-5191, Emp: 85, $600,000

**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 4, 14, 18, 21, 39, 40, 50, 52, 76, 80, 83, 89, 96, Tel: ULysses 5-5131, Yr: 1924, Emp: 500, ▲4, $1,000,000**

See ad on page 438

Turner Associates, G. K., 2425 Pulgas Ave., Palo Alto, Calif., 14, 19, Tel: DAvenport 5-8332, Yr: 1958, Emp: 6, ▲1, $60,000

Turner Co., The, 909 17th St. N.E., Cedar Rapids, Iowa, 59, Tel: EM 3-8144, Yr: 1931, Emp: 170, ▲3

Twin Lock, Inc., 1024 W. Hillcrest, Inglewood 1, Calif., 73, Tel: ORegon 8-4773, Yr: 1957, Emp: 20, ▲2

# U

USI Western Design, Div. U.S. Industries, Inc., Santa Barbara Airport, Goleta, Calif., 63, 82, Tel: WO 7-4571

Ucinite Company, Div. United-Carr Fastener Corp., 459 Watertown St., Newtonville 60, Mass., 46, 55, 62, 64, 72, 81, Tel: LAsalle 7-8100

**Ulanet Co., George, 416 Market St., Newark 5, N.J., 72, 74, Tel: MArket 2-4876, Yr: 1931**

See ad on page 560

Ultek Corp., 920 Commercial St., Palo Alto, Calif., 63, 96, Tel: DAvenport 1-4117, Yr: 1958, Emp: 12, ▲2, $60,000

Ultra Electroforming & Mfg. Co., 110 Cedar Ave., Pitman, N.J., 89, Tel: LU 9-7666, Yr: 1936

Ultra Violet Products, Inc., 5114 Walnut Grove Ave., San Gabriel, Calif., 14, 19, 95, Tel: CUmberland 3-3193, Yr: 1933, Emp: 40, $100,000

Ultradyne Inc., 2630 San Mateo N.E., Albuquerque, N.M., 75, Tel: AM 8-2131, Yr: 1953, Emp: 35

**Ultrasonic Industries, Inc., Dept. IRED-60, 141 Albertson Ave., Albertson, L.I., N.Y., 14, 95, 96, Tel: PIoneer 1-4333, Yr: 1959, Emp: 25, ▲5**

See ad on page 679

Ultraudio Products, Div. Oberline, Inc., P.O. Box 921, Beverly Hills, Calif., 14, 32, 34, 88, Tel: CRestview 6-2726, Yr: 1954, Emp: 12, ▲1

Ultronix, Inc., 111 E. 20th Ave., San Mateo, Calif., 5, 9, 11, 30, 33, 40, 64, 69, 89, 94, Tel: FIreside 5-7921, Yr: 1956, Emp: 100, $750,000

Underwood Electrical & Mfg. Co., Inc., 1926 W. Grand Ave., Chicago 39, Ill., 43, Yr: 1938

Ungar Electric Tools, 4101 Redwood Ave., Los Angeles 66, Calif., 96, Tel: EXmont 8-5718, Yr: 1932, Emp: 200, ▲3

**Unholtz-Dickie Corp., 2994 Whitney Ave., Hamden 18, Conn., 14, 38, 96, Tel: AT 8-3358, Yr: 1958, Emp: 9, ▲1**

See ad on page 295

Uniform Tubes, Inc., Collegeville, Pa., 85, 91, 97, Tel: HUxley 9-7276, Yr: 1910, Emp: 100, ▲3

Union Carbide Corp., Haynes Stellite Co., 270 Park Ave., New York 17, N.Y., 97, Tel: LL 1-2345

Union Carbide Corp., Linde Co., 270 Park Ave., New York 17, N.Y., 49, 86, 92, 93, 96, 97, 103, Tel: LL 1-2345

Union Carbide Corp., National Carbon Co., 270 Park Ave., New York 17, N.Y., 91, 104, Tel: LL 1-2345

Union Carbide Corp., Silicones Div., 270 Park Ave., New York 17, N.Y., 93, 95, Tel: LL 1-2345

Union Carbide Corp., Union Carbide Consumer Products Co., 270 Park Ave., New York 17, N.Y., 41, 62, Tel: LL 1-2345, Yr: 1917, Emp: 90,000

Union Carbide Corp., Union Carbide Metals Co., 270 Park Ave., New York 17, N.Y., 97, Tel: LL 1-2345

Union Electric Products Co., 24 Edison Pl., Newark 2, N.J., 3, 40, 45, 47, 52, 57, 76, 82, 88, Tel: MArket 3-5489, Yr: 1940, Emp: 3, ▲1

Union Steel Chest Corp., 54 Church St., Le Roy, N.Y., 84, Tel: Le Roy 584, Yr: 1893, Emp: 135, $250,000

Union Switch & Signal, Div. Westinghouse Air Brake Co., 1789 Braddock Ave., Pittsburgh 18, Pa., 4, 8, 9, 58, 62, 68, Tel: CHurchill 2-5000, Yr: 1881, Emp: 2200

Union Ultra-Sonics Corp., 111 Penn St., Quincy 69, Mass., 75, 96, Tel: GRanite 9-6800, Yr: 1957

Unistrut Products Co., 933 W. Washington Blvd., Chicago 7, Ill., 84, 87, 96, Tel: MOnroe 6-2665

Unitech Corporation, 50 Colfax Ave., Clifton, N.J., 96, Tel: PRescott 3-7100

United Aircraft Corp., Norden Div., 58 Commerce Rd., Stamford, Conn., 1, 4, 6, 7, 9, 17, 18, 27, 30, 38, 39, 60, 75, 96, Tel: DAvis 5-2611, Yr: 1928, Emp: 2500, ▲260

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

United Aircraft Corp., Norden Div., Ketay Dept., Jericho Turnpike, Commack, N.Y., 4, 30, 38, 60, 69, Tel: FOrest 8-5500, Yr: 1928, Emp: 60,000

United Aircraft Corp., Sikorsky Aircraft Div., Stratford, Conn., 91, Tel: DRexel 8-6361

United Aircraft Products, Inc., 1116 Bolander Ave., Dayton 8, Ohio, 4, 14, 54, 83, 84, 87, 91, Tel: BA 4-3841, Yr: 1929, Emp: 630

United Carbon Products Co., 1300 N. Madison St., Bay City, Mich., 96, Tel: TWinbrook 3-4575, Yr: 1945, Emp: 100

United-Carr Fastener Corp., 31 Ames St., Cambridge, Mass., 91, Tel: KIrkland 7-1900

**United Components, Inc., 105 Lincoln Ave., Orange, N.J., 54, 70, 72, Tel: ORange 3-6422, Yr: 1950, Emp: 50, ▲1, $200,000**

**See ads on pages 453, 541**

United Control Corp., 4510 Union Bay Pl., Seattle 5, Wash., 1, 4, 9, 30, 38, 47, 52, 58, 60, 63, 72, 74, 75, Tel: LAkeview 5-9200, Yr: 1948, Emp: 878, ▲10, $11,680,119

United Electric Controls Co., 85 School St., Watertown 72, Mass., 4, 72, 74, Tel: WAlnut 6-1000, Yr: 1931, Emp: 175

United Electrodynamics, Inc., 200 Allendale Rd., Pasadena, Calif., 15, 36, 38, 47, 63, 82, 83, Tel: SY 9-7161, Yr: 1935, Emp: 423, ▲13, $4,700,000

United Electronic Mfg. Corp., 542 39th St., Union City, N.J., 43, Tel: UNion 5-4452, Yr: 1950

United Electronics Co., 42 Spring St., Newark 4, N.J., 79, Tel: HUmboldt 4-6300, Yr: 1935, Emp: 156, ▲5

United International Dynamics Corp., 243 Lexington St., Waltham 54, Mass., 46, 71, 72, 73, 89, Tel: TWinbrook 4-7271, Yr: 1956, Emp: 25, ▲1

**United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., Importers, 43, 48, 69, 71, 85, 86, 97, 101, 104, Tel: BEekman 3-8870, Yr: 1945, Emp: 150, ▲2**

**See ads on pages 533, 699**

United Sensor & Control Corp., Glastonbury, Conn., 4, 14, Tel: ME 3-2867

United Shoe Machinery Corp., 140 Federal St., Boston 7, Mass., 1, 4, 6, 7, 8, 9, 18, 20, 21, 27, 29, 30, 38, 39, 40, 46, 52, 76, 83, 88, 89, 91, 96, 97, Tel: LIberty 2-9100, ▲10, $200,000

U. S. Burke Machine Tool Co., Brotherton Rd., Cincinnati 27, Ohio, 96, Tel: BR 1-5000

United States Chemical Milling Corp., 1700 Rosecrans Ave., Manhattan Beach, Calif., 39, 84, 87, 89, 93, Tel: ORegon 8-4041, Yr: 1955, Emp: 575, ▲2

**U. S. Components, Inc., 454 E. 148th St., New York 55, N.Y., 46, Tel: CYpress 2-6525**

**See ad on page 134**

U. S. Controls, Inc., 410 4th Ave., Brooklyn 15, N.Y., 4, 69, 88, 89, 94, Tel: MAin 4-7507, Yr: 1954, Emp: 12

U. S. Dielectric Products, Inc., 98 Adams St., Leominster, Mass., 39, 40, 46, 73, 83, 89, 91, 93, 94, 98, 99, Tel: KE 4-8311, Yr: 1956, Emp: 17, ▲1

United States Dynamics Inc., 10 Dedham St., Newton Highlands 61, Mass., 96, Tel: WOodward 9-9655

United States Electronics Corp., 280 Warren St., Lyndhurst, N.J., 45, 52, 73, 76, 98, Tel: GEneva 8-2400, Yr: 1948, Emp: 75, ▲2, $450,000

U. S. Gear Corp., 81 Bay State Rd., Wakefield, Mass., 30, Tel: CRystal 6-4900, Yr: 1954, Emp: 42

United States Instrument Corp., Route 29 N., Charlottesville, Va., 18, 45, 59, 68, 72, Tel: CHarlottesville 3-5153, Yr: 1937, Emp: 400

United States Motors Corp., 102 W. 5th Ave., Oshkosh, Wis., 63, Tel: BEverly 1-4560

United States Radium Corp., P.O. Box 216, Hanover Ave., Morristown, N.J., 19, 24, 52, 62, 84, 89, 91, 104, Tel: JEfferson 9-4000, Yr: 1917, Emp: 450, ▲2, $2,750,000

U. S. Recording Co., 1121 Vermont Ave. N.W., Washington 5, D.C., 4, 16, 19, 32, 34, 38, 40, 61, 63, 65, Tel: LIncoln 3-2705, Yr: 1936, Emp: 50, ▲1, $650,000

U. S. Relay-Electronics, 717 N. Coney Ave., Azusa, Calif., 45, 68, 72, 98, Tel: EDgewood 4-8206

U. S. Science Corp., 5221 W. 102nd St., Los Angeles 45, Calif., 1, 4, 9, 10, 12, 13, 14, 15, 17, 18, 20, 22, 23, 24, 26, 27, 28, 30, 64, 66, 75, 76, 82, 88, 89, Tel: SPring 6-0450, Yr: 1955, Emp: 569, ▲25

U. S. Semiconductor Products, Div. United Industrial Corp., 3540 W. Osborn Rd., Phoenix, Ariz., 17, 43, 49, 64, 66, 70, Tel: BRowning 2-1341, Yr: 1957, Emp: 175, ▲5, $1,500,000

U. S. Sonics Corp., 63 Rogers St., Cambridge 42, Mass., 48, 52, 75, 86, Tel: KI 7-2502, Yr: 1958, Emp: 25, ▲2, $125,000

United States Steel Corp., 525 Wm. Penn Pl., Pittsburgh 30, Pa., 85, 91, 95, 97, Tel: EXpress 1-2315, Yr: 1901, Emp: 223,490

U. S. Stoneware Co., Alite Division, P.O. Box 119, Orrville, Ohio, 17, 46, 48, 54, 86, 89, 93, 98, 104, Tel: MOnica 9-2271

United States Testing Co., Inc., 1415 Park Ave., Hoboken, N.J., 88, 94, Tel: SWarthmore 2-2400, Yr: 1880, Emp: 450, ▲6, $750,000

U. S. Time Corporation, The, Waterbury, Conn., 1, 4, Tel: PLaza 8-2444, Yr: 1857, Emp: 4708

U. S. Tool Company, Inc., 255 N. 18th St., East Orange, N.J., 96, Tel: ORange 5-4000, Yr: 1918, Emp: 225

U. S. Transistor Corp., 149 Eileen Way, Syosset, L.I., N.Y., 70, Tel: WA 1-5800

**United Transformer Corp., 150 Varick St., New York 13, N.Y., 38, 45, 51, 52, 76, Tel: ALgonquin 5-3500, Yr: 1933**

**See ad on Cover 2**

Unitek Corp., Weldmatic Div., 950 Royal Oaks Dr., Monrovia, Calif., 63, 92, 96, Tel: SYcamore 5-5995, Yr: 1950, Emp: 140, ▲1, $1,000,000

Universal Can & Condenser Co., 3435 N. Kimball Ave., Chicago 18, Ill., 43, Tel: CO 7-3933

Universal Circuit Controls, 3610 Oakton, Skokie, Ill., 62, 72, 84, 85, 88, Tel: ORchard 5-2620, Yr: 1953, Emp: 25, ▲1

Universal Electronics Co., 1720 22nd St., Santa Monica, Calif., 63, Tel: EX 3-9219, Yr: 1951, Emp: 21, $263,498

Universal Instruments Corp., 139 E. Frederick St., Binghamton, N.Y., 14, 89, 96, Tel: RA 2-1241, Yr: 1919, Emp: 200, ▲1, $500,000

**Universal Mfg. Co., Inc., 1168 Grove St., Irvington 11, N.J., 11, 14, 83, 96, Tel: ESsex 4-9800, Yr: 1941, Emp: 88, ▲1, $500,000**

**See ad on page 678**

Universal Match Corp., Armament Div., 472 Paul Ave., St. Louis 35, Mo., 4, 30, 38, 60, 94, Tel: JAckson 2-1620, Yr: 1937, Emp: 1530, ▲7

Universal Products Engineering, Route 3, P.O. Box 315, Racine, Wis., 39, Tel: MElrose 7-2527, Yr: 1949, Emp: 6, $60,000

**Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 38, 45, 47, 52, 76, Tel: ESsex 4-9804, Yr: 1958, Emp: 35, ▲1, $300,000**

**See ad on page 407**

University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N.Y., 32, 52, 56, 84, 88, Tel: WH 6-7700, Yr: 1937

Univox Corp., 102 Warren St., New York 7, N.Y., 30, 38, 39, 85, 89, Tel: WOrth 2-5630, Yr: 1945, Emp: 75, ▲3, $1,500,000

Uniwave, Inc., 109 Marine St., Farmingdale, L.I., N.Y., 4, 47, 58, 75, 83, 96, Tel: CHapel 9-8180, Yr: 1956, Emp: 15, ▲1

Uppco, Inc., 900 S. DesPlaines St., Chicago 7, Ill., 60, Yr: 1930, Emp: 200, ▲1

Utah Radio Products Corp., 1124 E. Franklin, Huntington, Ind., 56, Yr: 1922, Emp: 275

Utica Drop Forge & Tool, Div. Kelsey-Hayes Co., 2415 Whitesboro St., Utica 4, N.Y., 96, Tel: RE 5-6411, Yr: 1895

Utrad Corporation, Div. Litton Industries, 305 N. Briant St., Huntington, Ind., 76, Tel: 4088, Yr: 1956, Emp: 145, $985,000





# V

Vacap Corp., 1905 Summit Ave., Union City, N.J., 44, Tel: UNion 7-6699, Yr: 1955, Emp: 20, ▲1

Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill., 73, 96, Tel: WH 4-2340, Yr: 1937, Emp: 250

**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 4, 14, 24, 38, 63, 78, 89, 91, 92, 96, Tel: AN 1-2660, Yr: 1959, Emp: 10, $50,000**

**See ad on page 678**

Vacuum Ceramics Inc., Route 14, Cary, Ill., 54, Yr: 1955, Emp: 143

Vacuum Instrument Corp., 4 Stepar Pl., Huntington Station, L.I., N.Y., 14, 96, Tel: HAmilton 3-5520, Yr: 1957, Emp: 15, $100,000

Vacuum Specialties Co., Inc., 31 Linden St., Somerville 43, Mass., 92, 96, Tel: MOnument 6-5450, Yr: 1951, Emp: 50, $120,000

Valco Mfg. Co., 4700 W. Walton, Chicago 51, Ill., 38, Tel: MAnsfield 6-7574, Yr: 1927, Emp: 30

Valor Instruments, Inc., 13214 Crenshaw Blvd., Gardena, Calif., 14, 17, 21, 28, 36, 37, 40, 45, 47, 50, 52, 63, 76, 80, 83, Tel: FAculty 1-2280, Yr: 1954, Emp: 65, ▲2

Valpey Crystal Corp., 1244 Highland St., Holliston 1, Mass., 17, 28, 33, 36, 49, 75, 86, Tel: GArden 9-1851, Yr: 1931, Emp: 60

Valverde Labs., 252 Lafayette St., New York 12, N.Y., 72, 74, Tel: WAlker 5-6742, Yr: 1930, Emp: 10

Van Norman Industries, Inc., Electronics Div., 186 Granite St., Manchester, N.H., 3, 6, 7, 10, 14, 21, 26, 28, 31, 33, 38, 40, 44, 58, 63, 64, 71, 80, Tel: NAtional 5-9701, Emp: 225, ▲3, $1,631,800

Van Nostrand Company, Inc., D., 120 Alexander St., Princeton, N.J., 100, Tel: WAlnut 1-6000, Yr: 1848, Emp: 240, ▲2

Vanguard Electronics Co., 3384 Motor Ave., Los Angeles 34, Calif., 45, 50, 52, 76, Tel: UPton 0-6721, Yr: 1952, Emp: 30, ▲1

Vap-Air Div., Vapor Heating Corp., 6444 W. Howard St., Chicago 48, Ill., 4, 30, 38, 68, 72, 74, Tel: NEwcastle 1-9200, Yr: 1904, Emp: 850, ▲4

Vapor Recovery Systems Co., 2820 N. Alameda St., Compton, Calif., 4, 9, 30, 36, 58, Tel: NEvada 6-1211, Yr: 1928, Emp: 180, $650,000

Var-Lac-Oid Chemical Co., 116 Broad St., New York 4, N.Y., 48, 49, 95, 97, Tel: WH 4-0318

Varflex Corp., 512 W. Court St., Rome, N.Y., 93, Tel: FF 6-4400, Yr: 1924, Emp: 90

Vari Corp., 2825 Cedar Ave., Minneapolis 7, Minn., 38, 56, 59, 96, Tel: PArkway 2-1715, Yr: 1947, Emp: 7, $35,000

**Vari-L Company, Inc., 207 Greenwich Ave., Stamford, Conn., 28, 36, 38, 45, 76, Tel: FIreside 8-0091, Yr: 1953, Emp: 14, ▲1, $100,000**

**See ad on page 406**

**Varian Associates, Instrument Div., 611 Hansen Way, Palo Alto 42, Calif., 14, 15, 16, 57, Tel: DAvenport 6-4000**

**See ad on page 176**

**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 4, 14, 19, 20, 21, 24, 27, 38, 63, 79, 83, 96, Tel: DAvenport 6-4000, Yr: 1948, Emp: 2100, ▲35**

**See ad on pages 116-117**

Varo Mfg. Co., Inc., 2201 Walnut, Garland, Tex., 1, 4, 9, 17, 22, 23, 26, 30, 33, 38, 39, 45, 47, 52, 57, 58, 60, 63, 64, 68, 75, 76, 82, 89, 91, Tel: BRoadway 6-6141, Yr: 1946, Emp: 320, ▲10, $4,000,000

**Vector Electronic Co., Inc., 1100 Flower St., Glendale 1, Calif., 55, 71, 73, 84, 91, 104, Tel: CHapman 5-1076, Yr: 1947, Emp: 80, ▲1, $924,000**

**See ad on page 544**

VecTrol Engineering, Inc., 85 Magee Ave., Stamford, Conn., 4, 30, 38, 63, 66, 67, 82, 83, Tel: DAvis 4-1602, Emp: 5, ▲2

**Vecco Vacuum-Electronics Corp., Terminal Dr., Plainview, L.I., N.Y., 4, 14, 24, 96, Tel: OVerbrook 1-8300, Yr: 1945, Emp: 200**

**See ad on page 681**

Veeder-Root, Inc., 70 Sargeant St., Hartford 2, Conn., 10, Tel: JA 7-7201, Yr: 1928, Emp: 3500

Vemaline Products Co., P.O. Box 222, Hawthorne, N.J., 10, 14, 62, 68, 72, 91, 98, Tel: MUlberry 4-1688

**Vernitron Corp., 131 Old Country Rd., Carle Place, L.I., N.Y., 30, 60, Tel: Pioneer 1-4130**

**See ad on page 469**

Vibro Mfg. Co., Inc., 61-17 Roosevelt Ave., Woodside 77, L.I., N.Y., 83, Yr: 1942, Emp: 100, ▲1, $1,000,000

Vickers Inc., Electric Products Div., 1815 Locust, St. Louis 3, Mo., 4, 18, 30, 34, 38, 63, 66, 70, 75, 82, 94, 96, 100, Tel: CEntral 1-5830

Vicon Corp., 1369 Industrial Rd., San Carlos, Calif., 23, 31, 38, 39, 88, Tel: LYtell 3-8003, Emp: 25, ▲6

Victor Adding Machine Co., 3900 N. Rockwell St., Chicago 39, Ill., 9, 10, 36, Tel: KE 9-8210

**Victor Gloves, Inc., 49 E. 21st St., New York 10, N.Y., 96, Tel: ALgonquin 4-7842, Yr: 1940, Emp: 100, $150,000**

**See ads on page 681**

**Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 24, 58, 63, 69, 70, 78, Tel: ENdicott 1-6200, Yr: 1928, Emp: 300, ▲4, $3,000,000**

**See ads on pages 535, 578**

**Victory Engineering Corp., P.O. Box 373, 114 Springfield Rd., Union, N.J., 4, 47, 69, 82, Tel: MUrdock 8-7150, Yr: 1942, Emp: 170, ▲1**

**See ad on page 535**

Victory Mica Mfg. Co., Inc., 1313 39th St., Brooklyn 18, N.Y., 93, 104, Tel: GE 5-3127, Yr: 1945, Emp: 100, $875,000

Video Industries Co., 212 Madison Ave., Port Chester, N.Y., 39, 89, 91, Tel: WEstmore 9-1919, Yr: 1948, Emp: 6, $100,000

Video Instruments Co., Inc., 3002 Pennsylvania Ave., Santa Monica, Calif., 38, 63, 68, Tel: EXbrook 3-1244

Videon Electronic Corp., 902 E. Michigan St., Indianapolis 2, Ind., 88, 94, Tel: MElrose 6-1590, Yr: 1952, Emp: 4, ▲1

Viewlex, Inc., 35-01 Queens Blvd., Long Island City 1, N.Y., 29, Tel: EXeter 2-0100, Emp: 200, ▲3

Viking Industries, Inc., 21343 Roscoe Blvd., Canoga Park, Calif., 30, 33, 38, 46, 63, 71, Tel: DIamond 7-8500, Yr: 1951, Emp: 220, ▲3, $2,000,000

Vinco Electronics Corp., 65 Wallace St., New Haven 11, Conn., 2, 3, 6, 12, 14, 18, 22, 23, 24, 32, 38, 63, 80, 84, 94, Tel: UN 5-5600, Yr: 1936, Emp: 12, ▲1, $100,000

Vinson Co., E. R., 1401 Middle Harbor Rd., Oakland 20, Calif., 1, 16, 64, 84, 89, 94, Tel: GLencourt 1-2357, Yr: 1948, Emp: 12, $100,000

Vinson Mfg. Co., Inc., 8044 Woodley Ave., Van Nuys, Calif., 1, 75, Tel: TRiangle 3-3510, Yr: 1948, Emp: 152

Virginia Electronics Co., Inc., River Rd. at B. & O. R.R., Washington 16, D.C., 1, 3, 4, 9, 14, 15, 18, 22, 23, 28, 32, 34, 35, 38, 39, 45, 46, 55, 63, 64, 72, 76, 85, 88, 89, 94, 96, Tel: OLiver 4-6680, Yr: 1951, Emp: 60, ▲2, $500,000

**Vitramon, Inc., P.O. Box 544, Bridgeport 1, Conn., 43, Tel: AMherst 8-1656, Yr: 1948, Emp: 350, ▲2**

**See ad on page 396**

Vitro Chemical Co., 342 Madison Ave., New York 17, N.Y., 86, 97, Tel: YU 6-2180, Yr: 1959, Emp: 175

Vitroseal Corp., The, Vine & Race Sts., Ridgway, Pa., 54, Tel: PRospect 2-4655, Yr: 1945, Emp: 20

Vocaline Co. of America, Inc., Coulter St., Old Saybrook, Conn., 8, 12, 18, 22, 32, 89, Tel: EV 8-3414, Yr: 1950, Emp: 158, ▲1, $1,800,000

Vogue Instrument Corp., 381 Empire Blvd., Brooklyn 25, N.Y., 30, Tel: SI 6-4700

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

$$\frac{d^2 r_1}{dt^2} - r_0\left(\frac{d\phi_0}{dt}\right)^2 - 2r_0\frac{d\phi_0}{dt}\frac{d\phi_1}{dt} - r_1\left(\frac{d\phi_0}{dt}\right)^2 =$$

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POWER BWO'S

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NOISE GENERATING
EQUIPMENT



Volkert Stampings, Inc., 222-34 96th Ave., Queens Village 29, N.Y., 101, Tel: HOllis 4-8100, Yr: 1935, Emp: 185, ▲3, $3,000,000

Volta Mfg. Co., 1934 W. North Ave., Chicago 22, Ill., 6, 39, 45, 69, Yr: 1953, Emp: 45, $170,000

Vulcan Electric Co., 88 Holten St., Danvers, Mass., 92, 96, Tel: SPring 4-1730, Emp: 150

# W

Waage Electric Inc., 720 Colfax Ave., Kenilworth, N.J., 72, 74, 92, 96, Tel: CHestnut 5-9363, Yr: 1909, Emp: 18, ▲2

Waber Electronics, Inc., Hancock & Somerset Sts., Philadelphia 33, Pa., 38, 39, 89, 94, Tel: NEbraska 4-3200, Yr: 1958, Emp: 12, ▲1, $108,000

WacLine, Inc., 35 S. St. Clair St., Dayton 2, Ohio, 3, 4, 11, 21, 28, 39, 58, 60, 68, 83, Tel: BA 8-5161, Yr: 1951, Emp: 100, ▲2, $700,000

Wah Chang Corp., 233 Broadway, New York 7, N.Y., 85, 97, 104, Tel: CO 7-0887, Yr: 1916, Emp: 500

Wahlgren Magnetics, Div. Marshall Industries, 1900 Walker Ave., Monrovia, Calif., 52, 76, Tel: MUrray 1-8456, Yr: 1947, Emp: 150, $1,172,790

Waldes Kohinoor, Inc., 47-16 Austel Pl., Long Island City 1, N.Y., 91, 96, Tel: EXeter 2-3100, Yr: 1902, Emp: 800

Waldom Electronics, Inc., 1625 W. 53rd St., Chicago 32, Ill., 46, 49, 56, 58, 71, 73, 84, 91, 95, 98, Tel: LUdlow 5-1212, Yr: 1946, Emp: 130, ▲5

**Wales-Strippit, Inc., Unit of Houdaille Industries, Inc., 246 Buell Rd., Akron, N.Y., 96, Tel: LH 2-5441, Yr: 1925, Emp: 364, $2,500,000**

**See ad on page 680**

**Walker Co., George, 118 Amsterdam Ave., Passaic, N.J., 91, Tel: PRescott 7-3337**

**See ad on page 653**

Walkirt Co., 141 W. Hazel St., Inglewood 3, Calif., 4, 9, 10, 23, 33, 36, 38, 61, 89, 91, Tel: ORegon 8-4814, Yr: 1948, Emp: 30, ▲3, $250,000

Wall Mfg. Company, P., Erie St., Grove City, Pa., 92, 96, Tel: Grove City 910, Yr: 1864, Emp: 150, $500,000

Wallace & Tiernan Inc., 25 Main St., Belleville 9, N.J., 4, 14, 58, Tel: PLymouth 9-8000, Yr: 1913, Emp: 3000

**Wallson Associates, Inc., 912-914 Westfield Ave., Elizabeth, N.J., 4, 14, 38, 63, 88, Tel: FLanders 1-0700, Yr: 1947, Emp: 40, ▲2**

**See ad on page 294**

**Walsco Electronics Mfg. Co., Div. of G-C Textron Electronics, Inc., 400 S. Wyman St., Rockford, Ill., 39, 55, 72, 87, 91, 95, Tel: WOodland 8-9661, Yr: 1925, Emp: 500, ▲3**

**See ad on page 640**

Walsh Engineering Co., P.O. Box 218, Millington, N.J., 76, 94, Tel: PLainfield 7-8545, Yr: 1940, Emp: 3, ▲2

Waltham Electronics Corp., 751 Main St., Waltham 54, Mass., 3, 9, 14, 23, 28, 36, 38, 40, 49, 83, 88, 89, Tel: TWinbrook 4-7810, Yr: 1956, Emp: 26, ▲5, $250,000

Waltham Horological Corp., 395 Lynnway, Lynn, Mass., 16, 55, Tel: LYnn 8-4750

Wang Laboratories, Inc., 12 Huron Dr., Natick, Mass., 4, 9, 29, 35, 36, 72, Tel: OLympic 3-3910, Yr: 1951, Emp: 15, ▲2, $125,000

Ward Leonard Electric Co., 83 South St., Mount Vernon, N.Y., 68, 69, 72, Tel: MOunt Vernon 4-1000, Yr: 1892, Emp: 1000

Warner Electric Brake & Clutch Co., Beloit, Wis., 30, Tel: DUnkirk 9-2211, Yr: 1927

Warren Components Div., El-Tronics, Inc., S. Irvine St., Warren, Pa., 16, 49, 54, 58, 73, 83, 89, 91, 96, 98, 104, Tel: RA 3-6200, Yr: 1942, Emp: 250

Warren Mfg. Co., Inc., The, Newtown Rd., Littleton, Mass., 36, 38, 63, 84, Tel: HUnter 6-3511, Yr: 1955, Emp: 165, $1,000,000

Warren Wire Co., Pownal, Vt., 85, 93, 97, Tel: VAlley 3-7321, Yr: 1917, Emp: 800, $8,000,000

Warren Wire Co., Wire Co. of America Subsid., 1601 Chestnut St., Alhambra, Calif., 85, Yr: 1947, Emp: 30, $500,000

Warsaw Coil Co., P.O. Box 389, Warsaw, Ind., 15, Tel: AM 7-6011, Yr: 1954, Emp: 35, $150,000

Warwick Mfg. Corp., 7300 N. Lehigh Ave., Chicago 48, Ill., 6, 29, 38, 61, 64, 80, Tel: SPring 4-6100, Yr: 1932, Emp: 3016, ▲35, $63,414,000

Warwick Products Co., 1572 Riverbed Ave., Cleveland 13, Ohio, 84, Tel: CHerry 1-6260, Yr: 1942, Emp: 18

Washington Aluminum Co., Inc., Knecht Ave. & Penna. R.R., Baltimore 29, Md., 27, 39, 84, 87, Tel: CIrcle 2-1000

Wassco Electric Products Corp., 2032 2nd Ave. S., St. Petersburg 12, Fla., 96, Tel: OR 1-2948, Yr: 1946, Emp: 5, ▲1, $12,500

Waterbury Companies, Inc., 835 S. Main St., Waterbury, Conn., 84, 89, 91, 93, 98, Tel: PLaza 6-5551, Yr: 1812, Emp: 450

**Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 23, 25, 34, 77, Tel: GArfield 6-8600, Emp: 369, ▲6**

**See ad on page 322**

Waters Conley Co., Inc., 501 First Ave. N.W., Rochester, Minn., 61, Tel: AT 2-2755, Yr: 1899, Emp: 248

Waters Mfg., Inc., Boston Post Rd., Wayland, Mass., 5, 14, 25, 68, 69, 86, 94, Tel: ELmwood 8-2777, Yr: 1951, Emp: 175, ▲2

**Watkins-Johnson Co., 3333 Hillview Ave., Stanford Industrial Park, Palo Alto, Calif., 20, 38, 79, Tel: DAvenport 6-8830, Yr: 1957, Emp: 110, ▲6, $1,000,000**

**See ad on page 236**

Watlow Electric Mfg. Co., 1376 Ferguson Ave., St. Louis 33, Mo., 69, 92, Tel: PArkview 1-7887

Watson Mfg. Co., Inc., 1710 Taylor St., Jamestown, N.Y., 87, Tel: 7-191, Yr: 1887, Emp: 550

Waugh Engineering Co., 7812 Burnet Ave., Van Nuys, Calif., 4, 30, 38, 47, 58, Tel: TRiangle 3-1055, Yr: 1952, Emp: 84, $687,000

Wave Particle Corp., P.O. Box 252, Menlo Park, Calif., 20, 21, 24, 28, 38, 40, 52, 63, 79, Tel: DAvenport 5-2681

Waveforms, Inc., 333 Sixth Ave., New York 14, N.Y., 3, 14, 36, Tel: WA 9-2795, Yr: 1951, Emp: 18, $150,000

Waveguide, Inc., 1769 Placentia Ave., Costa Mesa, Calif., 38, 49, 83, 89, Tel: MAdison 8-7786, Yr: 1954, Emp: 25, $300,000

Waveline, Inc., P.O. Box 718, West Caldwell, N.J., 21, 39, 40, 49, 52, 58, 76, 80, 83, Tel: CApital 6-9100, Yr: 1946, Emp: 70, ▲3, $1,000,000

Wayne-George Corpotation, 588 Commonwealth Ave., Boston 15, Mass., 9, Tel: COpley 7-8125, Yr: 1956, Emp: 50, ▲10

**Wayne Kerr Corporation, 1633 Race St., Philadelphia 3, Pa., 3, 4, 5, 11, 14, 21, 28, 40, 43, 58, 76, Tel: LOcust 8-6820, Yr: 1946**

**See ad on page 255**

Webcor, Inc., Electronics Div., 816 N. Kedzie Ave., Chicago 51, Ill., 1, 4, 18, 20, 27, 29, Tel: NE 2-3425, Yr: 1944, Emp: 3000, $10,000,000

Weber Aircraft Corp., 2820 Ontario St., Burbank, Calif., 84, 87, 89, Tel: VIctoria 9-1181, Yr: 1898, Emp: 671

Webster Electric Co., 1900 Clark St., Racine, Wis., 9, 29, 32, 38, 47, 58, 61, 65, Tel: MElrose 3-3511, Yr: 1909, Emp: 500

Webster Manufacturing, 317 Roebling Rd., South San Francisco, Calif., 39, Tel: JUno 9-0120, Yr: 1941, Emp: 9, ▲1, $150,000

**Weckesser Co., 5713-17 Northwest Hwy., Chicago 16, Ill., 89, 91, 99, Tel: ROdney 3-6688, Yr: 1934, Emp: 25**

**See ad on page 654**

◀For details, circle #168 on Reader Service Card

Weighing & Controls, Inc., Hatboro Industrial Park, Hatboro, Pa., 4, 58, 96. Tel: OS 5-0901. Yr: 1952. Emp: 18. ▲1, $70,000

**Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md. 14, 21, 28, 40, 63, 83. Tel: LOckwood 4-0121**

**See ads on pages 315, 384**

Welch Mfg. Co., Inc., A. W., 509 E. 29th St., Indianapolis 5, Ind., 45. Tel: WAlnut 5-7878. Yr: 1957. Emp: 10. $10,000

**Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick St., Chicago 10, Ill., 4, 11, 14, 24, 33, 58, 96. Tel: MIchigan 2-2000, Yr: 1880**

**See ad on page 681**

**Weller Electric Corp., 601 Stone's Crossing Rd., Easton, Pa., 96, Tel: BLackburn 3-3521. Yr: 1950. Emp: 150, $1,200,000**

**See ad on page 683**

Wells Co., Inc., Gary, 361 Rockaway Ave., Valley Stream, L.I., N.Y., 43, 44, 56, 69, 77. Tel: LOcust 1-2914. Yr: 1955

Wells Electronics Co., 1701 S. Main St., South Bend 23, Ind., 9, 11, 14, 38, 43, 45, 50, 52, 64, 66, 70, 76, 84, 91, 94, 98, 102. Tel: ATlantic 8-4651. Yr: 1958. Emp: 55, ▲2

Wells-Gardner Electronics Corp., 2701 N. Kildare Ave., Chicago 39, Ill., 6, 80, 81. Tel: ALbany 2-8220. Yr: 1925. Emp: 1200, ▲20, $24,300,000

Wells Industries Corp., Basic Electronic Controls Div., 6880 Troost Ave., North Hollywood, Calif., 10, 38, 44, 64, 69, 84, 87, 89, 96. Tel: TR 7-3353. Yr: 1924. Emp: 125

Welwyn International, Inc., 3355 Edgecliff Ter., Cleveland 11, Ohio, Importers, 69. Tel: WInton 1-1333. Yr: 1938. Emp: 2200. ▲12

Wesco Electrical Co., Inc., 27 Olive, Greenfield, Mass., 43, 44, 63. Tel: PRescott 4-4358. Yr: 1937. Emp: 60

West Instrument Corp., 4363 W. Montrose Ave., Chicago 41, Ill., 4, 14, 16, 17, 58, 75. Tel: AVenue 6-1007. Yr: 1946. Emp: 125

Western Coil & Electrical Co., 215 State St., Racine, Wis., 19, 39, 91, 98. Tel: MElrose 2-1741. Yr: 1915. Emp: 78

**Western Devices, Inc., 600 W. Florence Ave., Inglewood 1, Calif., 14, 34, 42, 60, 84, 87, 91. Tel: ORegon 8-7827, Yr: 1953, Emp: 180**

**See ad on page 624**

Western Electronic Products Co., 2420 N. Lake Ave., Altadena, Calif., 5, 14, 96. Tel: SYcamore 4-6379. Yr: 1956

Western Gear Corp., Electro-Products Div., 132 W. Colorado St., Pasadena, Calif., 30, 42, 60. Tel: MUrray 1-6604. Yr: 1951. Emp: 150, $2,000,000

Western Gold & Platinum Co., 525 Harbor Blvd., Belmont, Calif., 85, 86, 89, 95, 97, 103. Tel: LYtell 3-3121. Yr: 1927. Emp: 100. ▲1

Western Semiconductors, Inc., 605G Aldon St., Santa Ana, Calif., 70. Tel: KI 9-1851

Western Union Telegraph Co., The, 60 Hudson St., New York 13, N.Y., 3, 9, 13, 16, 35, 36, 51, 52, 68, 73, 94. Tel: WOrth 2-7300. Yr: 1856. Emp: 39,000, ▲63

Westfield Metal Products Co., Inc., 1070 Lower Union St., Westfield, Mass., 91. Tel: LOgan 2-3614. Yr: 1935. Emp: 50. $75,000

Westinghouse Electric Corp., Plant & Orange Sts., Newark 1, N.J., 14, 36, 58. Tel: HUmboldt 4-3000

Westinghouse Electric Corp., Air Arm Div., P.O. Box 746, Baltimore 3, Md., 1, 4, 9, 14, 17, 27, 30, 38, 39, 64. Tel: SO 1-1000. Yr: 1952. Emp: 5000, ▲100

**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 17, 24, 52, 67, 77, 78, 79, 83, 91, 104, Tel: REgent 9-3611, Emp: 2300. ▲144, $30,000,000**

**See ad on page 580**

Westinghouse Electric Corp., Electronics Div., P.O. Box 1897, Baltimore 3, Md., 1, 4, 6, 7, 9, 18, 26, 27, 31, 39. Tel: SOuthfield 1-1000

Westinghouse Electric Corp., Lamp Div., Bloomfield, N.J., 97, 104. Tel: HU 4-3000

Westinghouse Electric Corp., Semiconductor Dept., Youngwood, Pa., 17, 66, 69, 70, 72, 96. Tel: WA 5-7272. Yr: 1956. Emp: 950

Westinghouse Electric Corp., Small Motor Div., Aircraft Equipment Dept., P.O. Box 989, Lima, Ohio, 60, 63, 82. Tel: CApital 1-0121

Westinghouse Electric Corp., Specialty Transformers, Greenville, Pa., 48, 76. Tel: DI 6-5511

Westinghouse Electric Corp., TV-Radio Div., Route 27, Metuchen, N.J., 6. Tel: LIberty 8-5000

Westlab Inc., 590 Tuckahoe Rd., Yonkers, N.Y., 32, 34, 38, 56, 88, 89, 94. Tel: SPencer 9-6400

Westline Products Div., Western Lithograph Co., 600 E. 2nd St., Los Angeles 54, Calif., 91. Tel: MA 7-2641. Yr: 1905. Emp: 350. ▲1

**Westman, Jr., Harold P., 45 Bond St., Westbury, L.I., N.Y., 88. Tel: EDgewood 3-3090**

**See ad on page 630**

**See the pink section preceding page 1 for complete instructions on how to get the most out of this Directory.**

Westport Electric, 149 Lomita St., El Segundo, Calif., 4, 10, 23, 33. Tel: OR 8-9993. Yr: 1955

**Westrex Corp., Div. of Litton Industries, 540 W. 58th St., New York 19, N.Y., 1, 3, 4, 6, 8, 9, 12, 13, 16, 18, 20, 22, 26, 28, 29, 31, 32, 33, 34, 35, 36, 38, 39, 40, 51, 52, 56, 60, 61, 65, 75, 80, 84, 88, 89, 91, 104, Tel: JU 2-3030, Yr: 1928, Emp: 1300. ▲100**

**See ad on page 704**

Westronics, Inc., 3605 McCart, Fort Worth 10, Tex., 14, 16. Tel: WA 3-8211. Yr: 1946. Emp: 40

Westronics of California, 318 E. Calaveras, Altadena, Calif., 40, 63, 68, 83, 88, 94. Yr: 1954. Emp: 5. ▲2, $20,000

Wharfedale, 80 Shore Rd., Port Washington, L.I., N.Y., 56. Tel: PO 7-7700

Wheaton Engineering Corp., 920 Manchester Rd., Wheaton, Ill., 23, 50, 58, 60, 72. Tel: MO 8-2330. Yr: 1946. Emp: 170, ▲2, $1,000,000

Wheelabrator Corp., 1483 Byrkit St., Mishawaka, Ind., 95, 96. Tel: BL 5-2141

Wheeler Automation Co., P.O. Box 243, Freeport, L.I., N.Y., 91, 96. Tel: FReeport 9-0046. Yr: 1956. ▲1

Wheeler Electronic Corp., 150 E. Aurora St., Waterbury 20, Conn., 1, 4, 38, 45, 50, 52, 63, 64, 76. Tel: PLaza 4-5191. Yr: 1909. Emp: 654. ▲3

**Wheeler, Harold A., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 88. Tel: HUnter 2-7876**

**See ad on page 630**

**Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 39, 52, 76, 80, 83, 88, 94. Tel: HUnter 2-7876, Yr: 1947. Emp: 65, ▲31**

**See ad on page 664**

Wheelock Signals, Inc., 273 Branchport Ave., Long Branch, N.J., 4, 68, 72. Tel: CApital 2-6680. Yr: 1924. Emp: 200. ▲3

**White Industrial Div., S. S., Dept. PR, 10 E. 40th St., New York 16, N.Y., 55, 69, 91, 96, 98. Tel: MUrray Hill 3-3015, Yr: 1844, Emp: 2200**

**See ad on page 682**

**White Instrument Laboratories, P.O. Box 9006, Austin 17, Tex., 43, 52. Tel: GLendale 3-8447. Yr: 1953, Emp: 20. ▲3**

**See ad on page 447**

Whitewater Electronics, Inc., 136 W. Main St., Whitewater, Wis., 45, 50, 52. Tel: Whitewater 986. Yr: 1955. Emp: 125. ▲1, $680,000

Whitney Blake Co., 93 Pershing St., New Haven 14, Conn., 14, 46, 64, 85. Tel: CHestnut 8-5515. Yr: 1899. Emp: 550. ▲2, $1,500,000

Whitney Metal Tool Co., 742 Forbes St., Rockford, Ill., 96. Tel: WO 2-5571. Yr: 1910. Emp: 130





Whitso, Inc., 9330 Byron St., Schiller Park, Ill., 55, 73, 89, 91, 98. Tel: GLadstone 5-5297. Yr: 1946. Emp: 80, $225,000

Whittaker Gyro Div., Telecomputing Corp., 16217 Lindbergh St., Van Nuys, Calif., 1, 4, 30, 75. Tel: TRiangle 3-1950. Yr: 1938. Emp: 700

Wiancko Engineering Co., 255 N. Halstead Ave., Pasadena, Calif., 4, 14, 28, 36, 75. Tel: ELgin 5-7186. Yr: 1946. Emp: 300, ▲10

Wickes Engineering & Construction Co., 12th St. & Ferry Ave., Camden 4, N.J., 4, 14, 17, 27, 38, 58, 59, 60, 63, 82, 84, 88, 89, 96. Tel: WOodlawn 4-1912. Yr: 1923. Emp: 100. ▲3, $1,500,000

Widney-Dorlec, 80 Shore Rd., Port Washington, L.I., N.Y., 84. Tel: PO 7-7700

Wiedemann Machine Co., Gulph Rd., King of Prussia, Pa., 96. Tel: BRoadway 9-1120

Wiegand Co., Edwin L., 7500 Thomas Blvd., Pittsburgh 8, Pa., 92. Tel: CHurchill 2-6400. Yr: 1919. Emp: 2000

Wiggins Oil Tool Co., Inc., E. B., 3424 E. Olympic Blvd., Los Angeles 23, Calif., 46. Yr: 1930. Emp: 400

Wilco Corp., 546 Drover St., Indianapolis 21, Ind., 45. Yr: 1953. Emp: 70. $289,000

Wilcolator Co., 1001 Newark Ave., Elizabeth, N.J., 74. Yr: 1925. Emp: 600

**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th & Chestnut, Kansas City 27, Mo., 1, 6, 7, 12, 22, 26, 27, 31, 35, 39, 45, 47, 49, 50, 51, 52, 63, 67, 76, 80, 94. Tel: BEnton 1-0700, Yr: 1931, Emp: 674, ▲42, $4,622,426**

**See ad on page 573**

Wildberg Bros. Smelting & Refining Co., 349 Butler Ave., South San Francisco, Calif., 85, 97, 103. Yr: 1907. Emp: 66, $1,000,000

Wilder Mfg. Co., Inc., Mechanic St. & Erie R.R., Port Jervis, N.Y., 96. Tel: POrt Jervis 3-2291. Yr: 1921. Emp: 30

Wiley Electronics Co., 2045 W. Cheryl Dr., Phoenix, Ariz., 27, 39, 83. Tel: WIndsor 3-7267. Yr: 1955. Emp: 36, ▲10, $500,000

**Wiley & Sons, Inc., John, 440 Park Ave. S., New York 16, N.Y., 100, Tel: MUrray Hill 9-7630, Yr: 1807**

**See ad on page 696**

Wilkinson Co., The, 1660 9th St., P.O. Box 303, Santa Monica, Calif., 85, 97, 103. Tel: EXbrook 5-1349. Yr: 1919. Emp: 16, $600,000

Williams & Co., C. K., 640 N. 13th St., Easton, Pa., 48, 97. Tel: BL 3-6261. Yr: 1868. Emp: 1000, ▲2

**Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 48, 85, 89, 91, 97, 103, Tel: UNiversity 7204, Yr: 1908, Emp: 50**

**See ad on page 688**

Willson Camera Co., 1395 Lawrence Rd., Havertown, Pa., 89, 99. Tel: HIlltop 6-8760. Yr: 1950. Emp: 25. $30,000

Wilmad Glass Co., Inc., Route 40 & Oak Rd., Buena, N.J., 91, 104. Tel: OXford 2-6000. Yr: 1951. Emp: 50

Wilmington Fibre Specialty Co., New Castle, Del., 89, 91, 93, 99. Tel: EA 8-7525. Yr: 1904. Emp: 100

Wilrite Products, Inc., 3835 W. 150th St., Cleveland 11, Ohio, 69. Tel: CLearwater 2-1810. Yr: 1954. Emp: 85, $275,000

**Wilson Div., H. A., Engelhard Industries, Inc., U. S. Highway 22, Union, N.J., 72, 74. Tel: MUrdock 6-6600**

**See ad on page 170**

Wiltron Co., 2395 Cowper St., Palo Alto, Calif., 21, 37. Tel: DAvenport 5-8269

Winatic Corp., The, 50 Stage Rd., Vestal, N.Y., 45, 57, 68. Tel: Pioneer 8-1518, Yr: 1950, Emp: 101, $450,000

Wincharger Corp., E. 7th & Division, P.O. Box 1168, Sioux City 2, Iowa, 47, 60. Tel: 2-1844. Yr: 1931. Emp: 1000, $750,000

Winchester Electronics Inc., 19 Willard Rd., Norwalk, Conn., 46, 71, 72, 73, 96. Tel: TEmple 8-8433. Yr: 1941. Emp: 600, ▲4

Wind Turbine Co., 248 E. Market St., West Chester, Pa., 39, 85, 86, 89, 94. Tel: OWen 6-3110, Yr: 1932, Emp: 60, ▲1

**See ad on page 377**

Winkler Laboratories, 5225 North 20th St., Phoenix, Ariz., 14. Tel: AM 6-5952. Yr: 1954

Winner Mfg. Co., Inc., P.O. Box 87, West Trenton, N.J., 84, 89, 99. Tel: OWen 5-5406. Yr: 1936. Emp: 50

Winslow Co., Inc., The, 701 Lehigh Ave., Union, N.J., 1, 3, 5, 11, 14, 21, 25, 28, 33, 38, 43, 55, 58, 69, 72, 75, 91, 98. Tel: MU 8-0020. Yr: 1928. Emp: 85, $615,000

Winston Electronics, Div. Jetronic Industries, Inc., 4000 N.W. 28th St., Miami 42, Fla., 3, 14, 18, 22, 37. Tel: NE 3-2505. Yr: 1954. Emp: 95, ▲8, $50,000

Wintronics, 213 S. Hawthorne Blvd., Hawthorne, Calif., 3, 4, 6, 14, 28, 30, 32, 38, 58, 63, 64, 88, 89, 94. Tel: OSborne 5-1464. Yr: 1951. ▲1, $100,000

Wirco Electronics, Inc., 11680 McBean Dr., El Monte, Calif., 45. Tel: GIlbert 3-1433. Yr: 1957. Emp: 12, $80,000

Wire Cloth Enterprises, Inc., 3408 Penn Ave., Pittsburgh 1, Pa., 85. Tel: MAyflower 1-3222

Wirecraft Products, Inc., Rt. 9, West Brookfield, Mass., 85. Tel: VOlunteer 7-3155. Yr: 1955. Emp: 10

Wirekraft Inc., Rolling Prairie, Ind., 85, 92, 93, 99. Tel: 8-5595. Yr: 1959. Emp: 25, ▲1

Wiremold Co., Hartford 10, Conn., 46. Tel: AD 3-6251

Wollensak Optical Co., 850 Hudson Ave., Rochester 21, N.Y., 17, 25, 34

Wood Counter Laboratory, N., 1525 E. 53rd St., Chicago 15, Ill., 24, 78. Tel: FAirfax 4-1114

Wood Electric Co., Inc., 244 Broad St., Lynn, Mass., 46, 72. Tel: LYnn 8-5313. Yr: 1939. Emp: 80. $900,000

Wood Steel Co., Alan, Penco Div., Oaks, Pa., 84, 89. Tel: GLendale 2-2271. Yr: 1826. Emp: 4000

Worcester Pressed Aluminum Corp., 13-15 Hope Ave., Worcester 3, Mass., 91. Tel: PLeasant 4-2627. Emp: 100

Worcester Pressed Steel Co., 100 Barber Ave., Worcester 6, Mass., 89, 104. Tel: PL 5-4361. Yr: 1883. Emp: 200

Worklon, Inc., 253 W. 28th St., New York 1, N.Y., 96. Tel: LO 4-7390. Yr: 1951. Emp: 100

Workman TV Products, Inc., P.O. Box 5397, Sarasota, Fla., 69. Tel: RIngling 6-4211

Worner Electronic Devices, Rankin, Ill., 4, 38. Tel: EXport 7-4553. Yr: 1939

Wright Equipment Corp., Lukoch Ct., Milltown, N.J., 14, 89, 94. Tel: MIlltown 8-1400. Yr: 1953. Emp: 50. $650,000

**Wright Machinery Co., Div. Sperry Rand Corp., Durham, N.C., 30, 60, Tel: 2-8161, Yr: 1893, Emp: 850, ▲2**

**See ad on page 469**

**Wright Metalcoaters, Inc., 255 West St., South Hackensack, N.J., 89, Tel: HUbbard 7-5136, Yr: 1948, Emp: 30, $150,000**

**See ad on page 637**

Wright-Zimmerman, Inc., New Brighton, St. Paul 12, Minn., 45, 56, 59, 76. Tel: MElrose 3-3131. Yr: 1946. Emp: 30. $235,170

Wrought Washer Mfg. Co., 2281 S. Bay St., Milwaukee 7, Wis., 89, 91, 104. Tel: SHeridan 4-0771. Yr: 1887. Emp: 300

Wyco Metal Products, 6918 Beck Ave., North Hollywood, Calif., 84, 87, 89. Tel: TRiangle 7-1316. Yr: 1952. Emp: 50

Wyle Laboratories, 128 Maryland St., El Segundo, Calif., 94. Tel: ORegon 8-1251. Yr: 1949. Emp: 275

Wyle Mfg. Corp., 133 Center St., El Segundo, Calif., 14, 96. Tel: ORegon 8-0911. Yr: 1952. Emp: 56

Wyle-Parameters, Inc., 195 Herricks Rd., New Hyde Park, L.I., N.Y., 14, 94. Tel: PIoneer 7-8484. Yr: 1952. Emp: 17, ▲2

Numbers after address show the product and service classes in which firm appears. These classified listings follow the Alphabetical Directory. For complete instructions on use of this Directory, see pink sheets preceding catalog section. Yr = Year of founding. Emp = Total employees. ▲ = Number of IRE members. $ = Net radio-electronic sales during last fiscal year.

Wyrco Projects Inc., 66 Main St., Binghamton, N.Y., 96, Tel: RA 2-8217, Yr: 1959, Emp: 200, ▲1, $29,000

# X

Xcelite Incorporated, Thorne & Bank Sts., Orchard Park, N.Y., 96, Tel: IDlewood 4161, Yr: 1920, Emp: 65

# Y

Yardney Electric Corp., 40-50 Leonard St., New York 13, N.Y., 41, 96, Tel: WOrth 6-3100, Yr: 1944, Emp: 479, $6,500,000

Yellow Springs Instrument Co., P.O. Box 106, Yellow Springs, Ohio, 4, 58, 75, Tel: RO 7-7212, Yr: 1918, Emp: 45, ▲6, $200,000

**Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 5, 14, 25, 30, 58, 60, Tel: BEekman 3-6720, Yr: 1915, Emp: 1700**

**See ad on page 296**

Yorinks, Alexander, 17 Stanwood Rd., New Hyde Park, L.I., N.Y., 88, Tel: Pioneer 6-2296

York Co., Inc., Otto H., 6 Central Ave., West Orange, N.J., 81, 85, 91, 102, Tel: OR 7-3000, Yr: 1947, Emp: 75, ▲1

York Metal Products, Inc., 350 Greenwich St., New York 13, N.Y., 84, 87, 89, Tel: WAlker 5-7227, Yr: 1940, Emp: 30

York Research Corp., 1 Research Dr., Stamford, Conn., 88, 89, 94, 100, Tel: DAvis 3-3179, Yr: 1943, Emp: 48, ▲6

Young Brothers Co., 1843 Columbus Rd., Cleveland 13, Ohio, 92, Tel: MAin 1-2473, Yr: 1896, Emp: 25, ▲2, $200,000

Yu, Y. P., 249 Terhune, Passaic, N.J., 88, Tel: GRegory 2-5622

Yuba-Dalmotor Div., Yuba Consolidated Industries, Inc., 1375 El Camino Real, Santa Clara, Calif., 30, 38, 47, 60, 63, Tel: CHerry 3-9114, Yr: 1916, Emp: 80

# Z

Z & W Mfg. Corp., Electronics Div., 30240 Lakeland, Wickliffe, Ohio, 39, 45, 89, 91, Tel: WIl 3-5700, Yr: 1935, Emp: 450, ▲1, $350,000

Zagar, Inc., 24000 Lakeland Blvd., Cleveland 23, Ohio, 96, Tel: REdwood 1-0500, Yr: 1938, Emp: 155, $500,000

Zell Products Corp., 276-280 Main St., Norwalk, Conn., 51, Tel: VIctor 7-3811, Yr: 1918, Emp: 800, $5,000,000

Zenith Electric Co., 152 W. Walton St., Chicago 10, Ill., 4, 68, 72, Tel: MIchigan 2-3322, Yr: 1923, Emp: 100

Zenith Optical Laboratory, 1940 Great Neck Rd., Copiague, L.I., N.Y., 17, 64, 96, Tel: AMityville 4-4616, Yr: 1912, Emp: 75, ▲11

Zenith Plastics Co., Subsid. Minnesota Mining & Mfg. Co., Box 91, Gardena, Calif., 39, 84, 89, 94, 99, Tel: FAculty 1-2020, Yr: 1944, Emp: 600, ▲6

Zephyr Mfg. Co., Inc., 201 Hindry Ave., Inglewood, Calif., 96, Tel: ORegon 8-1331, Yr: 1942, Emp: 125, $150,000

Zero Manufacturing Co., 1127 Chestnut St., Burbank, Calif., 84, 89, Tel: VIctoria 9-5521, Yr: 1938, Emp: 450, $3,707,627

Zeus Engineering Co., Inc., 635 S. Kenmore Ave., Los Angeles 5, Calif., 100, Tel: DUnkirk 7-7175, Yr: 1957, ▲1

Zierick Mfg. Corp., Beechwood & Rockdale, New Rochelle, N.Y., 53, 73, 89, 91, Tel: NEw Rochelle 6-8520, Yr: 1919, Emp: 85, $1,000,000

Ziff-Davis Publishing Co., 1 Park Ave., New York 16, N.Y., 100, Yr: 1919, Emp: 400

**Zippertubing Co., The, 752 S. San Pedro St., Los Angeles 14, Calif., 14, 85, 93, 99, 102, Tel: MAdison 4-6664, Yr: 1952, Emp: 35, $500,000**

**See ad on page 659**

Zirconium Corp. of America, 31501 Solon Rd., Solon 39, Ohio, 86, 93, Tel: CHurchill 8-6191, Yr: 1957, Emp: 40

**Zophar Mills, Inc., 112-130 26th St., Brooklyn 32, N.Y., 93, 95, Tel: SOuth 8-0907, Yr: 1846, Emp: 35**

**See ad on page 665**

# Classifications with a System!

THE IRE Directory Product Classifications have both a pattern and a purpose. They differ widely from most product indexes, deliberately. They aim to organize the hundreds of products and services of a complex technical industry according to the way engineers think. The result is a division of all products and services into three fundamental indexes into which 104 basic classifications have been organized.

For detailed identification, these 104 products and services, grouped in 3 indexes, are further defined into 932 named products. We have tried to avoid oversimplification, and a tremendous amount of information is given by our product number system. But, the basic indexing adds speed. Purely alphabetical directories are as slow and cumbersome as a telephone book. IRE engineers have liked our system better!

You will note that we here differ from most directory compilers, for we do not mix meters with motors simply for alphabetical reasons. Products which are in the form of "Complete Equipment" form the first fundamental group. Yet, the same manufacturer may also appear in the "Component Parts" section. This system gives subject grouping for speed and convenience. A directory should aid a man who has forgotten some detail, or product name. Ours helps by grouping products as one would *think*.

For safety, an alphabetical "terminology" index is given in the pink pages. You will note also that after each firm, its products are listed by number code in the alphabetical list, and that sub-classifications shown by number code in the product indexes give much detail. Just a little study of the system will help you get great good from this book.

## The IRE DIRECTORY is four directories in one

**Alphabetical • Complete Equipment • Components • Materials and Services**



# 1961 IRE DIRECTORY

# Directory I

# Complete Equipment

## Communication— Computation— Instrumentation— Test

### 37 major groups
### 281 products

The products and services of the radio-electronics industry have been organized into three basic directories:

I. Complete Equipment
II. Components
III. Materials & Services

Within these three basic directories, 104 major product and service groups are numbered consecutively throughout. Under each of these 104 classes a further breakdown is given, showing in detail by a system of code numbers after each firm listed what specific products within the class are manufactured by that firm.

For a terminology cross-index listing the 932 sub-products in alphabetical order, consult the pink section preceding page 1.

### The first few times you use this EDGE INDEX

follow the "How to use" instructions slowly—one step at a time. After that you will be able to open easily and almost instantly to the section that you seek.

Machol edge indexes covering the alphabetical section and each of the three major directory groups will be found on pages 135, 241, 359, and 597.

### HOW TO USE

1. Bend the Directory almost double with the back cover page on the inside.
2. Hold in your right hand with your four fingers near to the bound edge and your right thumb near the middle of the open side of this page.
3. From the heavy or light line symbol adjacent to the subject you seek, run your eyes across the page edges until you reach the horizontally corresponding symbol.
4. OPEN THERE!



LICENSE NO. 25G
MACHOL EDGE INDEX PATENT #2680630

For complete list of products and services, arranged alphabetically for fast reference, see the pink section preceding page 1.


| | |
|---|---|
| 1 | COMPLETE DATA SPREADS |
| 135 | ALPHABETICAL DIRECTORY |
| 241 | DIRECTORY I COMPLETE EQUIPMENT |
| 359 | DIRECTORY II COMPONENTS |
| 597 | DIRECTORY III MATERIALS & SERVICES |


### INDEX TO COMPLETE EQUIPMENT


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**Accelerators, particle:**
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**Adapters, single-sideband:**
See class 31

**Admittance meters:**
See class 28

**Aging racks:**
See class 14

**Air filters:**
See class 84

**Air navigation computers:**
See class 9

**Air speed indicators:**
See class 58

**Airborne radar equipment:**
See class 27

## 1. Aircraft & Airport Equipment.

### Communication & Navigation

5. Airborne receivers
10. Airborne transmitters
15. Airport receivers
20. Airport transmitters
25. GCA types
30. Inertial guidance
35. Transceivers
40. VOR types

A C Electronics, Inc., Calif., 5c, 10c
AC Spark Plug, The Electronics Div. of General Motors, Wis., 5s, 10s, 30sc
A.R.F. Products, Inc., Ill., 5c
Adams-Russell Co., Inc., Mass., 10c
Admiral Corp., Ill., 5c, 10c, 35c
Advanced Research Associates, Inc., Md., 5c, 10c
Aeronautical Communications Equip. Inc., Fla., 5s, 10s, 15s, 20s
Aeronautical Electronics, Inc., N.C., 35s
Aircraft Radio Corp., N.J., 5s, 10s, 35s, 40s
American Development Electronics Co., N.J., 35c

**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 5c, 10c, Tel: WAlnut 5-8780**
**See ad on page 369**

American Electronics Co., N.Y., 35s
Applied Electro Mechanics, Inc., Va., 5c, 10c

**Applied Electronics Corp. of New Jersey, 22 Center St., Box 43, Metuchen, N.J., 30c, Tel: LIberty 9-1500**
**See ad on page 353**

Arma Div., American Bosch Arma Corp., N.Y., 30c
Autonetics, Div. North American Aviation, Inc., Calif., 30c
Babcock Radio Engineering, Inc., Calif., 5s
Bausch & Lomb Incorporated, N.Y., 30c
Bell Aircraft Corp., Avionics Div., N.Y., 30c
Bendix Corp., The, Bendix Radio Div., Md., 5s, 10s, 15s, 20s, 25c, 40s, Transponders sc
Bendix Corp., The, Bendix Systems Div., Mich., 30c



**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 30c, 40c, Tel: ATlas 8-2000**
**See ad on pages 103-106**

Bruno-New York Industries Corp., N.Y., 5c
Budd Electronics, Inc., N.Y., 5c, 10c, 15c, 20c, 30c, 35c
Bunnell & Co., J. H., N.Y., 20c

**Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 10c, 20c, Tel: ORiole 8-3070**
**See ad on page 479**

Cadre Industries Corp., N.Y., 35c
Canadian Aviation Electronics, Ltd., Canada, 40c
Canadian Marconi Co., Canada, 5s, 10s, 35s
Canadian Westinghouse Co., Ltd., Canada, 40c
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 15c
Cedar Engineering Div., Control Data Corp., Minn., 30c
Chance Vought Electronics Div., Texas, 30c, 40c, Beacons c
Chesapeake Instrument Corp., Md., 5c, 10c
Chicago Electronic Div., Land-Air, Inc., Ill., 5c, 10c, 30c, 35c
Chisholm Industries Ltd., Canada 5c, 10c, 15c, 20c

**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, 10s, 15s, 20s, 35s, Tel: OAkwood 7-6800**
**See ad on page 308**

Collins Radio Co., Iowa, 5sc, 10sc, 35sc, 40sc
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 20s, 25c, 30c, 35s, 40s
Communications Co., Inc., Fla., 15sc, 20sc, 35sc

**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 10c, Tel: EVergreen 1-1135**
**See ad on page 156**

Crosley Div., Avco Corp., Ohio, 5s, 20s, Beacons s
Dalmo Victor Co., Div. of Textron, Inc., Calif., 35c
Dayton Electronic Products Co., Ohio, 5c
Designers for Industry, Inc., Ohio, 5c, 10c, 15c, 20c, 30c, 35c
Di/An Controls Inc., Mass., 30c
Dollar Co., The Robert, Communications Equipment Div., Calif., 20c
Dunn Engineering Associates, Inc., Mass., 30c
Dynamics Research Corp., Mass., 30c

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, 15c, 20c, 25c, 40c, Tel: HAlifax 6-7491**
**See ad on page 400**

E.M.I.-Cossor Electronics, Ltd., Canada, 5c, 20c
Edo Corp., N.Y., 5s
Ehrenpreis, David, Consulting Engineers, N.Y., 30c
Electron Corporation, Tex., 10c
Electronet Div., Rue Products, Calif., 5c, 10c, 35c
Electronic Assistance Corp., N.J., 5c, 10c
Electronic Communications, Inc., Fla., 5c, 10c, 15c, 35c
Electronic Specialty Co., Calif., 5sc
Elliott-Automation Limited, England, 5sc, 10sc, 15sc, 20sc, 25c, 30c, 35c, 40c
Engineering Associates, Ohio, 5c
Erco Radio Laboratories, Inc., N.Y., 15sc, 20sc, 35sc
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 10c
Fairchild Engine & Airplane Corp., Fairchild Astrionics Div., N.Y., 30c
Fecker Div., J. W., American Optical Co., Pa., 30c
Federal Manufacturing & Engineering Corp., N.Y., 5c, 10c, 25c, 30c, 35c
Ferranti/Packard Electric, Ltd., Canada, 30c
Flight Research, Inc., Va., Automatic Pilot s

**General Communication Co., 677 Beacon St., Boston 15, Mass., 35c, Beacons c, Tel: COpley 7-6030**
**See ad on page 331**

General Electric Co., Light Military Electronics Dept., N.Y., 5c, 10c, 30c
General Electric Co., Ordnance Dept., Mass., 30s
General Electric Co. Ltd. of England, Telephone Works, England, 15s, 20s
General Electronic Laboratories, Inc., Mass., 5sc, 10sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c
General Mills, Inc., Mechanical Div., Minn., 30c
Giannini Controls Corp., Calif., 30c
Gilfillan Bros., Inc., Calif., 5c, 10c, 15c, 20c, 25sc, 35c
Gonset Div., Young Spring & Wire Corp., Calif., 35s
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 5c, 10c, 15c, 20c
Granger Associates, Calif., 5c, 10sc
Gray Mfg. Co., The, Conn., 5c, 10c
Gulton Industries, Inc., N.J., 30sc
HRB-Singer, Inc., Pa., 5c
Hallicrafters Co., The, Ill., 5c, 10c, 30c, 35c
Hamilton Standard Div., United Aircraft Corp., Conn., 30c
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 35c, 40c
Hoffman Electronics Corp., Calif., 5sc, 10sc, 40sc
ITI Electronics, Inc., N.J., 15c
Instrument Development Laboratories, Inc., Mass., Inertial Velocimeters c
Instruments for Industry, Inc., N.Y., 5c, 10c, 35c
Intelex Systems, Inc., N.Y., 5s, 10s, 35s
International Crystal Mfg. Co., Inc., Okla., 35s
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c, 15c, 40c
International Telephone & Telegraph Corp., ITT Laboratories, Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 20c, 30c, 35c, 40c
Jansky & Bailey, Inc., D.C., 40c
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c, 35c
Kaar Engineering Corp., Calif., 5c, 10c, 15c, 20c, 25c, 35s





# Directory I. Complete Equipment

## 1. Aircraft & Airport Equipment.

**Kearfott Div., General Precision, Inc., Little Falls, N.J., 30c, Tel: CLifford 6-4000**
**See ad on pages 120-121**

King Radio Corp., Kansas, 5s, 10s, 15s, 20s, 35s, 40s

**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 5c, 35c, Tel: STillwater 3-5000**
**See ad on page 415**

Knight Corp., Ewen, Mass., 5c, Radiometric Navigation c

**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 5c, 10c, 15c, 35c, Tel: AMityville 4-2200**
**See ad on page 365**

Laboratory for Electronics, Inc., Mass., 25c
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 5c, 10c, 25c, 30c, Beacons c
La Pointe Industries, Inc., Conn., 30c

**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., Beacons s, Tel: LOwell 6-2600**
**See ad on page 312**

**Leach Corporation, 18435 Susana Rd., Compton, Calif., 5c, 10c, Tel: NEvada 6-1C61**
**See ad on page 514**

Lear, Inc., Calif., 30sc, Inertial References sc
Lear, Inc., Mich., 5sc, 25sc, 40sc
Levinthal Electronic Products, Inc., Calif., 20c
Link Division, General Precision, Inc., Palo Alto Lab., Calif., 25c
Litton Industries, Electronic Equipments Div., Calif., 30c
Litton Industries, Maryland Division, Md., 5, 10, 15, 20, 40
Madigan Electronic Corp., N.Y., 5c, 10c
Magnavox Co., The, Ind., 5c, 10c, 15c, 20c, 30c
Magnavox Research Laboratories, Calif., 5sc, 10sc
Mallory & Co., Inc., P.R., Ind., 5c, 10c, 35c
Mandrel Industries, Inc., Calif., 5c, 10c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s, 15s, 20s, 35s, 40s
Marine View Electronics, Inc., N.Y., 20c
Martin Co., The, Md., 5c, 10c, 30c
Maxson Corp., The W. L., Instruments Div., N.Y., 30sc
Mayberry Electronics Co., Calif., 5c, 10c
Melabs, Inc., Calif., 5s, 10c, 15c, 20c, 35c
Mergenthaler Linotype Co., N.Y., 30c
Minneapolis-Honeywell, Military Products Group, Minn., 30c
Mitchell Industries, Inc., Tex., 5s, 10s, 35s, 40s, Automatic Pilot sc
Motorola Aviation Electronics, Inc., Calif., 5s, 10s, 15c, 20c, 35c, 40s
Motorola, Inc., Ill., 5s, 10s, 40s
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c, 30c, 35c
National Aeronautical Corp., Pa., 5s, 10s, 15s, 20s, 35s, 40s, Beacons s, Direction Finders s
National Company, Inc., Mass., 5c, 10c, 15c, 20c

**National Radio Company Inc., 37 Washington St., Melrose 76, Mass., 15, Tel: NOrmandie 5-4800**
**See ad on page 614**

Nems-Clarke Co., Div. Vitro Corp. of America, Md., 5c, 15c
Neptune Electronics Co., N.Y., 5c, 10c
New London Instrument Co., Conn., 10c
Nippon Electric Co., Ltd., Japan, 5c, 10c, 15c, 20c, 25c, 35c, 40c

**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5c, 10c, Tel: WAtkins 9-9117**
**See ad on pages 36-39**

Nuclear Electronics Corp., Pa., 15c, 20c, 35c
Olympic Radio & Television, Div. Siegler Corp., N.Y., 5sc, 10sc, 15sc
OPTOmechanisms, Inc., N.Y., 30c
Osborne Electronics Sales Corp., Ore., 5c, 10c, 15sc, 20c, 25c
Otis Elevator Co., Defense & Industrial Div., N.Y., 30c
Packard Bell Electronics Corp., Calif., 5c, 10c
Palomar Scientific Corp., Calif., 30c
Peer, Incorporated, Texas, 10c
Philco Corp., Pa., 5c, 10c, 15c, 20c, 35c
Philco Corp., Govt. & Industrial Group, Pa., 5c, 10c, 15c, 20c, 25c, 35c
Philips Electronics Industries, Ltd., Canada, 15c, 20c, 35c
Philmore Mfg. Co., Inc., N.Y., 35s

**Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 5c, Tel: EXeter 2-4500**
**See ad on pages 107-108**

Production Research Corp., Subsid. Radio Condenser Co., N.Y., 10c, 35c
RCA Victor Co., Ltd., Canada, 5c, 10c, 15c, 20c, 35c

**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 5c, 10c, Tel: DAvenport 1-1130**
**See ad on this page**

Radiation Inc., Fla., 5c, 10s
Radio City Products Co., Inc., Pa., 5c
Radio Corp. of America, Astro-Electronic Products Div., N.J., 5c, 10c
Radio Corp. of America, Defense Electronic Products, N.J., 5c, 10c, 30c, 35c
Radio Engineering Laboratories, Inc., N.Y., 15sc, 20sc, 35sc
Radio Industries, Inc., Kansas, 5c, 40c

**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, Tel: EVergreen 8-6000**
**See ad on page 506**

Raytheon Co., Commercial Apparatus & Systems Div., Mass., 5s, 10s
Raytheon Co., Equipment Div., Mass., 5c, 10c, 25c
Reeves Instrument Corp., N.Y., 30c, Inertial Reference c, Platforms c
Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c, 20c
Resdel Engineering Corp., Calif., 10c

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, 20c, 35c, Tel: LOckwood 5-4578**
**See ad on page 324**

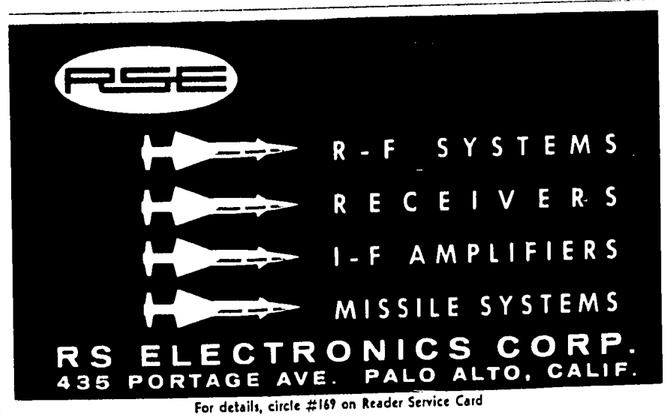
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 5c, 10c, 30c
Seiscor, Div. Seismograph Service Corp., Okla., 5c, 35s
Servo Corp. of America, N.Y., 10s, 40s

**Sierra Research Corp., P.O. Box 22, Buffalo 25, N.Y., 5c, 10c, Tel: NF 2-8823**
**See ads on pages 271, 356, 662**

Sigma Electronics Research Corp., Wash., 5c, 10c, 15c, 20c, 25c
Simmonds Precision Products, Inc., N.Y., Beacons sc
Skiatron Electronics & Television Corp., N.Y., 30c

**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 5c, 10c, 35c, Tel: EMpire 4-2271**
**See ad on page 420**

Sorensen Industrial Electronic Co., N.J., Automatic Pilot c
SoundScriber Corp., The, Conn., 40s
Southwestern Industrial Electronics Co., Texas, 5sc, 10sc
Space Electronics Corp., Calif., 5c, 10c, 30c



For details, circle #169 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Directory I. Complete Equipment

## 1. Aircraft & Airport Equipment.

Specialty Electronics Development Corp., N.Y., 5c, 10c, 15c, 20c 35c
Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., N.Y., 35c
Spectralab Instruments, Calif., 35c
Sperry Gyroscope Co., Sunnyvale Development Center, Calif., 30c
Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 5c, 10c, 30c
Spivey, Inc., James S., D.C., 5c, 10c
Springer Aircraft Radio Corp., Ind., 5s, 10s, 35s, 40s
Standard Telephones & Cables Ltd., England, 5sc, 10sc, 15sc, 20sc, 25sc, 40sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 35c, 40c
Sylvania Electric Products Inc., N.Y., 5c, 10c

**Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 5, 10, Tel: YOrkshire 8-6211**
**See ad on pages 48-49**

Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 5c, 10c
Systems, Inc., Fla., 40sc
TRG, Incorporated, N.Y., 5c, 10c, 15c, 20c
Tamar Electronics, Inc., Calif., 35c
Technology Instrument Corp., Mass., 5s, 10s
Telechrome Mfg. Corp., N.Y., 15c, 25c

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 10c, 15c, 20c, 40c, Tel: YE 2-8600**
**See ad on page 338**

Telephonics Corp., N.Y., 5c, 10c
Telerad Mfg. Corp., N.Y., 5sc, 10sc

**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 15sc, 20sc, Tel: TWining 8-1000**
**See ad on page 260**

Temco Electronics, Div. Ling-Temco Electronics Inc., Texas, 5c, 10c
Tensor Electric Development Co., Inc., N.Y., 5c, 10c
Texas Instruments Incorporated, Apparatus Div., Texas, 5c, 10c, 30c, 35c
Thompson Ramo Wooldridge Inc., Dage Television Div., Ind., 10c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 10c, 30c
Topping Electronics, Ltd., F. V., Canada, 35s
United Aircraft Corp., Norden Div., Conn., 30c
United Control Corp., Wash., 10c
United Shoe Machinery Corp., Mass., 25c
U. S. Science Corp., Calif., 5c, 10c, 15c, 20c, 35c, 40c
U. S. Time Corp., The, Conn., 30c
Varo Mfg. Co., Inc., Texas, 5sc, 10sc
Virginia Electronics Co., Inc., D.C., 5c, 15c, 35c
Webcor, Inc., Electronics Div., Ill., 5c, 10c, 15c, 20c, Direction Finders c
Westinghouse Electric Corp., Air Arm Div., Md., 5s, 15s
Westinghouse Electric Corp., Electronics Div., Md., 15c, 20c

**Westrex Corp., Div. Litton Industries, Inc., 540 W. 58th St., New York 19, N.Y., 5sc, 10c, 15sc, 20c, 35sc, Tel: JUdson 2-3030**
**See ad on page 704**

Wheeler Electronic Corp., Conn., 15sc, 20sc, 35sc
Whittaker Gyro Div., Telecomputing Corp., Calif., 30c

**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, 10sc, 15sc, 20sc, 25c, 35sc, 40s, Tel: BEnton 1-0700**
**See ad on page 573**

Winslow Co., Inc., The, N.J., 5c, 15c

**Alarm systems:**
**See class 4**

## 2. Amateur Equipment.

5. Receiving equipment
10. Transmitters

Aircraft Electronics, Ariz.., 5s, 10s
Airmec Limited, England, 5s
American Electronics Co., N.Y., 5s, 10s
American Geloso Electronics, Inc., N.Y., 5s, 10s
Arnoux Corp., Calif.., 5s
Barker & Williamson, Inc., Pa., 5sc, 10sc
Central Electronics, Inc. Ill., 10s
Chisholm Industries, Ltd. Canada, 5c, 10c

**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5sc, 10sc, Tel: OAkwood 7-6800**
**See ad on page 308**

Collins Radio Co., Iowa, 5s, 10s
Collins Radio Co., Central Sales Office, Texas, 5s, 10s
Davis Electronics, Inc., Calif., 5s
De Wald Radio Div., United Scientific Labs., N.Y., 5sc, 10sc
Destron Co., Calif., 10c
Dynamics Corp. of America, N.Y., 5sc, 10sc
Electric Eye Equipment Co., Ill., 10s
Electro-Voice, Inc., Mich., 5s, 10s
Electron Corporation, Texas, 5sc, 10sc
Electronet Div., Rue Products., Calif., 10c

**Electronic Instrument Co., Inc., (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 10s, Tel: STillwell 6-8700**
**See ad on page 283**

Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c
Fisher Research Lab. Inc., Calif., 5c, 10c
General Electric Co., Ltd. of England, Telephone Works, England, 5s
Globe Electronics, Iowa, 10s
Gonset Div., Young Spring & Wire Corp., Calif., 5s, 10s
Hallicrafters Co., The, Ill., 5s, 10s
Hammarlund Mfg. Co., Inc., N.Y., 5s, 10s
Heath Co., Subsid. Daystrom, Inc., Mich., 5s, 10s
I.D.E.A., Inc., Ind., 5s
International Crystal Mfg. Co., Inc., Okla., 10sc
Jetronic Industries, Inc., Pa., 5c, 10c
Johnson Co., E. F., Minn., 10s
Kaar Engineering Corp., Calif., 5s, 10s

## 2. Amateur Equipment.

Knight Electronics Corp., Ill., 5s, 10s
Lettine Radio Mfg. Co., N.Y., 10s

**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 10s, Tel: DAvenport 4-4108**
**See ad on page 402**

Morrow Radio Mfg. Co., Ore., 5s, 10s
Multi Products Co., Mich., 5s, 10s
Munzig International, Inc., Calif., 5s

**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 5, Tel: NOrmandie 5-4800**
**See ad on page 614**

**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5s, Tel: WAtkins 9-9117**
**See ad on pages 36-39**

Ortronix, Inc., Fla., 10s
Osborne Electronics Sales Corp., Ore., 5s, 10s
Philmore Mfg. Co. Inc., 5s, 10s
Radio Engineering Laboratories, Inc., N.Y., 5sc, 10sc

**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 5c, 10c, Tel: EMpire 4-2271**
**See ad on page 420**

Somerset Radiation Laboratory, Inc., N.J., 5s, 10s
Sorensen Industrial Electronic Co., N.J., 5s, 10sc
Superex Electronics Corp., N.Y., 5s
TMC (Canada), Ltd., Canada, 5sc, 10sc
Tapetone Inc., Mass., 5s

**Technical Materiel Corp., The, 700 Fenimore Rd., Mamaroneck, N.Y., 5s, 10s, Tel: OWens 8-4800**
**See ads on pages 344, 345**

Technology Instrument Corp., Mass., 5s, 10s
Telechrome Mfg. Corp., N.Y., 5sc, 10s
Vinco Electronics Corp., Conn., 5c, 10c

**Ammeters:**
**See class 58**

**Amplifiers:**
**See class 38**

**Analyzers, distortion & noise:**
**See class 3**

**Analyzers, servo:**
**See class 14**

**Analyzers, spectrum, audio frequency: See class 3**

**Analyzers, spectrum, microwave:**
**See class 21**

**Analyzers, spectrum, radio frequency: See class 28**

**Analyzers, vibration:**
**See class 14**

**Annunciator displays:**
**See class 62**

**Antennas:**
**See class 39**

**Atmospheric test chambers:**
**See class 14**

**Attenuators:**
**See class 40**

## 3. Audio Frequency Test Equipment.

5. AF Signal
10. Beat frequency oscillators
15. Distortion & noise analyzers
20. Harmonic frequency
25. Intermodulation meters
30. Output power meters
35. Phase meters
40. Sound level
45. Spectrum analyzers
50. Square wave generators
55. Telegraph test
60. Voltmeters-audio frequency

ASCOP, Div. Electro-Mechanical Research, Inc., N.J., 45c

**Acton Labs., Inc., 500-B Main St., Acton, Mass., 35s, Tel: COlonial 3-7756**
**See ad on page 346**

**Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 35sc, Tel: GRegory 2-5622**
**See ad on page 329**

**Aetna Electronics Corp., Readington Road, North Branch, N.J., 35c, 50s, Tel: RAndolph 5-1000**
**See ad on page 277**

Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 15s
Airmec Limited, England, 5s, 35s, 55s, 60s

**Airpax Electronics Inc., Seminole Div., Fort Lauderdale, Fla., 60c, Tel: LUdlow 3-6160**
**See ad on pages 82-83**

Airtronics International Corp., Fla., 60c, Telephone Test c
Allison Labs, Inc., Calif., 40s, White Noise Source s
American Development Electronics Co., N.J., 5c, 10c, 30c, 40c, 55c, 60c

**American Time Products, Inc., 61-20 Woodside Ave., Woodside 77, L.I., N.Y., 5sc, Tel: OLympia 1-7800**
**See ad on page 348**

Amplifier Corp. of America, N.Y., Wow & Flutter Meters s
Applied Dynamics Corp., Mass., 45s

**Associated Research, Inc., 3792 W. Belmont Ave., Chicago 18, Ill., 35s, Tel: COrnelia 7-4040**
**See ad on page 279**

Atlantic Research Corp., Va., 55sc
Atronic Products, Inc., Pa., 45c
Avo Limited, England, 60s
B & K Instruments, Inc., Ohio, 5s, 10s, 15s, 20s, 40s, 45s, 60s

**Ballantine Laboratories, Inc., Boonton, N.J., 60s, Tel: DEerfield 4-1432**
**See ad on page 144**

Barker & Williamson, Inc., Pa., 5sc, 15sc, 25sc, 30sc
Bea ing Inspection, Inc., Calif., 15c
Berkshire Laboratories, N.H., 15s
Brooks Research, Inc., N.Y., 40c, 45c
Bruel & Kjaer, A/S, Denmark, 10s, 15s, 20s, 40s, 45s, 60s

## 3. Audio Frequency Test Equipment.

**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 10c, 50c, Tel: NEwtown 9-5700**
**See ad on page 426**

Bunnell & Co., J. H., N.Y., 55c
Burr-Brown Research Corp., Ariz., 5s, 50s, 60s
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 15c, 35c, 40c
Canadian Marconi Co., Canada, 5s, 10s, 15s, 20s, 30s, 45s, 50s, 55s
Carad Corp., Calif., 15c
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 10c, 15c, 20c, 30c, 40c, 45c, 50c, 60c
Chadwick-Helmuth Co., Calif., 15s, Tracking Sweep Control s
Chicago Electronic Div., Land-Air Inc., Ill., 45c

**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, 30sc, 40sc, 60sc, Tel: OAkwood 7-6800**
**See ad on page 308**

Clough-Brengle Co., The, Ill., 5s, 10s, 30s, 60s
Coils-Electronics Co., Pa., 50c
Collins Radio Co., Central Sales Office, Texas, 5s, 10s, 15s, 20c, 25c, 40s, 45c, 50c
Continental Electronics Corp., N.Y., 10c, 30c

**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 35sc, Tel: HAmilton 7-7961**
**See ad on page 440**

Cooper Electronics, Inc., Pa., 30sc
Cosmic, Inc., D.C., 45s
Crown Engineering, N.Mex., 15c, 60c
D & R, Ltd., Calif., 20s, Flutter Meters s
Dallons Semiconductors, Div. Dallons Laboratories, Inc., Calif., Sine Wave Generators c
Daven Co., The, N.J., 30s, 45s, 60s
Dawe Instruments, Ltd., England, 5s, 15s, 30s, 35s, 40s, 60s
Decker Corporation, The, Pa., 45s
Deltron, Inc., Pa., 35s
Designers for Industry, Inc., Ohio, 5s, 10s, 45c, 50s
Direct T/V Replacements, Ltd., England, 5s, 30s, 60s
Djordjevic Engineering Co., Djeco Div., Ill., 50c
Donner Scientific Co., Subsid. Systron-Donner Corp., Calif., 5s, 15s, 50s
Dymec, Div. Hewlett-Packard Co., Calif., 5sc
Dytronics Co., Ohio, 35sc

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 10c, Tel: HAlifax 6-7491**
**See ad on page 400**

E O Electronics, Inc., N.J., 60c
Ehrenpreis, David, Consulting Engineers, N.Y., 15c, 20c, 50c
Electrend Products Corp., Mich., 10s
Electro Instruments, Inc., Calif., 60s
Electro-Mechanical Research, Fla., 45s

**Electron Arc Div., Ionics, Inc., 244 Broad St., Lynn, Mass., 10c, Tel: LY 8-2100**
**See ad on page 485**

Electronic Applications, Inc., Conn., 5s, 10s, 20s, 25s, 45s, 60s
Electronic Associates, Inc., N.J., 30s
Electronic Engineers, Inc., Ill., 5c, 45c

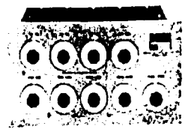
**Electronic Instrument Co. Inc., (EICO) 33-00 Northern Blvd., Long Island City 1, N.Y., 50s, Tel: STillwell 6-8700**
**See ad on page 283**

Electronics, Inc. of Pa., Pa., 60c
Elk Electronic Labs., Inc., N.Y., 5c, 25c
Elliott-Automation Ltd., England, 10c, 15c, 20c, 30sc, 35sc, 45c, 50sc, 55s, 60s

**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 15sc, 20sc, 25sc, Tel: VIctor 2-8400**
**See ads on pages 307, 309, 313, 315, 379, 584**

Engineering Assoc., Ohio, 5c, 10c 15c
Ensco, Inc., Utah, 5c, 50c
Exact Electronics, Inc., Ore., 50s
Farwest Mfg. Div., Inc., Wash., 35c
Federal Mfg. & Eng. Corp., N.Y., 5c, 25c, 35c
Federal Scientific Corp., N.Y., 15c, 45c
Flow Corporation, Mass., 5 Random s, 45s, 60s

ALLISON LABS
ALLISON LABORATORIES
Audio Frequency Test Instrumentation

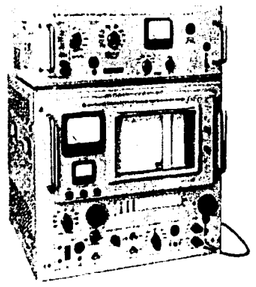


*Model 3MAN9 Noise Generator and Octave Band Equalizer*

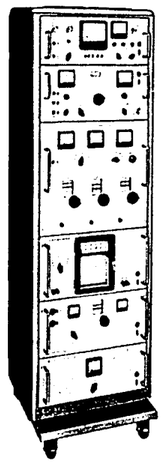
A controlled, calibrated audio noise source, as well as an octave band analyzer. 20-19,200 cycles. Unique continuously-variable passive filters of every type. Noise Generators, Octave-Band Equalizers, Band-Elimination Filter sets. Extremely high rejection, smooth flat-topped characteristics.

FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL
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MOUNT VERNON, N.Y. • MOunt Vernon 4-7530
WALTHAM .....TWinbrook 4-1955
SYRACUSE .....GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400
For details, circle #170 on Reader Service Card

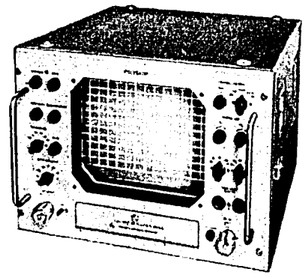
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



An Audio-Frequency Spectrograph



A Decade Frequency Measuring System



The Polyskop - - A Swept Frequency Generator

# A SELECTED LINE OF UNIQUE INSTRUMENTS FOR ELECTRONIC MEASUREMENTS AND COMMUNICATION

**MEASURING EQUIPMENT**

- Frequency Synthesizers and Decade Frequency Measuring Systems 0-12.6 kmc
- Time Standards and Portable Crystal Clocks
- Impedance Measuring Devices - - Diagraphs
- Power Signal Generators
- Audio-Frequency Spectrograph
- Swept Frequency Generators and Indicators - Polyskop
- Wave Analyzers
- Capacitance, Inductance and Resistance Bridges
- Teraohmmeters
- Standard Attenuators
- Selective Voltmeters and Amplifiers
- Standard Capacitors
- Power Meters
- Equipment For Measurement of Dieletric Losses
- Field Intensity Meters

**Communications Equipment**

- Multicouplers 60 kc - 400 mc
- FM Relay Receivers
- Dummy Antennas
- Frequency Synthesizers and Exciters

Within its scope, this equipment represents some of the most refined and precise available. Each of the equipment groups is described in detailed special catalogs or leaflets which are available on request.

All the equipment offered is backed by high engineering competence and field experience. Skilled repair personnel and a generous reservoir of spare parts assure that all equipment sold by Rohde & Schwarz will meet warranties and give long years of service.

Write for literature covering your special areas of interest. Quotations promptly furnished.

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**ROHDE & SCHWARZ**

111 Lexington Ave., Passaic, New Jersey
Telephone: PRescott 3-8010
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# Directory I. Complete Equipment

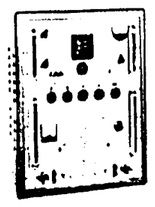
## 3. Audio Frequency Test Equipment.

Fluke Manufacturing Co., Inc., John, Wash., 60sc
Furzehill Laboratories, Ltd., England, 5s, 45s, 60s
General Applied Science Labs., Inc., N.Y., 45sc, 50s
General Electronic Laboratories, Inc., Mass., 15sc, 60sc
General Measurements Co., Inc., Mass., 5
General Meters, Inc., Colo., 60sc
**General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, 15s, 20s, 30s, 40s, 45s, 50s, 60s, Tel: EMerson 9-4400**
**See ad on Cover 4**
Gertsch Products, Inc., Calif., 35s, 60s
Goodmans Industries, Ltd., Axiom Works, England, 5s
Gotham Audio Sales Co., Inc., N.Y., 60s
Gulton Industries, Inc., N.J., 45sc
Gyrex Corp., The, Calif., 5sc
Harris Transducer Corp., The, Conn., 40c
Harrison Electrosonics, Inc., B.M., Mass., 40c, 60s
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 45c
Heath Co., Subsid. Daystrom, Inc., Mich., 5s, 15s, 20s, 25s, 30s, 40s, 50s, 60s
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 5s, 15s, 50s, 60s, Wave Analyzers s, Noise Figure Meters s, Tel: DAvenport 6-7000**
**See ad on pages 3-18**
Hickok Electrical Instrument Co., The, Ohio, 5s, 15s, 20s, 30s, 35s, 50s, 60s
Holt Instrument Laboratories, Wis., 5s, 10s, 60s
**Houston Instrument Corp., P.O. Box 22234, Houston 27, Tex., 40s, 60s, Tel: MOhawk 7-7405**
**See ad on page 298**
Hydel, Inc., Mass., 35s
ITI Electronics, Inc., N.J., 5c
Industrial Acoustics Co., Inc., N.Y., 40s
**Industrial Test Equipment Co., 55 East 11th St., New York 3, N.Y., 5sc, 35s, 60s, Tel: GRamercy 3-4684**
**See ad on page 333**
Instrument Electronics Corp., N.Y., 60s
Instrument Laboratories, Ill., 5s, 60s
International Electronics Mfg. Co., Md., 15c, 45c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c
Invar Electronics Corp., Calif., 5sc
**J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 20, Tel: STate 7-5825**
**See ads on pages 460, 546, 550**
Jackson Electrical Instrument Co., The, Ohio, 50s
Jansky & Bailey, Inc., D.C., 35c
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 60c
**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 10sc, 15s, 30s, 40s, 45s, 60s, Tel: CApital 6-4000**
**See ad on page 330**
**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 5c, 30c, 50c, Tel: STillwater 3-5000**
**See ad on page 415**
Knight Electronics Corp., Ill., 5s, 60s
Krohn-Hite Corp., Mass., 5s, 10s, 15s
Kurtston Electronics, N.Y., 50c
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 45s
Lear, Inc., Calif., 35sc
Ling Electronics, Div. Ling-Temco Electronics, Inc., 1515 South Manchester Ave., Anaheim, Calif., 45s, Tel: PRospect 4-9200
See ads on pages 247, 285
MB Electronics, Div. Textron Electronics, Inc., Conn., 15sc, 45s
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 10s, 15s, 20s, 25s, 30s, 45s, 50s, 60s, Tel: LOwell 7-0607**
**See ad on page 332**
Marine View Electronics, Inc., N.Y., 5c, 60c
Maxson Corp., The W. L., Instruments Div., N.Y., 35s
Maxson Corp., The W. L., United Mfg. Co. Div., Conn., 35c, FM Meters c
Mayberry Electronics Co., Calif., 5c, 60c
**Measurements, McGraw-Edison Division, P.O. Box 180, Boonton, N.J., 25s, 50s, Tel: DEerfield 4-2131**
**See ad on page 335**
Melpar, Inc., Special Products Dept., Va., 45sc, 55c
Meter-Makers, Inc., Ill., 60c
Metrologie, Compagnie Generale de, France, 5s
Millivac Instruments, Div. Cohu Electronics, Inc., N.Y., 60s
Minneapolis-Honeywell Regulator Co., Industrial Systems Div., Md., 15sc, 45sc
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 30c, 50c
Muirhead & Co. Ltd., England, 5s, 15s, 35s, 45s, 50s
Muirhead Instruments, Inc., N.Y., 5s, 15s, 20s, 35s, 45s, 50s
Munzig International, Inc., Calif., 5s, 60s
Mytron, Inc., Mass., 15sc
National Company, Inc., Mass., 60c
National Scientific Laboratories, Inc., D.C., 55c
New London Instrument Co., Conn., 50s
Nilsen Mfg. Co., Ill., 35sc
**Norrman Labs., Ernst, Williams Bay, Wis., 20s, Tel: CIrcle 5-5516**
**See ad on page 350**


**Holt INSTRUMENT LABORATORIES**

**Laboratory-Standard AC Instrumentation**

*Model AO.1 Oscillator (upper) with Model AVS-321 Voltage Standard*



Primary and Secondary standard AC generation, calibration, and measuring devices for the entire audio spectrum. Regulators, Amplifiers, Thermal Transfer Voltmeters, Oscillators, Reference Standards.

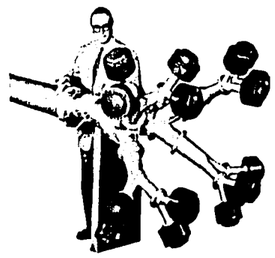
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WALTHAM .....TWinbrook 4-1955
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PHILADELPHIA .....SHerwood 7-9080
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BALTIMORE .....ENterprise 9-6400

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**HIGH INTENSITY SOUND**



Ling-Altec High Intensity Sound Equipment includes powerful reverberation chambers and plane wave tubes for realistic environmental testing of acoustic heat and vibration conditions... microphones, impedance translator and power supply for accurate measurement of high intensity sound.

**LING ELECTRONICS**

A DIVISION OF LING-TEMCO ELECTRONICS, INC. • 1515 SOUTH MANCHESTER, ANAHEIM, CALIFORNIA

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## 3. Audio Frequency Test Equipment.

**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 35sc, 60sc, Tel: OVerbrook 1-8600**
See ad on page 286

**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 50s, 55s, Tel: WAtkins 9-9117**
See ad on pages 36-39

Nuclear Electronics Corp., Pa., 5c, 50c
Pace Electrical Instruments Co., Inc., N.Y., 60s
Pam Associates, Inc., Md., Sirens c

**Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., 15s, 20s, 25s, 45s, Tel: OWens 9-4600**
See ad on page 334

Philamon Laboratories, Inc., N.Y., 5sc
Philco Corporation, Pa., 45c, 60c
Philips Electronic Instruments, N.Y., 5s, 30s, 35s, 40s, 50s, 60s
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 50s, 60s
Plectron Corp., Neb., 5s
Precise Electronics & Development Corp., N.Y., 5s, 10c, 15c, 20c, 50c, 60sc
Precision Apparatus Co., Inc., N.Y., 5s, 60s
Probescope Co., Inc., N.Y., 15s, 20s, 45s
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 45c
Quan-Tech Laboratories, Inc., N.J., 15s, 20s, 45s
RMS Associates, Inc., N.Y., 5c
Radio City Products Co., Inc., Pa., 40sc
Radio Corp. of America, N.J., 5s, 15s

**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 5s, Tel: HUmboldt 5-3900**
See ad on pages 54-55

Radio Engineering Laboratories, Inc., N.Y., 15sc, 25sc
Radio Engineering Products, Canada, 55s
Radiometer, Denmark, 5s, 10s, 15s, 25s, 40s, 45s, 60s
Railway Communications, Inc., Mo., 45sc, 60sc
Rank Cintel, Ltd., England, 10s, 50s

**Rawson Electrical Instrument Co., Inc., 118 Potter St., Cambridge 42, Mass., 60sc, Tel: KIrkland 7-4041**
See ad on page 461

Raytheon Co., Commercial Apparatus & Systems Div., Mass., 45s
Raytheon Co., Industrial Components Div., Mass., 45sc
Republic Electronic Industries Corp., N.Y., 10c, 15c, 30c, 40c, 45c, 50c, 60c

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, 20c, 35c, 45sc, 50c, Tel: LOckwood 5-4578**
See ad on page 324

**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 5s, 10s, 30s, 35s, 40s, 45s, Tel: PRescott 3-8010**
See ad on page 246

Rowan Controller Co., The, Md., 5c
Schaevitz Engineering, N.J., 50c
Scott, Inc., H. H., Mass., 15s, 40s, 45s

**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 5sc, 60s, Tel: HOpkins 7-3200**
See ads on pages 385, 519

**Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N.Y., 60c, Tel: BEverly 5-2300**
See ad on page 292

Sierra Electronic Corp., Calif., 45s, 60s

**Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 60s, Tel: ESTebrook 9-1121**
See ad on page 462

Smith-Florence, Inc., Wash., 60c
Solartron Electronic Group, Ltd., The, England, 5s, 10s, 30s, 50s, 60s
Solartron, Inc., Calif., 5s, 35s, 50s, 60s
Southwestern Industrial Electronics Co., Tex., 10s, 40s, 60s
Specialty Electronics Development Corp., N.Y., 5sc, 30sc, 50sc, 60sc
Spectrum Instruments, Inc., N.Y., 45c
Standard Telephones & Cables Ltd., England, 5s, 15s, 40s, 45s, 55s
Stelma, Inc., Conn., 15s, 55c
Stereatronics, Inc., Mass., 50c
Supreme Electronics Corp., Miss., 60c
Systron-Donner Corp., Calif., 35s
TMC (Canada) Ltd., Canada, 10s
Taffet Electronics, N.Y., 5c, 10c, 55c
Technical Products Co., Calif., 45sc
Technology Instrument Corp., Mass., 35s, 60s
Tektronix, Inc., Ore., 50s
Telechrome Mfg. Corp., N.Y., 55c

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 50c, 55c, Tel: YE 2-8600**
See ad on page 338

**Telonic Engineering Corp., 773 Broadway, Laguna Beach, Calif., 5c, 10c, Tel: HYatt 4-7581**
See ad on page 71

**Telonic Industries, Inc., 60 N. First Ave., Beech Grove, Ind., 5s, 20s, Tel: STate 7-7241**
See ad on page 70

**Teltronics, Inc., 277 Main St., Nashua, N.H., 5c, Tel: TUxedo 2-6264**
See ad on page 337

Tensor Electric Development Co. Inc., N.Y., 50c
Theta Instrument Corp., N.J., 35s

**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 30sc, 35sc, 60sc, Tel: OVerbrook 1-0400**
See ad on page 294

Union Electric Products Co., N.J., 60s
Van Norman Industries, Inc., Electronics Div., N.H., 10sc
Vinco Electronics Corp., Conn., 40c
Virginia Electronics Co., Inc., D.C., 5c, 30c, 55c
WacLine, Inc., Ohio, 30c, 40c
Waltham Electronics Corp., Mass., 50sc
Waveforms, Inc., N.Y., 5s, 30s, 40s, 50s, 60s

**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 5s, 15s, 60s, Tel: LOcust 8-6820**
See ad on page 255

Western Union Telegraph Co., The, N.Y., 35c, 55s

**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 15sc, Tel: JUdson 2-3030**
See ad on page 704

Winslow Co., Inc., The, N.J., 10c, 55c
Winston Electronics, Div. Jetronic Industries, Inc., Fla., 5s, 20s, 25s, 60s
Wintronics, Calif., 35sc

**Audio-Visual aids:**
See class 29

**Audiometers:**
See class 19

## 4. Automatic Control Equipment.

**5. Burglar-alarm & protective systems**
**10. Combustion & smoke-nuisance controls**
**15. Electronic remote controls**
**20. Fluid flow**
**25. Gyroscopes**
**30. Liquid level**
**35. Photo electric**
**40. Positioning equipment**
**45. Pressure**
**50. Production controls, counting & sorting equipment**
**55. Servo type**
**60. Temperature, electronic**
**65. Timing**
**70. Vacuum controls**
**75. Variable speed controls**

A C Electronics Inc., Calif., 15c
A C Spark Plug, The Electronics Div. of General Motors, Wis., 5s, 25sc
ACF Electronics Div., ACF Industries, Inc., Md., 50sc
A.R.F. Products, Inc., Ill., 15s
ASCOP, Div. Electro-Mechanical Research, Inc., N.J., 15sc

**Acme Electric Corp., 44 Water St., Cuba, N.Y., 75sc, Tel: CUba 4**
See ad on page 476

Advance Instrument Corp., N.J., 55sc
Advanced Electronics, Inc., Conn., 15s
Advanced Research Associates, Inc., Md., 15s, 35c, 40s
Aero Mechanism, Inc., Calif., 45sc
Aeroflex Corp., Aeroflex Laboratories Div., N.Y., 25s
Affiliated Manufacturers, Inc., N.J., 50c
Airborne Accessories Corp., N.J., 60c
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 50s
Airmec, Limited, England, 10s, 30s, 35s, 40s, 50s, 60s, 65s, 75s

**Airpax Electronics, Inc., Seminole Div., Fort Lauderdale, Fla., 40c, 75c, Tel: LUdlow 3-6160**
See ad on pages 82-83

Airtronics International Corp., Fla., 5c

**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 65, Tel: FOrest 6-4467**
See ad on page 276

Allen-Bradley Co., Wis., 30sc, 45s, 65s
Allied Research Assoc., Inc., Mass., 50c
Allis-Chalmers Mfg. Co., Wis., 40sc, 55c, 75c
Alpha Corp., Tex., 15c
Alto Scientific Co., Inc., Calif., 65c
American Communications Corp., N.Y., 5c

**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 25c, Tel: DUnkirk 5-7401**
See ad on page 164

American Instrument Co., Inc., Md., 20sc, 45sc, 60s
American Machine & Foundry Co., D.C., 15c
American Machine & Foundry Co., Tobacco Div., N.Y., 50sc, 55sc, 75s
American Measurement & Control, Inc., Mass., 15c, 40c, 55c, 75c
American Research & Mfg. Corp., Md., 15c, 30c, 45c, 55s, 60c, 65c, 75c





# Directory I. Complete Equipment

## 4. Automatic Control Equipment.

**American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 5sc, Tel: CApital 2-3791**
See ad on page 472

**Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 65sc, Tel: BUckingham 1-2727**
See ads on pages 463, 577

Analogue Controls, Inc., N.Y., 40c, 55c
Andersen Labs., Inc., Conn., 60c
Antlab, Inc., Ohio, 15sc, 40s
Applegate & Co., C. J., Colo., 5sc, 10sc
Applied Dynamics, Inc., Mich., 15c, 40c, 55c
Applied Technology Corp., N.Y., 75s
Arch Gear Works, Inc., Mass., 75c
Arkay Products Mfg. Co., Calif., 15c
Arma Div., American Bosch Arma Corp., N.Y., 55c
Armstrong Whitworth Equipment, England, 15c, 20c, 40c, 55c
Arnoux Corp., Calif., 60s
Artronic Instrument Co., The, Md., 65c
Assembly Products, Inc., Ohio, 15c, 50c, 60c
Associated Electrical Industries Ltd., Instrumentation Div., England, 20s, 30s, 45s
Atlantis Electronics Corp., Texas, 50sc
Atronic Products, Inc., Pa., 35s, 50s
Atwood, Consulting & Mfg. Engineer, Wilfred L., Ohio, 15c, 20c, 30c, 45c, 60c, 65c, 70c
Auerbach Electronics Corp., Pa., 40c
Austin Electronics, N.Y., 15c, 35c, 40c, 55c
Automatic Timing & Controls, Inc., Pa., 10c, 15c, 20c, 30sc, 40sc, 45sc, 50sc, 55sc, 60c, 65sc, 70c, 75c
Automation Dynamics Corp., N.J., 15c, 35c, 45c, 60c
Automation, Inc., Mass., 50sc
Automation Industries, Inc., Calif., 15c
Automation Management, Inc., Mass., 50sc
Autometric Corp., N.Y., 40c, 55c
Autonetics, Div., North American Aviation, Inc., Calif., 40c
Autotron, Inc., Ill., 35c, 65c
Autotronics, Inc., Mo., 75s
Avien Inc., N.Y., 15c, 30c, 60c
Avionics Corp. of America, Pa., 30c, 40c, 55c
BJ Electronics, Borg-Warner Controls, Calif., 45c, 55c
Babcock Radio Engineering, Inc., Calif., 15sc
Bailey Meter Co., Ohio, 10c, 15c, 20c, 30c, 45c

**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 15c, 40c, 55c, 65c, Tel: WOodland 8-6833**
See ad on page 465

Barnes Development Co., Pa., 50sc, 55sc
Barnes Engineering Co., Conn., 40c
Barnes & Reinecke, Ill., 15c, 20c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c, 75c
Barton Electronics, Inc., Conn., 15c, 35c, 50sc, 65c
Beach-Russ Co., N.Y., 75sc
Beckman Instruments, Inc., Beckman Systems Div., Calif., 65c
Beckman Instruments, Inc., Berkeley Div., Calif., 35s, 50s, 65s
Bell Aircraft Corp., Avionics Div., N.Y., 15c, 25c, 45c, 55c, 60c
Bell & Gossett Co., Ill., 15sc
Bendix Corp., The, Bendix-Pacific Div., Calif., 5c, 10c, 15c, 20c, 30c, 40c, 45c, 50c, 60c, 65c
Bendix Corp., The, Bendix Systems Div., Mich., 15c

**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 15c, 25c, 40c, 45c, 55sc, Tel: ATlas 8-2000**
See ad on pages 103-106

Bendix Corp., The, Friez Instrument Div., Md., 45c
Bendix Corp., The, Industrial Controls Section, Mich., 40sc, 55sc
Benson-Lehner Corp., Calif., 40c
Bently Scientific Co., Calif., 15sc, 40sc, 45sc, 50sc, 55sc, 70sc
Bergen Laboratories, Inc., N.J., 60c, 65sc
Berkeley/Dynamics, Calif., 5sc, 15c, 35sc, 50sc, 65sc
Berneo Engineering Corp., Ind., 65s
Blue M Electric Co., Ill., 60sc
Bone Engineering Corp., Calif., 20c

**Branson Corp., 41 S. Jefferson Rd., Whippany, N.J., 65sc, Tel: TUcker 7-1100**
See ad on page 511

Breeze Corporations, Inc., N.J., 15c, 30c
Bristol Co., Conn., 5c, 10c, 15c, 20c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 70c, 75c
Bristol Motors, Div. Vocaline Co. of America, Conn., 65sc
Buck Instrument Co., Colo., 45sc, 55sc
Budd Electronics, Inc., N.Y., 5c, 15c, 60c

**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 35c, 60c, 65c, Tel: NEwtown 9-5700**
See ad on page 426

Burton-Rodgers, Inc., Ohio, 15c, 40c, 55c
Bytrex Corp., Mass., 15c, 45c, 60c
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 15c
C.E.S. Electronic Products, Calif., 60s
Cadre Industries Corp., N.Y., 15c, 55c
Camera Equipment Co., Inc., N.Y., 40sc, 65c, 75sc
Canadian Aviation Electronics Ltd., Canada, 25c, 55c
Canoga Division, Underwood Corp., Calif., 55s




**SPECIAL KEYBOARDS**

**Any number of keys, bars, switches or lights in any arrangement you require—wired to your specifications.**

Concord Keyboards can be found working with many different types of equipment throughout the United States and Canada. Only proven components with exceptionally long life characteristics are used. A typical example: a keyboard that has twelve keys and one bar, wired to a cable and connector with a steel case painted grey—$220. Delivery three to five weeks. Send us a sketch of your desired key layout and wiring specifications for an immediate estimate.

**Also call upon us for your special requirements for paper tape or magnetic tape input equipment.**

**CONCORD CONTROL INC**
1282 Soldiers Field Road, Boston, Mass.

For details, circle #174 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240

Carmody Corp., N.Y., 55c
Cedar Engineering Div., Control Data Corp., Minn., 15c, 25c, 55c
Central Dynamics Ltd., Canada, 5c, 15c, 20c, 30c, 45c, 50c, 55c, 60c, 75c
Cerberus AG, Werk Fur Elektronentechnik, Switzerland, 5sc
Cetron Electronic Corp., Ill., 70sc
Chance Vought Electronics Div., Texas, 15c, 40c, 55c
Chapin Electronics, Mass., 5s, 15c, 65c
Chicago Aerial Industries, Inc., Ill., 15c, 35c, 65c, 75c
Chicago Electronic Div., Land-Air Inc., Ill., 15c, 20c, 40c, 65c
Chrono-Log Corp., Pa., 50s, 65s
Clark Controller Co., The, Ohio, 5sc, 10sc, 35sc, 40c, 50sc, 60c, 75sc
Clipper Gear & Machine Co., Mich., 55c, 60c, 65c
Co Engineering Co., N.J., 20c
Coils-Electronics Co., Pa., 15sc, 30sc, 35sc, 50sc, 60sc, 65sc
Coleman Electronics, Calif., 40c
Collins Corp., G. L., Calif., 40c
Collins Radio Co., Central Sales Office, Tex., 15s, 25s, 40s, 55s, 65sc
CompuDyne Corp., Pa., 15c, 20c, 30c, 40c, 45c, 55c, 60c, 75c
**Computer Control Co., Inc., Eastern Div., 983 Concord St., Framingham, Mass., 15c, 40c, 50c, 65c, Tel: TRinity 5-6185**
See ad on page 264
**Computer Control Co., Inc., Western Div., 2251 Barry Ave., Los Angeles 64, Calif., 15c, 40c, 50c, 65c, Tel: BRadshaw 2-9135**
See ad on page 264
Computer Equipment Corp., Calif., 65c
Computer-Measurements Co., Div. Pacific Industries, Inc., Calif., 50s, 70s
**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 15c, 40c, 55c, Tel: ALgonquin 4-5106**
See ad on page 249
Consolidated Avionics Corp., N.Y., 5c, 15c, 65c
Consolidated Controls Corp., Conn., 40c, 45c, 50c, 55c, 60c, 70c
Consolidated Electrodynamics Corp., Calif., 45s, 70s
Consolidated Vacuum Corp., N.Y., 70c
Continental Sound Engineering, Inc., Wis., 15c, 50c
Control Data Corp., Minn., 50sc
Control Equipment Corp., Mass., 15c, 35c, 40c, 50c, 60c, 65c, 70c
Control Indicating Corp., Conn., 60c
Controls Co. of America, Ill., 20sc, 30sc, 65sc
Cook Electric Co., Ill., 65sc
Cook Technological Center, Div. Cook Electric Co., Ill., 15c, 35c, 40c, 55c, 65c
Corbett Science Laboratories, F. W., Calif., 15c, 35c, 40c, 50sc
Corona Engineering Service, N.Y., 15sc, 30c, 35c, 50c, 60sc, 65c
Cosmic, Inc., D.C., 70s, 75s
Craig Electronics, Calif., 15c, 65sc
Cramer Controls Corp., Conn., 5s, 30s, 35s, 50s, 65s
Crouse-Hinds Co., N.Y., 35s
Crown Engineering, N.Mex., 5c
Cutler-Hammer, Inc., Wis., 15s, 20s, 30s, 35s, 40c, 50c, 65s, 70s, 75s
Daco Instrument Co., N.Y., 25c, 55c, 65c, 75c
Dalmo Victor Co., Div. Textron, Inc., Calif., 15c, 40c, 55c, 60c
Datascan Inc., N.J., 75c
Datex Corp., Calif., 15c, 40sc, 50c, 55sc, 75c
Davenport Mfg. Co., Ill., 5c, 15c, 35c, 65c
Daystrom, Inc., Control Systems Div., Calif., 5c, 50c
Daystrom, Inc., Weston Instrument Div., N.J., 15sc, 45sc, 60sc, 70sc
Dayton Aircraft Products, Inc., Fla., 55c
Daytronic Corp., Ohio, 15sc, 40sc, 50sc
De-Tec-Tronic Corp., Ill., 5s, 10s, 15sc, 35sc, 40sc, 50sc, 65sc
Decker Corp., The, Pa., 15s, 25c, 40s, 45s, 60c
Dietz Co., Inc., N.J., 35sc, 40sc, 50c
Deltron, Inc., Pa., 30s, 35s
Design Tool Corp., N.Y., 40c
Designers For Industry, Inc., Ohio, 15c, 35c, 40c, 50c, 55c, 65c, 75c
Destron Co., Calif., 65c
Devco Engineering, Inc., N.J., 15c, 40c, 50c
Devol Research Corp., Conn., 15sc, 40s, 55s
Di/An Controls, Inc., Mass., 50c, 65sc
Diamond Power Specialty Corp., Ohio, 10sc, 15sc
Dicon Corp., N.Y., 5c, 15c, 35c, 40c
Diehl Mfg. Co., N.J., 40c, 55c, 75c
Digitronics Corp., N.Y., 15c
Djordjevic Engineering Co., Djeco Div., Ill., 15c, 75c
Du Kane Corp.., Ill., 5c
Dunn Engineering Associates, Inc., Mass., 15c, 40c
Durant Mfg. Co., Wis., 35s, 50sc
Dychro Corp., Mass., 35sc, 40c
Dynamics Research Corp., Mass., 25c
Dynapar Corp., Ill., 15s, 20s, 35s, 40s, 45s, 50s, 60s, 65s, 75s
Dynatran Electronics Corp., N.Y., 50c
**E.M.I.-Cossor Electronics Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 15c, 40c, 55c, 65c, 75c, Tel: HAlifax 6-7491**
See ad on page 400
E.M.I. Electronics, Ltd., England, 40c, 50c
Eagle Signal Co., Ill., 50s, 65s
Eastern Industries, Inc., Conn., 40c, 55c
Ebauches, S. A., Dept. Oscilloquartz, N.Y., 65c
Edison Industries, Thomas A., Instrument Div., N.J., 10s, 45s, 55s, 65s
Edmund Scientific Co., N.J., 25s
Edwards High Vacuum (Canada), Ltd., Canada, 70s
Ehrenpreis, David, Consulting Engineers, N.Y., 25c, 30c, 40c, 45c
**Eisler Engineering Co., Inc., 753 S. 13th St., Newark 3, N.J., 40sc, Tel: BIgelow 3-5310**
See ad on page 669
Electric Eye Equipment Co., Ill., 35c, 40c, 55c, 75c
Electric Hotpack Co., The, Pa., 60sc
Electric Machinery Mfg. Co., Minn., 75s
Electric Regulator Corp., Conn., 40sc, 50c, 55c, 60c, 75c
Electric Specialty Co., Conn., 5c, 30c, 35c, 45c, 60c, 65c, 75c
Electrical Service Co., Calif., 5sc, 35sc, 50c
Electro Development Corp., Wash., 15c
Electro-Mechanical Research, Inc., Fla., 15s
Electro-Physics Co., N.Y., 35c
Electro Precision Corp., Ark., 50, 55, 65
Electro Products Laboratories, Inc., Ill., 40sc, 50sc, 65sc
**Electro-Pulse, Inc., 6711 S. Sepulveda Blvd., Los Angeles 45, Calif., 15c, 35c, 40c, 50sc, 60c, 65sc, Tel: ORegon 8-2244**
See ad on page 264
Electro-Seal Corp., Ill., 5sc, 15c, 60c
**Electron Arc Div., Ionics Inc., 244 Broad St., Lynn, Mass., 35c, 65c, Tel: LY 8-2100**
See ad on page 485
Electron-Radar Products, Ill., 5sc, 10sc, 15sc, 30sc, 35sc, 50s, 70sc
Electronic Cable Corp., Mass., 5c
Electronic Control Corp., Mich., 5s, 10s, 35s, 50s, 60s, 65s
Electronic Controls, Inc., Conn., 10c, 15c, 40c, 50s, 55c, 60c, 75s
Electronic Counters, Inc., N.Y., 50s
Electronic Processes Corp. of California, Calif., 60sc, 65sc
Electronic Specialty Co., Calif., 15c, 40c, 50c, 55c, 60c, 65sc, 75c
Electronic Systems Development Corp., Calif., 40c, 65c
Electronica Industrial Ltda., Brazil, 65c, 75sc
Electronics Corp. of America, Mass., 5s, 10s, 15s, 20s, 30s, 35s, 40s, 50s, 60s, 65s
Electronics Research, N.J., 15c, 40c, 55c
Elk Electronic Labs., Inc., N.Y., 35c, 65c
Elliott-Automation Limited, England, 15sc, 20sc, 25c, 30sc, 40sc, 45c, 50c, 55sc, 60sc, 70sc
Ellison Draft Gage Co., Inc., Ill., 5c, 45s, 70s
Engineered Electronics Co., Calif., 15c, 50c, 65c
Engineering Associates, Ohio, 30c
Erdco Engineering Corp., Ill., 45s
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 20s, 45s, 65s, 75s, Tel: GLendale 6-8592**
See ad on pages 40-41
Espey Mfg. Co. Inc., Saratoga Industries Div., N.Y., 15c, 55c
**Ewald Instruments, Route 7, Kent, Conn., 65s, Tel: WAlker 7-3278**
See ad on page 671
Exact Engineering & Mfg. Inc., Calif., 55c, 65c
Exactel Instrument Co., Calif., 20s, 30s, 40s, 45s, 55s, 70c
Fairchild Controls Corp., Components Div., N.Y., 15sc, 20sc, 25sc, 40sc, 45sc, 60sc, 75sc
Fairchild Engine & Airplane Corp., Fairchild Astrionics Div., N.Y., 40c
Fairchild Recording Equipment Corp., N.Y., 75s
Fairfield Engineering Corp., Conn., 15c, 40c, 55c, 60c, 75c
Farwest Mfg. Div., Inc., Wash., 15c, 65c
Fasco Industries, Inc., N.Y., 65s
Fecker Div., J. W., American Optical Co., Pa., 35sc, 40sc, 55sc, 65sc, 75sc





# Directory I. Complete Equipment

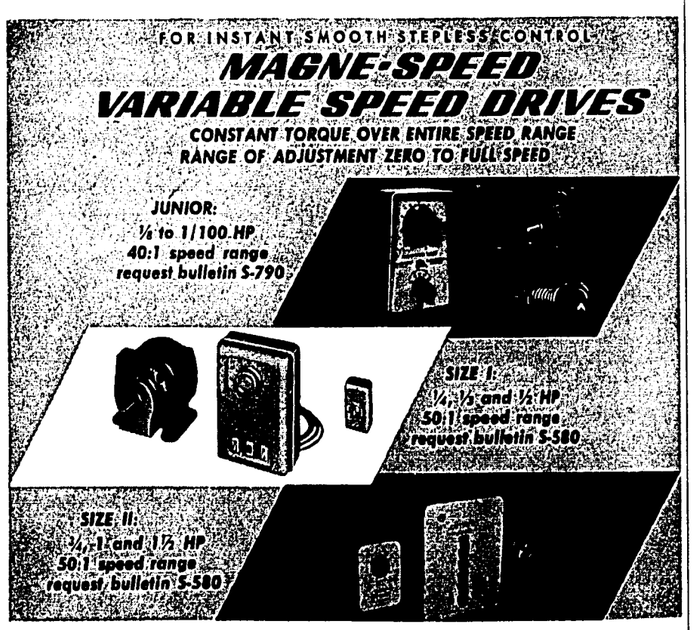
## 4. Automatic Control Equipment.

Federal Manufacturing & Engineering Corp., N.Y., 15c, 55c, 75c
**Federal Tool Engineering Co., 1400 Pompton Ave., Cedar Grove, N.J., 65sc, Tel: CLifford 6-5300**
See ad on page 670
Feedback Controls, Inc., Mass., 15c, 40c, 55sc
Fenske, Fedrick & Miller, Inc., Calif., 65s
Ferranti Electric, Inc., N.Y., 25c, 50c
Ferranti/Packard Electric Ltd., Canada, 15c, 25c
Fire Control Co., Inc., Del., 5sc
Fischer & Porter Co., Pa., 15s, 20s, 30s, 45s, 50s, 60s, 65s, 70s
Fisher-Pierce Co., The, Mass., 35sc
Flo-Tronics, Inc., Minn., 15sc, 30s, 40s
Flow Corporation, Mass., 20s
Food Machinery & Chemical Corp., Calif., 35sc, 50sc
**Frequency Standards, P.O. Box 504, Asbury Park, N.J., 40c, Tel: PRospect 4-0500**
See ad on page 443
Fried, Walter, N.Y., 35c, 40c, 60c
Garrett Corp., The, Calif., 40c, 45c, 55c, 60c, 70c, 75c
Gemco Electric Co., Mich., 15c, 30c, 35c, 40c, 45c, 50c, 55c, 65c, 70c, 75c
General Applied Science Labs., Inc., N.Y., 15c, 40c
General Automatics, Inc., Calif., 5c, 15s, 30c, 35c, 40c, 50s, 55s, 60c, 65c, Go/No-Go Comparator c
General Control Co., Mass., 65s
General Controls Co., Calif., 20s, 30s, 45s, 50s, 65s, 70s
General Electric Co., Apparatus Sales Div., N.Y., 10s, 15sc, 30s, 35s, 45s, 50c, 60sc, 65sc, 70s, 75sc
General Electric Co., Light Military Electronics Dept., N.Y., 25c, 60c
General Electric Co., Ordnance Dept., Mass., 10s
General Electric Co., Specialty Control Dept., Va., 15s, 30s, 35s, 40c, 50c, 65s, 75c
General Electric Co., Ltd. of England, The, Telephone Works, England, 15s, 30s, 40s, 50s, 60s, 65s
General Electronic Control, Inc., Minn., 15c, 55c, 60c
General Electronic Laboratories, Inc., Mass., 40c
**General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 60, Tel: VAlley Stream 5-6363**
See ad on page 284
**General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 15c, 60c, Tel: WEst 9-8571**
See ad on page 363
General Mills, Inc., Mechanical Div., Minn., 15c
**General Radio Co., 22 Baker Ave., West Concord, Mass., 75s, Tel: EMerson 9-4400**
See ad on Cover 4
General Time Corp., Central Research Lab., N.Y., 50c, 65sc
Genisco, Inc., Calif., 75c
Gertsch Products, Inc., Calif., 40s
Giannini Controls Corp., Calif., 15sc, 25sc, 40sc, 45sc, 55sc, 60sc
Gibbs Mfg. & Research Corp., Wis., 65sc, 75c
Gilfillan Bros., Inc., Calif., 5c, 40c, 55c
Gilmore Industries, Inc., Ohio, 15c, 20c, 40c, 45c, 55c, 60c
Good Electronic Corp., Fla., 5c, 60c
Goodrich Aviation Products, B. F., Ohio, 45c
Green Rectifier Co., N.J., 70c, 75sc
Greenleaf Mfg. Div., Mandrel Industries, Inc., Mo., 25sc, 60s
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 10c, 15sc, 30c, 40sc, 50c, 55sc, Tel: CHesapeake 3-1100**
See ad on page 512
**Guidance Controls Corp., 110 Duffy Ave., Hicksville, L.I., N.Y., 55c, Tel: WElls 8-9500**
See ad on page 342
Gulton Industries, Inc., N.J., 20sc, 30sc, 45sc, 60sc, Ultrasonic sc
Gyrex Corp., The, Calif., 25c, 65c
Haledy Electronics Co., N.Y., 20s, 30s, 35s
Hallikainen Instruments, Calif., 60s
Hallicrafters Co., The, Ill., 60sc
Hamilton Standard Div., United Aircraft Corp., Conn., 30c, 45c, 55c, 60c
Hammarlund Mfg. Co., Inc., N.Y., 15sc
Hanson-Gorrill-Brian, Inc., N.Y., 40c, 55c, 60c, 75sc
Harman-Kardon, Inc., N.Y., 20c
Harrel, Inc., N.Y., 60sc
Harrison Electrosonics, Inc., B.M., Mass., 40c, 75c
Hastings-Raydist, Inc., Va., 15s, 40s, 45s, 70s
Hathaway Instruments, Inc., Colo., 60s, 75c
Haydon Company, The A. W., Conn., 15c, 40c, 50c, 65c
Haydon Instrument, Conn., 65sc
Hays Corp., The, Ind., 10c, 15c, 20c, 30c, 40c, 45c, 60c
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 15c, 40c
Henschel Corp., Mass., 5c, 30c, 45c, 55c
Hickok Electrical Instrument Co., The, Ohio, 60c
High Vacuum Euipment Corp., Mass., 70c
Hillyer Corp., N.J., 40sc
Hoffman Electron Tube Corp., N.Y., 40s
Hoover Electric Co., Calif., 15sc, 40c, 55sc, 75c
Hoover Electronics Co., Md., 15c, 55c, 60c
Howe Scale Co., The, Vt., 50sc
Hudson Bay Co., Div. Labline, Inc., Ill., 15s, 30s, 35s, 45s, 65s
Hughes Aircraft Co., Industrial Systems Div., Calif., 40sc
Hughes Aircraft Co., Santa Barbara Research Center, Calif., 45s
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 70sc
**Hughey & Phillips, Inc., 3200 N. San Fernando Blvd., Burbank, Calif., 35s, Tel: VIctoria 9-1104**
See ad on page 374
**Hull Corporation, Davisville Rd., Hatboro, Pa., 70c, Tel: OSborne 5-5000**
See ad on page 673
Humphrey, Inc., Calif., 25c, 75c
Huppert Co., K. H., Ill., 60s
Hydel, Inc., Mass., 40c, 50sc, 55c
Hydro-Aire Co., Calif., 65sc
ITI Electronics, Inc., N.J., 50c, 60c
Iconix, Inc., Calif., 35c, 50sc, 65sc
Illinois Water Treatment Co., Ill., 20c
Image Instruments, Inc., Mass., 5c, 35c, 50c
Indikon Co., Inc., The, Mass., 45sc, 60sc
Industrial Components, Inc., Ore., 15c, 30c, 40c, 45c, 50c, 65c, 75c
Industrial Control Co., N.Y., 15sc, 40sc, 55sc, 75sc
**Industrial Electronic Engineers, Inc., 5528 Vineland Ave., North Hollywood, Calif., 15c, Tel: TRiangle 7-1144**
See ads on pages 191, 473
Industrial Timer Corp., N.J., 65sc
Infrared Industries, Inc., Mass., 5c, 30c, 35c
Insco Co., Div. Barry-Wright Corp., Mass., 75s
Instrument Development Laboratories, Inc., Mass., 35c
Instruments of New England, Mass., 15c, 50s
Intercontinental Dynamics Corp., N.J., 35c
International Electronics Mfg. Co., Md., 15c
**International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 35 Cells s, Tel: OREgon 8-6281**
See ad on pages 118-119
International Register Co., Ill., 65s
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 15c, 35c, 40c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 15c, 40c, 50c, 55c, 75c
Iron Fireman Mfg. Co., Electronics Div., Ore., 25sc
Itek Corp., Mass., 35c
JEM Electronics Corp., Ill., 35c, 40c
Jan Hardware Mfg. Co., Inc., N.Y., 75s
Jansky & Bailey, Inc., D.C., 15c
Jetronic Industries, Inc., Pa., 5c, 15c
Jones & Lamson Machine Co., Comparator Div., Vt., 40s
Jordan Controls, Inc., Wis., 15s, 40s, 55s, 75s
Jordan Electronics, Div. Victoreen Instrument Co., Calif., 65sc
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 15c
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 10c, 20c, 50c
**Kato Engineering Co., 1420 First Ave., Mankato, Minn., 75c, Tel: 8-2941**
See ad on page 467

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Kearfott Div., General Precision, Inc., Little Falls, N.J., 25sc, 55sc, Tel: CLifford 6-4000**
**See ad on pages 120-121**

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5s, 15c, 40c, 50c
Kidde & Co., Inc., Walter, N.J., 10c, 15c, 40c, 55c, 65c, 75c
Kidde Ultrasonic & Detection Alarms, Inc., N.J., 5sc, 35sc
Kingston Electronics, Div. Kingston Inds., Inc., Mass., 75c
**Kinney Mfg. Div., The New York Air Brake Co., 3631 Washington St., Boston 30, Mass., 70c, Tel: JAmaica 2-7100**
**See ad on page 35**
Knight Electronics Corp., Ill., 35s
Kollmorgen Optical Corp., Mass., 40c, 55c
**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 15c, 35c, 40c, 45sc, 55sc, Tel: TWining 9-5600**
**See ad on page 268**
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 5c, 10c, 40c
Larson Instrument Co., N.Y., 60c
**Leach Corporation, 18435 Susana Rd., Compton, Calif., 15c, 65c, Tel: NEvada 6-1061**
**See ad on page 514**
Lear, Inc., Calif., 15sc, 25sc, 30sc, 40sc, 55sc, 60sc, 65sc, 75sc
Lear, Inc., Mich., 15sc, 25sc, 40sc, 55sc
Leeds & Northrup Co., Pa., 10c, 20c, 30c, 45c, 60s
**Leesona Corp., P.O. Box 1605, Providence 1, R.I., 5c, 10c, 60c, 65c, Tel: WIlliams 1-5200**
**See ad on page 674**
Lektra Laboratories, N.Y., 35sc, 65sc
Leland Airborne Products, Div. of A.M.F., Ohio, 15c
Lenkurt Electric Co., Inc., Calif., 15s
Lessells & Associates. Inc., Mass., 15c, 55c
Life Instrument Co., Inc., Mass., 35c, 50c, 65c
Lignes Telegraphiques et Telephoniques, France, 20c
Link Division, General Precision, Inc., N.Y., 15c, 40c, 50c, 55s
Link Division, General Precision, Inc., Palo Alto Lab., Calif., 15c, 20c, 30c, 45c, 55c, 60c
Liquidometer Corp., The, N.Y., 30c, 55c
Litton Industries, Maryland Div., Md., 40, 55
Low, Inc., M., Clary Electronic Systems, N.Y., Digital automation equipment
Lynch Carrier Systems, Calif., 15sc
MB Electronics, Div. of Textron Electronics, Inc., Conn., 15s, 55s
MacLaren & Co., Inc., F. B., N.Y., 15c, 55c, 75c
Madigan Electronic Corp., N.Y., 15c, 40c, 55c
Magnaflux Corp., Subsid. General Mills, Ill., 50s
**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 35c, 55c, 75s, Tel: CYpress 2-6610**
**See ads on pages 252, 364, 418**
Magnetic Circuit Elements, Calif., 60c
Magnetic Controls Co., Minn., 60sc
**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 15c, 30s, 40c, 55c, 60s, Tel: ROgers 9-5312**
**See ad on page 364**
**Magnetico, Inc., 6 Richter Ct., East Northport, N.Y., 55sc, Tel: ANdrew 1-4502**
**See ad on page 366**
Magnetics Research Co., Inc., N.Y., 15c, 50sc
Magtrol, Inc., N.Y., 55c, 75c
Maico Electronics, Inc., Minn., 15sc, 40s, 50sc
Mallory & Co., Inc., P. R., Ind., 35c, 65c
Mandrel Industries, Inc., Calif., 25s, 50s
Mandrel Industries, Inc., Texas, 35c, 60c
Manning, Maxwell & Moore, Inc., Conn., 15s, 20s, 30s, 40s, 45s, 60s, 70s
Marine Electric Corp., N.Y., 30c
Marine View Electronics, Inc., N.Y., 15c
Marquardt Corp., The, Pomona Div. Calif., 5c, 15c
Marstan Electronics Corp., N.Y., 35c, 65s
Martin Co., Md., 25c, 40c, 45c, 65c, 75c
Mason Instrument Co., N.Y., 35sc, 50sc, 60sc
Mast Development Co., Inc., Iowa, 65c
Mayberry Electronics Co., Calif., 15c, 40c, 45c, 55sc, 65sc
McKiernan-Terry Corp., N.J., 15c, 40c, 55c, 75c
Melpar, Inc., Special Products Dept., Va., 5c, 35sc, 40c, 45c, 55c
Mercoid Corp., The, Ill., 30s, 45s
Micro Balancing, Inc., N.Y., 35s
Micro Gee Products, Inc., Calif., 40s, 45s, 55s
Milgo Electronic Corp., Fla., 65c
Miller-Harris Instrument Co., Wis., 65sc
Milro Controls Co., Inc., N.J., 15c, 40c, 55c, 75c
Miltronics Co., Wis., 35c, 50c, 65c
Minco Products, Inc., Minn., 60c
Minneapolis-Honeywell Regulator Co., Boston Div., Mass., 25sc, 40sc, 55sc, 60sc
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 10s, 15s, 20s, 30s, 35s, 40s, 45s, 55s, 60s, 70s
Minneapolis-Honeywell Regulator Co., Fall River Div., Mass., 15c, 20c, 30c, 45c, 55c, 60c, 70c
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 15c, 25sc, 30sc, 40sc, 45c, 55sc, 60sc, 65c, 75c
Minneapolis-Honeywell Regulator Co., Twin Cities, Minn., 5c, 10s, 15sc, 20sc, 40sc, 45sc, 55sc, 60sc, 75sc
Miratel, Inc., Minn., 35c, 65s
**Mittelmann, Eugene, 549 W. Washington Blvd., Chicago 6, Ill., 20, Tel: CEntral 6-2983**
**See ad on page 629**
Mobil Electronics, Inc., Div., Radionic Labs., Inc., Ind., 15sc
Modelectric Products Corp., N.J., 5sc, 15c, 35c, 50c, 65c
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 15c
**Moeller Instrument Co., Inc., Electronics Div., 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 15c, 60c, Tel: VIrginia 9-2100**
**See ad on page 588**

MAGNETIC AMPLIFIERS DIVISION
THE [illegible] CORPORATION
632 TINTON AVE., NEW YORK 55, N. Y.
CYPRESS 2-6610
For details, circle #175 on Reader Service Card






# Directory I. Complete Equipment

## 4. Automatic Control Equipment.

Montek Associates, Inc., Utah, 15c, 40c, 50c, 55c
Moore Associates, Inc., Calif., 15s
Moseley Co., F. L., Calif., 35s, 55s
Mosler Research Products, Inc., Conn., 5s
Motorola Aviation Electronics, Inc., Calif., 25c
Motorola, Inc., Military Electronics Div., Ariz., 15c, 40c, 50c
Muirhead & Co. Ltd., England, 15s, 25s, 55s
Muirhead Instruments, Inc., N.Y., 55s
Multi Products Co., Mich., 15sc
Multitone of Canada, Ltd., Canada, 5c
**N R C Equipment Corp., Dept. RE-A, 160 Charlemont St., Newton 61, Mass., 70s, Tel: DEcatur 2-5800**
**See ad on page 676**
Nacimco Products, Calif., 30s, 60s
Naniloa Corp., Ohio, 15c, 35sc, 40sc, 50sc, 55sc
National Electronics, Wyo., 15c, 35c, 60c
National Instrument Laboratories, Inc., D.C., 35c, 60c, 65c
National Scientific Laboratories, Inc., D.C., 15c, 50c, 55c, 60c
National Standard Electronics, Inc., N.Y., 35s, 50c, 55s, 60s
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 40c, 65c, Tel: HOward 5-7700**
**See ad on page 498**
Neptune Electronics Co., N.Y., 15c, 50c
**New York Air Brake Co., Kinney Mfg. Div., 3631 Washington St., Boston 30, Mass., 70c, Tel: JAmaica 2-7100**
**See ad on page 35**
Newark Controls Co., N.J., 30s, 45s, 70s
Newton Co., The, Conn., 40sc, 55c
Nichols, Ltd., R. H., Canada, 15c, 45s, 50c, 60s
Nilsen Mfg. Co., Ill., 55c
Nippon Electric Co., Ltd., Japan, 15c
Non-Linear Systems, Inc., Calif., Go/No-Go Comparators s
**Norrman Labs., Ernst, Williams Bay, Wis., 65s, Tel: CIrcle 5-5516**
**See ad on page 350**
**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 55sc, Tel: OVerbrook 1-8600**
**See ad on page 286**
North Electric Co., Ohio, 15c, 20c, 40c, 50c
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 65s, Tel: NAtional 2-6485**
**See ad on pages 27-30**
Northern Electronic & Vacuum Industries, Canada, 5c, 35c, 55c
**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 15s, Tel: WAtkins 9-9117**
**See ad on pages 36-39**
Northrop Corp., Nortronics Div., Precision Products Dept., Mass., 25c
Nuclear Electronics Corp., Pa., 5c
Ohio Crankshaft Co., Ohio, 50c
Oilgear Co., The, Servocontrol Div., Mass., 40c, 55c, 75c
Olympic Radio & Television, Div. Siegler Corp., N.Y., 20sc
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 15c, 40c, 75c, Tel: WOrth 6-0380**
**See ad on page 483**
OPTOmechanisms, Inc., N.Y., 35c
Otis Elevator Co., Defense & Industrial Div., N.Y., 15c, 40c, 55c, 65c, 75c
Ovitron Corp., N.Y., 15c, 40c, 50c, 55sc, 60sc, 75sc
PIC Automation Controls, Div. General Controls Co., Ill., 10s, 45s, 50s, 65s
PIC Design Corp., N.Y., 75s
Pace Controls Corp., Mass., 75
Palomar Scientific Corp., Calif., 15c, 25c, 40c, 45c, 55c, 65c
Pam Associates, Inc., Md., 15c
Paraplegics Mfg. Co., Inc., Ill., 15c, 65c
Parks Laboratory, Henry Francis, Wash., 60c
Parsons Company, The Ralph M., Electronics Div., Calif., 65c
Partlow Corp., N.Y., 10s, 60s, 65s
Patterson Moos Research, Div. Leesona Corp., N.Y., 5c, 10c, 60c, 65c
Pegasus Laboratories, Inc., Mich., 25c, 40s, 45s, 55s, 75s
Perma-Power Co., Ill., 15sc
**Peschel Electronics, Inc., Towners, R.F.D. #1, Patterson, N.Y., 15c, Tel: TRinity 8-3251**
**See ad on page 289**
Philco Corporation, Govt. & Industrial Group, Pa., 55c
Philips Electronic Instruments, N.Y., 15s, 50s, 60s, 65s
Philips Electronics Industries Ltd., Canada, 5s, 30s, 35s, 45s, 60s, 65s
Phoenix Precision Instrument Co., Inc., Pa., 10sc, 20c, 30c, 35c, 50c, 55c
Photo-Crystals, Inc., Ill., 5c, 10c, 15c, 35sc, 50c, 60c, 70c
Photobell Co., Inc., N.Y., 5sc, 10sc, 15c, 20c, 30sc, 35sc, 40sc, 50sc, 75c
Photomation, Inc., N.J., 10s, 30s, 35s, 50s
Pickard & Burns, Inc., Mass., 60c, 65c
Pitometer Log Corp., N.Y., 15c, 55c, 75c
Plug-In Instruments, Inc., Tenn., 15sc, 40c, 45c, 50c, 55sc
Potter Aeronautical Corp., N.J., 20c
Potter Instrument Co., Inc., N.Y., 65c
Powertron Ultrasonics Corp., N.Y., 20c, 30s
Precision Mechanisms Corp., N.Y., 40c, 55sc, 65c
**Presin Co., 2014 Broadway, Santa Monica, Calif., 10s, 30s, 35s, Tel: EXbrook 3-9738**
**See ad on page 519**
Process & Instruments, N.Y., 70c
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 5c
Pyrometer Instrument Co., Inc., N.J., 60c
Quantametric Devices, Inc., N.Y., 35c
REF Manufacturing Corp., N.Y., 20c, 45c
RMS Associates, Inc., N.Y., 15c, 45c, 50c
Radiation Electronics Co., Ill., 60s
Radio Condenser Co., N.J., 5c
Radio Corp. of America, Defense Electronic Products, N.J., 15c
Radio Development & Research Corp., Div. Bogue Electric Mfg. Co., N.J., 30sc, 60sc, 75sc
Railroad Electronic Labs. of Omaha, Inc., Neb., 15c
Ram Meter, Inc., Mich., 15c, 40c, 55c
Rank Cintel Ltd., England, 5s, 15c
Ransom Research, Inc., Calif., 40c, 65c
Red Point Corp., Calif., 60s, 70s
Reeves Instrument Corp., N.Y., 25sc, 55c
Republic Electronic Industries Corp., N.Y., 30c, 55c, 60c, 70c
Rescon Electronics Corp., Mass., 60c
Research, Inc., Minn., 15s, 20s, 30sc, 40s, 45s, 50s, 55s, 60s, 65c, 70c, 75c
Research Industrial Laboratory of Electronics, Pa., 30c, 50c, 60c, 65s, 70c
Revere Corp. of America, Subsid. Neptune Meter Co., Conn., 20c, 30c, 60c
Rhodes, Inc., M. H., Conn., 65sc
Robertshaw-Fulton Controls Co., A & I Div., Calif., 20s, 30s, 45s
Robertshaw-Fulton Controls Co., Fulton Sylphon Div., Tenn., 20c, 30c, 45c, 60c, 70c
Robinette Co., W. C., Calif., 15c, 40c, 55c, 75c
Rockwell Engineering Co., Ind., 55c, 75c
Rosemount Engineering Co., Minn., 60c
Rotary Devices Corp., N.J., 15c, 35c, 65c
Ruge Associates, Inc., Arthur C., N.H., 60c
Rust Industrial Co., Inc., The, N.H., 15sc, 40sc, 60sc
Sanders Associates, Inc., N.H., 15sc, 20sc, 25sc, 40sc, 55sc
Sangamo Electric Co., Ill., 15c, 55sc, 65sc
Scaico Controls, Inc., N.J., 15s, 45c, 60s, 65s, 70c
Schaevitz Engineering, N.J., 15c, 20s, 30s, 40s, 45s, 50s, 55s, 60s, 65s, 70s, 75s
Schirmer National Alarm Co., N.J., 5sc, 10c, 15c, 35sc, 50c, 60c
Scientific-Atlanta, Inc., Ga., 55c, 75sc
Scientific Engineering Laboratories, Calif., 70sc
Scott, Inc., H. H., Mass., 5sc, 50c
Secode Corp., Calif., 15c
**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 35c, Tel: CRestview 4-8542**
**See ad on page 507**
Serfass Corp., Div., Milton Roy Co., Pa., 10c, 15c, 30c, 45c
Servo-Tek Products Co., N.J., 15s, 40s, 55s, 75s
Servodyne Corp., Mass., 15c, 55c, 75c
Servomechanisms, Inc., Calif., 20c, 30c, 45c, 55c, 60c, 65c
Servonic Instruments, Inc., Calif., 45c
Servospeed Div., Electro Devices, Inc., N.J., 75sc
Sheffield Corp., Subsid. The Bendix Corp., Ohio, 50c, 65sc
Shepard Laboratories, Inc., N.J., 35c, 55c, 75c
**Sierra Research Corp., P.O. Box 22, Buffalo 25, N.Y., 15c, 40c, 55c, Tel: NF 2-8823**
**See ads on pages 271, 356, 662**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Simmonds Precision Products, Inc., N.Y., 20c, 30c, 60c
Singer Mfg. Co., The, Conn., 5
Slaughter Co., Ohio, 50c
Sloan Company, The, Calif., 65sc
Smith Mfg. Co., J. & H., N.Y., 15c, 40c
Smith Mfg. Co., Inc., E. C., Pa., 30c, 60sc
Solar Systems, Inc., Ill., 35c
Solartron Electronic Group, Ltd., The, England, 15c, 45s, 55sc

**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 15c, Tel: EMpire 4-2271**
**See ad on page 420**

Sorensen Industrial Electronic Co., N.J., 25c, 65c
Southwest Products, Inc., Texas, 35c, 60c, 65sc
Southwestern Industrial Electronics Co., Texas, 15c
Special Instruments Laboratory, Inc., Tenn., 5c
Specialties, Inc., N.Y., 40c
Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., N.Y., 5c, 35c, 40c, 60c
Spectrol Electronics Corp., Calif., 55c
Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 25c
Sperry Gyroscope Co., Sunnyvale Development Center, Calif., 25c
Sperry Gyroscope Co. of Canada Ltd., Canada, 25c, 40c
Sperry Piedmont Co., Div. Sperry Rand Corp., Va., 15c, 25c, 40c, 55c
Standard Electric Time Co., The, Mass., 65c
Standard Electrical Products Co., Ohio, 75c
Standard Telephones & Cables Ltd., England, 15c
Stereatronics, Inc., Mass., 15c, 50c, 60c, 65c
Strand Engineering Co., Mich., 35c, 50c
Strandberg Engineering Labs., Inc., N.C., 50s
Strempel Instrument Corp., N.Y., 35c
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 15c, 40c, 65c
Sunshine Scientific Instrument, Pa., 15c, 40c, 45c, 50c, 55c, 60c, 65sc

**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 75s, Tel: LUdlow 2-9561**
**See ads on pages 412, 468, 494, 572, 586**

Sylvania Electric Products Inc., N.Y., 5c
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 50c
TRG, Incorporated, N.Y., 40c, 55c, 65c
Tapeswitch Corp. of America, N.Y., 5sc
Taylor-Emmett Controls, Inc., Ohio, 45s, 50c, 65s
Technical Industries Corp., Calif., 40sc, 45sc, 55sc, 60sc
Technique Associates, Div. Duncan Electric Co., Inc., Ind., 60s
Technology Instrument Corp., Mass., 45c, 55c
Telechrome Mfg. Corp., N.Y., 15sc, 40c, 50c, 55c, 65c
Telecomputing Corp., Calif., 15sc, 20sc, 25c, 30c, 45c, 50sc, 70c
Telecomtrol Corp., N.J., 15c

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 15c, Tel: YE 2-8600**
**See ad on page 338**

Telectron, Fla., 15sc

**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 35sc, Tel: TWining 8-1000**
**See ad on page 260**

**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 50c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**

Telkor, Inc., Ohio, 5c
Temco Electronics, Div. Ling-Temco Electronics Inc., Texas, 15c, 40c, 55c, 65c
Temperature Engineering Corp., N.J., 60c, 65s, 70s
Tempo Instrument, Inc., N.Y., 65sc
Texas Instruments Incorporated, Apparatus Div., Texas, 15c, 55c, 65c, 75c
Texas Instruments Incorporated, Geosciences & Instrumentation Div., Texas, 30s, 45c, 50c, 60c

**Thermal Controls, Inc., 41 River Rd., North Arlington, N.J., 65sc, Tel: NOrth 1-1000**
**See ad on page 450**

Thermo Electric Co., Inc., N.J., 15sc, 55sc, 60sc
ThermoCal, Inc., Calif., 40, 60
Theta Instrument Corp., N.J., 40s
Thomas Electronics, Inc., N.J., 50c
Thompson & Co., John I., D.C., 50c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 15c, 25c, 40c, 55c, 60c, 65c, 75c
Torwico Electronics, Inc., N.J., 60c
Tracerlab, Inc., Mass., 30c, 40sc
Transistor Specialties, Inc., N.Y., 15c, 35c, 40c, 65c

**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 15, 65, Tel: LOwell 7-3810**
**See ad on page 520**

Tri-Tronics Co., Ill., 35s, 50s
Trinity Equipment Corp., N.Y., 45c

**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 15sc, 40c, 50sc, 55sc, Tel: OVerbrook 1-0400**
**See ad on page 294**

Trott Electronics, Inc., N.Y., 35c, 50c, 60c, 65c

**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 15c, Tel: ULysses 5-5131**
**See ad on page 438**

Union Switch & Signal, Div. Westinghouse Air Brake Co., Pa., 15c
United Aircraft Corp., Norden Div., Conn., 25sc, 50c, 55s
United Aircraft Corp., Norden Div., Ketay Dept., N.Y., 25sc
United Aircraft Products, Inc., Ohio, 45c, 60c
United Control Corp., Wash., 5c, 15c, 20c, 30c, 40c, 45c, 55c, 60sc, 65c
United Electric Controls Co., Mass., 30sc, 45sc, 60sc, 70sc
United Sensor & Control Corp., Conn., 40s
United Shoe Machinery Corp., Mass., 15c, 40c, 55c
U.S. Controls, Inc., N.Y., 10c, 15c, 20c, 30c, 40c, 50c, 60c, 65c
U.S. Recording Co., D.C., 5c
U.S. Science Corp., Calif., 45c, 60c, 65c, 75c
U.S. Time Corporation, The, Conn., 25sc
Universal Match Corp., Armament Div., Mo., 40c, 55c, 60c
Uniwave, Inc., N.Y., 5c, 15c, 30c, 35c, 40c, 45c, 50c, 65c, 70c

**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 45s, 70s, Tel: AN 1-2660**
**See ad on page 678**

Vap-Air Div., Vapor Heating Corp., Ill., 60c, 65c
Vapor Recovery Systems Co., Calif., 15sc, 30sc, 45sc, 60sc

**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 5c, 70c, Tel: DAvenport 6-4000**
**See ad on pages 116-117**

Varo Mfg. Co., Inc., Texas, 15c, 20c, 40c, 55c, 65c
VecTrol Engineering, Inc., Conn., 35c, 60c, 75c

**Veeco Vacuum-Electronics Corp., Terminal Dr., Plainview, L.I., N.Y., 70s, Tel: OVerbrook 1-8300**
**See ad on page 681**

Vickers, Inc., Electric Products Div., Mo., 20c, 30c, 55c, 75c

**Victory Engineering Corp., P.O. Box 373, 114 Springfield Rd., Union, N.J., 30c, 60c, Tel: MUrdock 8-7150**
**See ad on page 535**

Vinson Co., E. R., Calif., 5c, 15c, 35c, 50c, 65c
Vinson Mfg. Co., Inc., 15c, 20c, 30c
Virginia Electronics Co., Inc., D.C., 15c, 50c
WacLine, Inc., Ohio, 15c, 75c
Walkirt Co., Calif., 50c, 65c
Wallace & Tiernan, Inc., N.J., 20s, 30s, 45s, 70s

**Wallson Associates, Inc., 912-914 Westfield Ave., Elizabeth, N.J., 40c, 70c, Tel: FLanders 1-0700**
**See ad on page 294**

Wang Laboratories, Inc., Mass., 40c, 60c
Waugh Engineering Co., Calif., 20sc, 65c

**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 30s, 60s, Tel: LOcust 8-6820**
**See ad on page 255**

Webcor, Inc., Electronics Div., Ill., 65c
Weighing & Controls, Inc., Pa., 30sc

**Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick St., Chicago 10, Ill., 35s, 70s, Tel: MIchigan 2-2000**
**See ad on page 681**

West Instrument Corp., Ill., 15s, 45s, 60s
Westinghouse Electric Corp., Air Arm Div., Md., 25s, 55s
Westinghouse Electric Corp., Electronics Div., Md., 15c
Westport Electric, Calif., 50sc

**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 40c, Tel: JUdson 2-3030**
**See ad on page 704**

Wheeler Electronic Corp., Conn., 15c, 65c
Wheelock Signals, Inc., N.J., 5s
Whittaker Gyro Div., Telecomputing Corp., Calif., 15c, 25c, 40c, 55c





# Directory I. Complete Equipment

## 4. Automatic Control Equipment.

Wiancko Engineering Co., Calif., 45c
Wickes Engineering & Construction Co., N.J., 15c, 75c
Wintronics, Calif., 5c, 55c
Worner Electronics Devices, Ill., 5s, 10s, 15s, 20s, 30s, 35s, 50s
Yellow Springs Instrument Co., Ohio, 60sc
Zenith Electric Co., Ill., 65sc, Magnetic Relays sc

**Automatic pilots:**
**See class 1**

**Beacons, aircraft:**
**See class 1**

**Beat frequency oscillators:**
**See class 3**

**Benches, test:**
**See class 84**

**Beta gauges:**
**See class 24**

**Bolometers:**
**See class 21**

**Brakes:**
**See class 30**

## 5. Bridges.

5. Capacitance
10. Impedance
15. Inductance
20. Resistance

Arnoux Corp., Calif., 20s

**Associated Research, Inc., 3792 W. Belmont Ave., Chicago 18, Ill., 20c, Tel: COrnelia 7-4040**
**See ad on page 279**

Atohm Electronics, Calif., 20c
Avo Limited, England, 5s, 10s, 15s, 20s
B & F Instruments, Inc., Pa., 20s
Barnes Development Co., Pa., 5sc, 20sc
Biddle Co., James G., Pa., 20s

**Boonton Electronics Corp., 738 Speedwell Ave., Morris Plains, N.J., 5s, 15s, Tel: JEfferson 9-4210**
**See ad on page 256**

Bristol Co., Conn., 5c, 10c, 15c, 20c
Brooks Research, Inc., N.Y., 5sc, 10sc, 15sc, 20sc
Bruel & Kjaer, A/S, Denmark, 5s, 10s, 15s, 20s
Brunswick Instruments, N.J., 20c
C.E.S. Electronic Products, Inc., Calif., 5s
Canadian Marconi Co., Canada, 5s, 10s, 15s, 20s
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 10c, 15c, 20c

## 5. Bridges.

**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, 10sc, 15s, 20s, Tel: OAkwood 7-6800**
**See ad on page 308**

Clough-Brengle Co., Ill., 5s, 15s, 20s

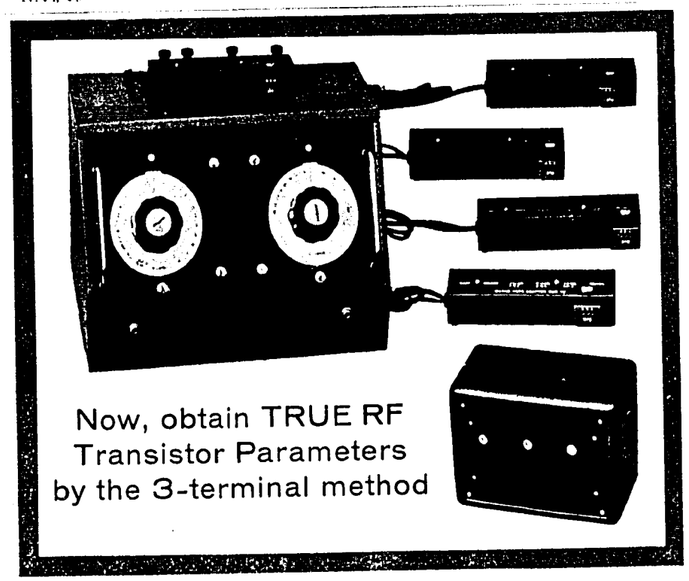
**Communication Measurements Laboratory, Inc., 348 Leland Ave., Plainfield, N.J., 20sc, Tel: PLainfield 4-5502**
**See ad on page 479**

Consolidated Airborne Systems, Inc., N.Y., 5s

**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 20sc, Tel: YOnkers 3-5900**
**See ad on page 523**

**Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 5s, Tel: PLainfield 6-9000**
**See ad on Cover 3**

Datascan, Inc., N.J., 5c
Decker Corporation, The, Pa., 5s


You can now measure alpha and admittance parameters of transistors accurately (within 2%) and easily under small signal conditions.

The addition of 5 special transistor adapters to the revolutionary Wayne Kerr RF Bridge, a two or three terminal transformer ratio arm bridge, makes these measurements possible. The direct currents and voltages required are furnished by a separate Wayne Kerr Control Unit which also provides for monitoring. Write for technical information.

**FOR TRANSISTOR MEASUREMENTS** Measure input, output admittance and current gain in grounded base configuration, and input and transfer admittance in grounded emitter configuration.
**FOR GENERAL MEASUREMENTS** Measure complex impedance, balanced and unbalanced, or balanced with the center point grounded and the impedance between any pair of terminals in a 3-terminal network.
Measure resistance, capacitance and inductance over 15 kc to 5 mc.
**Capacitance range:** 0.01 μμf to 20,000 μμf in 6 ranges
**Resistance range:** 10 ohms to 10 megohms in 6 ranges
**Inductance range:** 0.5μH to 50 mH in 6 ranges
Extreme stability due to fact that impedance looking back into the terminals and impedance to ground at balance are both exceedingly low.
Accuracy of bridge: 1% over most of range; with adapters—within 2%.
RF Bridge B-601 $640.00
Transistor Adapters Q-601 A to E $300.00
**OTHER INSTRUMENTS:** AF, VHF Bridges; AF, UHF Oscillators; Microwave Equipment; Attenuators; Wave Analyzer; Distance and Vibration Meters.
**Send for complete W-K catalog showing other instruments**

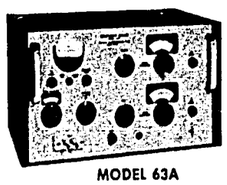
**WAYNE KERR** CORPORATION 1633 Race Street Philadelphia 3, Pa.
*Electronics for Measurement and Control*
*Sales, Stock and Service Facilities*

For details, circle #176 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# INSTRUMENTS FOR LABORATORY and PRODUCTION

WIDE RANGE PRECISION
**INDUCTANCE BRIDGE**



- .002 μh to 1.1 h inductance
- Accuracy to 0.25%
- Resolution to 0.01%
- .002 to 110K ohm series res.
- Self contained 1-100KC osc-det.
- No false or sliding nulls

MODEL 63A
PRICE $1500

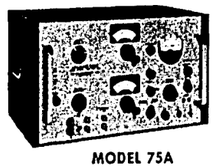
ACCEPTED THROUGHOUT THE INDUSTRY!
**SENSITIVE RF VOLTMETERS**



- 10KC — 600 MC frequency range
- 300 μv — 3V range: 91CA
- 1 μv — 3V range: 91C
- RMS reading below 0.1V
- HI-Z Probe and 52 ohms Adapter supplied

MODEL 91CA Price $495
MODEL 91C Price $395

THREE TERMINAL **CAPACITANCE BRIDGE** FOR 1 MC USE



- .0002 to 1000 μμf capacitance
- Accuracy to 0.25%
- Resolution to 0.01%
- .01 to 1000 μmhos conductance
- 1000 ohms to 100 megohms resistance
- Self contained 1 MC osc-det.
- Built-in DC bias for semiconductor testing available

MODEL 75A
PRICE $990

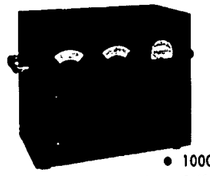


**SENSITIVE DC NULL DETECTOR**
FOR MAXIMUM READOUT ON WHEATSTONE BRIDGES

- 1 μv to 100 v sensitivity
- Input: 10 megohms constant
- Floating input
- Amplifier Gain: 100 db

MODEL 56A
PRICE $395

THREE TERMINAL
**CAPACITANCE BRIDGE**
FOR 100 KC USE



- .0002 to 11,000 μμf capacitance
- Accuracy to 0.25%
- Resolution to 0.01%
- .001 to 1000 μmhos conductance
- 1000 ohms to 100 megohms resistance
- Self-contained 100KC osc-det
- Built-in DC bias for semiconductor testing available

MODEL 74C
PRICE $935

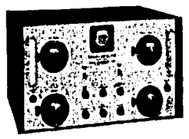
**SENSITIVE DC METER**
ULTRA SENSITIVITY IN VOLTAGE & CURRENT MEASUREMENTS

- 1 μv to 1000 v in 17 ranges
- 0.1 μμa to 1 a in 25 ranges
- Input: 10 megohms constant
- Floating input
- Amplifier Gain: 100 db



MODEL 95A
PRICE $495

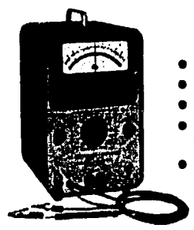
**TUNED AC NULL DETECTOR**



- Useful as a detector for low frequency impedance bridges Balance can be observed on either built in CRT or external meter
- 20 cycles to 200 KC tuning range
- 10 μv sensitivity
- 1 megohm shunted by 100 μμf input
- Discrimination to 40 db against 2nd harmonic
- Phase sensitive

MODEL 51A
PRICE $1900

**DC VOLTMETER**



- 10 μv to 1000 v in 14 ranges
- Input: varies 10-100 megohms
- Amplifier Gain: 70 db
- Amplifier Output: ±0.5 ma into 1500 ohms
- Zero center meter eliminates polarity switch

MODEL 97A
PRICE $325

RF DISTORTION METER & VOLTMETER



- 1-100 MC:85B
- 0.1-6 MC:85C
- Sensitivity: 60 db below 1 v
- Accuracy: ±2 db
- RF Voltmeter: Same as 91C

MODEL 85B & C
PRICE $740

UHF GRID DIP METER

- Highest sensitivity to L & C coupling
- 300 to 1000 MC
- Accuracy: 2%



MODEL 101B
PRICE $275

**DIFFERENTIAL DC VOLTMETER**

- 10 μv to 1000 v in 14 ranges
- Input: varies 10-50 megohms
- DC common mode rejection = 80 db
- Critically balanced attenuators provide true differential measurements



MODEL 98A
PRICE $395

*HERE ARE OUR REPRESENTATIVES*

**NEW ENGLAND:** George Gregory Assoc., West Newton, Mass. • **CONNECTICUT:** George Gregory Assocs., Chesshire, Conn. • **W. NEW YORK STATE:** S. B. M. Assoc., Rochester, N. Y. • **E. NEW YORK STATE:** SBM Assocs., Albany, N. Y. • **N. J., N. Y. C., L. I., WESTCHESTER:** N. L. R. Assoc., W. Orange N. J. • **E. PENNA.:** NLR Associates, Phila., Penn. • **DEL., MD., WASH., D.C.:** C. F. Paddock, Silver Spring, Md. • **SOUTH EAST:** J. L. Highsmith & Co., Charlotte, N. C. • **MICHIGAN:** Dayton Associates, Detroit, Mich. • **W. PENNA., OHIO, W. VA.:** Dayton Assoc., Dayton, O. • **ILL., INDIANA:** Kenneth W. Meyers Co., Chicago 31, Ill. • **IOWA, WIS., MINN.:** Arthur Engineering Sales Co., Milwaukee, Wisc. • **TEX., OKLA., ARK., LA.:** Engineering and Equipment Co., P. O. Box 13311, Ft. Worth, Texas, Phone: WA 3-7386 • **COL., UTAH, N. M.:** Parrish Electronics, Denver Col. • **WASH., OREGON, E. IDAHO:** Hawthorne Electronics, Seattle, Washington • **N. CALIF.:** J. F. O'Halloran & Assocs., Palo Alto, Calif. • **SO. CALIF., ARIZ., NEV.:** J. F. O'Halloran & Assoc., N. Hollywood, Calif. • **CANADA:** Mel Sales Ltd., Toronto, Canada • **EXPORT:** A. V. Marano & Co., N. Y. C.

**Boonton ELECTRONICS Corp.** Morris Plains, N. J. Phone: JEfferson 9-4210




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# Directory I. Complete Equipment

## 5. Bridges.

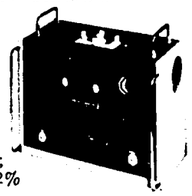
Direct T/V Replacements, Ltd., England, 5s, 20s
Dytronics Company, Ohio, 5s, 10s, 15s, 20s
E P I C, Inc., N.Y., 5s, 15s, 20s
Electro Scientific Industries, Ore., 5sc, 10sc, 15sc, 20sc
Electronic Applications, Inc., Conn., 5s, 10s, 15s, 20s
**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 5s, 20s, Tel: STillwell 6-8700**
See ad on page 283
Electronic Measurements Corp., N.Y., 5s
Elk Electronic Labs., Inc., N.Y., 5c, 10c, 15c
Elliott-Automation Limited, England, 5c, 10c, 15c, 20c
Engineering Associates, Ohio, 10c, 15c, 20c
Eppley Laboratory, Inc., The, R.I., 20c
**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5s, 15s, 20s, Tel: EVergreen 6-1300**
See ad on page 566
Furzehill Laboratories, Ltd., England, 15s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 20c
**General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, 15s, 20s, Tel: EMerson 9-4400**
See ad on Cover 4
General Resistance, Inc., N.Y., 20s
Geotronic Labs., Inc., Tex, 15c
Gertsch Products, Inc., Calif., 10s
Gray Instrument Co., Pa., 20s
Gulton Industries, Inc., N.J., 5sc
Harris Transducer Corp., The, Conn., 10s
Harrison Electrosonics, Inc., B. M., Mass., 20s
Heath Company, Subsid. Daystrom, Inc., Mich., 5s, 10s
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 10s, Tel: DAvenport 6-7000**
See ad on pages 3-18
Indikon Co., Inc., The, Mass., 5c
Industrial Control Co., N.Y., 5sc
Industrial Development Labs., Inc., N.J., 5s, 20s
Industrial Instruments, Inc., N.J., 5s, 10s, 20s
**Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 5s, 10s, 15s, 20s, Tel: GRamercy 3-4684**
See ad on page 333
Industrial Transformer Corp., Fla., 15sc
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c
Julie Research Laboratories, Inc., N.Y., 10c, 20sc
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 20sc, Tel: CLifford 6-4000**
See ad on pages 120-121
Keithley Instruments, Inc., Ohio, 20s
**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 5c, 10c, Tel: STillwater 3-5000**
See ad on page 415
Knight Electronics Corp., Ill., 5s, 20s
Leeds & Northrup Co., Pa., 5s, 10s, 15s, 20s
Liquidometer Corp., The, N.Y., 5s
MacLeod & Hanopol, Inc., Mass., 5c
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 5s, 10s, 15s, 20s, Tel: LOwell 7-0607**
See ad on page 332
**Measurements, A McGraw-Edison Division, P.O. Box 180, Boonton, N.J., 5c, Tel: DEerfield 4-2131**
See ad on page 335
Metrologie, Compagnie Generale de, France, 10s
**Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 20s, Tel: DRexel 6-7130**
See ad on page 482
Millitest Corp., N.Y., 20sc
Millivac Instruments, Div. Cohu Electronics, Inc., N.Y., 20s
Minneapolis-Honeywell Regulator Co., Rubicon Instruments, Pa., 20sc
Mui-Lead & Co., Ltd., England, 5s, 10s, 15s, 20s
Muirhead Instruments, Inc., N.Y., 5s, 10s, 15s, 20s
Munzig International, Inc., Calif., 5s, 10s, 15s, 20s
Nacimco Products, Calif., 20s
Narda Microwave Corp., The, N.Y., 10s
Neptune Electronics Co., N.Y., 20c
Network Industries, Inc., N.J., 5c
New England Scientific Instruments Co., Mass., 5s, 15s, 20s
Nichols, Ltd., R. H., Canada, 5s, 15s, 20s
Pacific Instrument Co., Calif., 15c
Philips Electronic Instruments, N.Y., 5s, 10s, 20s
Philips Electronics Industries, Ltd., Canada 5s, 20s
**Physics Research Laboratories, Inc., P.O. Box 555, Hempstead, L.I., N.Y., 20c, Tel: IVanhoe 3-8299**
See ad on page 288
Precise Electronics & Development Corp., N.Y., 5c, 10c, 15c, 20c
RMS Associates, Inc., N.Y., 20c
Radio City Products Co., Inc., Pa., 20s
Radiometer, Denmark, 5s, 10s, 15s, 20s
Rank Cintel, Ltd., England, 5s, 10s, 15s, 20s
Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c, 20c

**See the pink section preceding page 1 for complete instructions on how to get the most out of this Directory.**

Rinco, Inc., Ore., 5sc, 10s, 15sc, 20sc
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, 20c, Tel: LOckwood 5-4578**
See ad on page 324
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 5s, 10s, 15s, 20s, Tel: PRescott 3-8010**
See ad on page 246
Ruge Associates, Inc., Arthur C., N.H., 20c
Scopes Company, Inc., The, N.Y., 5s, 20s
**Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N.Y., Thermometer c, Tel: BEverly 5-2300**
See ad on page 292
Serfass Corp., Div. Milton Roy Co., Pa., 5c
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 15c, 20s, Tel: WOodlawn 5-2341**
See ad on page 258
Simmonds Precision Products, Inc., N.Y., 5s
Solartron Electronic Group, Ltd., The, England, 5s, 20s
Southwestern Industrial Electronics Co., Tex., 5s, 10s, 15s, 20s
Spivey, Inc., James S., D.C., 5c, 15c
Standard Telephones & Cables, Ltd., England, 10s


THE WAYNE KERR CORPORATION
Electronics for Measurement and Control

Transformer Ratio-Arm Type B801 VHF Admittance Bridge 1-100 Mc; 0-100 mmho; ±230pf; ±2%



A complete line, world renowned for its excellence. Precision *Transformer* bridges from 60 cps to 250 MC for *direct 2, 3 or 4 terminal measurements.* Audio, Video, and VHF oscillators, voltmeters, wave analyzers, wattmeters. Industrial electronic micrometers and vibration *instruments.*

**FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL**
**BURLINGAME ASSOCIATES**
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WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400
For details, circle #178 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Shallcross

## PRECISION WIREWOUND RESISTORS



Small, Shallcross "P-Type" encapsulated resistors offer unmatched stability and reliability for critical applications. All are reverse-pi wound on multiple-section epoxy resin bobbins then hermetically-sealed in a tough epoxy coating.

"P-Type" resistors are offered in a complete range of commercial and military types with radial leads, axial leads, or lug terminals. Military types meet or exceed MIL-R-93A (85°C ambient) and MIL-R-9444 (125°C ambient) requirements—including salt water immersion tests. Standard tolerances—1%, 0.5%, 0.25%, 0.1%, and 0.05%. Close tolerances and matched pairs a specialty. *Write for Bulletin L-30.*

## ROTARY SELECTOR SWITCHES

### STANDARD SWITCHES



Single-Pole, instrument-type switches using silicone-impregnated steatite or phenolic desks. ⅛" laminated silver or solid brass contacts and multiple-leaf wiper arms. Positive, long-life ball-bearing detent. Up to 4 decks. Many optional special features. *Bulletin L131.*

### OVAL CERAMIC SWITCHES



Assembled by Shallcross from stock, interchangeable parts, the "12,000" Series offers custom-built quality without the delay and cost of specials. Solid silver contacts and collector rings on steatite decks. 0.0025 Ω contact resistance. 1 to 3 poles per deck, up to 10 decks. Adjustable stop. Optional detent. *Bulletin L-32.*

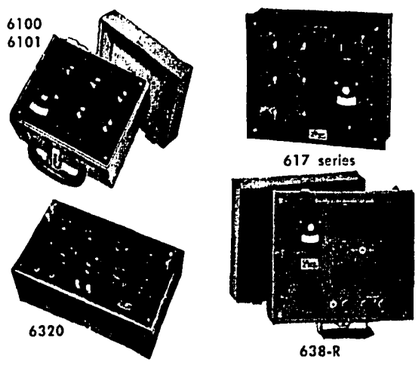
### MINIATURE SWITCHES



Only 1⅞" square by 1" deep for first deck, ⅝" for additional decks. Silver alloy button contacts and multi-leaf wipers maintain low contact resistance. Glass fiber Silicone-laminate decks for outstanding humidity, moisture and salt-spray resistance. 1 to 4 poles per deck. 1 or 2 hole mounting. Easily-positioned, adjustable stops. *Bulletin L-45A.*

## BRIDGES

Field & Lab Types for
Precise DC Resistance Measurements
. . . 1 micro-ohm to $10^{9}$ megohms.
*Bulletin L-19B*




| Model Number | Measurement Accuracy | Maximum Setting | Minimum Setting | Circuit | Special Features |
|---|---|---|---|---|---|
| 6100 | ±0.1% +0.01Ω (.1Ω to 1.011 MegΩ) | 1.011 MegΩ | 0.001Ω | Fault Location—Wheatstone | Fault Location by Murray, Varley, Hilborn & Fisher Loop Tests. |
| 6101 | ±0.1% +0.01Ω (1Ω to 11.11 MegΩ) | 11.11 MegΩ | 0.001Ω | Wheatstone | Four dial rheostat usable as decade box. |
| 6320 | ±0.02% +0.01Ω (1Ω to 11.11 MegΩ) | 111.11 MegΩ | 0.00001Ω | Wheatstone | Most accurate five dial Shallcross bridge for direct resistance measurement. |
| | ±0.05% to ±20% on separate "+" and "—" percent selectors. (1Ω to 10 MegΩ) | 11.111 MegΩ | 0.0001Ω | Percent Limit | Rapid "GO-NO GO" percent limit testing. Built-in adjustable comparison standard. |
| 638-R | ±0.75% or better (.001Ω to 1Ω) | 11.11Ω | 0.000001Ω | Kelvin | Overlapping Kelvin and Wheatstone ranges selected with single ratio dial. |
| | ±0.2% +0.01Ω (1Ω to 11.11 MegΩ) | 11.11 MegΩ | .001Ω | Wheatstone | |
| 6350 | ±1%, (10Ω to 10 MegΩ) ±2%, (10 MegΩ to 10,000 MegΩ) ±5%, (above 10,000 MegΩ) | 1.111 x $10^{9}$ MegΩ | 0.01Ω | Wheatstone with d-c Amplifier | Modular construction dual range power supply, null indicator-amplifier, for 115V. 60 cycle operation. |
| 617 Series | ±0.1% to ±20% on separate "+" and "—" selectors from a minimum resistance consistent with number of dials in use to the maximum settings. | 111,111Ω 1,111,110Ω 11,111,100Ω | 0.1Ω *1Ω 10Ω | Percent Limit | For rapid "GO-NO GO" percent limit testing. Hand or foot operated for production testing. All models also usable for direct resistance measurements. Binding post for external d-c power supply. |
| | †±0.2% +0.01Ω from a minimum consistent with number of dials in use to the maximum setting. | 111,111Ω 1,111,110Ω 11,111,100Ω | 0.1Ω *1Ω 10Ω | Wheatstone | |

† Except 617B and 617J ±0.1% ±0.01Ω. * Except 617G, 0.01Ω.

## DECADE RESISTANCES



Available as single unmounted decades or as complete decade resistance boxes with 1 to 6 dials. Steps as low as 0.01 ohm; total resistance as high as 11,111,100 ohms.

Remarkably rugged and accurately-calibrated for maintained stability in rough lab, classroom and production line work. Uses impregnated Shallcross precision wirewound resistors mounted on steatite switch decks. Large button contacts of silver or brass. *Write for Bulletin L-17A.*

## DECADE VOLTAGE DIVIDERS



Laboratory-type voltage dividers used in bridge circuits, for measuring rotary potentiometer linearity, in synchro-test delta bridge circuits, and in other uses requiring maintained accuracy and high resolution. Kelvin-Varley or Potentiometer circuits available in eight 4 and 5 dial models.

Impregnated Shallcross precision wirewound resistors used throughout. Steatite instrument switches assure uniformly low contact resistance. *Bulletin L-16B.*

## SHALLCROSS MANUFACTURING CO.

SELMA, NORTH CAROLINA
Representatives in principal U.S. Cities· Toronto & Vancouver, Canada



For details, circle #179 on Reader Service Card



## PIPELINE TO PRECISION



**Model WWVT RECEIVER**
*transistorized and rugged*
**3½" RACK MOUNT** *also available*

A portable receiver for utilizing transmissions of WWV and WWVH. It is battery operated, small (9"×12"×5"), light weight (6 lbs.), rugged-sealed metal case and encapsulated components, and designed especially for remote operations under extreme environmental conditions; meets MIL-B180B Specifications. It features instantaneous crystal controlled frequency selectivity, self-contained antenna and 2 microvolt sensitivity.

**Model WWVC STANDARD FREQUENCY COMPARATOR**

A highly sensitive (better than 1 uv on all frequencies) crystal controlled receiver for utilizing transmissions of the National Bureau of Standards stations WWV and WWVH. Used for precise audio and radio frequency standards work as well as accurate time interval measurements. Available in cabinet or for rack mounting using a 5¼" panel.

**Model SR-7 WWV RECEIVER**

This receiver is the dual conversion type. Dimensions: 3-15/16" × 11" × 8½" deep. Available in upright or vertical models, or as rack mounted model. Noise limiter, antenna trimmer and provision for an oscilloscope or head phone are incorporated.

**Model AK-8 ANTENNA KIT**

This special antenna is designed to provide optimum response to signals from WWV and WWVH on 2.5, 5, 10, 15 and 20 mc. Includes modification kit for receiver with all wire, 50' of coaxial cable and suitable fittings to provide outstanding performance. Antenna is completely assembled; needs only one support for satisfactory operation.

# NEW!

*VLF Receiving and frequency Calibrating Equipment now available*

DETAILS SENT UPON REQUEST

*Send for specifications, prices and delivery*

SPECIFIC PRODUCTS
21051 COSTANSO · BOX 425
WOODLAND HILLS, CALIF

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# Directory I. Complete Equipment

## 5. Bridges.

**Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 20s, Tel: REctor 2-8163**
See ad on page 462
Sullivan, Ltd., H. W., N.Y., 5s, 15s, 20s
**Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N.J., 10c, 15c, Tel: WIndsor 4-2221**
See ad on page 555
Technology Instrument Corp., Mass., 5s, 10s, 15s, 20s
Tel-Labs, Inc., N.H., 20c
Telechrome Mfg. Corp., N.Y., 20s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, Tel: YE 2-8600**
See ad on page 338
Trans-Sonics, Inc., Mass., 20c
Transformers, Inc., N.Y., 10c, 15c, 20c
Ultronix, Inc., Calif., 20c
Waters Mfg., Inc., Mass., 10s, 15s
**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 5s, 10s, 15s, 20s, Tel: LOcust 8-6820**
See ad on page 255
Western Electronic Products Co., Calif., 5s, 10s, 15s, 20s
Winslow Co., Inc., The, N.J., 5sc, 10sc, 15sc, 20sc
**Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 5c, 10c, 15c, 20c, Tel: BEekman 3-6720**
See ad on page 296

## 6. Broadcast Receivers.

5. AM broadcast
10. AM shortwave
15. FM broadcast
20. TV broadcast—B & W
25. TV broadcast—Color
30. TV closed circuit
35. UHF—VHF

Acoustical Mfg. Co., Ltd., England, 5s, 15s
Admiral Corp., Ill., 20s, 25s, 30c
American Communications Corp., N.Y., 5c
American Elite, Inc., N.Y., 5s, 10s, 15s
American Geloso Electronics, Inc., N.Y., 5s, 10s, 15s
**American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 5s, 20s, 35s, Tel: CApital 2-3791**
See ad on page 472
**Amtron Corp., 17 Felton St., Waltham 54, Mass., 35c, Tel: TWinbrook 4-5020**
See ad on page 591
Andrea Radio Corp., N.Y., 20s
Audiotronics Corp., Calif., 5s, 15s
Automatic Radio Mfg. Co., Inc., Mass., 5s, 15s
Bell Aircraft Corp., Avionics Div., N.Y., 35c
Bendix Corp., The, Bendix Radio Div., Md., 35s
Blonder-Tongue Laboratories, Inc., N.J., 5s, 10s, 15s, 30s, 35s
Bogen-Presto Co., N.J., 5s, 15s, Multiplex s

## 6. Broadcast Receivers.

CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 5c, 15c, 20c, 25c, 30c
Calbest Electronics, Calif., 5s, 15s
Canadian Marconi Co., Canada, 5s, 10s, 15s, 20s, 30s
Capehart Corp., Dynamic Electronics Div., N.Y., 5sc, 15sc, 20sc, 25c, 30c, 35c
Channel Master Corp., N.Y., 5s, 10s
Chicago Aerial Industries, Inc., Ill., 30c
Chisholm Industries, Ltd., Canada, 5c, 15c
Collins Radio Co., Iowa, 5s
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 30s
Community Engineering Corp., Pa., 35c
Continental Mfg., Inc., Neb., 5s, 15s
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 35c, Tel: HAmilton 7-7961**
See ad on page 440
Crosby-Teletronics Corp., N.Y., 15s
Crosley Division, Avco Corp., Ohio, 15s
Delco Radio Div., General Motors Corp., Ind., 5c
De Wald Radio Div., United Scientific Labs., N.Y., 5sc
Dominion Electrohome Industries, Ltd., Canada, 5s, 15s, 20s, 25s
Du Kane Corp., Ill., 5s, 15s
E.M.I. Electronics, Ltd., England, 30s
Electron Corporation, Tex., 20sc, 30sc, 35sc
Electron Enterprises, Inc., Ill., 5sc, 15c
Electronet Div., Rue Prods., Calif., 35c
Electronic Applications, Inc., Conn., 15s
Elk Electronic Labs., Inc., N.Y., 5c, 10c, 15c, 35c
Engineering Associates, Ohio, 35c
Fanon Electronic Industries, Inc., N.J., 5s
Federal Manufacturing & Engineering Corp., N.Y., 35c
Fisher Radio Corp., N.Y., 5s, 15s
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 30sc, Tel: CEnter 9-6100**
See ad on page 480
GPL Division, General Precision, Inc., N.Y., 30 sc
General Electric Co., Ltd. of England, The, Telephone Works, England, 5s, 10s, 15s, 20s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 35c
Gilfillan Bros., Inc., Calif., 25c, 30c
Gonset Division, Young Spring & Wire Corp., Calif., 5s, 10s
Granco Products, Inc., N.Y., 5s, 15s
Grimson Color, Inc., N.Y., 30 Wide-screen s
Hallamore Electronics Co., Calif., 30s
Hallicrafters Co., The, Ill., 5s, 10s, 15s, 35c
Hammarlund Mfg. Co., Inc., N.Y., 5s, 10s
Harman-Kardon, Inc., N.Y., 5c, 15c

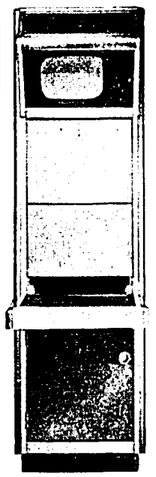
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# SCAN-A-GRAPH®

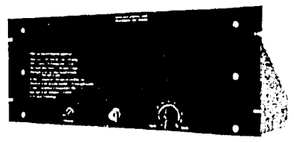
**DISTORTION-FREE**

**CLOSED CIRCUIT TV WITHOUT CAMERA OR LIGHT...**

**to as many as 500 MONITORS simultaneously!**

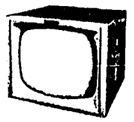


Yes, without camera or light, Scan-a-graph, a self-contained TV transmitter provides instant, accurate visual communication with as many as 500 locations simultaneously. Scan-a-graph guarantees needle sharp, telescopic brightness essential for closed circuit systems in science, industry, and education.



**VIDEO LINE AND DISTRIBUTION AMPLIFIER**

Versatile, one chassis unit with internal switching permits use as distribution or line amplifier or a combination of both - Adjustable frequency compensation-Electronically regulated power supply.



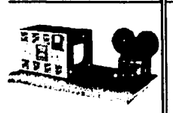
**VIDEO MONITORS**

800 L. definition, aluminized CRT for brightness and detail. Exclusive "syncrolace" for perfect interlace. Sizes: 8, 14, 17, 21, 24, 27 inches.



**SYNC GENERATOR**

Self contained, regulated unit with exclusive sync pulse mixing for perfect interlace. Separate H and V and mixed H and V outputs.



**KINESCOPE RECORDER**

A high quality kinescope recorder, completely self contained, providing an inexpensive method for the filming of telecasts.



**PULSE CROSS MONITOR**

Inputs permit viewing both remote and local sync signals simultaneously. Provides a visual check of signal.

*Also manufacturers of "OFF THE AIR" tuners and "REGULATED POWER SUPPLIES"*

**TELEVISION UTILITIES CORP.**
**DIVISION OF NORD**
New Hyde Park, L.I., N.Y.

TWining 8-1000 • Cable Address: NORDNEWHYDEPARK
For details, circle #181 on Reader Service Card




## 6. Broadcast Receivers.

Hastings Products, Mass., 15s
Heath Co., Subsid. Daystrom, Inc., Mich., 5s, 10s, 15s
Hoffman Electron Tube Corp., N.Y., 20s, 30s
Hoffman Electronics Corp., Calif., 5s, 15s, 20s, 35s
I.D.E.A., Inc., Ind., 5s, 15s
Intercontinental Electronics Corp., N.Y., 30sc
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 30c, 35c
Interstate Electronics Corp., Calif., 35c
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c, 25c, 35c
Karg Laboratories, Inc., Conn., 15sc
**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., P.O. Box 623, San Diego 11, Calif., 30s, Tel: BRowning 7-6700**
**See ad on pages 110-111**
Knight Corp., Ewen, Mass., 35c
Knight Electronics Corp., Ill., 5s, 10s
Lettine Radio Mfg. Co., N.Y., 35c
Madigan Electronic Corp., N.Y., 30c
Magnavox Co., The, Ind., 5s, 15s, 20s, 25c, 35s
Mallory & Co., Inc., P. R., Ind., 35c
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 5s, 10s, 15s, 35s, Tel: LOwell 7-0607**
**See ad on page 332**
Miratel, Inc., Minn., 5s, 20s, 30s, 35s
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 5c, 10c
Motorola, Inc., Ill., 5s, 15s, 20s, 30s, 35s
Munzig International, Inc., Calif., 5s, 10s, 15s
**National Radio Company, Inc., 37 Washington Ave., Melrose 76, Mass., 5, 10, Tel: NOrmandie 5-4800**
**See ad on page 614**
Nems-Clarke Co., Div. Vitro Corp. of America, Md., 20c, 25c
Nevada Air Products Co., Nevada, 5s, 35s
Newcomb Audio Products Co., Calif., 5s, 15s
Nippon Electric Co., Ltd., Japan, 5sc, 20s
Olympic Radio & Television, N.Y., 5sc, 10sc, 15sc, 20sc, 25sc
Omega Mfg. Co., Inc., N.Y., 5c, 15c, 20c
Pacific Mercury Electronics, Thomas Organ Co., Calif., 5s, 15s, 20s, 35s
Packard Bell Electronics Corp., Calif., 5s, 15s, 20s, 25s, 30s, 35s
Philco Corporation, Pa., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35c
Philco Corporation, Govt. & Industrial Group, Pa., 30sc
Philmore Mfg. Co., Inc., N.Y., 5s
Precise Electronics & Development Corp., N.Y., 5s, 10c, 15s
Precision Electronics, Inc., Ill., 15s
Prescott Television Co., Calif., 30c
Pye Telecommunications, Ltd., England, 10s, 35s
RCA Victor Co., Ltd., Canada, 5sc, 10sc, 15sc, 20sc, 25s
**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 35c, Tel: DAvenport 1-1130**
**See ad on page 243**
Racal Engineering, Ltd., England, Wide-range s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20s, 25s, 30sc, 35sc
Radio Engineering Labs., N.Y., 35sc
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 35c, Tel: EVergreen 8-6000**
**See ad on page 506**
Railway Communications, Inc., Mo., VLF sc
Republic Electronic Industries Corp., N.Y., 30c
Resdel Engineering Corp., Calif., 35s
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 15s, Tel: PRescott 3-8010**
**See ad on page 246**
Scott, Inc., H. H., Mass., 5s, 15s
Setchell-Carlson, Inc., Minn., 20s, 30s
Sherwood Electronic Labs., Inc., Ill., 5sc, 15sc
Simpson Mfg. Co., Inc., Mark, N.Y., 5s, 15c
**Specific Products, P.O. Box 425, 21051 Costanso, Woodland Hills, Calif., WWV sc, Tel: DI 0-3131**
**See ad on page 259**
Spencer-Kennedy Laboratories, Inc., Mass., 30c
Standard Telephones & Cables, Ltd., England, 5c, 10c, 15c, 20c, 30sc, 35c
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5s, 15s
Superex Electronics Corp., N.Y., 5s
Sylvania Electric Products Inc., N.Y., 5s, 15s, 20s, 25c, 30s, 35s
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 35c
TMC (Canada) Ltd., Canada, 5s
Tapetone, Inc., Mass., 35sc
Telechrome Mfg. Corp., N.Y., 5s, 10s
**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 30sc, Tel: TWining 8-1000**
**See ad on this page**
Tensor Electric Development Co., Inc., N.Y., 35c
Thompson Ramo Wooldridge Inc., Calif., 5c, 20s, 25s, 30c, 35sc
United Aircraft Corp., Norden Div., Conn., 30c
United Shoe Machinery Corp., Mass., 35c
Van Norman Industries, Inc., N.H., 10c
Vinco Electronics Corp., Conn., 15c, 35c
Volta Mfg. Co., Ill., 5c
Warwick Mfg. Corp., Ill., 5c, 10c, 15c, 20c, 25c, 35c
Wells-Gardner Electronics Corp., Ill., 5c, 15c, 20c, 35c
Westinghouse Electric Corp., Electronics Div., Md., 35c
Westinghouse Electric Corp., TV-Radio Div., N.J., 5s, 15s, 20s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 10sc, Tel: JUdson 2-3030**
**See ad on page 704**
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, 35sc, Tel: BEnton 1-0700**
**See ad on page 573**
Wintronics, Calif., 5c, 15c





# Directory I. Complete Equipment

## 7. Broadcast Transmitters.

5. AM broadcast
10. FM broadcast
15. Fixed Frequency
20. Relay broadcast & STL equipment
25. TV broadcast
30. TV closed circuit
35. UHF—VHF

Adler Electronics, Inc., N.Y., 20sc, 25sc, 35sc
**Amtron Corp., 17 Felton St., Waltham 54, Mass., 35c, Tel: TWinbrook 4-5020**
**See ad on page 591**
Barber Labs., Alfred W., N.Y., 15c
Bell Aircraft Corp., Avionics Div., N.Y., 35c
Blonder-Tongue Laboratories, Inc., N.J., 30s
Budelman Electronics Corp., Conn., 20c
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 5c, 10c, 25c, 30c
Canadian General Electric Co., Ltd., Electronic Equip. & Tube Dept., Canada, 5s, 25s
Canadian Marconi Co., Canada, 5s, 10s, 25s, 30s
Chisholm Industries, Ltd., Canada, 5c, 10c, 15c, 20c
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 15s, 20s, 35s, Tel: OAkwood 7-6800**
**See ad on page 308**
Collins Radio Co., Iowa, 5s
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 20s, 35sc
**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 5c, 25c, 35c, Tel: EVergreen 1-1135**
**See ad on page 156**
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 35c, Tel: HAmilton 7-7961**
**See ad on page 440**
Crosley Division, Avco Corp., Ohio, 10s, 15s
Crown Engineering, N.M., 20c
Dynair Electronics, Inc., Calif., 10c, 25sc, 30s, 35c
Dynamics Corp. of America, N.Y., 5c, 10c, 15c, 25c, 30c, 35c
E.M.I.-Cossor Electronics, Ltd., Canada, 25c, 30c
E.M.I. Electronics, Ltd., England, 10s, 20s, 25s, 30s, 35s
Electron Corporation, Tex., 25sc, 30sc, 35sc
Electronet Div., Rue Prods., Calif., 35c
Electronic Applications, Inc., Conn., 20c
Emerson Electric Mfg. Co., The, Mo., 15c
Engineering Associates, Ohio, 35c
Federal Manufacturing & Engineering Corp., N.Y., 35c
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 30sc, Tel: CEnter 9-6100**
**See ad on page 480**
GPL Division, General Precision, Inc., N.Y., 30sc
Gates Radio Co., Ill., 5s, 10s, 15s, 20s, 25s, 35s
General Electronic Laboratories, Inc., Mass., 10sc, 15sc, 20sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 35c
Gilfillan Bros., Inc., Calif., 30c
Hallicrafters Co., The, Ill., 5c, 10c, 15c, 35c
Heath Co., Subsid. Daystrom, Inc., Mich., 15s
Intercontinental Electronics Corp., N.Y., 30sc
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c, 15c, 20c, 35c
International Telephone & Telegraph Corp., ITT Industrial Products Div., Calif., 15sc, 30sc
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 20c, 30c, 35c
Interstate Electronics Corp., Calif., 30c, 35c
Jansky & Bailey, Inc., D.C., 15c
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c, 25c
Kahn Research Laboratories, Inc., N.Y., AM Stereo Adapters, s
**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 30s, Tel: CApital 6-4000**
**See ad on page 330**
**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., Box 623, San Diego 11, Calif., 30s, Tel: BRowning 7-6700**
**See ad on pages 110-111**
Levinthal Electronic Products, Inc., Calif., 35c
Madigan Electronic Corp., N.Y., 30c
Mallory & Co., Inc., P. R., Ind., 35c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s, 20s, 25s, 30sc, 35s
Missile Systems Corp., Calif., 20s
Motorola, Inc., Ill., 30s
Nippon Electric Co., Ltd., Japan, 5c, 10c, 15c, 20c, 25c, 30s, 35c
Packard Bell Electronics Corp., Calif., 30s
Packard Bell Electronics, Service Division, Calif., 30s
Peer, Incorporated, Tex., 20c
Philco Corporation, Pa., 20c, 30sc
Philco Corporation, Govt. & Industrial Group, Pa., 30sc
Pye Telecommunications, Ltd., England, 5s, 10s, 15s, 35s
RCA Victor Co., Ltd., Canada, 5s, 10s, 20s, 25s, 30s, 35s
Radio Corp. of America, N.J., 5s, 10s, 20s, 25s, 30s, 35s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20c, 25s, 30s, 35sc
Radio Engineering Laboratories, Inc., N.Y., 10sc, 15sc, 20sc, 35sc
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 35c, Tel: EVergreen 8-6000**
**See ad on page 506**
Republic Electronic Industries Corp., N.Y., 30c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, Tel: LOckwood 5-4578**
**See ad on page 324**
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 10s, Tel: PRescott 3-8010**
**See ad on page 246**
Seg Electronics Co., Inc., N.Y., 30s
Spencer-Kennedy Laboratories, Inc., Mass., 30c
Standard Electronics Div., Reeves Instrument Corp., N.J., 5c, 10c, 15c, 25c, 30c, 35c
Standard Telephones & Cables, Ltd., England, 5sc, 10sc, 15sc, 25sc, 35sc
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 35c
Tel-Instrument Electronics Corp., N.J., 30s
Telecomtrol Corp., N.J., 20sc
Telerad Mfg. Corp., N.Y., 15sc
**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 30sc, Tel: TWining 8-1000**
**See ad on page 260**
Thompson Ramo Wooldridge Inc., Calif., 30sc
Thompson Ramo Wooldridge Inc., Dage Television Div., Ind., 30sc
United Aircraft Corp., Norden Div., Conn., 30c
United Shoe Machinery Corp., Mass., 35c
Van Norman Industries, Inc., Electronics Div., N.H., 5c, 10c, 15c, 20c
Westinghouse Electric Corp., Electronics Div., Md., 15c, 35c
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, 35sc, Tel: BEnton 1-0700**
**See ad on page 573**

**Burglar alarm systems:**
See class 4

**Cabinets, enclosures & panels:**
See class 84

**Cable & wire:**
See class 85

**Cable testers:**
See class 14

**Calculators, electronic:**
See class 9

**Calibrators, instrument:**
See class 14

**Calibrators, telemetering:**
See class 36

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Calibrators, television test:**
See class 37

**Calibrators, time & voltage:**
See class 25

**Calorimeters:**
See class 21

**Cameras, oscilloscope:**
See class 25

**Cameras, television:**
See class 34

**Capacitor testers:**
See class 14

**Cardiac equipment:**
See class 19

## 8. Carrier Current Equipment.

5. Complete terminal equipment
10. Repeat & relay equipment

AMP Incorporated, Pa., 5s, 10s
Adler Electronics, Inc., N.Y., 10sc
Altec Lansing Corp., Calif., 10s
Automatic Timing & Controls, Inc., Pa., 10s
Bell & Gossett Co., Ill., 5c
Budd Electronics, Inc., N.Y., 5c, 10c
Budelman Electronics Corp., Conn., 5s, 10s
Collins Radio Co., Iowa, 5sc, 10sc
Collins Radio Co., Central Sales Office, Tex., 5s, 10s
Control Corp., Minn., 5c
Crescent Engineering & Research Co., Calif., Carrier Control Systems s
Daystrom, Inc., Weston Instrument Div., N.J., 10s
Dicon Corporation, N.Y., 5c, 10c
Electric Specialty Co., Conn., 5c, 10c
Electronic Assistance Corp., N.J., 5c, 10c
Elliott-Automation Limited, England, 10c
Etelco, Ltd., England, 5sc, 10sc
Federal Manufacturing & Engineering Corp., N.Y., 10c
Fisher Berkeley Corp., Calif., 5s
General Electric Co., Apparatus Sales Div., N.Y., 5c, 10c
General Electric Co., Communication Products Dept., Va., 5s, 10s
General Electric Co., Ltd., of England, Telephone Works, England, 5s, 10s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c
Gray Mfg. Co., The, Conn., 5c, 10c
Hoover Electronics Co., Md., 5c, 10c
International Telephone & Telegraph Corp., ITT Laboratories, Calif., 5c, 10c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c

## 8. Carrier Current Equipment.

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5s, 10s
Lenkurt Electric Co., Inc., Calif., 5s, 10s
Lynch Carrier Systems, Inc., 5s
Marstan Electronics Corp., N.Y., 10c
Moore Associates, Inc., Calif., 5sc
Motorola, Inc., Ill., 5s, 10s
National Scientific Laboratories, Inc., D.C., 10c
Nippon Electric Co., Ltd., Japan 5s, 10s
**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5s, Tel: WAtkins 9-9117**
**See ad on pages 36-39**
Philco Corporation, Govt. & Industrial Group, Pa., 5sc, 10sc
Philips Electronics Industries, Inc., Canada, 5s, 10s
Pye Telecommunications, Ltd., England, 10c
Radio Engineering Products, Canada, 5s, 10s
**Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 5c, Tel: DEerfield 4-3100**
**See ad on page 290**
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, Tel: EVergreen 8-6000**
**See ad on page 506**
Railway Communications, Inc., Mo., 5sc, 10sc
Robertshaw-Fulton Controls Co., A. & I. Div., Calif., 5sc, 10sc
Specialty Electronics Development Corp., N.Y., 5c, 10c
Standard Telephones & Cables, Ltd., England, 5sc, 10sc
Telechrome Mfg. Corp., N.Y., 5s, 10s
ThermoCal, Inc., Calif., 10
**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 10, Tel: LOwell 7-3810**
**See ad on page 520**
Union Switch & Signal, Div. Westinghouse Air Brake Co., Pa., 5c, 10c
United Shoe Machinery Corp., Mass., 10c
Vocaline Co. of America, Inc., Conn., 5c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 10c, Tel: JUdson 2-3030**
**See ad on page 704**

**Cases & cabinets:**
See class 84

**Cathode-ray tubes:**
See class 77

**Chambers, environmental test:**
See class 14

**Changers, record:**
See class 61

**Chokes:**
See class 45

**Circuit testers:**
See class 14

**Clocks, digital:**
See class 9

**Closed circuit receivers:**
See class 6

**Closed circuit transmitters:**
See class 7

**Clutches, magnetic:**
See class 30

**Coaxial cable:**
See class 85

**Combustion controls:**
See class 4

**Commutators, telemetering:**
See class 36

**Computer amplifiers:**
See class 38

## 9. Computers & Accessories.

5. Analog to digital converters
10. Card to tape converters
15. Computers, air navigation
20. Computers, analog
25. Computers, digital
30. Data reduction equipment
35. Digital to analog converters
40. Electronic calculators
45. Encoders
50. Memory & storage devices
55. Packaged circuits
60. Perforators
65. Printers
70. Programming devices
75. Shift registers
80. Tape to card converter
85. Tape readers
90. Tape recording & playback equip.

AC Spark Plug, The Electronics Div. of General Motors, Wis., 15c, 25c
**ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 55c, 75c, Tel: VIctoria 9-2414**
**See ad on page 474**
ACF Electronics Div., ACF Industries, Inc., Md., 5c, 10c, 20c, 25c, 30c, 35s, 45c, 55sc, 75sc
ALWAC Computer Div., El-Tronics, Inc., Calif., 25s, 30c, 50sc, 55s, 90sc
AMP Incorporated, Pa., 50s, 55s, 70s, 75s
A R & T Electronics, Inc., Ark., 5c
ASCOP, Div. Electro-Mechanical Research, Inc., N.J., 5c, 45sc
Adage, Inc., Mass., 5sc, 10c, 35sc, 50sc, 80c
Advanced Instrument Corp., Calif., 5s, 45s, 60s, 70s, 85s
Advanced Research Associates, Inc., Md., 5c, 20c, 35c, 45c
Aeroflex Corp., The, Aeroflex Laboratories Div., N.Y., 5s
Aeronutronic, Div. Ford Motor Co., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50sc, 55sc, 70c
Aircraft Armaments, Inc., Md., 20c, 30c, 70c

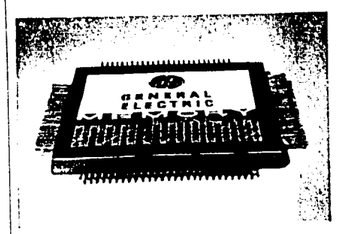




# Directory I. Complete Equipment

## 9. Computers & Accessories.

**Airflyte Electronics Co., 537 Avenue A, Bayonne, N.J., 5c, 35c, 45c, 70c, Tel: HEmlock 6-2230**
**See ad on page 408**
Airmec Limited, England, 20s
**Airpax Electronics, Inc., Seminole Div., Fort Lauderdale, Fla., 5c, Tel: LUdlow 3-6160**
**See ad on pages 82-83**
**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 30, 65, Tel: FOrest 6-4467**
**See ad on page 276**
**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 50s, 55c, Tel: JUniper 3-0160**
**See ad on page 496**
Allegany Instrument Co., Inc., Md., 5c, 25c, 30c
Alpha Corporation, Tex., 30c, 70c
**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 5c, 10sc, 20c, 60sc, 90sc, Tel: DUnkirk 5-7401**
**See ad on page 164**
American Hydromath Corp., N.Y., 20sc
American Machine & Foundry Co., Tobacco Div., N.Y., 5sc, 20s, 25c
Ampex Corp., Data Products Co., Calif., 50sc, 85sc, 90sc
Ampex Military Products Co., Calif., 50c, 85c, 90c
Anadex Instruments, Inc., Calif., 5c, 30c, 70c
Analogue Controls, Inc., N.Y., 15c, 20c, 25c
ANelex Corp., Mass., 65c, 85c, Tape to Printer Converter c
Antlab, Inc., Ohio, Electronic Integrators sc
Applied Dynamics, Inc., Mich., 20s
**Applied Electronics Corp. of New Jersey, 22 Center St., Box 43, Metuchen, N.J., 5sc, 10s, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc, 55sc, 70s, 75s, Tel: LIberty 9-1500**
**See ad on page 353**
Applied Magnetics Corp., Calif., 90sc
Arma Div., American Bosch Arma Corp., N.Y., 20c, 25c
Armstrong Whitworth Equipment, England, 5s, 35s
Arnoux Corp., Calif., 30s, 35s
Artronic Instrument Co., The, Md., 30c, 50c, 55s, 75c
Associated Electrical Industries Limited, Instrumentation Div., England, 20c, 50c
Audio Devices, Inc., N.Y., 90s
Auerbach Electronics Corp., Pa., 10c, 25c, 50c, 55sc, 70c, 75s, 80c
Austin Electronics, N.Y., 5c, 20c, 25c, 30c, 50c
Automation Dynamics Corp., N.J., 5c, 30c, 35c
Automation, Inc., Mass., 50c
Automation Management, Inc., Mass., 20sc, 30sc, 35sc
Autometric Corp., N.Y., 20c, 25c, 30c, 70c
Autonetics, Div. North American Aviation, Inc., Calif., 15c, 20c, 25s, 50s
B & F Instruments, Inc., Pa., 30sc
BJ Electronics, Borg-Warner Controls, Calif., 30c, 50sc, 55s, 70c, 90sc
Bach Auricon, Inc., Calif., 30s, 70s, 90s
Bailey Meter Co., Ohio, 20c, 25c, 30c
Baldwin Piano Co., The, Industrial Products Div., Ohio, 5s, 45s, 70s
Barnes & Reinecke, Ill., 5c, 20c, 25c, 55c, 70c
Beattie-Coleman, Inc., Calif., 70sc
Beckman Instruments, Inc., Berkeley Div., Calif., 20s, 30c, 35s, 65s
Beckman Instruments, Inc., Scientific & Process Instruments Div., Calif., 5c, 25c, 30c, 35c
Beckman Systems Div., Calif., 5c, 30c
Beck's, Inc., Minn., 50s, 55c
Bell Aircraft Corp., Avionics Div., N.Y., 20c, 25c
Bell & Gossett Co., Ill., 10sc, 20sc, 30c, 45sc, 50c, 55c, 65sc, 70c, 75c
Bendix Corp., The, Bendix-Pacific Div., Calif., 5c, 25c, 30c, 35sc, 40c, 45sc, 50c, 55s, 70sc, 75sc
Bendix Corp., The, Bendix Systems Div., Mich., 30c, 70c
Bendix Corp., The, Computer Div., Calif., 10s, 20c, 25s, 30sc, 35c, 45c, 50c, 55c, 70c, 75c, 80s, 85sc
**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 5c, 45sc, 50c, 70c, Tel: ATlas 8-2000**
**See ad on pages 103-106**
Bendix Corp., The, Industrial Controls Section, Mich., 55s
Bendix Corp., The, York Division, Pa., 5c, 25s, 30s
Benson-Lehner Corp., Calif., 5c, 10c, 30sc, 35c, 50c, 65c, 70c, 80c, 85c, 90c
Biophysical Electronics, Inc., Pa., 20c, 25c, 30c, 65c
Bone Engineering Corp., Calif., 45c, 65c
**Bowmar Instrument Corp., 8000 Bluffton Rd., Box 2835, Fort Wayne, Ind., 5c, 20c, 35c, 70c, Tel: SHerwood 3121**
**See ad on page 340**
Bristol Co., Conn., 5c, 20c, 25c, 30c, 35c, 70c
Brooks Research, Inc., N.Y., 5c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 90c
Bruno-New York Industries Corp., N.Y., 20c
Bryant Computer Prods. Div., Vt., 50sc
Budd Electronics, Inc., N.Y., 5c, 15c, 25c, 30c, 35c, 45c, 55c, 65c, 70c
Bunnell & Co., J. H., N.Y., 85sc
Burr-Brown Research Corp., Ariz., 55s
Burroughs Corp., Mich., 5c, 10s, 15c, 20c, 25sc, 30sc, 35c, 40s, 50s, 65sc, 80s
Burroughs Corp., Electronic Instruments Div., Pa., 75sc
Burton-Rodgers, Inc., Ohio, 20c, 55c, 70c
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 50c, 55c
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 90c
CGS Laboratories, Inc., Conn., 5c, 10c, 35c, 80c
C & K Components, Inc., Mass., 50sc, 55sc, 75sc
Cadre Industries Corp., N.Y., 50c, 55c
California Computer Products, Inc., 5c, 15c, 25c, 35c, 50c, 55c
California Technical Industries, Div. Textron, Inc., Calif., Tape reader punches & duplicators
Cambridge Thermionic Corp., Mass., 30s, 50s, 70s
Canadian Aviation Electronics, Ltd., Canada, 5c, 20c, 30c, 35c
Canadian Westinghouse Co., Ltd., Canada, 15sc
Canoga Division, Underwood Corp., Calif., 20c, 25c, 30c, 35c, 55c
Capehart Corp., Dynamic Electronics Div., N.Y., 55c, 70c, 75c
Carmody Corp., N.Y., 70sc
Cedar Engineering Div., Control Data Corp., Minn., 5c, 35c, 45c, 50c
Centronix, Inc., Fla., 55c
Chadwick-Helmuth Co., Calif., Multipliers s
Chance Vought Electronics Div., Texas, 5c, 15c, 20c, 25c, 45c, 50c, 70c
Chesapeake Instrument Corp., Md., Analog to Digital Analyzers sc
Chicago Aerial Industries, Inc., Ill., 5c, 20c, 30c, 55c




GE MEMORY PACKS

General Electric's *Memory Pack* is a completely encapsulated memory storage plane for computer systems. Built to withstand considerable shock and vibration and extreme variations in humidity, altitude and temperature, the enclosed construction of the Memory Pack allows it to be easily stacked into multiples of the basic number of bits. Tested packs are available in virtually any size, usually at no increase in cost over open planes. 2721

GENERAL ELECTRIC

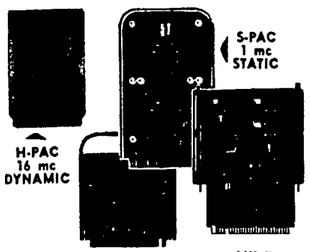
DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK

For details, circle #182 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# DIGITAL MODULES AND SYSTEMS

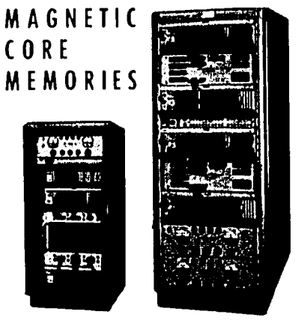
## HIGH SPEED DIGITAL MODULES



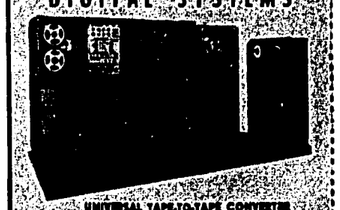

## CODE BAR SWITCHES AND KEYBOARDS



## RANDOM ACCESS MAGNETIC CORE MEMORIES



## SPECIAL PURPOSE DIGITAL SYSTEMS



UNIVERSAL TAPE-TO-TAPE CONVERTER

- Computer Language Translators
- Time Compression — Delties
- Data Processing and Control
- Information Storage and Retrieval
- Automatic Data Reduction

COMPUTER CONTROL COMPANY, INC.
982 CONCORD STREET • FRAMINGHAM, MASS.
2251 BARRY AVENUE • LOS ANGELES, CALIF.

For details, circle #183 on Reader Service Card



# MODULARIZED PULSE GENERATING EQUIPMENT

**Time Delays and Gates**

**1310A:** Single channel, repetition rate variable 0.1—1000 CPS, delay variable 10 μs to 10 seconds.

**2300 Series:** 1, 2 or 3 channels, 1—10,000 μs delay from external trigger or 10 CPS—100 KC internal oscillator.

**Single Pulses**

**3450C:** 2 CPS—2 MC repetition rate, 0—10,000 μs delay, .05—10,000 μs width, .015 μs rise, ±50 v into 50Ω (slightly less at 2 MC).

**3450C/Y:** Provides two simultaneous pulses similar to flip-flop plate outputs. 1.7 MC repetition rates, widths to 1 second, .02 μs rise, ±45 v from 470Ω.

**3450C/X:** Offers pulse pairs and pulse trains. 1 MC repetition rate, pair separation is 0.5 μs—1 second, train separation/duration 0.2 μs—1 second, .015 μs rise, ±50 v into 50Ω.

**4120B:** .5 CPS—500 KC repetition rate, .05 μs—10,000 μs delay, 0.1—10,000 μs width, .03 μs rise, ±35 v into 100Ω.

**4550A:** 100 CPS—10 MC repetition rate, .02—1000 μs delay, .05—1000 μs width, 0.01 μs rise, ±8 v into 180Ω (12 v open circuit).

**2120B:** Single shot—100 KC repetition rate, 0—10,000 μs delay, .05—10,000 μs width, .02 μs rise, ±50 v into 50Ω.

**1410A:** 0.1—1000 CPS repetition rate, .01—100 MS width, 1 μs rise, ±25 v from 5000Ω.

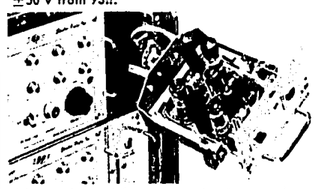
**Double Pulses**

**4565A:** 10 MC unit with 0.01 μs rise; delays, widths to 1000 μs. Separate outputs ±8 v into 180Ω (12 v open circuit).

**2140B:** Single shot—100 KC, 1—10,000 μs separation, 0.05—10,000 μs width, .02 μs rise, ±50 v into 50Ω.

**Code Groups (PPM)**

**2130B-2150B:** Three to five outputs, single shot—10 KC, 0—100 μs delays, .04 μs rise. Mixed outputs ±50 v from 93Ω.



E-P plug-in modular construction is versatile and highly accessible and permits easy extension of standard instruments to special requirements.

**DIGITAL PULSE EQUIPMENT**

**Single and Double Pulses**

**5620A, 5632A, 5650A:** For high accuracy and low jitter. Pulse repetition rates, delays, and widths are controlled by gating through selected clock pulses, which may be provided from a crystal oscillator or variable repetition rate module.

**Code Groups (PCM)**

**5632A:** Sync repetition rate 1—10,000 clocks, two groups with three pulses each. Group and pulse delays to 1000 clocks. Clock periods determined by accessory modules.

**Word Generators**

**5500A:** Clock rates to 1 MC, 1—40 serial bits, 0.1—1000 μs output width, 4.5 v into 600Ω.

**5510A:** Same as 5500A, except 1—80 serial bits.

**Pulse Trains**

**5632A:** Two trains. Sync repetition rate is 1—10,000 clocks, 1—1000 pulses per train, train delays 1—1000 clocks, 0.2 μs wide pulses, 5 v into 600Ω.

**CURRENT GENERATING and CORE TESTING EQUIPMENT**

**5100B:** Two positive, two negative drivers; two delayed, four direct coding channels; 100 CPS—1 MC programming; +5 ma to 2.4 amperes, −5 ma to 4 amperes driver outputs; .04—.5 μs rise times; .1—100 μs widths. Program: 10 bits plus repeats. Model 81 jig permits test of .50 ID and larger cores.

**5120B:** Same as 5100B except two delayed coding channels only, one positive & one negative driver.

**3000A:** Same as 5120B except: driver input is external triggers or pulses at rates to 3.3 MC.

**3010A:** Same as 3000A except two positive and two negative drivers.

**6020B Calibrator:** Measures pulse amplitude to 0.5%, minimum-maximum comparison ±0—500 v, 0—1000 ma in five ranges.

**CA100:** Same, but single comparison. ±0—100 mv, 1 v ranges.

Representatives in Major Cities
Phone: ORegon 8-2244

**Electro-Pulse, Inc.**
A SUBSIDIARY OF SERVO CORPORATION OF AMERICA
6711 S. SEPULVEDA BLVD., LOS ANGELES 45, CALIF.

For details, circle #184 on Reader Service Card



ANALOG SHAFT POSITION converted to DIGITAL NOTATION

ANALOG VOLTAGE

# DIGITO-METER™

TYPE D15




For all computer applications

ELECTRO-MEC

instruments are outstanding in precision and reliability—documented by complete performance test data (supplied with each instrument at no extra charge).

All our standard designs are individually engineered to meet the requirements of your specific application.

**ELECTRO-MEC Laboratory, Inc.**

**47-51 33 Street,**
**Long Island City 1, N.Y.**

Write or phone our Engineering Department
**STillwell 6-3402**
**Teletype: NY 4-2126**



TYPE 11

# POTENTIO-METER

For details, circle #185 on Reader Service Card






# Directory I. Complete Equipment

## 9. Computers & Accessories.

Chicago Electronics Div., Land-Air, Inc., Ill., 5sc, 30c, 55c, 75c
Chrono-Log Corp., Pa., 70s, Digital Clocks s
Clary Corp., Calif., 25s, 40s, 60sc, 65sc, 75c
Cleveland Metal Specialties Co., Ohio, 55sc, 75c
Clifton Precision Products Co., Inc., Pa., 5c
Clipper Gear & Machine Co., Mich., 30c, 70c
Coils-Electronics Co., Pa., 45c, 55c
Coleman Electronics, Calif., 5s, 30c, 35s, 45s, 70c
Collins Radio Co., Central Sales Office, Tex., 5c, 10s, 15s, 20c, 25c, 30s, 35s, 45c, 50c, 55c, 70c, 80s, 85c
Collins Radio Co., Western Div., Calif., 85c

**Computer Control Co., Inc., Eastern Div., 983 Concord St., Framingham, Mass., 5c, 10c, 25sc, 30c, 35c, 40c, 45c, 50s, 55sc, 75sc, 80c, Tel: TRinity 5-6185**


See ad on page 264


**Computer Control Co., Inc., Western Div., 2251 Barry Ave., Los Angeles 64, Calif., 5c, 10c, 25sc, 30c, 35c, 40c, 45c, 50s, 55sc, 75sc, 80c, Tel: BRadshaw 2-9135**


See ad on page 264


Computer Engineering Associates, Inc., Calif., 20c
Computer Equipment Corp., Calif., 5c, 10c, 35c, 55c, 70c, 80c
Computer-Measurements Co., Div. Pacific Industries, Inc., Calif., 60s, 65s
Computing Systems, Inc., N.Y., 5c, 20sc, 35c, 50c, Multipliers s
Computing Devices of Canada, Ltd., 15sc, 20c, 50c

**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 25c, 45c, 50c, 55c, 70c, 75c, 90c, Tel: ALgonquin 4-5106**


See ad on page 249


Consolidated Avionics Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55sc, 70c, 75c, 80c
Consolidated Controls Corp., Conn., 5c, 45c, 50c
Consolidated Electrodynamics Corp., Calif., 5s, 30s, 50s, 90s
Control Corp., Minn., 5c, 25c, 50c, 70c
Control Data Corp., Minn., 5c, 15c, 25c, 30c, 35c, 90c

**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 50c, Tel: HAmilton 7-7961**


See ad on page 440


Control Equipment Corp., Mass., 5c, 25c, 30c, 35s, 40c, 45c, 50s, 55s, 70c, 75s, 90c
Control Instrument Co., Inc., Subsid. Burroughs Corp., N.Y., 5c, 10c, 20c, 25c, 30c, 50c, 65c, 80c, 85c
Cook Electric Co., Ill., 50c, 85c, 90c
Cook Electric Co., Data-Stor Div., Ill., 5c, 10c, 45c, 50c, 85c, 90c
Cook Technological Center, Div. Cook Electric Co., Ill., 15c, 30c, 45c, 50c, 55c, 65c, 85c, 90c
Corbett Science Laboratories, F. W., Calif., 30c, 70c
Crosley Division, Avco Corp., Ohio, 15s, 40s, 50s, 70s
Cubic Corp., Calif., 5s, 25c, 30c, 70s, Digital-Audio Readouts s, Precision Timing Devices s
Cunningham Son & Co., Inc., N.Y., 30s

**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 5sc, 20c, 25c, 35c, Tel: SWarthmore 1-0100**


See ad on page 510


Curtiss-Wright Corp., Electronics Div. IMI Branch, N.M., 5c, 25c, 30c, 35c, 45c, 50c, 55c, 70c
D & R, Ltd., Calif., 70s
Dalmo Victor Co., Div. of Textron, Inc., Calif., 15c, 50c
Data Products Co., Inc., Md., 5c, 30c, 35c, 50c, 55sc, 75c
Datascan, Inc., N.J., 70c
Datex Corp., Calif., 5sc, 10sc, 30sc, 35sc, 45sc, 65sc, 70sc, 80sc
Daven Co., The, N.J., 5c, 35c
Davenport Mfg. Co., Ill., 5c, 20c, 25c
Daystrom, Inc., Control Systems Div., Calif., 5c, 25c, 35c, 50c, Tape to Tape Converters c
Daystrom, Inc., Military Electronics Div., Pa., 15c, 20c, 25c, 30c, 50c
Daystrom, Inc., Weston Instrument Div., N.J., 35c
Dayton Electronic Products Co., Ohio, 55sc, 75sc
Delco Radio Division, General Motors Corp., Ind., 20s, 25s
Deltime, Inc., N.Y., 50c
Designers for Industry, Inc., Ohio, 5c, 10c, 15c, 20c, 25c, 30c, 35c, 50c, 55c, 70sc, 80c
Devol Research Corp., Conn., 5sc, 45sc, 70sc
Di/An Controls, Inc., Mass., 10c, 25c, 30c, 35c, 40c, 50sc, 55sc, 70sc, 75sc, 80c
Dicon Corporation, N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 65c, 70c, 75c, 80c, 85c, 90c
Digital Equipment Corp., Mass., 25, 35, 55
Digitran Co., The, Div. Endevco Corp., Calif., 5s, 35s
Digitronics Corp., N.Y., 25c, 30c, 55c, 85c
Dimensions, Inc., N.Y., 50c, 65c
Direct T/V Replacements Ltd., England, 90s
Djordjevic Engineering Co., Djeco Div., Ill., 5c, 15c, 20c, 25c, 35c, 70c
Donner Scientific Co., Subsid. Systron-Donner Corp., Calif., 15c, 20s, 30c, 40c, 55c
Dwyer Engineering Co., Inc., N.H., 55c
Dychro Corp., Mass., 5s, 35sc, 45sc
Dymec, Div. Hewlett-Packard Co., Calif., 5sc, 30sc, 60s
Dynamic Controls Co., Mass., 55sc
Dynamics Corp. of America, N.Y., 20c, 55c, 70c
Dynamics Research Corp., Mass., 5sc
Dynapar Corporation, Ill., 50s, 55s
E.M.I.-Cossor Electronics Ltd., Canada, 20c, 25c, 30c, 50c, 55c, 60c, 65c, 70c, 75c, 85c, 90c
E.M.I. Electronics Ltd., England, 10s, 20s, 25s, 50s, 90s
Ebauches S. A., Dept. Oscilloquartz, c/o Freeport Engineering Co., N.Y., 55sc
Edcliff Instruments, Calif., 15
Edison Industries, Thomas A., Instrument Div., N.J., 15c, 50c
Ehrenpreis, David, Consulting Engineers, N.Y., 5c, 15c, 25c, 30c, 40c
Elcon Laboratory, Inc., Mass., 5c
Eldorado Electronics, Calif., 30c
Electric Regulator Corp., Conn., 70c
Electro Instruments, Inc., Calif., 5s, 30s, 35s

**Electro-Mec Laboratory, Inc., 47-51 33rd St., Long Island City 1, N.Y., 5c, Tel: STillwell 6-3402**


See ad on page 264


Electro-Mechanical Research, Inc., Fla., 45s

**Electro-Pulse, Inc., 6711 S. Sepulveda Blvd., Los Angeles 45, Calif., 5c, 15c, 25c, 55sc, 70sc, 75s, pulse generators s, Tel: ORegon 8-2244**


See ad on page 264


Electro Radiation, Inc., Calif., 50c, 75c
Electro Scientific Industries, Oregon, 20s
Electro-Seal Corp., Ill., 55c
Electronet Div., Rue Prods., Calif., 55s
Electronic Assistance Corp., N.J., 20c
Electronic Associates, Inc., N.J., 5c, 15c, 20sc, 30c, 35s, 65s
Electronic Communications, Inc., Fla., 5c, 15c, 20c, 25c, 35c, 45c, 75c
Electronic Computer Co., Inc., Pa., 5sc, 20c, 25c, 30sc, 35sc
Electronic Controls Inc., Conn., 5c, 10c, 35c, 45c, 70c, 80c, 85c, 90c
Electronic Plastics Co., Calif., 20c, 70c
Electronic Specialty Co., Calif., 30c, 45sc, 55c, 70c
Electronic Systems Development Corp., Calif., 5c, 15c, 20c, 25sc, 30c, 35sc, 55sc, 75sc
Electronic Tube Corp., Pa., 70c
Electronics Corp. of America, Mass., 5c
Elliott-Automation Limited, England, 5sc, 15sc, 20sc, 25sc, 30sc, 40sc, 45sc, 50sc, 55s, 85s
Emerson Electric Mfg. Co., The, Mo., 5c, 20c, 25c
Engineered Electronics Co., Calif., 55s, 75s
Ensco, Inc., Utah, 20c
Epsco, Inc., Mass., 30c, 45c, 50s, 55s, 75s
Erie Pacific Div., Erie Resistor Co., Calif., 5c, 20c, 25c, 50sc

**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 35s, 55s, Tel: GLendale 6-8592**


See ad on pages 40-41


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# DIGITAL TIMING EQUIPMENT

## Companion units for all types of recording media

### For Data Acquisition

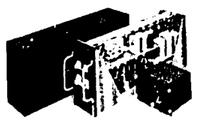
**DIGITAL TIMING GENERATOR**



Price: $7,950.00

Model 270 is an all solid state device which generates binary coded decimal timing signals. These signals are recorded on magnetic tape throughout the data recording periods, providing a precise digital index in terms of elapsed time. The Generator also visually displays the exact time in hours, minutes, and seconds as illuminated digits.

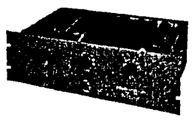
**AIRBORNE DIGITAL TIMING GENERATOR**



Price: $7,450.00

Model 206A is designed specifically for airborne applications. Its output is the same as Model 270. All essential requirements of MIL-E-5400 specifications are met.

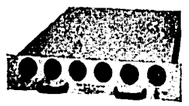
**RETARDED BIT RATE UNIT**



Price: $5,250.00

Model 220 operates in conjunction with Timing Generators, Models 270 and 206A, for providing a pulse-height, pulse-width signal to record time on equipments other than magnetic tape recorders.

**RUN CODE SELECTOR**

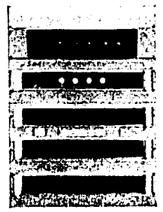


Price: $2,500.00

Model 225 is used with Model 270 Timing Generator inserting data run code numbers, or year, month, and day, in between timing words.

### For Data Reduction

**UNIVERSAL MAGNETIC TAPE SEARCH UNIT**



The Series 2000 Universal Magnetic Tape Search Unit is used to control a magnetic tape transport during periods of data reduction for automatically searching the tape on the basis of time indices previously recorded. Changing from one time code to another is accomplished by changing time code detectors. All tape times are displayed in decimal regardless of tape time code format.

Price: Dependent upon Time Code Formats Specified.

## Solid State BINARY TO DECIMAL CONVERTER

### for data processing systems



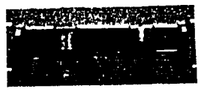
All solid state device for converting any 4 bit code to decimal illuminated display. Latching circuits provide memory for binary information. No preventive maintenance is required.

Price: $95.00 (Nixie Bulb not included – Discounts for Quantity Purchases)

**DIGITAL LANGUAGE TRANSLATORS** for converting angular encoders of N bits of binary or Gray code to decimal readout including conversion multiplier. Accuracy equivalent to accuracy of encoder. Conversion of 16 bits in 5 ms.

## ULTRA STABLE OSCILLATOR

### Guaranteed stability of 5 parts in $10^{10}$ per day.



Price: $2,350.00

With a history of over 4 years in installations throughout the world, the Model 101C Ultra Stable Oscillator has established an unexcelled performance record as a precision 1 Mc crystal controlled Frequency Standard of almost unbelievable stability. Every unit is pre-aged in the factory until the frequency drift rate is less than 5 parts in $10^{10}$ per day.

**MULTIPLIERS AND DIVIDERS** for providing frequencies in decade steps from 1 Kc to 100 Mc are available as standard equipment. Other frequencies can be obtained on special order.

*Write for Technical Data*

**Hermes**

ELECTRONICS CO.

75 CAMBRIDGE PARKWAY, CAMBRIDGE 42, MASS.

A DIVISION OF Itek






# Directory I. Complete Equipment

## 9. Computers & Accessories.

Espey Mfg. Co., Inc., N.Y., 55c
Exact Electronics, Inc., Ore., 70s
Exact Eng. & Mfg. Inc., Calif., 70c
Fairchild Camera & Instrument Corp., Defense Prods. Div., N.Y., 70c
Fairchild Controls Corp., N.Y., 15sc
Fairchild Engine & Airplane Corp., Fairchild Astrionics Div., N.Y., 5c, 20c, 25c, 30c, 35c
Farwest Mfg. Div., Inc., Wash., 55c
Fecker Division, J. W., American Optical Co., Pa., 20c, 30c, 55sc, 70c
Feedback Controls, Inc., Mass., 15c, 20c
Fenske, Fedrick & Miller, Inc., Calif., 30s, 65s, 70s
Ferranti Electric Inc., N.Y., 25c, 30c, 45s, 50s, 85sc
Ferranti/Packard Electric Ltd., Canada, 20c, 25c, 30c, 50c, 55c, 85c
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 50sc, Tel: CHerry 6-2811**

See ads on pages 267, 354, 423 457, 525, 620

**Filmohm Corp., 48 W. 25th St., New York 10, N.Y., 55c, Tel: WAtkins 4-6605**

See ad on page 525

Fischer & Porter Co., Pa., 5s, 10s, 30s, 80s
Flight Research, Inc., Va., 30 Photographic sc
**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 75c, Tel: YEllowstone 4-2691**

See ads on pages 341, 399, 403, 437, 563, 569

**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 70c, Tel: CEnter 9-6100**

See ad on page 480

Franklin Electronics Inc., Pa., 5s, 30sc
GPL Division, General Precision, Inc., N.Y., 15sc, 20sc, 50c, 65c, 70c
Garrett Corp., The, Calif., 20c
General Applied Science Labs. Inc., N.Y., 5c, 15c, 20c, 25c, 35c, 50c, 55s, 70c
General Automatics, Inc., Calif., 20c, 25c, 30c, 50c
General Circuits Inc., N.Y., 55c
General Computers, Inc., Calif., 20sc, 30sc, 35c
General Devices Inc., N.J., 5c, 30sc, 35c, 45sc, 50c, 70c
General Electric Co., Apparatus Sales Div., N.Y., 5c, 10c, 20c, 25c
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 20c, 25c, 30c, 50c, 55c, 75c, Tel: GRanite 6-4411**

See ads on pages 263, 267, 435, 437, 501, 621

General Electric Co., Light Military Electronics Dept., N.Y., 15c
General Electric Co., Ordnance Dept., Mass., 30s, 70s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 15c, 20c, 25c, 35c, 45c, 50c
General Kinetics Inc., Va., 90sc
**General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 55c, 75c, Tel: WEst 9-8571**

See ad on page 363

**General Magnetics Inc., 135 Bloomfield Ave., Bloomfield, N.J., Multipliers c, Tel: PIlgrim 8-2400**

See ads on pages 484, 485

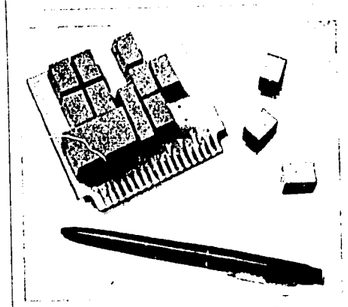
General Mills Inc., Mechanical Div., Minn., 5s, 15c, 25s, 30s, 50s, 55s, 70c, 85s
General Time Corp., Central Research Lab., N.Y., 50sc
General Transistor Corp., Magne-Head Div., Calif., 50c, 90c
Geotechnical Corporation, The, Texas, 30s
Geotronic Labs., Inc., Texas, 20c
Gertsch Products, Inc., Calif., 35sc
Giannini Controls Corp., Calif., 5sc, 10sc, 15sc, 20c, 25c, 30sc, 35sc, 45sc, 50sc, 65sc, 70sc, 80sc
Gilfillan Bros., Inc., Calif., 5c, 15c, 20c, 25c, 30c, 45c, 55c
Gilmore Industries Inc., Ohio, 5sc, 20c, 30sc
Good Electronic Corp., Fla., 55c
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 45sc, 50sc, 55c, 70sc, Tel: CHesapeake 3-1100**

See ad on page 512

Gulton Industries, Inc., N.J., 5sc, 20sc, 30sc, 55sc, 70sc, 90sc
Gyrex Corp., The, Calif., 10c, 30c
HRB-Singer, Inc., Pa., 25c, 30c, 50c, 70c, 80c
Hallicrafters Co., The, Ill., 5c, 15c, 30c, 35c, 45c, 55c, 70c
Haloid Xerox, Inc., N.Y., 65c
Hamilton Standard Div., United Aircraft Corp., Conn., 5c, 15c, 20c, 25c, 30c, 35c, 55c
Hampshire Eng. Co., Mass., 25c, 30c, 35c
Hanson-Gorrill-Brian, Inc., N.Y., 5s, 30sc, 70sc
Harman-Kardon, Inc., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 50sc, 55sc, 70c, 75sc, 80c
Harvey-Wells Electronics, Mass., 25, 30
Haydon Company, The A. W., Conn., 45c, 50c, 70c
Haydon Instrument, Conn., 75c
Hazeltine Electronics Div., N.Y., 15c, 20c, 25c, 30c, 40c, 45c, 50c, 75c
Heath Company, Subsid. Daystrom Inc., Mich., 20s, 90s
**Hermes Electronics Co., 75 Cambridge Pkwy., Cambridge 42, Mass., 30c, 50c, 55c, 70c, 75c, 85c, Binary to Decimal Converters c, Tape Search Units c, Tel: UNiversity 4-7200**

See ads on pages 266, 442





**SHIFT REGISTERS**
**. . . custom designed**

General Electric custom designs shift registers between 0 and 700 kc/s. With shift pulse power as low as .001 watts per kc, *voltage controlled* registers can deliver shift rates from 70 to 700 kc, to customers' specifications. Up to 100 kc, core-diode registers can be tailored to your exact needs. Most important, G. E.'s short cycle design service delivers first prototypes within a matter of days after specifications are received. 227-25

**GENERAL ELECTRIC**

DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK

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CORPORATION OF AMERICA
50 East Bridge Street, Saugerties, N. Y.

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

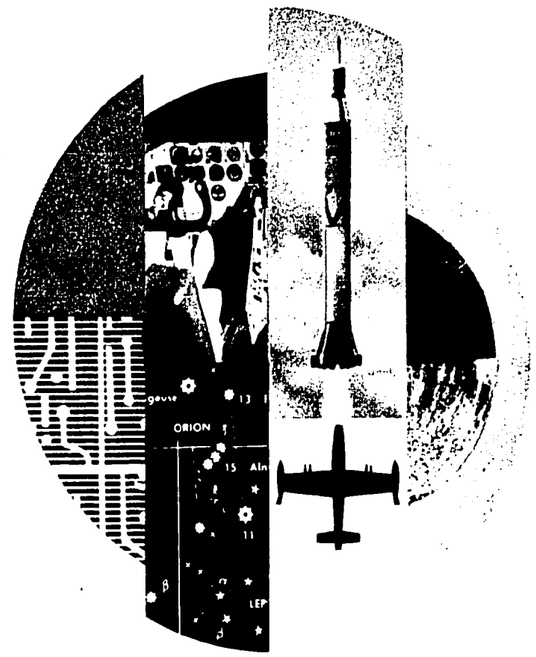
*32 years of experience . . . unequalled craftsmanship spell unchallenged leadership in the design and production of precision flight instruments, automatic celestial navigation, electromechanical, and avionic systems for the aviation industry.*

There's a Kollsman instrument aboard almost every known aircraft. Proof of dependability. Proof of craftsmanship. Proof of acceptance in a field which can't tinker with chance. Kollsman engineering and manufacturing complexes produce precision instruments, flight systems, missile modules, and ground support equipments of unmatched excellence. Kollsman leads the world in automatic celestial navigation systems. More than three decades of Kollsman specialization serve as a springboard to the stars.



# If it flies it relies on kollsman

Astro trackers
Automatic astro compass
Air data computers
Electromechanical systems
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Flight instruments
Kollsman Integrated Flight Instrument System
Optical systems & components
Doppler computation systems
Sextants (periscopic—handheld—photoelectric)
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# Directory I. Complete Equipment

## 9. Computers & Accessories.

**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 5s, Digital Clocks s, Digital Delay Generators s, Tel: DAvenport 6-7000**
**See ad on pages 3-18**

Hoffman Electron Tube Corp., N.Y., 20s, 25s, 50s
Hoffman Electronics Corp., Calif., 25sc
Hoffman Electronics Corp., Semiconductor Div., Calif., 50sc
Hoover Electronics Co., Md., 5c, 35c
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 50sc
Hydro-Aire Co., Calif., 55c
Iconix Inc., Calif., 70sc
Image Instruments, Inc., Mass., 50c
Imtra Corporation, Mass., 50c, 60c, 85c
Industrial Control Co., N.Y., 5sc, 20sc, 55sc
Industrial Timer Corp., N.J., 70sc
Instrument Development Laboratories, Inc., Mass., 5sc, 70c, Timing Devices c
International Business Machines Corp., N.Y., 5c, 10sc, 15c, 20c, 25sc, 30sc, 35c, 40sc, 45sc, 50sc, 65sc, 70sc, 80sc, 85sc, 90sc
International Business Machines Corp., Federal Systems Div., D.C., 10sc, 15c, 25sc, 40s, 50sc, 65sc, 80sc, 85sc
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 50c, 55c, 70c, 75c, 80c, 85c, 90c
International Telephone & Telegraph Corp., ITT Laboratories, Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c, 70c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c, 70c, 75c, 80c, 85c, 90c
Interstate Electronics Corp., Calif., 70c, Preselectors c
Itek Corp., Mass., 20c, 25c, 45c, 85c, Electro-Mechanical Calculators c
Jansky & Bailey, Inc., D.C., 30c, 70c
Julie Research Laboratories, Inc., N.Y., 5sc, 35sc, 55sc
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 5c, 15c, 20c, 25c, 35c, 50c
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 70c
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 5sc, 15c, 20c, 25c, 35sc, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kearfott Div., General Precision, Inc., Microwave Products, Calif., 50c
Kellogg Switchboard & Supply Co., Ill., 35c, 50c, 55c, 65c, 70c
Kidde & Co., Inc., Walter, N.J., 5c, 35c
**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., Box 623, San Diego 11, Calif., 5s, Tel: BRowning 7-6700**
**See ad on pages 110-111**
Knight Corp., Ewen, Mass., 70c
**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 5c, 15c, 20c, 25c, 35c, Tel: TWining 9-5600**
**See ad on page 268**
Laboratory For Electronics, Inc., Mass., 15c, 25c, 35c, 50c, 55c, 75c
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 5c, 30c, 55sc, 70c, 75c
Landis & Gyr, Inc., N.Y., 65s
La Pointe Industries, Inc., Conn., 55c
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 70c, Tel: LOwell 6-2600**
**See ad on page 312**
Lear, Inc., Calif., 5c, 20c, 25c, 45c, 50c, 70sc, 85c
Leeds & Northrup Co., Pa., 20c, 25c, 30c
Librascope Div., General Precision, Inc., Calif., 5sc, 10sc, 15c, 20c, 25sc, 30sc, 45sc, 50sc, 80sc
Link Division, General Precision, Inc., N.Y., 5sc, 20sc, 25sc, 30sc, 35sc, 40sc, 55sc
Link Division, General Precision, Inc., Palo Alto Lab., Calif., 5c, 20c, 25c, 35c, 45c, 50c, 55sc
Litton Industries, Electronic Equipments Div., Calif., 5c, 15c, 25c, 30c, 45c, 50c, 55c
**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 20c, 25c, 30c, 35c, 55c, Tel: REgent 9-4321**
**See ad on pages 112-113**
Lockheed Electronics Co., Stavid Division, N.J., 15c, 20c, 25c, 55c
Loral Electronics Corp., N.Y., 15c, 20c, 25c
MB Electronics, Div. Textron Electronics, Inc., Conn., 20s
MacLaren & Co., Inc., F. B., N.Y., 20c
MacLeod & Hanopol, Inc., Mass., 5c
Madigan Electronic Corp., N.Y., 5c, 15c, 20c, 25c, 35c, 45c, 70c, 75c
Magnasync Corp., Calif., 50c, 70c, 90c
Magnavox Co., The, Ind., 20c, 50c, 90s
Magnavox Research Laboratories, Calif., 5c, 25c, 30c, 45c, 50sc
**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 20c, 55s, 70c, Tel: CYpress 2-6610**
**See ads on pages 252, 364, 418**
**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 20c, Tel: ROgers 9-5312**
**See ad on page 364**
Magnetics Research Co., Inc., N.Y., 10c, 30c, 50sc, 55sc, 75sc
Maico Electronics, Inc., Minn., 5c, 15c, 20c, 25c, 35c, 45c, 50c, 90c
Mallory & Co., Inc., P. R., Ind., 55c, 70c
Mandrel Industries, Inc., Tex., 90c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 15s
Marquardt Corp., The, Pomona Div., Calif., 5c, 30c, 35c, 50c, 55c, 70c
Martin Co., The, Md., 5c, 10c, 20c, 25c, 30c, 35c, 50c, 55c, 80c
Mast Development Co., Inc., Iowa, 30c
Matthews & Co., Jas. H., Pa., 65sc
Mayberry Electronics Co., Calif., 15c, 20c, 40c, 55sc
Melpar, Inc., Special Products Dept., Va., 20c, 25c, 30c, 35c, 40c, 55sc, 75c
Mergenthaler Linotype Co., N.Y., 15c, 20c, 25c, 30c
Midwestern Instruments, Inc., Okla., 30sc, 45c, 50c, 90sc
Milgo Electronic Corp., Fla., 5c, 15c, 20c, 25c, 30sc, 35sc, 40c, 50sc, 70sc, 75sc, 85sc
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 30c
Minneapolis-Honeywell Regulator Co., Datamatic Div., Mass., 25s
Minneapolis-Honeywell Regulator Co., Industrial Systems Div., Md., 5c, 50sc, 55c, 80c, 90sc
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 5c, 15c, 20c, 25c, 35c, 50c, 55c
Minnesota Mining & Mfg. Co., Magnetic Products Div. & Electrical Prods. Div., Minn., 20s, 90s
Missouri Research Laboratories, Inc., Mo., 5c, 15c, 30c
Modern Design, Div. of H. C. Schlober, Inc., N.Y., 5c, 25c, 35c, 45c, 50c, 55sc, 75sc
**Moeller Instrument Co., Inc., Electronics Div., 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 20c, 25c, Tel: VIrginia 9-2100**
**See ad on page 588**
Monroe Calculating Machine Co., Inc., Div. Litton Industries, Calif., 25c, 30c, 40c, 65c, 80c, 85c
Monroe Calculating Machine Co., Inc., Div. Litton Industries, N.J., 25s, 40s, 50sc, 55s, 60s, 65s, 70s
Montek Associates, Inc., Utah, 15c, 20c, 25c, 70c
Moore Associates, Inc., Calif., 70s
Moseley Co., F. L., Calif., 30s, 35s, 70s
Motorola, Inc., Ill., 15c, 20c
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 65c, 70c, 75c, 85c
Munzig International, Inc., Calif., 5s, 25s, 50s, 55s, 75s
Namiloa Corporation, Ohio, 30c, 55c
National Cash Register Co., The, Electronics Div., Calif., 10s, 15c, 25sc, 30c, 50sc, 85s, 90s
National Company, Inc., Mass., 5c, 35c, 55c
National Scientific Laboratories, Inc., D.C., 20c, 25c, 45c, 50c, 55c, 70c, 75c
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 5c, 10c, 15c, 25c, 30c, 35s, 40c, 45c, 50s, 55s, 70c, 75s, 80c, 85c, Tel: HOward 5-7700**
**See ad on page 498**
Networks Electronic Corp., Calif., 70s
New London Instrument Co., Conn., 20c, 25c
Newton Co., The, Conn., 5c, 25c, 45c
Nilsen Mfg. Co., Ill., 45c
Nippon Electric Co., Ltd., Japan, 5c, 20s, 25s, 35c, 50c, 85c, 90c
Non-Linear Systems, Inc., Calif., 5s, 30s, 50s, Scanners s

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# PHILBRICK ANALOG COMPUTING INSTRUMENTS

Philbrick has the most complete line of dc operational amplifiers for computor, industrial and military applications available anywhere today. Besides the usual analog computing operations of addition, integration, and inversion, they comprehend function generation, isolation amplifying and current driving. Models with differential inputs also allow such dogmatic experiences as flipping, flopping, clipping, tripping, and the like . . . at dc accuracies limited only by external circuitry.



K2-W

## LOW COST PLUG-INS: K2 SERIES

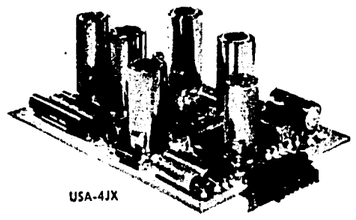
**K2-W** — An efficient, fool proof operational amplifier for all feedback computations, fast and slow; features differential inputs. $24*

**K2-P** — When used with K2-W, it makes a chopper-stabilized amplifier with gain of more than 15 million, coupled with sub-millivolt stability. $60*

**K2-XA** — Similar to K2-W, but with twice the output voltage, and three times the current capabilities. $28*

*Military equivalents of K2 series* are available, "ruggedized" to withstand most severe operating conditions. Open frame construction provides optimum free-air ventilation. Epoxy glass terminal boards, Blue Ribbon type connectors and provisions for secure chassis mounting. These include K2-WJ (price $58.), K2-YJ ($62.) and K2-PJ ($85.).

## FOR EXTRA-HIGH PERFORMANCE: USA-4 SERIES

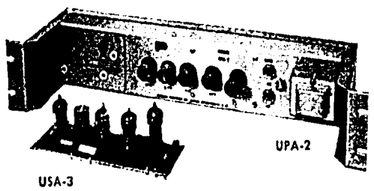


USA-4JX

**USA-4** — Highest performance, coolest running amplifier in the world. Sharply improved drift, noise, gain, bandwidth, plus elimination of grid current make it a "best buy" for critical applications. ± 100 volt output, minimum gain, 100 million. Turret terminals for permanent wiring or plug-in models designed for slide mounting.

**The USA-4JX** (for *military* applications) features MIL-STD components, greatly reduced internal dissipation density, teflon insulated standoff terminals, machined aluminum plate. Tubes and resistors operate at much less than half their wattage ratings, capacitors at less than half their voltage rating. $170

## ECONOMICAL PRINTED CIRCUIT AMPLIFIERS: USA-3 SERIES



USA-3 UPA-2

**USA-3** — Available with various housings, combines high performance and reliability with 100 $\mu$V dc stability and gain of $10^7$ v/v. Output exceeds ± 100 volts. Mounted in your chassis, it imparts precision to quality instrumentation. $95*

**USA-3-M3** — Self-contained, complete, ventilated, plug-in unit with Blue Ribbon connector, and sufficient space for mounting passive computing components. $125*

**PACKAGE UNITS AND MANIFOLDS**

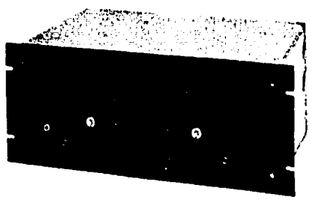
Requiring only external computing impedances, in rack-mounting or table-top forms, units come *ready-to-operate*. Housings contain balance adjustments and heater transformers. Banana jack terminals give access to input and output of each amplifier. Typical units are:

**UPA-2** — Utility Packaged Amplifier, with USA-3 .....$149*
**HK** — Operational Manifold, 10 K2's (normally K2-W) .....$425
**HKR** — Operational Manifold (self-powered) .....$600
**K7-A10** — Operational Manifold (stabilized) 10 USA-3's ....$1200

## REGULATED POWER SUPPLIES

Performance typical of the best quality reference supplies commercially available, in a complete range of well-regulated units. For instrument applications they feature superb transient response. Internal temperature rise averages only about 20 degrees when running at 30% overload; noise is typically less than 200 microvolts.

**Model R-100B** — Rated at 100 milliamperes, ± 300 vdc .....$189
**Model R-300** — Conservatively rated at 300 milliamperes .....$390
**Model R-500** — Doubles as a high accuracy reference voltage source ....$875



R-300

FOR FREE 24-PAGE MANUAL AND COMPLETE INFORMATION ON PHILBRICK COMPONENTS, WRITE DEPT. EAD

*OEM's: Write, wire, or phone for quantity discounts.

GEORGE A.
# PHILBRICK
RESEARCHES, INC.

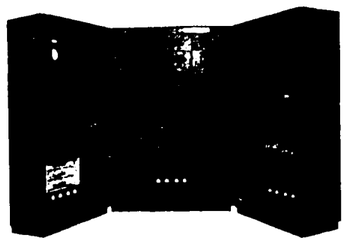
*285 Columbus Ave., Boston 16, Mass.*
*COmmonwealth 6-5375, TWX: BS1032, FAX: BSN*

Philbrick uses these components in its own computing modules and systems, even the most sophisticated ones. With them, you can buy a computor of *precisely* the capacity you need — and add to it as requirements become more demanding. (Right): Typical installation, shown with Model K5-U Universal Linear Operator, basic building block of larger Philbrick installations.

For information on Philbrick computors and applications, please address your request to Dept. DHS.



K5-U



Computing Center, ME Dept., M.I.T.






# Directory I. Complete Equipment

## 9. Computers & Accessories.

North Electric Co., Ohio, 10c, 25c, 50c, 70c, 80c, 85c

**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 5c, Tel: NAtional 2-6485**
**See ad on pages 27-30**

Northern Electronic & Vacuum Industries, Canada, 20s, 25c, 50c
Norton Associates, Inc., N.Y., 50c
Olympic Radio & Television, Div. Siegler Corp., N.Y., 25s, 30s, 90sc
Ortronix, Inc., Fla., 5c, 10c, 30c, 35c, 50c, 55c, 70c, 75c
Otis Elevator Co., Defense & Industrial Div., N.Y., 15c, 20c, 25c, 55c, 65c, 85c
Pacific Mercury Electronics, Thomas Organ Co., Calif., 5c, 50c
Packard Bell Computer Corp., Calif., 5s, 25s, 30c, 35c, 45c, 55s, Differential Analyzers c
Packard Bell Electr. Corp., Calif., 90c
Palomar Scientific Corp., Calif., 20c, 30c, Airborne c
Pastoriza Associates, Inc., James, Mass., 5c, 25c, 35sc, 50c, 55sc
Patterson, Inc., Wayne D., Calif., 20c, 25c, 50c, 55c
Pearce-Simpson, Inc., Fla., 5c, 30c, 35c, 45c, 70c
Pennwood Numechron Co., Pa., 25s, Digital Clocks s, Timing Devices s

**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 20s, 30s, 40s, 55s, Tel: COmmonwealth 6-5375**
**See ad on page 270**

Philco Corporation, Pa., 5c, 10sc, 15c, 25sc, 35sc, 40c, 45c, 50sc, 70sc, 75c, 80c, 85c
Philco Corporation, Govt. & Industrial Group, Pa., 5sc, 10sc, 15sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc, 60c, 65c, 70sc, 75sc, 80sc, 85sc, 90sc
Philips Electronics Industries Ltd., Canada, 5s, 30sc, 50sc

**Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 55c, 85sc, Tel: ORicle 6-8000**
**See ad on page 500**

Plug-In Instruments, Inc., Tenn., 55sc
Potter Aeronautical Corp., N.J., 5c, 35c
Potter Instrument Co., Inc., N.Y., 10c, 25c, 30s, 35s, 50s, 65s, 70c, 80c, 85s, 90s
Precise Electronics & Development Corp., N.Y., 50c, 70c
Precision Instrument Co., Calif., 90sc
Precision Mechanisms Corp., N.Y., 20c
Precision Specialties, Inc., N.J., 60sc

**Presin Co., 2014 Broadway, Santa Monica, Calif., 65s, Tel: EXbrook 3-9738**
**See ad on page 519**

Production Research Corp., Subsid. Radio Condenser Co., N.Y., 5c, 20c, 25c, 35c
Quantametric Devices, Inc., N.Y., 5s
Racal Engineering Ltd., England, 5s, 35s, 65c
Radiation Inc., Fla., 5s, 30c, 35s, 80c
Radiation Instrument Development Lab., Inc., Ill., 65c
Radio Corp. of America, Astro-Electronic Products Div., N.J., 50c, 90c
Radio Corp. of America, Defense Electronic Products, N.J., 5c, 10sc, 15c, 20c, 25c, 30c, 35c, 45c, 50sc, 55c, 65c, 75c, 80c, 85c, 90sc

**Radio Corp. of America, Semiconductor & Materials Div., Section I-22-NN, Rt. 202, Somerville, N.J., 50sc, 55c, Tel: RAndolph 2-3200**
**See ad on pages 56-57**

Ram Meter, Inc., Mich., 20c
Rank Cintel Ltd., England, 5c, 30c, 35c, 40c, 50c, 55s, 65c, 75s
Ransom Research, Inc., Calif., 5sc, 25c, 30sc, 35sc, 50sc, 55sc, 75sc
Raytheon Co., Equipment Div., Mass., 5c
Raytheon Co., Industrial Components Div., Mass., 50s, 55c
Raytheon Co., Semiconductor Div., Mass., 55sc

**Reeves-Hoffman, Div. Dynamics Corp. of America, 145 Cherry St., Carlisle, Pa., 55c, Tel: CHapel 3-5929**
**See ad on page 432**

Reeves Instrument Corp., N.Y., 5c, 20c, 35c
Remington Rand Univac, N.Y., 5c, 10s, 25sc, 40s, 50c, 65s, 80s, 90s
Remington Rand Univac, Military Div., Minn., 5c, 10s, 15c, 20c, 25s, 30c, 35c, 50s, 65s, 80s
Republic Aviation Corp., N.Y., 20c
Republic Electronic Industries Corp., N.Y., 45c, 55c, 70c
Resdel Engineering Corp., Calif., 5c
Rese Engineering, Inc., Pa., 10c, 25c, 30c, 50sc, 55s, 80c, Digital Clocks c
Research, Inc., Minn., 20c, 70s

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 35c, 50sc, 55sc, 75sc, 80c, 90c, Tel: LOckwood 5-4578**
**See ad on page 324**

Rotary Devices Corp., N.J., 5c, 70c
Royal McBee Corp., N.Y., 25s
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 5c, 15c, 20c, 25c, 35c
Sanders Associates, Inc., N.H., 50c, 55c
Sangamo Electric Co., Ill., 90c
Schaevitz Engineering, N.J., 70c
Scientific-Atlanta, Inc., Ga., 20sc
Secode Corp., Calif., 30c, 45c

**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 45sc, Tel: HOpkins 7-3200**
**See ads on pages 385, 519**

Seiscor, Okla., 20c, 30c
Servo Corp. of America, N.Y., 5c, 15c, 20c, 35c
Servomechanisms, Inc., Calif., 5c, 20c, 25c, 35c, 50c, 55c
Shepard Laboratories, Inc., N.J., 30c, 45 Decoders c, 65c, 85c
Shepherd Industries, N.J., 50sc, 90sc

**Sierra Research Corp., P.O. Box 22, Buffalo 25, N.Y., 5c, 15c, 20c, 35c, 55c, 75c, Tel: NF 2-8823**
**See ads on pages 271, 356, 662**

Skiatron Electronics & Television Corp., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 80c
Sloan Company, The, Calif., 70sc
Solartron, Inc., Calif., 5s, 20s, 30s
Solartron Electronic Group Ltd., The, England, 5s, 20s, 30s, 90s
Sorensen Industrial Electronic Co., N.J., 90c
Soroban Engineering, Inc., Fla., 25c, 30sc, 45sc, 50sc, 60s, 65sc, 85s
Southwest Products, Inc., Texas, 25c
Southwestern Industrial Electronics Co., Tex., 5sc, 20sc, 45c, 90sc
Space Electronics Corp., Calif., 5c, 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c
Spec-Tronics, Calif., 55c
Spectrol Electronics Corp., Calif., 55c, 70c
Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 20c, 25c, 50c, 70c
Sperry Gyroscope Co., Sunnyvale Development Center, Calif., 20c
Sperry Gyroscope Co. of Canada Ltd., Canada, 5c, 15c, 20c, 25c, 30c, 35c, 50c, 55c, 85c
Sperry Piedmont Co., Div. Sperry Rand Corp., Va., 55c
Sprague Electric Co., Mass., 50s, 55s, 75s
Standard Telephones & Cables Ltd., England, 25s, 30sc, 40s, 50sc
Stelma, Inc., Conn., 5c, 35c, 50c, 70c, 75c
Stereatronics, Inc., Mass., 5c, 20c, 25c, 30c, 55c, 70c, 75c




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Strand Engineering Co., Mich., 20c, 25c
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c, 15c, 25c, 30c, 35c, 45c, 50c, 55c, 65c
Stromberg-Carlson San Diego, Div. General Dynamics Corp., Calif., 55sc, 65sc
Sturrup, Inc., Conn., 50c
Summers & Mills, Inc., Tex., 20c
Sylvania Electric Products Inc., N.Y., 20c, 25c, 50c, 55c
Sylvania Electric Products Inc., Data Systems Operations, Mass., 5c, 10c, 15c, 25c, 30c, 35c, 40c, 50c, 55c, 75c, 80c
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 15c, 25c, 50c, 55c
Systems Labs. Corp., Calif., 35
Systron-Donner Corp., Calif., 5s, 25s, 30s, 35s, 45c, 50c, 65s, 70s, 75s
TRAK Electronics, Div. CGS Laboratories, Conn., 5c, 10c, 35c, 80c
TRG, Incorporated, N.Y., 15c, 20c, 25c, 30c
Tally Register Corp., Wash., 10sc, 30c, 50c, 60sc, 65c, 70c, 75c, 80sc, 85sc
**Taurus Corporation, 8 Coryell St., Lambertville, N.J., 75s, Tel: EXport 7-1571**
See ad on page 558
Technical Measurement Corp., Conn., 25s, 30s, 35s, 70sc
Technitrol Engineering Co., Inc., Pa., 5c, 10c, 25c, 65c
Technology Instrument Corp., Mass., 5c, 45c
Telechrome Mfg. Corp., N.Y., 5s, 10c, 15c, 20c, 25sc, 30sc, 35c, 40c, 45sc, 50sc, 55sc, 65sc, 70sc, 75sc, 80c, 85c, 90c
Telecomputing Corp., Calif., 5sc, 10s, 20s, 25s, 30s, 35s, 60s, 80sc, 85s, 90c
Telecomputing Corp., Data Instruments Div., Calif., 5sc, 30sc, 45s, 60s, 70s, 80s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 10c, 15c, 20c, 30c, 35c, 50sc, 80c, 85sc, 90sc, Tel: YE 2-8600**
See ad on page 338
Telemeter Magnetics, Inc., Calif., 10c, 35c, 50s, 75c, 80c
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 5c, 25c, 50sc, 55sc, Tel: MIdway 6-7211**
See ads on pages 456, 556
**Teltronics, Inc., 277 Main St., Nashua, N.H., 15c, 20c, Tel: TUxedo 2-6264**
See ad on page 337
Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 5c, 30c, 35c, 50c, 70c
Tempo Instrument, Inc., N.Y., 70c
Ten Bosch Inc., M., N.Y., 15
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 70c, 75c, 80c, 85c
Thompson & Co., John I., D.C., 20c, 30c
Thompson Ramo Wooldridge Inc., Calif., 5sc, 20sc, 25sc, 30sc, 35sc, 50sc
Thompson Ramo Wooldridge Inc., Dage Television Div., Ind., 85c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 20c, 25c, 45c, 55c, 70c
Thompson-Ramo-Wooldridge Products Co., The, Calif., 5c, 25c, 30c, 35c, 50c
Toroidal Components Co., Calif., 75c
**Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 50sc, 75c, Tel: WEst 9-6754**
See ad on page 472
Transistor Specialties, Inc., N.Y., 5c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c
**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 15c, 20c, 45c, 50c, 70c, Tel: OVerbrook 1-0400**
See ad on page 294
Tullamore Electronics Corp., Ill., 5
Ultronix, Inc., Calif., 55c
Union Switch & Signal, Div. Westinghouse Air Brake Co., Pa., 50c
United Aircraft Corp., Norden Div., Conn., 5s, 20sc, 25sc, 30c, 35c, 45s
United Control Corp., Wash., 15c, 20c, 50c, 70c
United Shoe Machinery Corp., Mass., 10c, 20c, 30sc, 40c, 45c, 60sc, 65sc
U.S. Science Corp., Calif., 5c, 15c, 20c, 25c, 35c, 45c, 55c, 70c
Vapor Recovery Systems Co., Calif., 30sc, 45sc
Varo Mfg. Co. Inc., Tex., 35sc, 55c, 70c
Victor Adding Machine Co., Ill., 65, Digital printers
Virginia Electronics Co., Inc., D.C., 55c, 70sc
Walkirt Co., Calif., 25c, 45c, 55s, 75s
Waltham Electronics Corp., Mass., 5c, 20c, 25c, 35c
Wang Laboratories, Inc., Mass., 5sc, 20c, 25c, 45sc, 50sc, 55sc, 65sc, 70c, 75sc, 80c
Wayne-George Corp., Mass., 5sc, 30c, 35c, 45sc, 75sc
Webster Electric Co., Wis., 90s
Wells Electronics Co., Ind., 55c
Western Union Telegraph Co., The, N.Y., 30c
Westinghouse Electric Corp., Air Arm Div., Md., 5s, 20s, 25s, 35s
Westinghouse Electric Corp., Electronics Div., Md., 20c, 25c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 85c, 90sc, Tel: JUdson 2-3030**
See ad on page 704

**Cones, loudspeaker:**
**See class 56**

**Consoles, cabinets & enclosures:**
**See class 84**

**Consoles, studio:**
**See class 34**

**Control equipment, automatic:**
**See class 4**

**Controls, remote:**
**See class 4**

**Converters, analog to digital, digital to analog, card to tape, tape to card:**
**See class 9**

**Converters, frequency shift:**
**See class 35**

**Coolers, infrared:**
**See class 17**

**Counters, radiation:**
**See class 24**

**Counting equipment, production control:**
**See class 4**

## 10. Counters.

5. Continuous
10. Mechanical
15. Pre-set

**Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 5sc, Tel: GRegory 2-5622**
See ad on page 329
Aerotronic Assoc., Inc., N.H., 5s
Amerac, Inc., Mass., 5sc, 10sc, 15sc
**Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 5c, Tel: BUckingham 1-2727**
See ads on pages 463, 577
Anadex Instruments, Inc., Calif., 5c, 15c
**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 5s, Tel: LIberty 9-1500**
See ad on page 353
Automatic Timing & Controls, Inc., Pa., 5sc, 10sc, 15sc
Barker & Williamson, Inc., Pa., 10sc
Barnes & Reinecke, Ill., 5c
Beckman Instruments, Inc., Berkeley Div., Calif., 5s, 15s
Bendix Corp., The, Bendix-Pacific Div., Calif., 5c, 15c
**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 5c, Tel: ATlas 8-2000**
See ad on pages 103-106
Benson-Lehner Corp., Calif., 5c
Boesch Mfg. Co., Inc., Conn., 5sc, 10sc, 15sc
Bone Engineering Corp., Calif., 5c, 10c, 15c
**Bowmar Instrument Corp., 8000 Bluffton Rd., Box 2835, Fort Wayne, Ind., 5c, 10c, 15c, Tel: SHerwood 3121**
See ad on page 340
Bristol Co., Conn., 5c, 15c
Burroughs Corp., Mich., 5s, 15s
C & K Components, Inc., Mass., 15sc
Central Dynamics Ltd., Canada 5c, 10s, 15s
**Chicago Dynamic Industries, Inc., Precision Products Div., 1725 W. Diversey Blvd., Chicago 14, Ill., 10c, Tel: WEllington 5-4600**
See ad on page 546
Chrono-Log Corp., Pa., 5s, 10s, 15s
Clipper Gear & Machine Co., Mich., 10c
**Computer Control Co., Inc., Eastern Div., 983 Concord St., Framingham, Mass., 5c, 15c, Tel: TRinity 5-6185**
See ad on page 264
**Computer Control Co., Inc., Western Division, 2251 Barry Ave., Los Angeles 64, Calif., 5c, 15c, Tel: BRadshaw 2-9135**
See ad on page 264
Computer-Measurements Co. Div., Pacific Industries, Inc., Calif., 5s, 15s





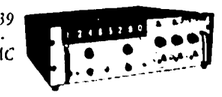

# Directory I. Complete Equipment

## 10. Counters.

Control Equipment Corp., Mass., 5s, 15s
Counting Instruments Limited, England, 5s, 10s, 15s
Cramer Controls Corp., Conn., 5s, 15s
Cyclotron Specialties, Calif., 10s
Daco Instrument Co., N.Y., 5c, 10c, 15c
Data Products Co., Inc., Md., 5sc
Dayton Electronic Products Co., Ohio, 5sc
Delta-F, Inc., Ill., 15c
Di/An Controls, Inc., Mass., 5sc, 15c
Dicon Corporation, N.Y., 5c, 10c, 15c
Digital Equipment Corp., Mass., 15
Digitran Co., The, Div. Endevco Corp., Calif., 5s, 10s, 15s
Durant Manufacturing Co., Wis., 5sc, 10sc, 15sc
Dymec, Div. Hewlett-Packard Co., Calif., 5sc, 15sc
Dynapar Corporation, Ill., 5s, 15s
E-H Research Laboratories, Calif., 5
Eagle Signal Co., Ill., 15s
Eldorado Electronics, Calif., 5sc
Electrical Service Co., Calif., 5c, 15c
Electro Instruments, Inc., Calif., 5s, 15s
**Electro-Pulse, Inc., 6711 S. Sepulveda Blvd., Los Angeles 45, Calif., 15s, Tel: ORegon 8-2244**
See ad on page 264
Electronic Communications, Inc., Fla., 5c
Electronic Counters, Inc., N.Y., 5s, 15s
Electronic Specialty Co., Calif., 5c
Electronics Corp. of America, Mass., 5s
Elliott-Automation Limited, England, 10s
Engineered Electronics Co., Calif., 5s, 15s
Engineering Associates, Ohio, 10c
Epsco, Inc., Mass., 5s, 15s
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5s, 15s, Tel: GLendale 6-8592**
See ad on pages 40-41
Exact Engineering & Mfg. Inc., Calif., 10s
Fischer & Porter Co., Pa., 5s, 10s
**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5s, 15s, Tel: EVergreen 6-1300**
See ad on page 566
General Applied Science Labs., Inc., N.Y., 5c, 10c, 15c
General Controls Co., Calif., 5s, 10s, 15s
General Devices, Inc., N.J., 5c, 10c, 15c
General Nuclear Corp., N.Y., 5sc, 15sc
General Time Corp., Central Research Lab., N.Y., 5s, 10s, 15s
Giannini Controls Corp., Calif., 5sc, 15sc
Gibbs Mfg. & Research Corp., Wis., 10c
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 5c, 15c, Tel: CHesapeake 3-1100**
See ad on page 512
Gyra Electronics Corp., Ill., 15c
Hamner Electronics Co., Inc., N.J., 5 Nuclear c
Harman-Kardon, Inc., N.Y., 5c, 15c
Harvey-Wells Electronics, Mass., 5
Haydon Company, The A. W., Conn., 5c, 15c
Haydon Instrument, Conn., 5c, 10c
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 5s, 15s, Tel: DAvenport 6-7000**
See ad on pages 3-18
Hudson Bay Co., Ill., 5s, 10s
Iconix, Inc., Calif., 5sc, 15sc
Industrial Components, Inc., Oregon, 10c, 15c
**International Eastern Co., 801 6th Ave., New York 1, N.Y., 5c, 10c, 15c, Tel: ALgonquin 5-5222**
See ad on page 675
International Telephone & Telegraph Corp. ITT Federal Div., N.J., 5c, 10c, 15c
Jetronic Industries, Inc., Pa., 5c, 10c
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 15c
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 10sc, 15c, Tel: CLifford 6-4000**
See ad on pages 120-121
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5c, 10s
**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 10sc, Tel: TWining 9-5600**
See ad on page 268
Laboratory For Electronics, Inc., Mass., 5c, 15c
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 5s, Tel: LOwell 6-2600**
See ad on page 312
Lear, Inc., Calif., 5sc, 10sc, 15sc
**M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 5sc, Tel: GRamercy 3-5899**
See ad on page 419
Magnetics Research Co., Inc., N.Y., 5sc, 15sc
Marstan Electronics Corp., N.Y., 5c, 15c
Mast Development Co., Inc., Iowa, 5c, 10c, 15c
Mechatrol, Div. Servomechanisms, Inc., N.Y., 10s
Milgo Electronic Corp., Fla., 5c, 15c
**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 10s, Tel: DAvenport 4-4108**
See ad on page 402
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 5sc, 15c
Molectronics, A Minneapolis-Moline Subsid., Calif., 10sc
Monroe Calculating Machine Co., Inc., Div. Litton Industries, Calif., 10c
Montek Associates, Inc., Utah, 5c, 15c
Naniloa Corporation, Ohio, 5c
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 15s, Tel: HOward 5-7700**
See ad on page 498
Nippon Electric Co., Ltd., Japan, 10s
North Electric Co., Ohio, 10sc
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 5sc, Tel: NAtional 2-6485**
See ad on pages 27-30
PIC Automation Controls, Div. General Controls Co., Ill., 5s, 10s, 15s
Pennwood Numechron Co., Pa., 5s
Philips Electronic Instruments, N.Y., 5s, 15s
Philips Electronics Industries Ltd., Canada, 5s, 15s
Photocon Research Products, Calif., 10sc, 15sc
Plasteck, Inc., Okla., 10c
Potter Aeronautical Corp., N.J., 5c, 15c
Potter Instrument Co., Inc., N.Y., 5s, 10s, 15s
**Presin Co., 2014 Broadway, Santa Monica, Calif., 5s, 10s, 15s, Tel: EXbrook 3-9738**
See ad on page 519
Racal Engineering Ltd., England, 5s
Radiation Instrument Development Lab., Inc., Ill., 5s
Radio Corp. of America, N.J., 10c
Railroad Electronic Labs. of Omaha, Inc., Neb., 15c
Ram Meter, Inc., Mich., 15c
Rank Cintel Ltd., England, 5s
Ransom Research, Inc., Calif., 15c
Republic Electronic Industries Corp., N.Y., 5c, 10c

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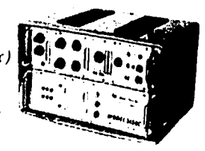
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## 10. Counters.

Resdel Engineering Corp., Calif., 15s
Servo Development Corp., N.Y., 10c
Skiatron Electronics & Television Corp., N.Y., 5c
Sodeco, Switzerland, 5s, 10s, 15s
Sprague Electric Co., Mass., 5s, 10s, 15s
Stelma, Inc., Conn., 5c
Stercatronics, Inc., Mass., 15c
**Stevens Mfg. Co., Inc., George, Pulaski Rd. at Peterson, Chicago 30, Ill., 10s, Tel: JUniper 8-1300**
**See ad on page 679**
Systron-Donner Corp., Calif., 5s, 15s
Taylor-Emmett Controls, Inc., Ohio, 15c
Telechrome Mfg. Corp., N.Y., 5sc
Telecomputing Corp., Calif., 5s, 10s
Telecomputing Corp., Data Instruments Div., Calif., 5s, 10s
Tempo Instrument, Inc., N.Y., 5c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c
Tracerlab, Inc., Mass., 5sc
Transistor Specialties, Inc., N.Y., 5s, 15s
U.S. Science Corp., Calif., 5c, 10c, 15c
Van Norman Industries, Inc., Electronics Div., N.H., 5sc
Veeder-Root, Inc., Conn., 5s, 10s, 15s
Vemaline Products Co., N.J., 15sc
Victor Adding Machine Co., Ill., 5
Walkirt Co., Calif., 15s
Wells Industries Corp., Basic Electronic Controls Div., Calif., 5sc, 15sc
Westport Electric, Calif., 15sc


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BALTIMORE .....ENterprise 9-6400

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**Couplings, servo:**
**See class 30**

**Crystal testers:**
**See class 14**

**Cutting heads & styli:**
**See class 65**

**Data recorders & storage mechanisms: See class 36**

**Data reduction equipment:**
**See class 9**

## 11. Decades.

5. Capacitance 15. Inductance
10. Impedance 20. Resistance

Aerovox Corp., Mass., 5s, 15s, 20s
American Development Electronics Co., N.J., 20c
Arco Electronics, Inc., N.Y., 5c
Atohm Electronics, Calif., 20c
Barker & Williamson, Inc., Pa., 15sc
Barnes Development Co., Pa., 20sc
Clarostat Mfg. Co., Inc., N.H., 20s
Coast Coil Co., Calif., 15s
Computer Engineering Associates, Inc., Calif., 15s
**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 20sc, Tel: YOnkers 3-5900**
**See ad on page 523**
**Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 5s, 20s, Tel: PLainfield 6-9000**
**See ad on Cover 3**
Daven Co., The, N.J., 20s
Dawe Instruments Ltd., England, 5s, 20s
Dicon Corporation, N.Y., 5c, 10c, 15c, 20c
Direct T/V Replacements Ltd., England, 5s
Dmeter Mfg. Co., Inc., N.Y., 20c
EPIC, Inc., N.Y., 20s
Electro Scientific Industries, Ore., 5sc, 10sc, 20sc
Electronic Applications, Inc., Conn., 5s
**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 5s, 20s, Tel: STillwell 6-8700**
**See ad on page 283**
Elpac, Inc., Calif., 5c
Espey Mfg. Co., Saratoga Industries Div., N.Y., 15c, 20c
Fidelity Amplifier Co., Ill., 20s
**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5s, 15s, Tel: EVergreen 6-1300**
**See ad on page 566**
**General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, 15s, 20s, Tel: EMerson 9-4400**
**See ad on Cover 4**
General Resistance, Inc., N.Y., 20c
Geotronic Labs., Inc., Texas, 5c
Godfrey Mfg. Co., Ill., 20s
Gray Instrument Co., Pa., 20s

## 11. Decades.

Heath Co., Mich., 5s, 20s
Hopkins Engineering Co., Calif., 5c
Industrial Instruments, Inc., N.J., 5s, 20s
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c
Julie Research Labs., Inc., N.Y., 20sc
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 20sc, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kurtston Electronics, N.Y., 20s
Leeds & Northrup Co., Pa., 5s, 10s, 15s, 20s
Marstan Electronics Corp., N.Y., 20c
Millitest Corp., N.Y., 20s
Minneapolis-Honeywell Regulator Co., Rubicon Instruments, Pa., 20sc
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 20c
Muirhead & Co., Ltd., England, 5s, 15s, 20s
Muirhead Instruments, Inc., N.Y., 5s, 15s, 20s
Munzig International, Inc., Calif., 5s, 10s, 15s, 20s
Neptune Electronics Co., N.Y., 20sc
New York Transformer Co., Inc., N.J., 15s
Newark Controls Co., N.J., 5s, 20s
Nichols Ltd., R. H., Canada, 5s, 15s, 20s
**Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 20s, Tel: ORchard 5-2600**
**See ad on pages 78-79**
Pacific Instrument Co., Calif., 15c
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 20s, Tel: COmmonwealth 6-5375**
**See ad on page 270**
Philips Electronic Instruments, N.Y., 5s
**Physics Research Laboratories, Inc., P.O. Box 555, Hempstead, L.I., N.Y., 20sc, Tel: IVanhoe 3-8299**
**See ad on page 288**
Precise Electronics & Development Corp., N.Y., 5s, 10c, 15c, 20s
Rinco, Inc., Ore., 5s, 20s
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, 20c, Tel: LOckwood 5-4578**
**See ad on page 324**
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 5s, 15s, 20s, Tel: PRescott 3-8010**
**See ad on page 246**
San Fernando Electric Mfg. Co., Calif., 5c
Sangamo Electric Co., Ill., 5c
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 20s, Tel: WOodlawn 5-2341**
**See ad on page 258**
Sigma Electronics Research Corp., Wash., 20c
Simmonds Precision Products, Inc., N.Y., 5s
**Southern Electronics Corp., 150 W. Cypress Ave., Burbank, Calif., 5c, Tel: VIctoria 9-3193**
**See ad on page 208**
Sprague Electric Co., Mass., 5sc, 15s, 20s
Sullivan Ltd., H. W., N.Y., 5s, 15s, 20s
Sunshine Scientific Instrument, Pa., 5c, 10c, 15c, 20c
Tel-Labs., Inc., N.H., 20c





# Directory I. Complete Equipment

## 11. Decades.

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, Tel: YE 2-8600**
**See ad on page 338**
Telegraph Condenser Co., Ltd., The, England, 5s
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 20s, Tel: MIdway 6-7211**
**See ads on pages 456, 556**
Torocoil Company, Ill., 15s
Transformers, Inc., N.Y., 15c
Ultronix, Inc., Calif., 20c
**Universal Mfg. Co., Inc., 1168 Grove St., Irvington 11, N.J., 15s, Tel: ESsex 4-9800**
**See ad on page 678**
**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 20s, Tel: LOcust 8-6820**
**See ad on page 255**
**Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick Ave., Chicago 10, Ill., 5s, 10s, 15s, 20s, Tel: MIchigan 2-2000**
**See ad on page 681**
Wells Electronics Co., Ind., 5c, 15c
Winslow Co., Inc., The, N.J., 5sc, 10sc, 15sc, 20sc

**Decommutators:**
**See class 36**

**Deflection yokes:**
**See class 45**

**Delay lines:**
**See class 50**

**Demagnetizers:**
**See class 65**

**Detectors, flaw:**
**See class 14**

**Detectors, radiation:**
**See class 24**

**Dictation equipment:**
**See class 29**

**Digital clocks:**
**See class 9**

**Digital timing generators:**
**See class 14**

**Digital voltmeters:**
**See class 14**

**Diode testers:**
**See class 14**

**Direction finders:**
**See class 18**

**Disk recorders:**
**See class 29**

**Disks, recording:**
**See class 65**

**Distortion & noise analyzers:**
**See class 3**

**Dollies:**
**See classes 34 & 84**

**Dosimeters:**
**See class 24**

**Dynamometers**
**See class 14**

**Electrocardiographs:**
**See class 19**

**Electrometers:**
**See class 14**

## 12. Emergency Communications Equipment.

5. Dispatching equipment 10. Walkie-talkies

Aircraft Electronics, Ariz., 10s
**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 5, Tel: FOrest 6-4467**
**See ad on page 276**
Altec Lansing Corp., Calif., 5s
American Development Electronics Co., N.J., 5c, 10c
Barker & Williamson, Inc., Pa., 10c
Bendix Corp., The, Bendix Radio Div., Md., 5s, 10s
Cadre Industries Corp., N.Y., 5sc, 10sc
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 10c
Chicago Electronic Div., Land-Air, Inc., Ill., 5c, 10c
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5sc, 10s, Tel: OAkwood 7-6800**
**See ad on page 308**
Collins Radio Co., Central Sales Office, Tex., 5c, 10c
Communications Co., Inc., Fla., 5sc
Cosmic, Inc., D.C., 10s
Crosley Div., Avco Corp., Ohio, 5s
Dalmo Victor Co., Div. of Textron, Inc., Calif., 10c
Designers for Industry, Inc., Ohio, 10c
Dixon Electronics Co., Mich., 10s
Dollar Co., The Robert, Communications Equipment Div., Calif., 5c, 10c

## 12. Emergency Communications Equipment.

Electro-Voice, Inc., Mich., 10s
Electronic Assistance Corp., N.J., 10c
General Electric Co., Communication Products Dept., Va., 5sc, 10sc
Gilfillan Bros., Inc., Calif., 10c
Gonset Division, Young Spring & Wire Corp., Calif., 5s
Hallicrafters Co., The, Ill., 10c
Heath Company, Subsid. Daystrom, Inc., Mich., 10s
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c
Jetronic Industries, Inc., Pa., 5c, 10c
Johnson Co., E. F., Minn., 10s
Kaar Engineering Corp., Calif., 5s
**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 10c, Tel: AMityville 4-2200**
**See ad on page 365**
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 10sc
Lear, Inc., Calif., 10c
Line Electric Co., N.J., 10s
Madigan Electronic Corp., N.Y., 5c, 10c
Melody Master Mfg. Co., Ill., 10c
Miratel, Inc., Minn., 5s
Mobil Electronics, Inc., Div. Radiomic Labs., Inc., Ind., 5c
Morrow Radio Mfg. Co., Ore., 10s
Mosler Research Products, Inc., Conn., 10s
Motorola, Inc., Ill., 5s, 10s
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c
Multi Products Co., Mich., 5s
Munzig International, Inc., Calif., 10s
Nippon Electric Co., Ltd., Japan, 10c
Osborne Electronics Sales Corp., Ore., 5s, 10s
Pacific Mercury Electronics, Thomas Organ Co., Calif., 5s
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 10c
Pye Telecommunications, Ltd., England, 10s
RCA Victor Co., Ltd., Canada, 5s, 10s
Radio Corp. of America, N.J., 5s, 10s
Radio Corp. of America, Defense Electronic Products, N.J., 5sc, 10sc
Radio Specialty Mfg. Co., Ore., 10s
Raytheon Co., Equipment Div., Mass., 10c
Seiscor, Div. Seismograph Service Corp., Okla., 10s
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 10c, Tel: EMpire 4-2271**
**See ad on page 420**
Sorensen Industrial Electronic Co., N.J., 5sc, 10sc
Specialty Electronics Development Corp., N.Y., 10c
Technology Instrument Corp., Mass., 5s, 10s
Telephonics Corp., N.Y., 10s
Topping Electronics, Ltd., F. V., Canada, 10s.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**alfax** is revolutionizing graphic recording!

"ELECTRICITY IS THE INK"

ALFAX PAPER AND ALDEN ADJUSTERLESS RECORDING TECHNIQUES MAKE POSSIBLE —

• ***New Accuracies and Resolution in Direct Graphic Recording!***

Record full range of your electronic signal outputs — monitor processes and operations directly and instantaneously on Alfax Paper — no pens or ink — up to 18 step permanent tone shades.



**Multi-Channel Fact Finder — 30 Channels Plus Timing**

Record thirty channels of on-off data by merely supplying current to writing stylI — no pens or inks — simple motion switches are easily installed to make or break writing current to Alfax Paper. Ideal for monitoring production operations and processes, this compact, rugged recorder is portable for lab, factory and field use. Also available in 2 channel Magazine Fact Finder.



**Alden "Flying Spot" Component Recorders**

Get hi-resolution tone shade recordings on Alfax Paper of detecting instruments using scanning or sweep methods to collect data; Synchronize Alden "Flying Spot" with sweep or rep rate of your equipment—use direct signal outputs to mark Alfax with tone shades proportional to signal variations. Ideal for sonar, radar, facsimile, ultrasonic and magnetic flaw detection etc.



**Alden 5" Graphic Presentation Lab.**

An Alden "Flying Spot" helix Recorder, easy coupling drive motors and plug-in electronics suitable for a range of applications at speeds of 60 to 1800 sweeps/minute with 100 sweeps/in. definition are arranged as flexible building block components in this compact, mobile lab.



**Precision Graphic Recorder**

Instant, direct graphic recording of underwater energy propagations embracing full range of applications including seismic profiling, layer studies, echo sounding and ranging, bottom mapping, finding underwater objects, broad oceanographic studies.

• ***Fastest, Most Accurate Means of Communication!***

New high and low speed Alden facsimile recording systems using Alfax Paper are the most accurate means of communication today — are simple to install and operate virtually unattended.



**High Speed Selective Dispatch Facsimile System**

Specially designed to permit selection of pertinent data from any copy — letters, dispatches, reports, etc. — for instant transmission to wherever needed — yet complete reproductions can also be sent. 72 square inches of copy, 1800 words of newspaper type, or 900 words of typewriter text can be transmitted and received per minute.



**Continuous Reproduction Facsimile System**

Extremely high quality reproduction of large copy; such as newspapers, weather maps, blueprints, finished advertising layout, drawings, photographs, etc., can be transmitted easily with this equipment. Copy is scanned flat and reproduction automatically on remote continuous recorder.



**Alden Giant Bulletin System**

Fastest, accurate means of disseminating information to large groups of people. Automatically provides changing "up to the minute" bulletins 4 feet wide and up to 10 feet high and as much as 12 square feet of copy per minute, enlarged 10 times from remote flat-copy scanner as sent either by wire or a microwave system.

**WRITE FOR LITERATURE**
**on Alfax or Alden Recorders to:**

**ALDEN ELECTRONIC & IMPULSE RECORDING EQUIPMENT CO.**

**Alden Research Center, Westboro, Mass.**

For details, circle #194 on Reader Service Card


## 12. Emergency Communications Equipment.

U.S. Science Corp., Calif., 5c, 10c

Vinco Electronics Corp., Conn., 10c

Vocaline Co. of America, Inc., Conn., 10s

Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, Tel: JUdson 2-3030
See ad on page 704

Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, Tel: BEnton 1-0700
See ad on page 573


**Enclosures & cabinets:** See class 84

**Enclosures, shielded:** See class 14

**Environmental test chambers:** See class 14

**Equalizers:** See class 51


## 13. Facsimile Equipment.

5. Receiving equipment
10. Sensitized paper
15. Transmitting equipment

Aeronutronic, Div. Ford Motor Co., Calif., 5c, 15c

Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 5, 10, 15, Tel: FOrest 6-4467
See ad on this page

Alden Systems Co., Mass., 5s, 15s

Alfax Paper & Engineering Co., Inc., Mass., 10sc

Autron Engineering, Inc., Calif., 15c

Brick Electronic Equipment Co., N.J., 5c, 10c, 15c

Bristol Co., Conn., 10c

CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 5c, 15c

Clipper Gear & Machine Co., Mich., 5c, 15c

Collins Radio Co. Western Div., Calif., 5c, 15c

Crosby-Teletronics Corp., N.Y., 5c, 15c

Designers for Industry, Inc., Ohio, 5c, 15c

Eastman Kodak Co., 343 State St., Rochester 4, N.Y., 10sc, Tel: LOcust 2-6000
See ad on page 300

Electro Radiation, Inc., Calif., 5c, 15c

Electronic Communications, Inc., Fla., 5sc, 15sc

Engineering Associates, Ohio, 5c, 15c

Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 15c

Fairchild Camera & Instrument Corp., Defense Prods. Div., N.Y., 5c, 15c

General Electric Co., Communication Products Dept., Va., 15c

Haloid Xerox, Inc., N.Y., 10s

International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 15c

## 13. Facsimile Equipment.

International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c

Itek Corp., Mass., 10c

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5c, 15c

Lear, Inc., Calif., 5c, 15c

Motorola, Inc., Military Electronics Div., Ariz., 10c

Muirhead & Co., Ltd., England, 5s, 10s, 15s

Muirhead Instruments, Inc., N.Y., 5s, 10s, 15s

Nippon Electric Co., Ltd., Japan, 5s, 15s

Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5s, 15s, Tel: WAtkins 9-9117
See ad on pages 36-39

Philco Corporation, Govt. & Industrial Group, Pa., 5c, 15c

RCA Victor Co., Ltd., Canada, 5s, 10s

Radio Corp. of America, Defense Electronic Products, N.J., 15sc

Stromberg-Carlson San Diego, Div. General Dynamics Corp., Calif., 5c, 15c

Sunshine Scientific Instrument, Pa., 10s

Technical Materiel Corp., The, 700 Fenimore Rd., Mamaroneck, N.Y., 5s, Tel: OWens 8-4800
See ads on pages 344, 345

Technitrol Engineering Co., Inc., Pa., 5c, 15c

Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 15c, Tel: YE 2-8600
See ad on page 338

Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 10sc, Tel: TWining 8-1000
See ad on page 260

Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c

U.S. Science Corp., Calif., 5c, 15c

Western Union Telegraph Co., The, N.Y., 5s, 10s, 15s

Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 10sc, 15sc, Tel: JUdson 2-3030
See ad on page 704


**Field intensity & field strength meters, radio frequency:** See class 28

**Field intensity meters, microwave:** See class 21

**Film processors:** See class 65

**Film projectors:** See class 34

**Filters:** See class 52

**Filters, air:** See class 84






# Directory I. Complete Equipment


**Flaw detectors:** See class 14

**Flight simulation equipment:** See class 14

**Flowmeters, fluid:** See class 4

**Frequency converters:** See class 47

**Frequency meters:** See class 58

**Frequency meters, microwave:** See class 21

**Frequency shift converters & keyers:** See class 35

**Frequency standards:** See class 33

**Function generators:** See class 14

**Furnaces, vacuum:** See class 92

**GCA equipment:** See class 1

**Galvanometers:** See classes 14 & 58

**Galvanometers, recording:** See class 15

**Gaussmeters:** See class 14

**Gears & gear-trains:** See class 30


**Complete addresses are supplied in the product sections of this directory for those firms who have placed advertisements in this issue. For addresses and phone numbers of non-advertisers, see the Alphabetical Directory, pages 135-240.**

## 14. General Test Equipment

2. Calibrators, instrument
4. Capacitor testers
6. Circuit testers
8. Crystal testers
10. Detectors—flaw
12. Digital timing generators
14. Digital voltmeters
16. Diode testers
18. Dynamometers
20. Electrometers
22. Environmental test chambers
24. Galvanometers
26. Gaussmeters
28. Grid dip meters
30. Gyro testers
32. High voltage testers
34. Insulation testers
36. Mass spectrometers
38. Multi-testers
40. Null indicators
42. Ohm & megohm meters
44. Pressure gages
46. Pyrometers
48. Racks—aging
50. Resistor testers
52. Servo analyzers
54. Shielded enclosures
56. Spectrometers
58. Stroboscopes
60. Transistor testers
62. Ultrasonic generators
64. Ultrasonic testers
66. Vacuum gages
68. Vacuum tube testers
70. Vacuum tube voltmeters
72. Vibration analyzers

AC Spark Plug, The Electronics Div. of General Motors, Wis., 30c

ACF Electronics Div., ACF Industries, Inc., Md., Flight Simulations

AMP Incorporated, Pa., 4s, 6s

Accessory Controls & Equip. Corp., Conn., 22c

Ace Engineering & Machine Co., Inc., Pa., 54sc

Acoustica Associates, Inc., N.Y., 62sc

Acromag, Incorporated, Mich., Magnetic Frequency Detectors s

Acton Labs., Inc., 500-B Main St., Acton, Mass., 70s, Tel: COlonial 3-7756
See ad on page 346

Advanced Electronics, Inc., Conn., 72s

Advanced Instrument Corp., Calif., 22c

Advanced Research Associates, Inc., Md., 52c

Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 40s, Tel: GRegory 2-5622
See ad on page 329

Aero Mechanism, Inc., Calif., 44sc

Aeroflex Corp., Aeroflex Laboratories Div., N.Y., 30s, 72s, Flight Simulation c

Aerolux Light Corp., N.Y., 32sc, 58c

Aerotronic Assoc., Inc., N.H., 16sc, 58s, 60sc

Aerovox Corp., Mass., 4s

Aetna Electronics Corp., Readington Rd., North Branch, N.J., 52s, Tel: RAndolph 5-1000
See ad on this page

Air-Shields, Inc., Pa., 22sc, 54sc

Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 6s, 8s, 16s, 60s, Function Generators s

Aircraft Electronics, Ariz., 34c, 60c

Aireco, Inc., N.Y., 22c

Airmec Limited, England, 32s, 34s, 42s, 70s

Airtronics International Corp., Fla., 38c

Alcar Instruments, Inc., N.J., 62sc, 64sc

All American Tool & Mfg. Co., Ill., 68sc

Allegany Instrument Co., Inc., Md., 2s, 6s, 42s, 44s

Allied Research Assoc., Inc., Mass., 72c

Amerac, Inc., Mass., 2sc

American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 56c, 60s, Tel: WAlnut 5-8780
See ad on page 369

American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 22c, Tel: DUnkirk 5-7401
See ad on page 164

American Instrument Co., Inc., Md., 22sc, 24s, 48s, 56s, 72s

American Optical Co., N.Y., 10, 36, 54

American Research Corp., Conn., 22c

American Research & Mfg. Corp., Md., 72s, Metal-Detectors s

American Scientific Dev. Co., Calif., 68s

Analogue Controls, Inc., N.Y., 50s

Anchor Specialty Mfg. Co., N.J., 6c, 10c, 18c, 22c, 30c, 32c, 34c, 40c, 48c, 50c, 60c, 66c

Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 2c, Tel: EDgewood 4-8770
See ad on page 379

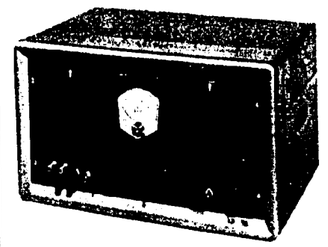
Anton Electronic Laboratories, Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 38s, 70s, Tel: EVergreen 6-5715
See ads on pages 319, 409, 581

Applied Electro Mechanics, Inc., Va., Conductance Meters c

Applied Physics Corp., Calif., 20s

Applied Radiation Corp., Calif., 20c


**SERVO ANALYZERS**



6 MODELS

Frequency Range .0008 to 100 CPS

Sine, Square, Modulated Carrier and Sweep Signal Outputs

Phase Measurements ± 180°

External Carriers To 10 KC

Low Cost, Excellent Performance.

**AETNA**

**ELECTRONICS CORPORATION**

Readington Road North Branch, N.J.

RAndolph 5-1000

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

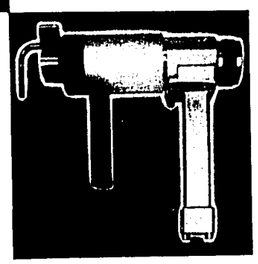
# LOOK TO AVCO...
## for use-proven space age research tools

Now available from Avco are advanced products and systems in the fields of Hypervelocity Instrumentation, Rocket-Environment Test Equipment, and Plasma Research Facilities. Represented by local agents throughout the United States and the world, these products are fully use-proven in research and development laboratories across the nation.

### PLASMA RESEARCH FACILITIES

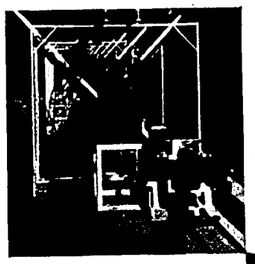


**Plasma Generator PG-500,** operating with air as the working fluid, duplicates all essential conditions of atmospheric re-entry, consumes up to 1.5 megawatts of power, produces enthalpies up to 12,500 Btu/lb. Uses include plasma research, materials testing and re-entry simulation.



**Plasma Generator PG-030,** designed as ultra-reliable powder spray tool for industrial applications and as laboratory heat source for scientific applications, consumes from 4 to 50 KW of power, sprays tungsten, carbides, alumina, zirconia, etc. Available with pistol grip or pedestal.

### HYPERVELOCITY INSTRUMENTATION



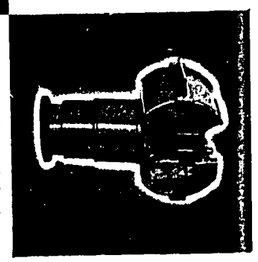
**Shadowgraph and Schlieren Systems** record events associated with hypervelocity aerodynamic phenomena; include light source, lenses, catadioptric light screen, Kerr Cell Shutter and Camera. Record shock waves, flow patterns and impact deformations of space age research.



**Avco Kerr Cell Shutter** permits any exposure from .005 to .1 μsec., is available as an independent module. Large 2-inch aperture unit may be remotely positioned for maximum utility. Useful for ultra-high speed shuttering in ballistic, chemical and thermal research. Can be synchronized to Package Light Source.

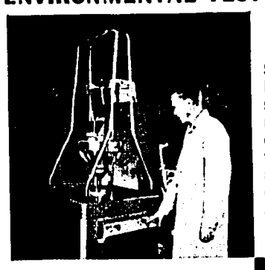


**Package Light Sources,** providing from .3 to 1 μsec. light pulse durations, are general purpose, spark-type units of cylindrical construction with coaxial discharge path; predetermined triggering; also provide synchronized output pulse for balance of system.

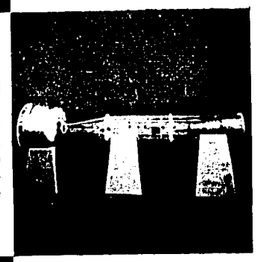


**Rotating Mirror and Drum Cameras** for accurate position-versus-time recording of hypervelocity events. Mirror camera writes at rate of 4mm/μsec. on 70 mm film; Rotating Drum Camera writes at rate of .19 mm/μsec. on 76mm film for streak and Schlieren recording.

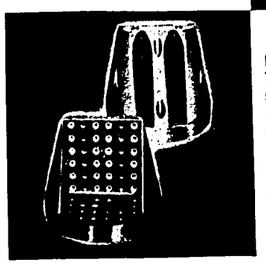
### ENVIRONMENTAL TEST EQUIPMENT



**Shock Machines,** 100 and 500-lb. capacity machines with shock pulses up to 1500 g's, meet ballistic missile test specifications by providing saw-tooth, quarter- and half-sine, and triangular pulses. 20-lb. capacity machine available June, 1960.



**Acoustic Noise Test Systems** available in a variety of configurations to meet specialized requirements. Systems available with random noise outputs of 163, 150, 140, and 120 db. Larger systems feature Avco Acoustic Noise Generator AG-012, simulating random noise of rocket engine firing.



**Environmental Test Fixture** TF-006-1 is compact and versatile, virtually resonance-free up to 2000 cps, mounts on standard vibration exciters, centrifuges and shock machines; also handles several specimens along three mutually perpendicular axes.

**Avco**
*Research & Advanced Development* division

**For more information write: Products and Services Department, Research and Advanced Development Division, Avco Corporation, Wilmington, Massachusetts.**

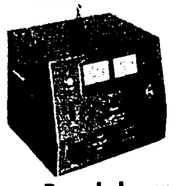



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## TEST INSTRUMENTS for ELECTRICAL EQUIPMENT

**Laboratory**
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**Maintenance**



### Voltage Breakdown Tests

Bench HYPOT* Test Sets, a-c and d-c models, have outputs to 30 kv. Separate 4½" meters for test voltage and leakage current. Wide selection of models.
Model 424 Bench HYPOT* provides 0-5000 v d-c. For testing cables, condensers, coils, transformers, motors, and assemblies. Measures leakage current from 0.1 microampere to 100 microamperes over four scale ranges. Rapid testing of capacitors with output of 5 milliamperes under short circuit. Operates from 110-120 v 50/60 c outlet with long-life selenium high voltage supply.
Net complete . . . . . $497.50

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  Dielectric strength determined to laboratory precision. Interchangeable test fixtures for varnishes, porcelain, tape, acetate sheet, films, tubing and cloth. Write for Bulletin, Model 4501 HYPOT* Materials Tester.
- **Insulating Oils Tester**
  New portable design, only 42 lbs., for testing insulating oils at point of application as well as in the laboratory. Test potential variable from 0 to 35 kv, with 2 kva rating. Write for bulletin Model 4505 HYPOT* Oil Tester.
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  VIBROTEST* megohmmeters provide direct reading measurements to FIVE million megohms and higher with electronic power supply that eliminates tedious cranking. Write for bulletin "VIBROTEST".
- **Test Electrical Grounds**
  VIBROGROUND* measures resistance to ground of electronic, telephone, and power equipment. Direct reading. Operates from self-contained battery. Write for Bulletin "VIBROGROUND"*
- **Special Instruments**
  A. R. I. engineers have developed instrumentation to meet many specialized research, development, and production applications. Your inquiry for special equipment will receive prompt attention.

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ASSOCIATED RESEARCH, Inc.

**3792 W. Belmont Ave., Chicago 18, Ill.**
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# Directory I. Complete Equipment

## 14. General Test Equipment.

**Arenberg Ultrasonic Lab., Inc.,** 94 Green St., Jamaica Plain 30, Mass., 62sc, 64sc, Tel: JAmaica 2-8640
See ad on page 435

Ark Electronics Corp., Pa., 54c

Artronic Instrument Co., The, Md., 2c, 12c

Assembly Products, Inc., Ohio, 46s

**Associated Research, Inc.,** 3792 W. Belmont Ave., Chicago 18, Ill., 6sc, 32sc, 34sc, Tel: COrnelia 7-4040
See ad on this page

**Associated Testing Laboratories, Inc.,** 115 Rt. 46, Wayne, N.J., 6sc, 22sc, 54 Acoustic s, 72s, Tel: CLifford 6-2800
See ads on pages 279, 660

Atlantic Research Corp., Va., 2sc, 44sc

Atlantis Electronics Corp., Tex., 16c, 60c

Atohm Electronics, Calif., 50c

Atronic Products, Inc., Pa., 60c

Austin Electronics, N.Y., 12c

Auto-Test, Inc., Ill., 58c

Automatic Timing & Controls, Inc., Pa., 6sc, 10sc, 26c, 38s, 40sc, 64c

Automation Dynamics Corp., N.J., 6c, 14c

Automation Industries, Inc., Calif., 64s, Eddy Current s

Autonetics, Div. North American Aviation, Inc., Calif., 6c

Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., 22c, 72c, Tel: OLiver 8-8911
See ad on page 278

Avionics Corp. of America, Pa., 48c, 60c

Avo Limited, England, 4s, 6s, 38s, 42s, 50s, 60s, 68s, 70s

B & F Instruments, Inc., Pa., 2sc, Torque s

BJ Electronics, Borg-Warner Controls, Calif., 44sc

B & K Instruments, Inc., Ohio, 42s, 70s, 72s

B & K Mfg. Co., Ill., 2s, 60s, 68s

Bach Auricon, Inc., Calif., 24s

Bailey, Inc., P. A., Conn., 2sc

**Baird-Atomic, Inc.,** 33 University Rd., Cambridge 38, Mass., 16s, 48c, 56s, 60s, 68s, Tel: UNiversity 4-7420
See ad on page 280

Baker Co., Inc., The, Me., 54 Dust sc

Baldwin-Lima-Hamilton Corp., Electronics & Instrumentation Div., Mass., Strain Gages s

**Ballantine Laboratories, Inc.,** Boonton, N.J., 2s, 4s, 40s, 70s, Tel: DEerfield 4-1432
See ad on page 144

Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., Hardness Testers s, Tel: WOodland 8-6833
See ad on page 465

Barber Labs., Alfred W., N.Y., 60s

Barker & Williamson, Inc., Pa., 28sc, 40sc

Barnes Development Co., Pa., 4s, 16c, 32c, 34c, 42sc, 50sc, 60c

Barnes Engineering Co., Conn., 46s, 56s

Barnes & Reinecke, Ill., 6c, 10c, 12c, 14c

Barry-Wright Corp., Mass., 72sc

Barton Electronics, Inc., Conn., 10s, 50s

Bausch & Lomb Incorporated, N.Y., 56s

Beach-Russ Co., N.Y., 60sc

Bearing Inspection, Inc., Calif., 10c, 72c, Bearing Testers c

Beckman Instruments, Inc., Berkeley Div., Calif., 14s

Beckman Instruments, Inc., Scientific & Process Instruments Div., Calif., 20s, 36s, 56s

Beckman Systems Division, Calif., 14s

Bell & Gossett Co., Ill., 60c

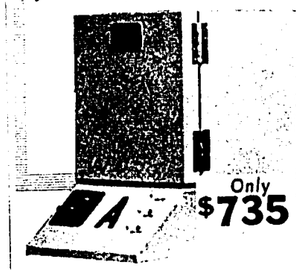
**Belling & Lee Ltd.,** Great Cambridge Rd., Enfield, Middlesex, England, 54sc, Tel: ENfield 3322
See ad on page 411

Bendix Corp., The, Cincinnati Div., Ohio, 36c, Viscometers c, Electron Microscopes c

**Bendix Corp., The,** Eclipse-Pioneer Div., Teterboro, N.J., 18sc, 30sc, 32sc, 34sc, Tel: ATlas 8-2000
See ad on pages 103-106


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### High-Low Temperature Chamber

Now you can perform tests in your own plant at lowest cost!




- *Interior dimensions 14" x 14" x 14"*
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- *Stainless steel liner standard equipment*
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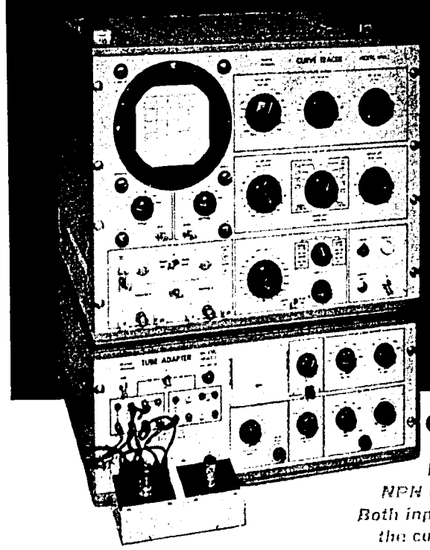
**ASSOCIATED TESTING LABORATORIES, INC.**
115 Rt 46 at Rt 23 WAYNE NEW JERSEY
TELEPHONE CLifford 6 2800 TWX LT FS NJ 943
Plants in Wayne N J and Orlando Florida

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

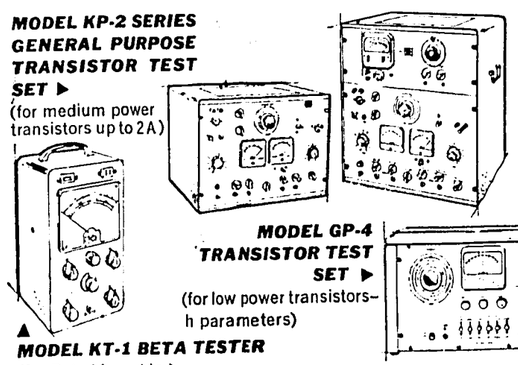
# Baird-Atomic MEETS THE TEST

WITH THE MOST COMPLETE LINE OF TRANSISTOR & SEMICONDUCTOR TEST EQUIPMENT AVAILABLE

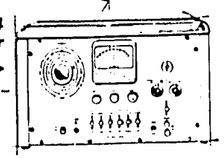


**CURVE TRACER, MODEL MW-1** *(Shown with tube adapter)*
*Baird-Atomic's Curve Tracer, Model MW-1, is the finest of its type. It is designed to display families of characteristic curves for PNP and NPN transistors in either common base or common emitter configurations. Both input and or output current or voltage may be selected as components of the curves displayed. Its operational range includes the* ***highest maximums*** *(30A collector current continuous duty—50A intermittent and 450 watts maximum) and the* ***lowest impedances*** *(minimum observed .001 ohms to 10 megohms) presently available. Maximum input drive current is 5 amperes and the MW-1 features* ***automatic overload protection.*** *These features make B/A's New Curve Tracer the most versatile on the market.*

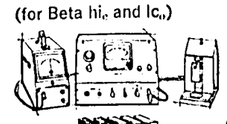
***MODEL KP-2 SERIES GENERAL PURPOSE TRANSISTOR TEST SET ▶***
(for medium power transistors up to 2A)



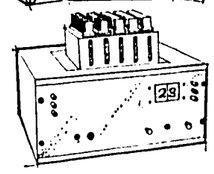
***MODEL GP-4 TRANSISTOR TEST SET ▶***
(for low power transistors—h parameters)



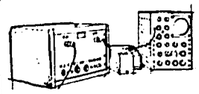
***◀ MODEL KT-1 BETA TESTER***
(for Beta $h_{fe}$ and $I_{co}$)



***◀ MODEL JJ SEMICONDUCTOR MINORITY CARRIER LIFETIME TEST SET***



***◀ MODEL JN RESISTIVITY TEST SET***



***◀ MODEL NA-1 COMPONENT SELECTOR***
(for inspection of 2 or 3-terminal components)

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Baird® Atomic

**Baird-Atomic, Inc.**
33 University Road
Cambridge 38, Massachusetts

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# Directory I. Complete Equipment

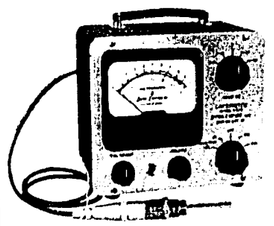
## 14. General Test Equipment.

Bendix Corp., The, Industrial Controls Section, Mich., 6s
Bendix Corp., The, Montrose Div., Pa., 44c
Bendix Corp., The, Pioneer-Central Div., Sonic Energy Products, Iowa, 62sc
**Bendix Corp., The, Red Bank Div., Electron Tube Products, State Hwy. #35, Eatontown, N.J., 12s, Totalizers s, Tel: LIberty 2-2090**
**See ad on page 574**
Bendix Corp., The, York Division, Pa., Flight Simulation c
Bently Scientific Co., Calif., 10sc
Bergen Laboratories, Inc., N.J., 42s, 70s
Berkshire Laboratories, N.H., 58s, 68s
Biddle Co., James G., Pa., 6s, 24s, 32s, 34s, 36s, 42s, 56s
Bliss Electronic Corp., N.J., 2s, 4c, 6s, 32s, 34s, 50s, Relay Testers s
Blue M Electric Co., Ill., 22sc
Boesch Mfg. Co., Inc., Conn., Permeameters sc
Bon-De Electronic Laboratories, Inc., Mass., 60s
Bone Engineering Corp., Calif., 12c
**Boonton Electronics Corp., 738 Speedwell Ave., Morris Plains, N.J., 24s, 28s, 40s, 70s, Tel: JEfferson 9-4210**
**See ad on page 256**
Bracke-Seib X-Ray Co., Inc., N.Y., 34c
Branson Ultrasonic Corp., Conn., 62s, 64s
Brilmayer Labs., Inc., E. W., N.Y., Metal Detectors sc
Bristol Co., Conn., 2c, 6c, 20c, 24c, 40c, 42c, 44c, 46c, 60c
Brooks Research, Inc., N.Y., 2sc, 6sc, 10sc, 32sc, 34sc, 38sc
Bruel & Kjaer, A/S, Denmark, 10 Roughness s, 22 Anechoic Acoustical s, 42s, 50s, 56s, 70s, 72 Damping Factor s, Acoustical Testers s
Bruno-New York Industries Corp., N.Y., 38c, 42c
Brunswick Instruments, N.J., 50c
Brush Instruments, Ohio, 52s
Buck Engineering Co., N.J., 32c, 48c
Buck Instrument Co., Colo., 40c, 44sc, 66sc
**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 30c, Tel: CLoverdale 3-8931**
**See ad on page 321**
Bunnell & Co., J. H., N.Y., 8c
Burton-Rodgers, Inc., Ohio, Flight Simulation c
Bytrex Corp., Mass., 2c
C.E.S. Electronic Products, Calif., 4s
Cable Specialists of Conn., Conn., 72s
California Technical Industries, Div. Textron, Inc., Calif., 4, 6, 16, 50, 60, Multiple component testers
Canadian Aviation Electronics, Ltd., Canada, 6c, Flight Simulation c
Canadian Marconi Co., Canada, 16s, 60s, 68s, 70s
Carad Corp., Calif., 32c
Capehart Corp., Dynamic Electronics Div., N.Y., 2c, 4c, 6c, 8c, 28sc, 32c, 38c, 40c, 42c, 48c, 50c, 62c, 68c, 70c
Carmody Corp., N.Y., Flight Simulation s
Cedar Engineering Div., Control Data Corp., Minn., 52c
Central Research Laboratories, Inc., Minn., 34s
Central Scientific Co., Ill., 60s
Century Electronics & Instruments, Inc., Okla., 24s, Strain Gages s, Bridge Testers s
Cetron Electronic Corp., Ill., 60sc
Chadwick-Helmuth Co., Calif., 52s, 58s, 72s
Chance Vought Electr. Div., Texas, 6c
Chester-Morton Electr. Corp., Pa., 8s
Chicago Aerial Industries, Inc., Ill., 4c, 6c, 10c, 18sc, 68c
Chicago Electronic Div., Land-Air, Inc., Ill., 50c, 72c
Chromo-Log Corp., Pa., 12s
Cincinnati Sub Zero Products, Ohio, 22c
**Clegg Laboratories, N.J. Rt. 53, Mount Tabor, N.J., 2s, 4s, 6s, 8s, 12s, 14s, 16s, 28s, 32sc, 48s, 68s, 70s, Tel: OAkwood 7-6800**
**See ad on page 308**
Clippard Instrument Laboratories, Inc., Ohio, 4s, 50s
Coils-Electronics Co., Pa., 16sc, 60sc
Coleman Instruments, Inc., Ill., 20s, 24sc, Chemical analysis c
**Communication Measurements Laboratory, Inc., 348 Leland Ave., Plainfield, N.J., 42sc, Tel: PLainfield 4-5502**
**See ad on page 479**
**Components for Research, Inc., 979 Commercial St., Palo Alto, Calif., 32c, Tel: DAvenport 1-5252**
**See ad on page 688**
**Computer Control Co., Inc., Eastern Div., 983 Concord St., Framingham, Mass., 12c, Tel: TRinity 5-6185**
**See ad on page 264**
**Computer Control Co., Inc., Western Division, 2251 Barry Ave., Los Angeles 64, Calif., 12c, Tel: BRadshaw 2-9135**
**See ad on page 264**
Computer-Measurements Co., Div. Pacific Industries, Inc., Calif., 12sc
Computing Systems, Inc., N.Y., Function Generators s
Conrad, Inc., Mich., 22sc
Consolidated Airborne Systems, Inc., N.Y., 4s, 34s, 42s
Consolidated Avionics Corp., N.Y., 2sc, 6sc, 12c, 16c, 34c, 38sc, 60c
Consolidated Electrodynamics Corp., Calif., 2s, 24s, 36s, 44s, 50s, 66s, 72s
**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., Voltage Dividers sc, Tel: YOnkers 3-5900**
**See ad on page 523**
Consolidated Vacuum Corp., N.Y., 22sc, 66s
Control-Data Corp., Minn., Flight Simulation c
Control Equipment Corp., Mass., 12s, 30c, 62c
Controlled Atmosphere Enclosures Mfg. Co., Inc., Fla., 22c, 54sc
Contronics, Mass., 16, 60
Cook Electric Co., Ill., 2c, 4c, 10c, 22c, 54c, 72c
Cook Technological Center, Div. Cook Electric Co., Ill., 10c, 22c, 30c, 50c, 52c, 60c, 72c
Corbett Science Laboratories, E. W., Calif., 62sc, 64c
**Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 4s, Tel: PLainfield 6-9000**
**See ad on Cover 3**
Corona Engineering Service, N.Y., 22sc
Cosa Corporation, N.Y., 18sc, 72sc
Cosmic, Inc., D.C., 32s, 50s
Crosby-Teletronics Corp., N.Y., 10s, 30s
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Cubic Corp., Calif., 14s, 42s
**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 6c, 14c, 20sc, 60sc, Tel: SWarthmore 1-0100**
**See ad on page 510**
Curtiss-Wright Corp., Electronics Div., IMI Branch, N.M., 14s, 60s
D & R, Ltd., Calif., 62c
Daco Instrument Co., N.Y., 52c
Dallons Semiconductors, Div. Dallons Laboratories, Inc., Calif., 62c, 64c
Data Products Co., Inc., Md., 14s
Datascan, Inc., N.J., Inc., 34, 42c, 60c
Datex Corp., Calif., 14sc, 48c, 60c, 68c
Daven Co., The, N.J., 10c, 48c, 70s
Davenport Mfg. Co., Ill., 2sc, 6c, 14sc, 32sc, 34sc, 42sc, 58c
Dawe Instruments Ltd., England, 58s, 70s, 72s
Daystrom, Inc., Military Electronics Div., Pa., 60c
Daystrom, Inc., Weston Instrument Div., N.J., 2sc, 4sc, 6sc, 10c, 24sc, 34c, 38sc, 40sc, 42sc, 46sc, 50sc, 68sc, 70sc
Decker Corporation, The, Pa., 44s, 60s, 70s
**Del Electronics Corp., Dept. RE, 521 Homestead Ave., Mount Vernon, N.Y., 32sc, Tel: OWens 9-2000**
**See ads on pages 282, 481, 567**
Delmhorst Instrument Co., N.J., Humidity Testers sc
Delta Design, Inc., Calif., 22c
Deltron, Inc., Pa., 40s
DeRyder Electronics, N.J., 68c
Designers for Industry, Inc., Ohio, 6c, 10sc, 12c, 16sc, 30c, 60s, 62s
Development Engineering Co., Inc., Conn., 22
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 10c
Dice Co., J. W., N.J., 10s, Micrometers, Electronic sc
Dicon Corporation, N.Y., 12c, 14c, 26c, 30c, 62c
Direct TV Replacements, Ltd., England, 4s, 60s, Shorting Turn Testers s
Dit-Mco, Inc., Electronics Div., Mo., 6sc, 34sc, 52sc
Djordjevic Engineering Co., Djeco Div., Ill., Thickness Testers s
Donner Scientific Co., Subsid. Systron-Donner Corp., Calif., 12c, 40s, 52c, 72sc

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Select the transistorized **DYNA-EMPIRE** GAUSSMETER best suited to your needs

Completely transistorized Dyna-Empire gaussmeters accurately measure flux density and determine "flow" direction. Ideal for measuring and locating stray fields, plotting variations in strength and performing rapid comparisons of production lots against a standard. Easy-to-operate,—no jerk, pull, ballistic readings or circuit breaking required.



**NEW TRANSISTORIZED GAUSSMETER MODEL D-874**

This precision instrument reads from 300 to 30,000 gauss full scale, with an accuracy of ±3.5%. It fulfills all needs of a quality gaussmeter at a modest price.

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REQUIRES NO EXTERNAL POWER SOURCE
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DYNA EMPIRE Inc.

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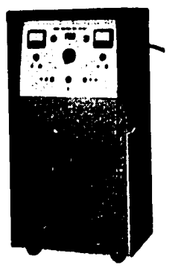



Dunn Engineering Associates, Inc., Mass., 16c, 30c, 60s
Durant Manufacturing Co., Wis., Cable Testers c
Dymec, Div. Hewlett-Packard Co., Calif., 4c, 14sc, 16c, 50c
**Dyna-Empire, Inc., 1075 Stewart Ave., Garden City, L.I., N.Y., 26, Tel: PIoneer 1-2700**
**See ad on this page**
Dynamics Instrumentation Co., Calif., 70s, Semiconductor Voltmeters s
Dynatran Electronics Corp., N.Y., 16s, 60s
E-H Research Laboratories, Calif., 20
E.M.I.-Cossor Electronics, Ltd., Canada, 58sc, 60sc
E.M.I. Electronics, Ltd., England, 58s, 72s
E O Electronics, Inc., N.J., 70c
E P I C, Inc., N.Y., 20s, 24s, 26s, 34s, 38s, 40s, 46s, 58s, 72s
Edgerton, Germeshausen & Grier, Inc., Mass., 58s
Edmund Scientific Co., N.J., 56s
Edwards High Vacuum (Canada) Ltd., Canada, 60s
Ehrenpreis, David, Consulting Engineers, N.Y., 22c, 48c, 54c, 64c, 68c, 72c
**Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., 66s, Tel: LYtell 1-1451**
**See ad on pages 80-81**
Elcor, Inc., Va., 20sc
Electric Hotpack Co., Inc., The, Pa., 22sc
Electric Specialty Co., Conn., 4c, 16c, 32c, 34c, 50c, 60c
Electrical & Physical Instrument Corp., N.Y., 2c
**Electro Impulse Laboratory, Inc., 208 River St., Red Bank, N.J., Semiconductor Testers sc, Tel: SHadyside 1-0404**
**See ad on page 310**
Electro Instruments, Inc., Calif., 2s, 4s, 12s, 14s, 16s, 34s, 38s, 42s, 50s, 52c, 60s
**Electro-Mec Laboratory, Inc., 47-51 33rd St., Long Island City 1, N.Y., Goniometers s, Tel: STillwell 6-3402**
**See ad on page 264**
Electro-Mechanical Research, Inc., Fla., 72s
**Electro-Pulse, Inc., 6711 S. Sepulveda Blvd., Los Angeles 45, Calif., 2s, 12s, 16sc, Tel: ORegon 8-2244**
**See ad on page 264**
Electro Scientific Industries, Ore., 4sc, 24s, 40s, 50sc, 52c
Electro-Seal Corp., Ill., 30c
**Electron Arc Div., Ionics, Inc., 244 Broad St., Lynn, Mass., 62c, Tel: LY 8-2100**
**See ad on page 485**
Electronet Div., Rue Prods., Calif., 6s, 38s
Electronic Applications, Inc., Conn., 4s, 40s, 42s, 50s, 56s, 70s
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**NEW high voltage INSULATION TEST SET**

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OWENS 9-2000

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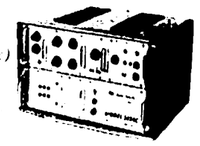

# Directory I. Complete Equipment



**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 4s, 6s, 28s, 32s, 38s, 50s, 60s, 68s, 70s, Tel: STillwell 6-8700**
**See ad on this page**
Electronic Measurements Corp., N.Y., 4s, 6s, 8s, 16s, 38s, 60s, 68s, 70s, 72s
Electronic Research Associates, Inc., N.J., 16s, 60s
Electronic Specialty Co., Calif., 6c, 12c
Electronics Corp. of America, Mass., 46s
Electronics, Inc. of Pa., Pa., 70c
Elk Electronic Labs., Inc., N.Y., 2c, 20c, 26c, 28c, 32c, 38c, 50c, 58c, 62c, 64c, 68c, 70c
Ellison Draft Gage Co., Inc., Ill., 2s, 44s, 66s
Emerson & Cuming, Inc., Mass., 54c
Emerson Electric Mfg. Co., The, Mo., 6c
Endevco Corp., Calif., 44sc
Engineering Associates, Ohio, 18c, 46c, 58c, 62c, 64c
Enjaco Corp., R.I., 32s, 34s, Cable Testers s
Ensco, Inc., Utah, 60c
Eppley Laboratory, Inc., The, R.I., 46s
Epsco Worcester, Mass., 24s
Erdco Engineering Corp., Ill., 4s, 6s, 42s, Cable Testers c
Erie Pacific Div., Erie Resistor Co., Calif., 12sc, 14sc


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*Model 345OC (2 cps to 2 mc) General Purpose Pulse Generator*



Pulse generating & counting equipment for every application: Single, Double, Pulse Burst, Time Delay & Gate Generators; Current, Word & Code Generators; Core Testers and Digital equipment. Also, modules for special systems.

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PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
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Erwood, Inc., Ill., 72c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 28c, 34c
Exact Electronics, Inc., Ore., 2s
Exactel Instrument Co., Calif., 44s, 66s
Fairchild Engine & Airplane Corp., Fairchild Astronics Div., N.Y., 60s
Falcon Division, General Thermodynamics Corp., Mass., 18s
Fecker Division, J. W., American Optical Co., Pa., 12sc, 30c, 40c
Federal Manufacturing & Engineering Corp., N.Y., 4c, 6c, 28c, 30c, 40c, 52c
Federal Scientific Corp., N.Y., 72c
Ferranti/Packard Electric, Ltd., Canada, 14c
Fisher Research Lab., Inc., Calif., 10s, 70s, Pipe Locator s
Flow Corporation, Mass., 70s, Random Signal Correlator s
Fluke Manufacturing Co., Inc., John, Wash., 2sc, 14s, 32s, 70sc, VAW Meters s
Forma Scientific, Inc., Ohio, 22c
Franklin Electronics, Inc., Pa., 14s, 38s, 42s
**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 34s, 40s, 42s, Tel: EVergreen 6-1300**
**See ad on page 566**
Furzehill Laboratories Ltd., England, 70s
G-M Laboratories, Inc., Ill., 24s
Gates Electronic Co., 1705-1 Taylor Ave., New York 60, N.Y., 16s, Tel: TYrone 2-6490
See ad on page 484
Gemco Electric Co., Mich., 2c, 6c, 34c, 54 Explosion c
General Applied Science Labs., Inc., N.Y., Simulation s
**General Communication Co., 677 Beacon St., Boston 15, Mass., 2sc, Tel: COpley 7-6030**
**See ad on page 331**
General Computers, Inc., Calif., Function Generators sc
General Controls Co., Calif., 46s
General Devices, Inc., N.J., 12c
General Electric Co., Apparatus Sales Div., N.Y., 2s, 18c, 24s, 26s, 32c, 34s, 44s, 46s, 58s, 66s
General Electric Co., Specialty Transformer Dept., Ind., 34c
General-Electro Mechanical Corp., N.Y., 18c
General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 34, 42, Tel: VAlley Stream 5-6363
See ad on page 284
General Kinetics, Inc., Va., 62c, 64c, Magnetic Tape Testers sc
General Meters, Inc., Colo., 6sc, 24sc, 34sc, 40c, 42c
**General Radio Co., 22 Baker Ave., West Concord, Mass., 2s, 20s, 34s, 40s, 42s, 58s, 62s, 70s, 72s, Tel: EMerson 9-4400**
**See ad on Cover 4**
General Vacuum Corp., Mass., 22c
Genisco, Incorporated, Calif., 2sc
Geotechnical Corporation, The, Texas, 24s
Gertsch Products, Inc., Calif., 2s, 40s, 70s
Giannini Controls Corp., Calif., 2c, 6c, 52c
Gibbs Mfg. & Research Corp., Wis., 30c, 52c
Gilmore Industries, Inc., Ohio, 2sc, 18c, 40c, Thrust-Weight Testers c
Gjaduy Corp., Richard, N.Y., 62s
Goodmans Industries, Ltd., Axiom Works, England, 58s, 72s
Gotham Audio Sales Co., Inc., N.Y., 70s
Gray Instrument Co., Pa., 2s, 46s, 50s
Green Instruments, Inc., Henry L., N.Y., Humidity Testers sc
Green Rectifier Co., N.J., 60c
Greenray Industries, Pa., 62sc
**Greibach Instruments Corp., 329 North Ave., New Rochelle, N.Y., 2sc, 16sc, 18sc, 42sc, 60sc, Tel: NEw Rochelle 3-7900**
**See ad on page 284**
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 6sc, 16c, 32sc, 34sc, 38sc, 50sc, 60c, Tel: CHesapeake 3-1100**
**See ad on page 512**
Guardite Co., Div. American-Marietta Co., Ill., 22sc


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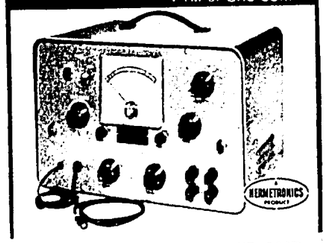
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

GHS MEGPOTS*
HERMETIC SEALING SERVICES
ELECTRONIC SUB-SYSTEMS
TOGGLE SWITCHES • GASEALS*
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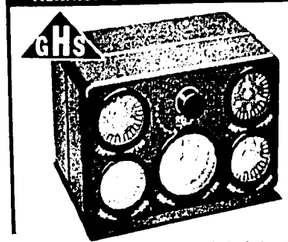

**MEGPOT MEGOHM-METER AND HIGH POTENTIAL TEST SET**

Non-destructive testing assured through quick acting relay, cuts current from tested components in milliseconds. Provides for continuously variable leakage test, with settings from 20 microamperes to 3 milliamperes. Reduces costs substantially for testing transformers, relays, capacitors and complete assemblies. Rugged, portable.
Voltage Ranges: Variable ranges to 0-5000V avail.
Megohm-Meter Ranges: Up to 4 million megohms at 100 or 200V DC, up to 10 million megohms at 500V DC.
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Weight: 26 lbs. BULLETIN No. 158

**MEGPOT HIGH POTENTIAL TEST SET**

Lightweight portable for non-destructive testing. Full scale output with 0.0025 mfd load capacitance.
Voltage Ranges: Variable ranges to 0-5000V avail.
Size: 11¼" wide x 8½" high x 9¼" deep.
Weight: 12 lbs. BULLETIN No. 570

**HERMETIC SEALING SERVICES**



This high altitude timer is typical of the many "problem packages" resolved by the exclusive GHS system of hermetic sealing with Mass Spectrometer Leak Testing. Protects against 7 major causes of product failure. GHS hermetically enclosed units could outlast ordinary similar products by more than 10 to 11 Complete engineering and manufacturing facilities for rapid, economical service in any quantity. BULLETIN No. 426

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Military approved. Meets applicable requirements of Mil-S-3950.
Electrical Rating: 10 amps at 125V AC or 30V DC.
Endurance: Greater than 10,000 cycles at +85°C.
Dielectric Strength: Over 1000V—60 C.P.S. AC.
Insulation Resistance: Over 1000 megohms.
Temperature Range: —55°C. to +85°C.
BULLETIN No. 540

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Re-usable, pressurized, leak-tight static sealing against gases and liquids under extremes of temperature and environment.
Service Temperature Range: From below —200°F. to above +800°F.
Tube Cross-Section: Minimum 1/16" O.D.; Maximum depending on seal size.
Seal Size: Minimum 1½" I.D.; Maximum over 36" O.D.
Seal Squeeze: .015 inch ±.005
Clamping Force: Approx. 150 p.l.i.
BULLETIN No. 258

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GHS electronics
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**ITEMLAB** INC.
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SINUSOIDAL AND RANDOM VIBRATION
(5 TO 5000 CPS FROM —120° TO +600° F AT 200,000 FT. ALTITUDE) (WITH AUTOMATIC CONTROLLING, PROGRAMMING AND RECORDING)

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**PRECISION METERS**




GIVE YOU
**BETTER THAN**
**¼% ACCURACY**
*...DESIGNED-IN, CONSTANT, GUARANTEED*

Greibach-patented Bifilar no-friction movement and weightless light beam pointer use no pivots, no jewels, no hairsprings, no amplifiers. Greibach meters start with near-perfect accuracy. Accuracy is ***unaffected even by overloads of 100,000%*** (to 125,000,000% in some cases). Rugged, shock-proof design cradles the coil; withstands up to 500 G's. There's nothing to wear, vary or age with use, so accuracy remains high over long periods. Most meters leave our plant with measured accuracy of better than 1/10%.

**OTHER EXCLUSIVE GREIBACH PRECISION METER FEATURES:**

- Sensitivity to 0.2 μamp. full scale
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The secret of Super-Precision Performance is in this cartridge, containing unique Bifilar Suspension.






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See 2nd

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# Directory I. Complete Equipment

## 14. General Test Equipment.

Gulton Industries, Inc., N.J., 4c, 62sc, 72sc
Gyra Electronics Corp., Ill., 20sc
Gyrex Corp., The, Calif., 2sc, 22s
Hallamore Electronics Co., Calif., 2c
Hallikainen Instruments, Calif., Liquid-Gas Testers c
Hamilton Standard Div., United Aircraft Corp., Conn., 52c, 72c
Hanmer Electronics Co., Inc., N.J., 5c
Nuclear s, Voltage Tracers s
Harman-Kardon, Inc., N.Y., 12c, 14c
Harris Refrigeration Co., Mass., 22
Harris Transducer Corp., The, Conn., 62s
Harrison Electrosonics, Inc., E. M., Mass., 2c, 70s
Harvey-Wells Electronics, Mass., 40, 5c
Hastings-Raydist, Inc., Va., 44s, 66s
Hathaway Instruments, Inc., Colo., 2s, 24s
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 24c
Heath Co., Subsid. Daystrom, Inc., Mich., 4s, 28s, 32s, 42s, 68s, 70s
**Hermes Electronics Co., 75 Cambridge Pkwy., Cambridge 42, Mass., 12s, Tel: UNiversity 4-7200**
See ads on pages 266, 442
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 2s, 12s, 14s, 42s, 70s, Function Generators s, Tel: DAvenport 6-7000**
See ad on pages 3-18
Hickok Electrical Instrument Co., The, Ohio, 2s, 16s, 28s, 40s, 42s, 60s, 68s, 70s
High Vacuum Equipment Corp., Mass., 22c, 66sc
High Voltage Engineering Corp., Mass., 3sc
Hoffman Electron Tube Corp., N.Y., 58s
Holt Instrument Laboratories, Wis., 2s
Holtzer-Cabot Motor Div., National Pneumatic Co., Inc., Mass., 34s
Hoover Electric Co., Calif., 60s
Hoover Electronics Co., Md., 6c
**Houston Instrument Corp., P.O. Box 22234, Houston 27, Tex., 70s, Tel: MOhawk 7-7405**
See ad on page 298
Howell Instrument Co., Tex., 24s
Hudson Bay Co., Div. Labline, Inc., Ill., 22s
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 66sc
**Hull Corporation, Davisville Rd., Hatboro, Pa., 22c, 66sc, Tel: OSborne 5-5000**
See ad on page 673
Huppert Co., K. H., Ill., 22c, 46s
Hycon Mfg. Co., Calif., 6c
Hydel, Inc., Mass., 40s
ITI Electronics, Inc., N.J., 38c
Ironix, Inc., Calif., 12sc
Ideal Industries, Inc., Ill., 6s, 34s
Impact-O-Graph Corp., The, Ohio, Thrust-weight testers s
Indikon Co., Inc., The, Mass., 16sc, 40c
Industrial Control Co., N.Y., 40sc, 52sc
Industrial Development Labs., Inc., N.J., 40s
Industrial Devices, Inc., N.J., 32s
Industrial Instruments, Inc., N.J., 4c, 16c, 32s, 34s, 42s, 50s, 60c
**Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 4s, 16c, 34s, 40s, 50s, 70s, Tel: GRamercy 3-4684**
See ad on page 333
Industrial Transformer Corp., Fla., 32sc, 34sc
Industro Transistor Corp., N.Y., 60c
Insco Company, Div. Barry-Wright Corp., Mass., Function Generators s
Instron Engineering Corp., Mass., 22c, Tension-compression testers c
Instrument Development Laboratories, Inc., Mass., 4sc, Color Comparators c
Instrument Electronics Corp., N.Y., 70sc
Instrument Laboratories, Ill., 6s, 38s, 70s
Instruments of New England, Mass., 40s, 48c, 50s
Intercontinental Dynamics Corp., N.J., 44c
International Electronic Research Corp., ELIN Div., Calif., 2s, 30s
**International Instruments, Inc., P.O. Box 2054, New Haven 15, Conn., 38c, Tel: FUlton 7-2515**
See ad on page 460
International Radiant Corp., N.Y., 22sc
International Research & Development Corp., Ohio, 72s, Dynamic Balancers s
International Telephone & Telegraph Corp., ITT Industrial Products Div., Calif., 42s
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 12c, 14c, 16c, 68c
Interstate Electronics Corp., Calif., 2c, 4c, 22c, 32c, 52c, 54c, 56c
Isotope Developments, Ltd., England, 20s
**Itemco, Inc., 16 Beechwood Ave., Port Washington, L.I., N.Y., 22, Tel: POrt Washington 7-8420**
See ad on page 284
**J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 20, Tel: STate 7-5825**
See ads on pages 460, 546, 550
Jackson Electrical Instrument Co., The, Ohio, 4s, 70s
Jan Hardware Mfg. Co., Inc., N.Y., 60sc, 72s
Janco Corp., Calif., 34c
Jansky & Bailey, Inc., D.C., 2c
Jarrell-Ash Co., Mass., 5sc
**Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 70s, Tel: CYpress 2-4025**
See ad on page 550
Jettronic Industries, Inc., Pa., 6c, 8c, 34s, 62c, 68c, 70s
Jones & Lamson Machine Co., Comparator Div., Vt., 10s
Julie Research Laboratories, Inc., N.Y., 2sc, 30sc
Kahn & Co., Inc., Conn., Personnel Conductivity Testers sc
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 12s, 14
Kartron, Inc., Calif., Slotted Line Indicators s
**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 6s, 8s, 10s, 64s, 70s, 72s, Tel: CApital 6-4000**
See ad on page 330
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 2sc, 4c, 14c, 24c, 34sc, 38c, 40c, 50c, 60c, Tel: CLifford 6-4 00**
See ad on pages 120-121
Keithley Instruments, Inc., Ohio, 30s, 34s, 40s, 42s, 70s
Kellogg Switchboard & Supply Co., Communications Div., ITT Corp., Ill., 6c, 42s
Kewaunee Mfg. Co., Mich., 22
Keystone Electronics Corp., N.Y., 4s
Kiddie & Co., Inc., Walter, N.J., 46c, 62s
**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., P.O. Box 623, San Diego 11, Calif., 2s, 14s, 24s, 40s, Tel: BRowning 7-6700**
See ad on pages 110-111
Kingston Electronics Div., Kingston Inds., Inc., Mass., 58s


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**Vibration Test Systems**



Now a complete line of matched test systems is available for any vibration testing need...from the complex of sine wave, Systems for random test, prototype, or fully automatic for production testing ...electrodynamic shakers or accessories. Call or write for Ling Systems Bulletins.

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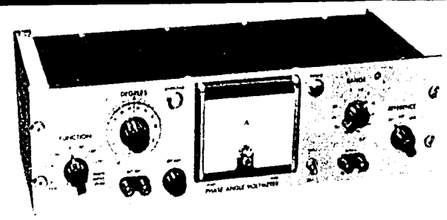
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-2 0

# NORTH ATLANTIC industries, inc.

# PHASE ANGLE AND RATIO INSTRUMENTS

## PHASE ANGLE VOLTMETER
MODEL VM-202



FOR DIRECT READING OF...
- Phase angle
- In-phase voltage
- Quadrature voltage
- Fundamental voltage
- Total voltage
- Nulls

A unique, multi-functional instrument that combines in one compact package a phase-sensitive voltmeter, AC vacuum tube voltmeter, phase meter and phase-sensitive null detector. Permits simple laboratory or production line measurement of total, fundamental, in-phase and quadrature voltage components; phase-sensitive nulling of in-phase or quadrature components; direct dial reading of phase angle without ambiguity. Characteristics include high input impedance, high sensitivity and wide voltage range. Optional parallel rear connectors, built-in reference channel isolation, built-in signal isolation for balanced or single-ended inputs, panel finishes to user specifications. Plug-in modules for reference isolation, signal summing and signal bridging available as optional accessories.

**MODEL VM-233 PORTABLE TRANSISTORIZED VOLTMETER.** All features of VM-202 in an all-transistor, ruggedized, low power unit for general field use and other applications where small size and light weight are essential.

## SPECIFICATIONS
These specifications describe the Model VM-202 Phase Angle Voltmeter only. The wide range of available standard and custom models are shown on this page. Detailed specifications for other models will be supplied promptly on request.

| | | | |
|---|---|---|---|
| NULLING SENSITIVITY | 5 microvolts | VOLTAGE RANGE | 1 mv. to 300V, in 12 ranges |
| HARMONIC REJECTION | 55 db (with filters) | VOLTAGE ACCURACY | ±2% of f.s. |
| SCALE | 3-0-3, 10-0-10, linear | PHASE ACCURACY | dial: ±1° meter: ±3% of f.s. degrees |
| PHASE ANGLE DIAL | 4 scales, 90° (elec.) apart | SIGNAL FREQUENCY | 1 freq., 30 cps-10 kc. |
| POWER | 60 watts, 115V, 60-400 cps. | INPUT IMPEDANCE | 10 megohms |
| DIMENSION | 5¼" h. x 19" w. x 7⅞" d. | REFERENCE INPUT | 100,000 ohms, 0.25V min. |
| MOUNTING | bench or rack | OVERLOAD | 5:1 |

MODEL VM-204



**THREE-FREQUENCY VOLTMETER.** For use where signals of known frequencies are encountered repeatedly. Similar to VM-202, but accommodates any three pre-specified signal frequencies, typically 400, 800 and 1000 cps. Choice of frequencies from 60 to 4500 cps in standard models; to 10 kc on special order. Panel size and configuration as VM-202, but 2" deeper case.

**BROADBAND VOLTMETER, MODEL VM-301.** For laboratory and other applications where a wide range of signal frequencies must be instrumented with highest accuracy. Accommodates signals from 10 cps to 100 kc. Phase shift accuracy 0.2° absolute, 0.01° with special techniques, uniform over full 360°. Phase shift can be read while sweeping frequency in full decade steps. Plug-in rejection filters eliminate harmonic effects. Null indications are insensitive to changes in signal level. Rack or bench mount.

MODEL VM-230B



**TRANSISTORIZED VOLTMETER.** Miniature, ruggedized version of VM-202 for modular inclusion in ground support and similar systems requiring small size and dependable performance in severe environments. Range down to 300 microvolts on special order. Input impedance 1 megohm direct; 120h, 0.5 meg. at 400 cps with isolation transformer. Frequency response 20 cps to 20 kc as VTVM.

## AC-to-DC CONVERTER
MODEL PSC-410

Transistorized, phase sensitive AC-to-DC converter features high linearity and sensitivity, flat frequency response, high output. Single- or double-ended output proportional to total, fundamental, in-phase or quadrature components. Compact modular, plug-in configuration readily integrates with ground or airborne instrument systems.

## RATIO BOXES



| RATIO BOX SPECIFICATIONS | | | |
|---|---|---|---|
| Ratio Range | —0.111111 to +1.111111 | Input Volts | 0.35f to 1.0f (350V max.) |
| Frequency Range | 25 cps to 10 kc | Series Z | 3.5 to 7.5 ohms |
| Accuracy | from 10 ppm to 1 ppm | Resonant Frequency | 400 cps to 10 kc. |
| Input Z | 300 k to 1.0 meg. | Size (typical) | 3¼" h. x 19" w. x 8½" d. |

Table shows range of available characteristics. Specific combinations of characteristics differ with particular models and will be quoted on request.

Precision inductive AC voltage dividers to meet all range, accuracy and cost requirements. Rack and portable bench models, deviation, binary, automatic stepping types and ratio standards. Maintain rated accuracy over specified frequency range; feature in-line readout, high input and low series impedance.

**CVR 550 COMPLEX VOLTAGE RATIOMETER** Provides direct reading of in-phase transformation ratio to 0.0001% with phase angles to 0.2 radians, unaffected by quadrature. Combines ratio box and phase angle voltmeter in a single efficient unit. For signals at any three frequencies from 400 to 2000 cps.

Write or call for literature or quotations on your requirements

**NORTH ATLANTIC INDUSTRIES, INC.**

TERMINAL DRIVE, PLAINVIEW, L. I., N. Y. • OVerbrook 1-8600

INSTRUMENTATION AND CONTROL SYSTEMS





## SEMI-CONDUCTOR TEST EQUIPMENT

### MODULAR BUILDING BLOCKS
- Constant current and voltage sources from micro-amps to amperes and microvolts to kilovolts.
- D.C. Comparators capable of .1% comparison accuracies in the millivolt regions.
- Programmers for multiple test scheduling.
- A.C. and D.C. Test modules covering a wide variety of semiconductor parameters.
- Automatic Sorters for product grading.
- Component Handling Devices.

### "TURN-KEY" SYSTEMS
- High Volume, Automatic Transistor-Diode Testers.
- Elevated Temperature Diode Test Sets.
- Life Test System for tubes, diodes, transistors, varistors and thermistors including digital programming, and punch-card readout.
- Wafer and Wire Bonding equipment.
- Component assembly, handling and sorting machines.

*Specialists* in the solution of difficult measurement problems, MRC offers engineering assistance in answering your test requirements. Write, wire or phone for details to Measurements Research Company, Castor & Kensington Aves., Phila. 24, Penna. JE 5-3700.

MEASUREMENTS RESEARCH CO. MRC

**MEASUREMENTS RESEARCH CO.**

*Div. Prudential Industries Inc.*

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# Directory I. Complete Equipment

## 14. General Test Equipment.

Kinney Mfg. Div., The New York Air Brake Co., 3631 Washington St., Boston 30, Mass., 66s, Tel: JAmaica 2-7100
See ad on page 35

Kistler Instrument Corp., N.Y., 44s, 64s, 72s

Knight Electronics Corp., Ill., 4s, 28s, 38s, 70s

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 2sc, 44sc, 66sc, Tel: TWining 9-5600
See ad on page 268

Korfund Co., Inc., 22D Cantiague Rd., Westbury, L.I., N.Y., 72s, Tel: RAvenswood 9-7580
See ad on page 587

Kraus Electronics, Inc., Calif., 14s, 38s, 70s

Kulite Semiconductor Products, Inc., N.J., Strain Gages s

L.A.B. Corp., N.Y., 18c, 72c

Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 72sc, Tel: GRaceland 7-7900
See ad on page 454

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 56s, 72sc

La Pointe Industries, Inc., Conn., 4c

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 6c, Tel: LOwell 6-2600
See ad on page 312

Leach Corporation, 18435 Susana Rd., Compton, Calif., 4c, 6c, 16c, 50c, 60c, Tel: NEvada 6-1061
See ad on page 514

Lear, Inc., Calif., 2sc, 6sc, 12c, 18sc, 30sc, 52sc, 72c

Lear, Inc., Mich., 2sc, 6sc, 18sc, 30sc, 38sc, 52sc

Leeds & Northrup Co., Pa., 2s, 4s, 18s, 24s, 34s, 38s, 40s, 42s, 46s, 50s

Leesona Corp., P.O. Box 1605, Providence 1, R.I., 16c, Tel: WIlliams 1-5200
See ad on page 674

Lessells & Associates, Inc., Mass., 72c

Lewis Engineering Co., The, Conn., 46c

Lindgren & Associates, Inc., Erik A., Ill., 54

Lindsay Div., International Steel Co., Ind., 22c, 54c

Ling Electronics, Inc., Div. Ling-Temco Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 22s, 72s, Tel: PRospect 4-2900
See ads on pages 247, 285

Link Division, General Precision, Inc., N.Y., 6sc, Micrometers, Electronic sc

Liquidometer Corp., The, N.Y., 4sc, 34s, 40c

Lockheed Aircraft Corp., Electronics, Avionics & Industrial Products Div., Calif., Strain Gages s

Lockheed Electronics Co., Stavid Division, N.J., 6c, 48c

Lumatron Electronics, Inc., Dept. IR, 116-120 County Courthouse Rd., New Hyde Park, L.I., N.Y., 16s, 60s, Tel: PIoneer 7-3200
See ad on page 323

MB Electronics, Div. Textron Electronics, Inc., Conn., 2s, 72s

MacLeod & Hanopol, Inc., Mass., 42c

Magnaflux Corp., Subsid. General Mills, Ill., 10s, 26s, 38s, 64s

Magnatran, Inc., N.J., 32c

Magnavox Co., The, Ind., 2c, 4c

Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 52s, 60s, Tel: CYpress 2-6610
See ads on pages 252, 364, 418

Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 40s, Tel: ROgers 9-5312
See ad on page 364

Marchol, Inc., N.Y., 18c

Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 32c, 34c, 68c, Tel: DAvis 5-1391
See ad on pages 96-97

Marconi's Wireless Telegraph Co., Ltd., N.Y., 2s

Marine Area Electronics, Inc., N.Y., 2c, 4c, 6c, 34c, 48c, 50c

Marion Instrument Div., Minneapolis-Honeywell Reg. Co., N.H., 2s, 40s

Marquardt Corp., The, Pomona Div., Calif., Flight Simulation c

Marstan Electronics Corp., N.Y., 4sc, 10s, 38s, 42sc

Martindale Electric Co., Ohio, 6s, 34s, 42s

Massa Division, Cohu Electronics, Inc., Mass., 18c, 24s, 72s

Mast Development Co., Inc., Iowa, 22c, 72c

Mauter, Inc., L.A., N.Y., 58s

Maxson Corp., The W. L., United Mfg. Co. Div., Conn., Voltage Modulation Meters c

Mayberry Electronics Co., Calif., 10c, 60c, 70sc

McKenna Laboratories, Calif., 62sc

McKiernan Terry Corp., N.J., Flight Simulation c

McMillan Electronics Industries, Mass., 54sc

Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 2s, 10s, 28s, 38s, 42s, 60s, 70s, Tel: DEerfield 4-2131
See ad on page 335

Measurements Research Co., Castor & Kensington Aves., Philadelphia 24, Pa., 60, Tel: JEfferson 5-3700
See ad on this page

Medistor Instrument Co., Wash., 20s

Melpar, Inc., Special Products Dept., Va., 6c

Menlo Research Laboratory, Calif., 10s

Meter-Makers, Inc., Ill., 38sc, 42s, 50sc, 68sc, 70sc

Meters, Inc., Ind., 24c, 40c, 42c, 46c

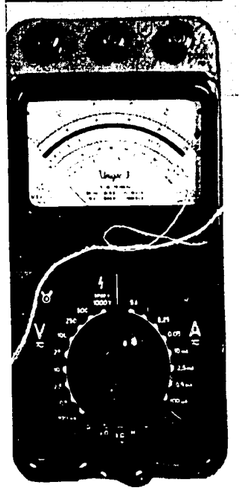
Metrolog Corp., Calif., 52

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Metrologic, Compagnie Generale de, France, 38s, 42s, 60s, 68s, 70s
Metropolitan Electronic & Instrument Co., N.Y., 38s, 42s, 60s, 70s
Micro Gee Products, Inc., Calif., 30s, Flight Simulation s
Microwave Electronic Tube Co., Inc., Mass., 8c
**Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 2s, 4s, 34s, 42s, 50s, Tel: DRexel 6-7130**
**See ad on page 482**
Midwestern Instruments, Inc., Okla., 24sc
**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 28s, Tel: DAvenport 4-4108**
**See ad on page 402**
Millitest Corp., N.Y., 40s, 42s, 50s
Millivac Instruments, Div., Cohu Electronics, Inc., N.Y., 8s, 16s, 34s, 42s, 70 Recording s
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 40s
Minneapolis-Honeywell Regulator Co., Industrial Systems Div., Md., 72s
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 16c, 30sc, 32c, 34c, 38c, 50c, 60c
Minneapolis-Honeywell Regulator Co., Rubicon Instruments, Pa., 24sc
Missimers, Inc., Calif., 4s, 16s, 22s, 50s, 60s
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 14c, 16c, 48c, 60c
Modern Lab. Equipment Co., N.Y., 22sc
Molectronics, A Minneapolis-Moline Subsid., Calif., 14sc, 32c, 52c, 70sc, Relay Testers s
Moseley Co., F. L., Calif., 40c
Motorola, Inc., Ill., 14s
Muirhead & Co., Ltd., England, 4s, 6s, 40s, 52s, 72s
Muirhead Instruments, Inc., N.Y., 14s, 34s, 40s, 52s, 70s, 72s
Multi-Amp Electronics Corp., N.J., 32s, 34s
Munzig International, Inc., Calif., 14s, 38s, 42s, 60s, 68s, 70s
**N R C Equipment Corp., Dept. RE-A, 160 Charlemont St., Newton 61, Mass., 22c, 66s, Tel: DEcatur 2-5800**
**See ad on page 676**
National Company, Inc., Mass., 12c, 14c, 36c, 38c, 40c
National Electronics, Wyo., 34c, 42c, 46c, 60c
National Instrument Laboratories, Inc., D.C., 2c, 60c
National Scientific Laboratories, D.C., 12c
National Standard Electronics, Inc., N.Y., 10s, 62c, 64c, Thickness Testers c
National Ultrasonic Corp., N.J., 62sc
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 12c, Tel: HOward 5-7700**
**See ad on page 498**
Network Industries, Inc., N.J., 4sc, 8c, 32c
New England Scientific Instruments Co., Mass., 24s, 42s
New London Instrument Co., Conn., 2c, 70s
**New York Air Brake Co., Kinney Mfg. Div., 3631 Washington St., Boston 30, Mass., 66s, Tel: JAmaica 2-7100**
**See ad on page 35**
Newark Controls Co., N.J., 38s
Nichols, Ltd., R. H., Canada, 6s, 18s, 20s, 24s, 26s, 34s, 38s, 42s, 44s, 46s, 54s, 58s, 60s, 68s, 70s, 72s
Nilsson Electrical Laboratory, Inc., N.Y., Pipe and Cable Locators sc
Non-Linear Systems, Inc., Calif., 34s, 38s, 42s, 50s
**Norrman Labs., Ernst, Williams Bay, Wis., 2s, Tel: CIrcle 5-5516**
**See ad on page 350**
**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 40s, 52s, 70s, Tel: OVerbrook 1-8600**
**See ad on page 286**
**North Hills Electronics, Inc., Alexander Pl., Glen Cove, L.I., N.Y., 2s, 16s, 30s, 60s, Tel: ORiole 1-5700**
**See ads on pages 405, 445, 588**
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 30sc, 48c, Tel: NAtional 2-6485**
**See ad on pages 27-30**
Nuclear-Chicago Corp., Ill., 20s
Nuclear Electronics Corp., Pa., 20c, 70s
Offner Electronics, Inc., Ill., 24sc
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 6c, 16c, 32c, 34c, 48c, 60c, Tel: WOrth 6-0380**
**See ad on page 483**


**GOERZ Presents the *Unigor 3***

**MULTIRANGE INSTRUMENTS**



**GOERZ** announces the world's most versatile line of multirange instruments—the **UNIGOR** series. Accuracies of 1.0% on D.C., 1.5% on A.C., automatic overload cut-out protection. Current and voltage measurements on *both* D.C. and A.C. Some models measure temperature, some models measure capacitance in addition to resistance on *all* models.

**FEATURES *Unigor 3***

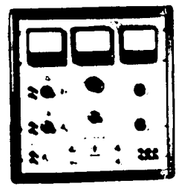
- 25,000 Ω/v on D.C.; 2000 Ω/v on A.C.
- ±1.0% on D.C.; ±1.5% on A.C.
- D.C. current from 100μa to 5 amp.; A.C. current from 500μa to 5 amp.
- D.C. voltage from 100 mv to 5000 volts; A.C. voltage from 500 mv to 5000 volts.
- *Resistance* up to 50 megohms; *Capacitance* from 100μμf.
- *Full automatic overload protection.*
- 48 ranges in all including output from −34 db to +56 db.

**Physics Research LABORATORIES** — P.O. Box #555, Hempstead, L. I., N. Y.
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**METROLOG CORPORATION**
Advanced-Design Servo and Power Electronics



*Direct-Reading Model 201 Servo Analyzer*

Offering the most advanced servo system analyzers available — direct-reading, precise, stable. Solid-State Power Supplies, AC Power Supplies, Automatic Frequency Response Instrumentation.

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# Directory I. Complete Equipment

## 14. General Test Equipment.

Optimized Devices, Inc., N.Y., 6s, 16s, 32s, 34s, 50s, 60s, Voltage Comparators s
Osborne Electronics Sales Corp., Ore., 32c, 40s
Owen Laboratories, Inc., Calif., 10c, 60sc, Strain Gages s
P.B.R. Manufacturing Co., Pa., 48sc
Pace Electrical Instruments Co., Inc., N.Y., 24s, 40s
Pacific Automation Products, Inc., Calif., 6c, 12c, 14c, 52c
Pacific Transducer Corp., Calif., 40s
Packard Bell Electronics Corp., Calif., 2sc, 10c, 14sc, 40s
Pam Associates, Inc., Md., 22sc, 72c
**Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., 2s, 64s, 72s, Tel: OWens 9-4600**
**See ad on page 334**
Pastoriza Associates, Inc., James, Mass., 10c
Patterson, Inc., Wayne D., Calif., 12c
Patterson Moos Research, Div. Leesona Corp., N.Y., 10c
Pearce-Simpson, Inc., Fla., 6sc, 12c, 32c, 34sc, 52sc
**Pearson Electronics, Inc., 707 Urban Lane, Palo Alto, Calif., Voltage Dividers sc, Tel: DAvenport 6-7285**
**See ad on page 571**
Pegasus Laboratories, Inc., Mich., 72c
Pennsylvania Testing Labs., Inc., Pa., 40s, 48s, Coil Testers c, Synchro Testers c
Performance Measurements Co., Mich., 44c, Torque c
**Peschel Electronics, Inc., Towners, R.F.D. #1, Patterson, N.Y., 2c, 6c, 10c, 32sc, 34sc, 42c, Tel: TRinity 8-3251**
**See ad on this page**
Phaostron Instrument & Electronic Co., Calif., 40c
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 2c, 4c, 16c, 20c, 40c, 50c, Tel: COmmonwealth 6-5375**
**See ad on page 270**
Philco Corporation, Pa., 2c, 4c, 6sc, 14c, 38c, 42c, 60sc, 68c, 70c
Philco Corporation, Govt. & Industrial Group, Pa., 60s
Philips Electronic Instruments, N.Y., 6s, 8s, 16s, 18s, 20s, 24s, 26s, 28s, 32s, 38s, 40s, 46s, 60s, 68s, 70s, 72s, Thickness Testers s, Microanalyzers s
Philips Electronics Industries, Ltd., Canada, 2s, 4s, 6s, 18s, 20s, 24s, 28s, 32s, 34s, 38s, 42s, 50s, 56s, 58s, 60s, 66s, 70s, 72s
Photocon Research Products, Calif., 44c
Photron Instrument Co., Ohio, 24s
**Physics Research Laboratories, Inc., P.O. Box 555, Hempstead, L.I., N.Y., 6s, 24s, 50s, Tel: IVanhoe 3-8299**
**See ad on page 288**
Pioneer Scientific Corp., N.Y., Polarascopes c
**Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 52sc, Tel: EXeter 2-4500**
**See ad on pages 107-108**
Poole Instruments, Inc., Tex., Leak Detectors sc, Fluid Density Meters sc
Potter Instrument Co., Inc., N.Y., 12s, 14c
Powertron Ultrasonics Corp., N.Y., 62s, 64c
Precise Electronics & Development Corp., N.Y., 6s, 12sc, 32s, 38s, 42s, 50s, 60s, 70s
**Precise Measurements Co., Millbrook Lane, P.O. Box 172, Flemington, N.J., 32sc, 34sc, Tel: STate 2-3000**
**See ad on page 488**
Precision Apparatus Co., Inc., N.Y., 6s, 38s, 42s, 64s, 68s, 70s
Precision Electronics, Inc., Ill., 70s
**Precision Scientific Co., 3749 W. Cortland St., Chicago 47, Ill., 22sc, 48sc, Tel: CApitol 7-2660**
**See ad on page 677**

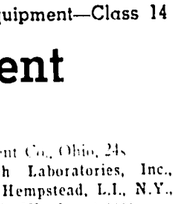

**PE HIGH VOLTAGE TEST EQUIPMENT**

**DC OVERPOTENTIAL TESTERS**

MODEL S50 DC 0-50 KV, 5 ma.
MODEL S100 DC 0-100 KV, 5 ma.
MODEL S120 DC 0-120 KV, 5 ma.
MODEL S150 DC 0-150 KV, 5 ma.
MODEL S200 DC 0-200 KV, 5 ma.

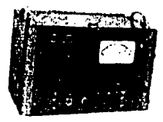
*Features:*
- Non-destructive testing
- Small, light weight units
- Rugged design for industrial use
- Use of selenium rectifiers
- Plug-in type HV output shielded cable
- Control cabinet stacks on top of HV tank (May be separated for remote control)

— Also available in heavier current models —



**SENSITIVE HIPOT TESTERS, DELUXE SERIES "H"**

H2 AC/DC 0-2 KV Peak AC/DC, 1 ma.
H5 AC/DC 0-5 KV Peak AC/DC, 1 ma.



*Features:*
- 5 microamp circuit breaker (adjustable to 1000) deenergizes HV
- Non-destructive testing
- Dual output, AC and DC
- Dual scale KV meter, directly at output
- Portable, safe
- Guarded or straight ground return

Also available in larger cabinets with 19" panel in 10 KV, 20 KV, and 30 KV models, with two meters, plus other extra features. (See general catalog.)

*Send for catalog of complete line, including: low-cost S & D hipot testers, high power HV test sets, cable fault locaters, and wire sparkers.*

**HIGH VOLTAGE TEST SETS, SERIES "K" HIGH CAPACITY AC, or DC**

Many sizes: 2 KV to 200 KV and 1 to 100 KVA or KW

For dielectric tests on: Insulating materials, motors and generators, transformers, wire and cable, HV bushings and other apparatus.





*FEATURES:*
- High current capacity to meet ASTM, IPCEA Standards
- Metering at output for greatest accuracy
- Complete safety and convenience controls, including external interlock
- 4" meters with dual scales
- Motorized output control optionally available
- Separate control section for remote control

**PE PESCHEL ELECTRONICS, INC.**
Towners, R.F.D. 1, Patterson, New York, TRinity 8-3251

For details, circle #212 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## For MAGNET CHARGING, TREATING and CALIBRATION



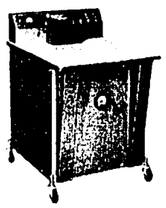
MODEL 1221 is used for small magnets. Its 10,000 ampere-turn output will saturate about 2" of Alnico V. Operates by condenser discharge method thru plug-in fixtures. Uses only 30 watts at 115 v. For continuous duty; charging cycle averages 3 sec. Price $195.



MODEL 107A is a versatile, condenser discharge magnetizer for most medium size magnets of either simple or complex pole configuration. It provides ranges of 12,000 and 24,000 ampere-turns and is capable of saturating most instrument magnets, including the core type mechanisms, using the standard flat bar, adapters or wire-wound fixtures. Can be used for continuous duty production magnetizing; average charging cycle is under 5 sec. Weight is 75 lbs. Size 12 x 7 x 17. Operates from 115-volt, 60-cycle line. Price $590.



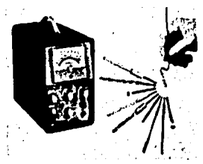
MODEL 1500 is designed for production, research and instrument repair work. It will magnetize the new cobalt platinum and barium ferrite materials as well as all the Alnicos. It will saturate large switchboard meter assemblies and all panel type instruments and uses most existing adapters designed for the Model 107A. Wire-wound fixtures are plugged into the front panel through a safety interlock system providing maximum operator protection. Operates from 115-volt, 60-cycle line. Size 11 x 20 x 15; weight 125 lbs. Price $995.



MODEL 942 will saturate Alnico magnets weighing up to 34 lbs. and high flux ceramic magnets of any shape or pole configuration. Operates on condenser discharge principle from regular 115-volt, 60-cycle line. Produces charging outputs (depending on number of 100 μf condensers employed) from 100,000 to 200,000 ampere-turns through plug-in transformers, up to 3600 watt-seconds using wire-wound fixtures. Adapters for multi-pole rotors, rod, bar, ring and various other shapes available. Equipped with extensive system of safety interlocks for complete operator protection. Designed for continuous production use with low power consumption. Price of basic unit is less than $2100.



MODEL 889A de-magnetizes saturated magnets to any desired level of flux. Provides a precision method for rapidly treating permanent magnets, including the new core type instrument mechanisms. Used with Model 206A Booster or Model 107A Charger. Price $247.



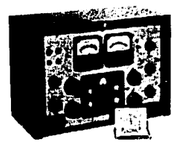
Ten rigid and flexible, flat and axial (Bi and InAs) probes shown offer selection to solve almost any magnet or flux field measurement problem. Axial probes supplied w/ spec. ref. magnets. Prices from $30 to $180.

MODEL 1295A transistorized Gaussmeter measures magnetic fields to ±3% accuracy over 9 full-scale ranges: 0-100, 200, 500, 1K, 2K, 5K, 10K, 20K and 20K+ gausses. Operates from 115-V, 50-400 cps or access. bat. Price with 1000-gauss ¾% ref. magnet $390.

RFL Radio Frequency LABORATORIES, INC. Boonton, New Jersey, U.S.A.

## For ELECTRICAL INSTRUMENT CALIBRATION

*A Model for Every Purpose and Price Range*



MODEL 829 checks AC and DC meters of all types and ranges. Compact cabinet contains power supply, special Weston standard meters, Wheatstone Bridge and all circuits for quick, convenient instrument calibration to 0.5% accuracy by non-technical personnel. Automatic protection for both operator and instrument under test is provided by interlocks and high voltage discharge circuits. Net price $2650.

MODEL 829A is a higher accuracy version of the Model 829. Separately housed, horizontally mounted Weston or Sensitive Research Standard meters are employed in place of the vertical standards. Full-scale accuracy on all AC and DC ranges is 0.25%. Covers 1.5 mv — 1500 V, 1.5 ma — 20 amp. AC; 0.25 mv — 2000 V, 2 uA — 20 amp. DC. Price $3150.

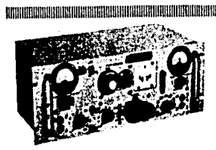




MODEL 1605 is a self-contained, AC-DC calibration/transfer standard capable of measuring AC (up to 50 kc) and DC voltages and currents up to 1500 volts and 15 amperes with high precision. It includes a volt-box, shunt-box, precision potentiometer, standard cell, galvanometer, thermal converter, plus all necessary compensating and switching circuits. 45 full-scale ranges are provided. Calibrated accuracy: ±0.03% DC, ±0.05% AC. Price $2450.

Nine additional, self-contained console type calibration standards having various accuracies and employing both electrical and electronic circuits are available. They offer three basic methods of calibration: visual comparison against a standard meter, digital presentation, and introduction of a selected, precise voltage or current to the instrument being calibrated. Models are 260C, 261B, 262B, 454, 643, 1294, 1487, 1900 and 1967. Prices from $5000 to $20,000.

## For CRYSTAL TESTING



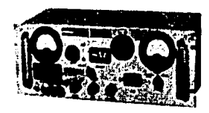
FOUR MODELS developed for Signal Corps under national crystal testing standardization program to measure resonance and anti-resonance resistance of quartz crystals including those covered by MIL-C-3098B. Capacitance, inductance and PI of crystal can be determined.



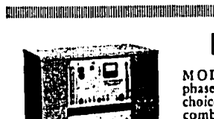
MODEL 459A (Improved TS-330/TSM) covers 800 kc to 15 mc, for 0.002% crystals, 0-9900 ohms. Operates from 115/230 v, 50-1000 cps. Price $1175.



MODEL 531 (TS-683/TSM) Crystal Impedance Meter covers range of 10-140 mc for 10-150 ohm crystals. Twelve fixed calibrating resistors of 10, 22, 30, 40, 51, 60, 68, 82, 91, 100, 120 and 150 ohms, plus a 100-ohm var. resistor for determining crystal resistance. Anti-resonance adapter also provided. Operates from 115/230 v, 50-1000 cps source. Price $725.

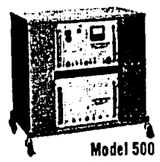


MODEL 541A (TS-710/TSM) for 10-1100 kc range crystals with resistances from 200 ohms to 0.5 megohms. An internal load capacitance is calibrated from 15 to 105 mmf with accuracy better than ±0.5 mmf. Power dissipated in crystal measured by built-in VTVM and ohmmeter. For 115/230 v, 50-1000 cps operation. Price $950.



MODEL 1207 (AN/TSM-15) covers range of 75-200 mc for 10-125 ohm crystals. Crystal voltage at series resonance is measured within 10%, effective resistance within ±5 ohms, and the power calculated. 18 $C_o$ cancellation inductances and 1 uncompensated var. resistor supplied; 5 compensated var. resistors available. 115/230 v, 50-1000 cps. Price $1295.

## POWER SUPPLIES



Model 500

MODEL 500 is a single phase, 500 VA supply with choice of 4 plug-in osc. for combinations of variable output power, frequency and voltage. Has high stability, low harmonic distortion and excellent voltage regulation. Output frequency range 40-3000 cps; output voltage 0-130; harmonic distortion better than 0.5% at 200 VA to less than 1% at 450 VA; amplitude regulation 0.5% for 5% line kick. Price $1550.



Model 150

MODEL 150 is a stable, 1 phase, 150 VA supply with choice of LC regulating osc. producing output frequencies from 380-2400 cps at 115 volts or a precision 400 cps ±0.01% osc. Price $595.

## SPECIAL HARDWARE



**Chassis Slides H-5798**

Will support 200-lb. chassis, quickly removable by pulling two pins. Complies w/ MIL Specs; has Iridite on cadmium plated steel rails, bronze rollers, stainless steel pins, nylon bushing. Price according to quantity ordered.



**Sealnuts**

*Seal out Water, Dirt & Corrosion*

Mount and seal electrical switches. Eleven styles fit most toggle, rotary and push-button types; provide metal-to-metal contact w/panel; Silicone sleeve and O-ring seal against 200 psi ext.; stay flexible at −65°C; comply w/MIL-B-5423.



**Model 10 Cart**

Inside shelf adjusts any vert. position for 2-level support of equipment; interior is 33 x 16½ x 26. One side takes 19" panels per RETMA standards. Heavy gauge steel w/baked enamel over prime coat. Acc. drop-leaf shelf fits either side.



For details, circle #213 on Reader Service Card





# Directory I. Complete Equipment

## 14. General Test Equipment.

Probescope Co., Inc., N.Y., 2s, 64s, 72s
Process & Instruments, N.Y., 36sc, 56s
Production Research Corp., Subsid., Radio Condenser Co., N.Y., 56c
Pyle-National Co., The, Ill., 6c
Pyramid Instrument Corp., N.Y., 38s, 42s
Pyrometer Instrument Co., Inc., N.J., 46s
Quan-Tech Laboratories, Inc., N.J., 50s, 60s
Quantametric Devices, Inc., N.Y., Light Measurement c
RCA Victor Co., Ltd., Canada, 2sc, 6sc, 42sc
REF Manufacturing Corp., N.Y., 2c, 6c, 52c
RMS Associates, Inc., N.Y., 40c
Racal Engineering, Ltd., England, 12s, 14s
**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 2, Tel: OVerbrook 1-5600**
See ad on page 314
Radiation Electronics Co., Ill., 46s
Radiation Instrument Development Lab., Inc., Ill., 56s
Radio City Products Co., Inc., Pa. 60c
Radio Corp. of America, Defense Electronic Products, N.J., 22c, 38c, 60c, 62c, 68c, 72c
Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 38s, 42s, 68s, 70s, Tel: HUmboldt 5-3900
See ad on pages 54-55
Radio Development & Research Corp., Div. Bogue Electric Mfg. Co., N.J., 62c
Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 2s, 8s, 26s, 32s, Tel: DEerfield 4-3100
See ad on page 290
Radiometer, Denmark, 24s, 28s, 34s, 42s, 62s, 68s, 70s, Titrators s, pH Meters s
Radionics, Inc., 76 Cambridge St., Burlington, Mass., 62sc, 64sc, Tel: BRowning 2-1233
See ads on pages 291, 343
Ram Meter, Inc., Mich., 25c, 32c, 38c
Ramage & Miller, Inc., Calif., 26c, 68c
Rank Cintel, Ltd., England, 6s, 12s, 32s, 68s
Rawson Electrical Instrument Co., Inc., 118 Potter St., Cambridge 42, Mass., 26sc, 32sc, 38sc, Fluxmeters sc, Tel: KIrkland 7-4041
See ad on page 461
Ray Proof Corp., Conn., 54sc
Red Point Corp., Calif., 22c, 68s
Reeves Instrument Corp., N.Y., 30c, Resolver Testers c
Republic Aviation Corp., N.Y., Battery Testers sc
Republic Electronic Industries Corp., N.Y., 2s, 4c, 42c, 44c, 52c, 72c
Rescon Electronics Corp., Mass., 16s, 22c, 60s, 68s
Rese Engineering, Inc., Pa., 2s, Permeameters s
Research, Inc., Minn., 22c
Research Industrial Laboratory of Electronics, Pa., 6c, 42s, 48c, 50s, 60c, 66s, 68c, 70c
Resitron Laboratories, Inc., Calif., 66s
Revere Corp. of America, Subsid. Neptune Meter Co., Conn., 2c, Strain Gages c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 6c, 12c, Tel: LOckwood 5-4578**
See ad on page 324
Robertshaw-Fulton Controls Co., Fulton Sylphon Div., Tenn., 44c, 66c
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 4s, 40s, 42s, Tel: PRescott 3-8010**
See ad on page 246
**Rotating Components, Inc., 267 Green St., Brooklyn 22, N.Y., 22 Cooling c, Tel: EVergreen 9-3490**
See ad on page 389
Rototest Laboratories, Inc., Calif., 72 Acoustic c, Cine-radiography c
Rowan Controller Co., The, Md., 6c, 34c, 38sc, 42s, 50c, 60s, 68c, 70s
Rucker Co., The, Calif., 22c, 52 Hydraulic c
Rutherford Electronics Co., Calif., 12sc
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 2c, 6c, 8c, 16c, 30c, 32c, 38c, 40c, 52c, 60c, 70c
Schaevitz Engineering, N.J., 18s, 24c, 44c
Schaffer Air Industries, N.Y., 6c
Schoene Electronics Laboratory, Ind., 40c, 48c, 68c
Scientific Engineering Laboratories, Calif., 22sc, 66s
Scopes Co., Inc., N.Y., 4s, 8s, 16s, 28s, 68s
Scott, Inc., H. H., Mass., 2s, 72s
Scott Instrument Labs., Inc., N.Y., 58s
Seco Electronics, Inc., Minn., 6s, 8s, 60s, 68s, 70s
**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 8c, 16c, 32c, Tel: CRestview 4-8542**
See ad on page 507
**Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N.Y., 2c, 22c, 24c, 26c, 70 Calibrators c, Tel: BEverly 5-2300**
See ad on page 292
Serdex, Inc., Mass., Humidity s
Servo Consultants, Ltd., N.Y., 52s
Servo Corp. of America, N.Y., 40s, 52s
Servo-Tek Products Co., N.J., 2sc, 38s
Servomechanisms, Inc., Calif., 6c, 44c, 52c
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 24s, 34c, 40s, 42s, 50s, Tel: WOodlawn 5-2341**
See ad on page 258


**TIMING GENERATOR...**

**TRIANGULAR-WAVE AND MARKER-PIP SWEEP-RASTER GENERATOR**

RADIONICS Model TWM-2A provides a simple and inexpensive method for achieving high-accuracy timing of single-shot, multiple-signal phenomena by substituting a high-precision triangular-wave timing raster for the usual X-axis sweep on a modern scope. Interpolating marker pips modulate the CRT Z-axis, with 10 pips per triangle period. Sweep expansion and timing accuracy are limited only by the number of triangles appearing in the timing raster.

*Write for complete information.*

**HIGH POWER PULSED OSCILLATOR FOR ULTRASOUND GENERATION**

**Model PUG-3**

Some pertinent characteristics: Supplies 0 to 9000 volts p-p rf to quartz plates up to 3.5 inches diameter, or 250 watts rf to a low impedance load, either pulsed or cw CCS . . . frequency range, 600 kc to 5 mc . . . precision pulse modulator . . . internal and external triggering . . . preset pulse counter and aural monitoring. Three-inch plate transducers and focussing lenses available as accessories for biomedical or industrial research.

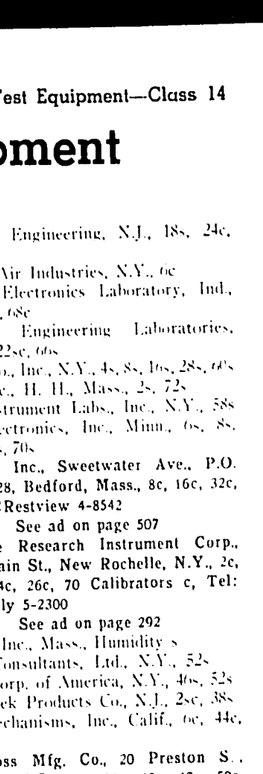
Other models: Lower power modularized rf pulsers and modulators for versatility and economy. Frequency ranges from 500 kc to 500 mc.

*Write for complete details.*

**ULTRASONIC ANALYZER**

Model UTS-2 is a modularized assembly of instrument components needed for ultrasonic analysis. The components are available separately or grouped. Components are: Wide range pulsed rf phase-stable oscillator . . . pulse forming circuits, delay and trigger generators . . . preamplifiers, preselector, and matching network . . . step attenuator, 1db/step . . . wide band rf amplifier, detector, video amplifier . . . elementary triggered-sweep scope to obviate buying or tying up expensive laboratory models . . . transducers (custom built) and matching networks.

When desired, these components may be integrally mounted as shown in the photo.




**RADIONICS, INC.**

76 CAMBRIDGE STREET • BURLINGTON, MASS.

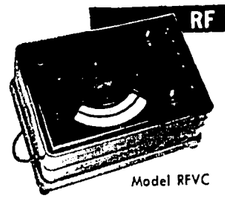
*Designers and Builders of Apparatus for Medical Research Since 1938*

For details, circle #214 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# NEW INSTRUMENTS *by Sensitive Research*

## RF VOLTMETER CALIBRATOR



Model RFVC

**Model RFVC** — Radio Frequency Self Checking RMS voltmeter for the certification of VTVM's from DC to 10 Mc. Accuracy .3% of full scale ± .2% frequency influence. Ranges .01/.1/1/3 V. Checks its own accuracy against a .05% stable internal standard source.

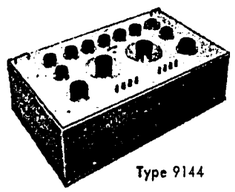
## CALIBRATION CONSOLES

**Model LTC** — AC-DC/DC. Accuracy .05% of actual reading. Ranges .5 V. to 1111 V.; 1 Ma (2 Ma on AC) to 11.11 amps. Resolution .01%. Frequency range DC to 25 KC. Direct % Error Readout. Model LT-PS — AC power supply to full capabilities of console. Harmonic distortion less than .1%. Other consoles available.



Model LTC

## DC POTENTIOMETERS



Type 9144

A new line of 6 figure instruments guaranteed 10X more accurate than any potentiometer commercially available today, having a subdivision of 1 part in $10^6$ of the 1 volt setting and calibrated to be usable to an accuracy of ± .0002% or better. Absolute accuracy guaranteed to ± .001% nominal or better. Resolution excellent for comparison of saturated standard cells. Temperature controlled. High sensitivity Galvanometer, 4 terminal NBS Type resistors, ratio boxes and other primary standards available.

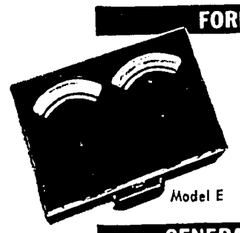
## EXPANDED SCALE INSTRUMENTS

**Model INCRE** — Differential incremeter. A NEW .05% f.s. accurate expanded scale DC standard for rack panel mounting or portable use. Combines the high comparison accuracy of the differential instrument with a .005% stable source. Scale has an effective length of 63" or 70", and a resolution of 1000 divisions. Each 10% of any range is expanded over the instrument's actual 6.3" or 7" scale length. Direct reading. No balancing or nulling. Single or multirange combinations from 200 ua. to 30 amps. and 200 mv. to 1 kv.



Model INCRE

## FORM FACTOR INSTRUMENT

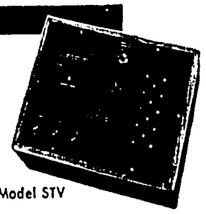


Model E

**Model E** — supplies a direct reading correction factor for instruments affected by non-sinusoidal wave form deviation. Indicates ratio of true RMS values to average, positive peak, and negative peak values. Determines the true RMS values of average and peak reading instruments that are used on a distorted wave. Accuracy: .2% between 25-500 cps.

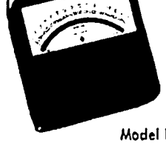
## DC VOLTAGE STANDARDS

**Model STV** — Nominal output 1.0000 V. and 1.0185 V. Accuracy ± .01%. Actual output certified within ± .001% and guaranteed stable within ± .005%. 115 V. 60 cps input. Unaffected by extremes of temperature, short circuiting, and vibration. Replaces the standard cell. OEM types available.



Model STV

## GENERAL PURPOSE PORTABLES

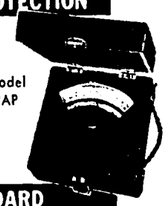


Model N

**Model N**—economically priced, stable and rugged .5% accurate DC current and voltage instrument. Long 6.1" scale. Employs a shielded "U" shaped magnet and not the common center core type characteristic of instruments in its price range. Model NP is for panel mounting. Model NSI is an AC version. All have molded bakelite cases and are available switch controlled.

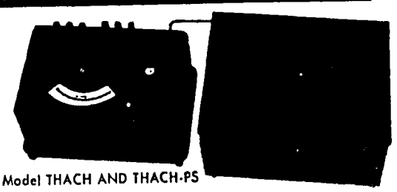
## AUTOMATIC OVERLOAD PROTECTION

**Model 2 AP** — AC-DC Polyranger. Thermocouple type. Automatically protected for overloads of at least 5000%. Accuracy: .75%. Ranges from 2 ma. to 1 amp. and 2 V. to 500 V. Sensitivity: 500 ohms/V. Diamond Pivoted. Other Polyrangers with as many as 88 ranges available.



Model 2AP

## AC-DC LABORATORY STANDARD AND POWER SUPPLY



Model THACH AND THACH-PS

**Model THACH** — AC/DC Self Checking Volt-Amp Milliammeter. Accuracy ± .2% f.s. to 4 kc. Ranges — 10/20/50/100/200/500 ma.; 1/2/5 Amps; 1/2/5/10/20/50/100/200/500/1000 V. f.s. Checks its own accuracy against an internal standard cell. Model THACH-PS — special regulated THACH Power Supply (optional) automatically shuts off power to the THACH when switching ranges, reducing possibility of accidental overloads. Output is DC or 60 cps. (50-2500 cps. can be plugged in). Combination serves as a calibrator, measuring instrument, and general purpose power supply.

**Primary and secondary standards** for the accurate measurement or certification of AC-DC current, voltage, power, power factor, frequency and magnetic quantities. All electrical indicating instruments have hand-drawn mirrored scales and most are Diamond Pivoted, of course!

Not illustrated above, but available, are a complete line of portable and panel types including: • **Wattmeters** • **Electrostatic Voltmeters** • **Peak Voltmeters** • **Thermocouple Instruments** • **Differentials** • **Ratiometers** • **Test Sets** • **Flux-meters** • **Panel Instruments** and **Multipliers.** **accessories such as Shunts** All SRIC instruments have their certification directly traceable to the National Bureau of Standards and are unconditionally guaranteed.

NEW ROCHELLE N.Y.

ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927

*Symbol of Quality*

**SENSITIVE RESEARCH INSTRUMENT CORPORATION**



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**Smith-Florence Inc.**

A Modern Approach to Electronic Instrumentation



*Model 951 Transistorized precision differential (potentiometric) microvoltmeter. Accuracy, 0.01%*

An example of advanced engineering applied to general-purpose instrumentation: combining 100% solid state circuitry and the ultimate in component selection, Model 951 measures DC potentials from 1 μV to 1000 V with extreme accuracy and reliability. Ask about other S-F advanced designs in Nuclear Test Equipment, Calibrators, Cable Fault Finders, HV Power Supplies, and VTVM's.

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WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400

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# Directory I. Complete Equipment

## 14. General Test Equipment.

Sheffield Corp., Subsid. The Bendix Corp., Ohio, X-Ray Testers s

Shepard Laboratories, Inc., N.J., 68c

Shielding, Inc., 514 N. Read Ave., Riverton, N.J., 54sc, Tel: TAlmadge 9-1433
See ad on page 190

Sierra Electronic Corp., Div. Philco Corp., Calif., 6c, 16s, 60s, 68s

Sigma Instruments, Inc., 31 Pearl St., South Braintree 85, Mass., Relay Testers c, Tel: VIctor 3-5000
See ad on page 518

Signal Equipment Co., Inc., Wash., 2c

Simmonds Precision Products, Inc., N.Y., 4s

Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 2s, 4s, 6s, 24s, 38s, 40s, 42s, 60s, 70s, Tel: EStebrook 9-1121
See ad on page 462

Skiatron Electronics & Television Corp., N.Y., 32c

Slaughter Co., Ohio, 4c, 6c, 16c, 32s, 34s, 5t s

Smith-Florence, Inc., Wash., 2s, 10s, 14s, 32s, 38s, 40s, 42s, 70s, Cable-testers s

Solartron Electronic Group, Ltd., The, England, 2s, 14s, 30s, 42s, 50s, 52s, 56s, Flight Simulation s

Solartron, Inc., Calif., 14s, 30s, 40s, 52sc

Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 12c, 44c, Tel: EMpire 4-2271
See ad on page 420

Sorensen & Co., Inc., Subsid. Raytheon Co., Richards Ave., South Norwalk, Conn., 32sc, Tel: TEmple 8-6571
See ad on page 490

Sorensen Industrial Electronic Co., N.J., 6sc, 8sc, 16c, 22c, 28c, 30sc, 32c, 34sc, 48sc, 58c, 60c, 68c, 72c, Rotor & Stator Testers sc

Southwestern Industrial Electronics Co., Tex., 4s, 32s, 34s, 38s, 42s, 50s, 70s, 72s

Specialty Electronics Development Corp., N.Y., 38sc, 70sc

Spectralab Instruments, Calif., 34s

Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 72s

Sperry Piedmont Co., Div. Sperry Rand Corp., Va., 6c

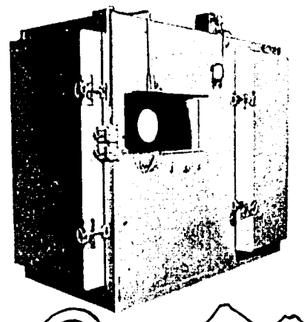
Sperry Products Co., Div. Howe Sound Co., Calif., 62s, 64s

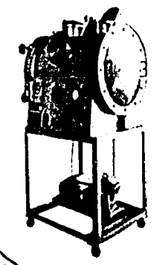
Sperry Products Co., Div. Howe Sound Co., Conn., 10sc, 64sc

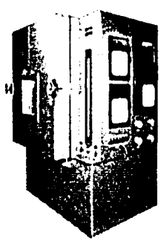

*Environmental* **TEST CHAMBERS**

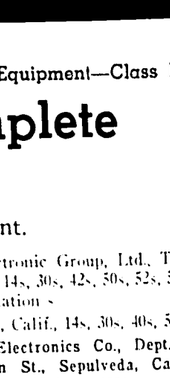
Standard test chambers are expertly designed for accurate, reliable testing. Superior design and quality construction assure years of dependable service with a minimum of maintenance. Whatever the simulated condition desired, there is a Standard Cabinet designed specifically to do the job, guaranteed to give excellent performance.

Standard Cabinet Company, a recognized pioneer in the field, has an uninterrupted history of over 18 years under the same ownership and management. It has acquired a wealth of experience and skill in the design and construction of chambers of every description.









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HIGH & LOW TEMPERATURE
ALTITUDE
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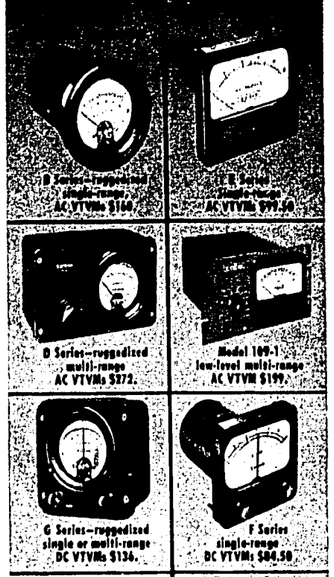
53 WASHINGTON AVENUE, CARLSTADT, N. J.

For details, circle #217 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

*the industry's pioneer & complete line of*

**MINIATURIZED ELECTRONIC INSTRUMENTS**




By building-in trio labs' panel-mounting instruments you . . . customize test systems, set-ups and instruments; save space (average model is 4" x 4" x 4"); save time with at-a-glance monitoring; save money; make monitoring foolproof (go-no go"); improve system reliability; increase overall design freedom. Choose from many "standard" or "special" models—or consult us for new designs for your needs. Write for free "how to" Engineering Guide to Dept. IRE-61

**CUSTOMIZE EFFICIENCY & ACCURACY WITH TRIO LABS' BUILD-IN INSTRUMENTS**



**BEFORE . . .** 3 external instruments were used to measure AC and DC voltages . . . cluttered, tedious, wasteful, subject to error.



**AFTER . . .** 3 trio labs' miniature VTVMs integrally built-in now are always on hand to measure just the parameters you designate.

trio

Trio Laboratories, Inc Plainview, L. I., N. Y.

For details, circle #218 on Reader Service Card

# YOU CAN...

## LIFE TEST

At 150°C in any quantity of 0.25 to 500 amp. Rectifiers using our economical Modular Package (Model 154)

## EVALUATE

Junction Thermal Resistance of any Semiconductor Device Rapidly and Accurately with our Model 149.

## TEST

Rectifiers (or SCR) Dynamically
Up to 20 amp. Model 141
Up to 75 amp. Model 115
Up to 200 amp. Model 122
Up to 500 amp. Model 128

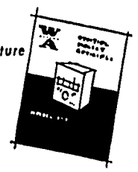
## GENERATE

Sinusoidal Surge Current from 5 to 5000 amp. with our Model 142

## GET DELIVERY

Our expanded facilities assure, in most cases, prompt, off-the-shelf delivery.

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*For Free Descriptive Literature*



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912-914 WESTFIELD AVE.
ELIZABETH, NEW JERSEY
FLanders 1-0700

For details, circle #219 on Reader Service Card


## 14. General Test Equipment.

Sprague Electric Co., Mass., 4s, 60s
**Standard Cabinet Co., Inc., 53 Washington Ave., Carlstadt 5, N.J., 22c, Tel: GEneva 8-1500**
See ad on page 293
Standard Electric Time Co., The, Mass., 18s
State Testing Laboratory, Inc., Conn., 22c
States Company, The, Conn., Relay Testers sc
Stephens Trusonic, Inc., Calif., 22sc, 72sc
Stereatronics, Inc., Mass., 6sc, 12c, 16sc, 60sc
**Sterling Components, Div. of Sterling Precision Corp., 5 Sintsink Dr. E., Port Washington, L.I., N.Y., 30sc, Tel: POrt Washington 7-8200**
See ad on page 343
**Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 20s, 34s, 38s, 42s, 46s, 58s, 72s, Tel: REctor 2-8163**
See ad on page 462
Stieh Chemicals Inc., N.Y., Mercury Vapor Meters c
Stokes Corp., F. J., Pa., 60s
Strand Engineering Co., Mich., 60s
Strand Labs., Inc., Mass., 56sc
Strat-O-Seal Mfg. Co., Ill., 10s
Strempel Instrument Corp., N.Y., 4c, 16c, 50c
Sturtevant Co., P. A., Ill., Torque Testers c


SYSTRON
Digital/Analog Systems and Instruments

*Model 1039 Transistorized 10 MC Timer-Counter*



DIGITAL Voltmeters, Counters, Ratiometers, Frequency Meters, Tachometers, Clocks, Scalers, Oscillators, ANALOG converters (AC-DC, Ω-DC, DC-Time, Freq.-DC) and complete A/D or D/A systems involving these techniques.

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SYRACUSE .....GRanite 4-7109
PHILADELPHIA .....SHerwood 7-6080
WASHINGTON .....OLiver 4-6100
BALTIMORE .....ENterprise 9-6100

For details, circle #220 on Reader Service Card



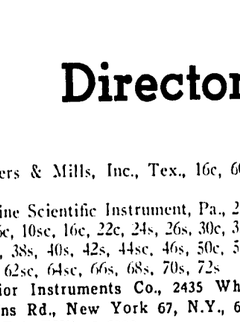



# Directory I. Complete Equipment

## 14. General Test Equipment.

Summers & Mills, Inc., Tex., 16c, 60c, 62c
Sunshine Scientific Instrument, Pa., 2sc, 4c, 6c, 10sc, 16c, 22c, 24s, 26s, 30c, 32c, 34sc, 38s, 40s, 42s, 44sc, 46s, 50c, 56c, 60s, 62sc, 64sc, 66s, 68s, 70s, 72s
**Superior Instruments Co., 2435 White Plains Rd., New York 67, N.Y., 60c, 68c, Tel: TUlip 2-6880**
See ad on this page
Supreme Electronics Corp., Miss., 38c, 42c, 60c, 68c, 70c
**Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 66, Tel: YOrkshire 8-6211**
See ad on pages 48-49
Systems, Inc., Fla., 8c
Systron-Donner Corp., Calif., 12s, 14s, 72c
Taffet Electronics, N.Y., 6c, 28c, 68c
Technical Industries Corp., Calif., 10c, 14sc, 40sc
Technical Measurement Corp., Conn., 56s
Technique Associates, Ind., 2s, 46s
Technology Instrument Corp., Mass., 2s, 4s, 18c, 24c, 32c, 34s, 38s, 40c, 42s, 44c, 50s, 52s, 60c, 70s
Technology Instrument Corp. of Calif., Calif., 22c
Tektronix, Inc., Ore., 60c, 68c
Tel-Instrument Electronics Corp., N.J., 72s
Tel-Labs, Inc., N.H., 50c
Telecomputing Corp., Data Instruments Div., Calif., 14s
Telecomtrol Corp., N.J., 68sc, 70sc
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 4sc, 38c, Tel: YE 2-8600**
See ad on page 338
**Telex, Inc., 1633 Eustis Ave., St. Paul 1, Minn., 14s, Tel: MIdway 6-7211**
See ads on pages 456, 556
**Teltronics, Inc., 277 Main St., Nashua, N.H., 6c, 40c, 48c, 60c, Tel: TUxedo 2-6264**
See ad on page 337
Temperature Engineering Corp., N.J., 22sc, 46sc, 60sc, 66s, 68s
Tempo Instrument, Inc., N.Y., 12c
Ten Bosch Inc., M., N.Y., Rotor testers
Tenney Engineering, Inc., N.J., 22sc, 54 Explosion sc
Tensor Electric Dev. Co., Inc., N.Y., 32c
Texas Instruments Incorporated, Apparatus Div., Tex., 12c
Texas Instruments Incorporated, Geosciences & Instrumentation Div., Tex., 4c, 16c, 50c, 60c
Thermo Electric Co., Inc., N.J., 46sc
Theta Inst. Corp., N.J., 2s, 30s, 40s, 52s
Thomas Electronics, Inc., N.J., 68s
Thompson Ramo Wooldridge Inc., Calif., 2sc
Thwing-Albert Inst. Co., Pa., 24c, 40c
Topatron, Calif., 22 Anechoic c, 54sc
Topper M'fg. Co., Inc., N.Y., 32c, 38c, 52c, 60c, 68c
Tracerlab, Inc., Mass., 20sc
Trans Electronics, Inc., Calif., 16sc, 60sc
Trans-Sonics, Inc., Mass., 44s, 66s
Transdyne Corp., N.Y., Flight Simulation c
Transistor Devices, Inc., N.J., 20c, 70c
**Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 16sc, 60sc, Tel: WEst 9-6754**
See ad on page 472
Transistor Specialties, Inc., N.Y., 10c, 12c, 60s
**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 38sc, 40sc, 42c, 52c, 68c, 70 RMS sc, Tel: OVerbrook 1-0400**
See ad on page 294
**Triplett Electrical Instrument Co., 286 Harmon Rd., Bluffton, Ohio, 38sc, 60s, Tel: 3231**
See ad on page 174

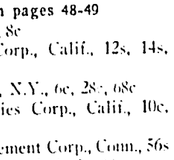

**Vibration Testing Equipment**



MODEL 200 SHAKER

Complete systems from 175 to 5000 pounds force, automatic control, minimum distortion or lateral motion. Systems for 100 g. testing; environmental chambers; or explosive atmosphere; and limited Random testing with minimum accessories.

Dial-A-Gain Sensitivity Standardizer and Cathode Follower for Accelerometer Readout. Dial accelerometer sensitivity and get 1 volt per g. Also available with meter, Driven Shield Cable, velocity and displacement outputs.

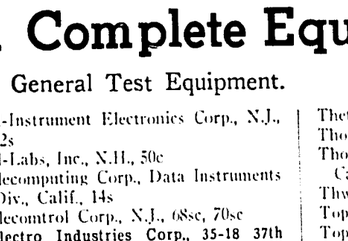


LINHOLTZ DICKIE CORPORATION
2994 Whitney Ave.
Hamden 18, Conn.

For details, circle #221 on Reader Service Card

*The Model 88 . . . . A New Combination*

**TRANSISTOR RADIO TESTER and DYNAMIC TRANSISTOR TESTER**



The Model 88 is perhaps as important a development as was the invention of the transistor itself, for during the past 5 years, millions of transistor radios and other transistor operated devices have been imported and produced in this country with no adequate provision for servicing this ever increasing output.

The Model 88 was designed specifically to test all transistors, transistor radios, transistor recorders, and other transistor devices under dynamic conditions.

**AS A TRANSISTOR RADIO TESTER**

We feel sure all technicians will agree that the instruments and methods previously employed for servicing conventional tube radios and TV have proven to be impractical and time consuming when used for transistor radio servicing. The Model 88 provides a new simplified rapid procedure—a technique developed specifically for radios and other transistor devices.

An R.F. Signal source, modulated by an audio tone is injected into the transistor receiver from the antenna through the R.F. stage, past the mixer into the I.F. Amplifier and detector stages and on to the audio amplifier. This injected signal is then followed and traced through the receiver by means of a built-in High Gain Transistorized Signal Tracer until the cause of trouble whether it be a transistor, some other component or even a break in the printed circuit is located and pin-pointed. The injected signal is heard on the front panel speaker as it is followed through the various stages. Provision has also been made on the front panel for plugging in a V.O.M. for quantitative measurement of signal strength.

The Signal Tracing section may also be used less the signal injector for listening to the "quality" of the broadcast signal in the various stages.

**AS A TRANSISTOR TESTER**

The Model 88 will test all transistors including NPN and PNP, silicon, germanium and the new gallium arsinide types, without referring to charactistic data sheets. The time-saving advantage of this technique is self evident. A further benefit of this service is that it will enable you to test new transistors as they are released!

The Model 88 will measure the two most important transistor characteristics needed for transistor servicing; leakage and gain (beta).

The leakage test measures the collector-emitter current with the base connection open circuited. A range from 50 ohms to 100,000 ohms covers all the leakage values usually found in both high and low power transistor types.

The gain test (beta) translates the change in collector current divided by the base current. Inasmuch as the base current is held to a fixed value of 50 microamperes, the collector current calibrated in relative gain (beta), is read directly on the meter scale.

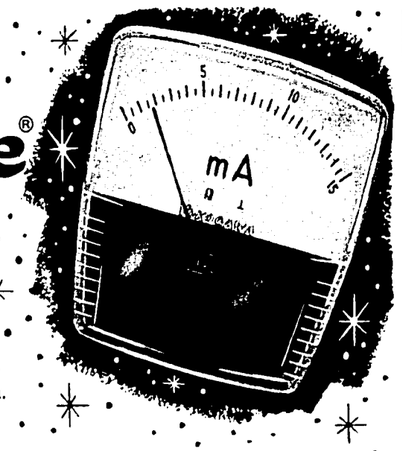
Model 88 comes housed in a handsome portable case. Complete with a set of Clip-On Cables for Transistor Testing, an R.F. Diode Probe for R.F. and I.F. tracing; an Audio Probe for Amplifier Tracing and a Signal Injector Cable. Complete—nothing else to buy! Only ..... **$38.50**

SICO SUPERIOR INSTRUMENTS COMPANY
2435 White Plains Road New York 67, N. Y.

For details, circle #222 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# The Prince® is here...




The Royal line in small panel meters... the PRINCE is a triumph in modern industrial design.

Thoroughly planned, developed and field tested with features that have made YEW panel instruments superior throughout the world.

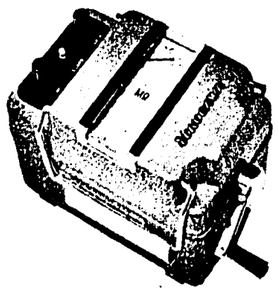
- *CORE MAGNET mechanism—except Movable Iron Type*
- *EZ-READ® dial—extra long scale*
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- *AVAILABLE in a complete line of 2½", 3½" and 4" models both AC & DC*

®applied for

**YEW** **YOKOGAWA ELECTRIC WORKS, Inc.**
**40 Worth Street • New York 13, N. Y.**

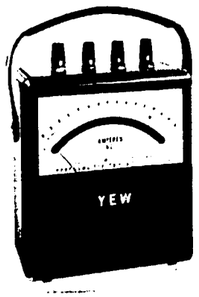
## INSULATION TESTER
### Model L-5



- *Expanded Scale*
- *Quick response*
- *Silent Generator*
- *CORE MAGNET mechanism indicator*
- *Housed in light metal case*
- *Optional accessory of leather carrying case and leads*

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Rated accuracy 0.5 of 1% of full scale




- *DC, AC and High Frequency Voltmeter and Ammeter*

  *DC: Model MPF*

  *AC: Models SPF, CPF*

  *HF: Model TPF*

- *Wattmeter*

  *DC-AC: Model DPB-1W*

**YEW** **YOKOGAWA ELECTRIC WORKS, Inc.**
**40 Worth Street • New York 13, N. Y.**

For details, circle #223 on Reader Service Card




## 14. General Test Equipment.

Trott Electronics, Inc., N.Y., 4c, 48c, 60c
Tucor, Inc., Conn., 66c
Tullamore Electronics Corp., Ill., 20
**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 6c, 22c, Tel: ULysses 5-5131**
See ad on page 438
Turner Associates, G. K., Calif., Chemical Analysis s
Ultra Violet Products, Inc., Calif., 10sc
**Ultrasonic Industries, Inc., Dept. 57-IRED-60, 141 Albertson Ave., Albertson, L.I., N.Y., 62c, Tel: PIoneer 1-4333**
See ad on page 679
Ultraudio Products, Div. Oberline, Inc., Calif., 6s
**Unholtz-Dickie Corp., 2994 Whitney Ave., Hamden 18, Conn., 72 Vibration Test System, Tel: AT 8-3358**
See ad on page 295
United Aircraft Products, Inc., Ohio, 22c
United Sensor & Control Corp., Conn., 46s
U. S. Science Corp., Calif., 2c, 6c, 12c, 18c
Universal Instruments Corp., N.Y., 4s, 16s, 50s
**Universal Mfg. Co., Inc., 1168 Grove St., Irvington 11, N.J., Coil Testers s, Tel: ESsex 4-9800**
See ad on page 678
**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 36s, 44s, 66s, Tel: AN 1-2660**
See ad on page 678
Vacuum Instrument Corp., N.Y., 10s, 22sc, 36s, 66s
Valor Instruments, Inc., Calif., 60s
Van Norman Industries, Inc., Electronics Div., N.H., 12c, 14c, 34c
**Varian Associates, Instrument Div., 611 Hansen Way, Palo Alto 42, Calif., 26s, 56s, Tel: DAvenport 6-4000**
See ad on page 176
**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 66s, Tel: DAvenport 6-4000**
See ad on pages 116-117
**Veeco Vacuum-Electronics Corp., Terminal Drive, Plainview, L.I., N.Y., 10c, 36s, 66s, Tel: OVerbrook 1-8300**
See ad on page 681
Vemaline Products Co., N.J., 34sc
Vinco Electronics Corp., Conn., 10c, 34c, 60c, 72c
Virginia Electronics Co., Inc., D.C., 6c, 32c
WacLine, Inc., Ohio, 20c
Wallace & Tiernan, Inc., N.J., 44s, 66
**Wallson Associates, Inc., 912-914 Westfield Ave., Elizabeth, N.J., 16sc, 48c, 60c, Rectifier Testers c, Surge Current Testers c, Thermal Impedance Testers c, Tel: FLanders 1-0700**
See ad on page 294
Waltham Electronics Corp., Mass., 68s
Waters Mfg., Inc., Mass., 16s
Waveforms, Inc., N.Y., 62s, 70s
**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 4s, 20s, 52s, 60s, 70s, 72s, Tel: LOcust 8-6820**
See ad on page 255





# Directory I. Complete Equipment

## 14. General Test Equipment.

Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 2, 40, Tel: LOckwood 4-0121
See ads on pages 315, 384
**Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick St., Chicago 10, Ill., 24s, 46s, 56s, 66s, Tel: MIchigan 2-2000**
See ad on page 681
Wells Electronics Co., Ind., 54c
West Instrument Corp., Ill., 40s
**Western Devices, Inc., 600 W. Florence Ave., Inglewood 1, Calif., 48sc, Tel: OREgon 8-7827**
See ad on page 624
Western Electronic Products Co., Calif., Impedance Meters sc
Westinghouse Electric Corp., N.J., 14c, 24c
Westinghouse Electric Corp., Air Arm Div., Md., 6s, 30s, 38s
Westronics, Inc., Tex., 40c
Whitney Blake Co., Conn., 10s
Wiancko Engineering Co., Calif., 2c
Wickes Engineering & Construction Co., N.J., 6c
Winkler Laboratories, Ariz., 72s
Winslow Co., Inc., N.J., 2c, 4c, 6sc, 18s, 24sc, 32c, 34sc, 40sc, 42sc, 46c, 50sc, 60c, 68c, 70c
Winston Electronics, Div. Jetronic Industries, Inc., Fla., 60s
Wintronics, Calif., 2s, 32c
Wright Equipment Corp., N.J., 60c, 68c
Wyle Mfg. Corp., Calif., 10c, 22sc, 50c, 60c
Wyle-Parameters, Inc., N.Y., 34c
**Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 2s, 6c, 24c, 34s, 38c, 42c, 68c, 70c, Tel: BEekman 3-6720**
See ad on page 296
**Zippertubing Co., The, 752 S. San Pedro St., Los Angeles 14, Calif., 54s, Tel: MAdison 4-6664**
See ad on page 659

**Generators, digital timing:** See class 14

**Generators, function:** See class 14

**Generators, marker, microwave:** See class 21

**Generators, marker, radio frequency:** See class 28

**Generators, marker, television:** See class 37

**Generators, motor:** See class 60

**Generators, motor (servo):** See class 30

**Generators, pulse, microwave:** See class 21

**Generators, random noise:** See class 28

**Generators, servo:** See class 30

**Generators, signal, radio frequency:** See class 28

**Generators, signal, telemetering:** See class 36

**Generators, signal, television:** See class 37

**Generators, square wave:** See class 3

**Generators, sweep, radio frequency:** See class 28

**Generators, sweep, television:** See class 37

**Generators, synchronizing:** See class 37

**Generators, time delay:** See class 21

**Generators, UHF-VHF:** See class 37

**Generators, ultrasonic:** See class 14

## 15. Geophysical Apparatus.

5. Complete exploration equipment
10. Control equipment
15. Microphones
20. Recording galvanometers

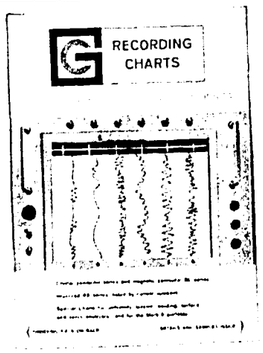
Advanced Research Associates, Inc., Md., 10s
Allied Research Assoc., Inc., Mass., 5c, 10c
**Associated Research, Inc., 3792 W. Belmont Ave., Chicago 18, Ill., 5s, Tel: COrnelia 7-4040**
See ad on page 279
Astatic Corporation, The, Ohio, 15sc
Atlantic Research Corp., Va., 15sc
Automatic Timing & Controls, Inc., Pa., 10c
Autometric Corp., N.Y., 5c
Bach Auricon, Inc., Calif., 20s
Beckman & Whitley, Inc., Calif., Radiometers s

## 15. Geophysical Apparatus.

Black Light Eastern Corp., N.Y., 5s
Bright Radio Labs., Inc., N.Y., 15c
Capps & Co., Inc., N.Y., 15c
Century Electronics & Instruments, Inc., Okla., 20s
Chemalloy Electronics Corp., Calif., 5sc
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, Tel: OAkwood 7-6800**
See ad on page 308
Coils-Electronics Co., Pa., 10c
**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 10c, Tel: ALgonquin 4-5106**
See ad on page 249
Cosmic, Inc., D.C., 20s
Curtiss-Wright Corp., Electronics Div., IMI Branch, N.M., 10c
Dalmo Victor Co., Div. Textron, Inc., Calif., 20c
Donner Scientific Co., Subsid. Syston-Donner Corp., Calif., 10c
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, Tel: HAlifax 6-7491**
See ad on page 400
Epsco Worcester, Mass., 20s
Eteleo, Ltd., England, 15sc
Fisher Research Lab., Inc., Calif., 5c
General Automatics, Inc., Calif., 10c
Geotechnical Corporation, The, Tex., 5c, 20s
Geotronic Labs., Inc., Tex., 5s
Hamilton Standard Div., United Aircraft Corp., Conn., 10c
Harris Transducer Corp., The, Conn., 15s
Harrison Electrosonics, Inc., B. M., Mass., 15c
Hathaway Instruments, Inc., Colo., 20s
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c
Isotopes Specialties Co., Div. Nuclear Corp. of America, Calif., 5s
Kaar Engineering Corp., Calif., 5c
Mandrel Industries, Inc., Calif., 5s, 10c, 20s
Mandrel Industries, Inc., Tex., 5s, 20s
Massa Division, Cohu Electronics, Inc., Mass., 2sc
Moseley Co., F. L., Calif., 10s
Motorola, Inc., Military Electronics Div., Ariz., 15c
Packard Bell Computer Corp., Calif., 10c
Pan Associates, Inc., Md., 10c
Philips Electronic Instruments, N.Y., 20s
Photron Instrument Co., Ohio, 20s
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 10c
Radio Corp. of America, N.J., 15s
Riverbank Laboratories, Dept. of Engineering, Ill., 10c
Rust Industrial Co., Inc., The, N.H., 20sc
Schaevitz Engineering, N.J., 20c
Seiscor, Div. Seismograph Service Corp., Okla., 5c, 10c, 15c, 20c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# EVERY USER OF OSCILLOGRAPHS Should have this FREE PORTFOLIO




This portfolio, yours for the asking, tells eight ways you'll benefit by standardizing on GC direct-writing charts. It holds a sheaf of samples to give you the "feel" of the ultra-smooth, specially milled paper on which GC Charts are printed. On the back is a handy guide for ordering the GC direct-writing charts that will meet your needs.

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Firm_____

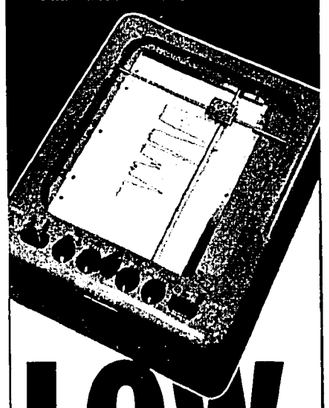
Address_____

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**HR-92 X-Y**
**X-Y RECORDER**
**Unconditionally Guaranteed For One Year**



# LOW $595.00 COST

- Flat bed — Full Chart visibility
- Unitized Construction
- Critically damped response
- Clip-on pen — Interchangeable for multicolor traces
- Standard 8½ x 11 paper

**RUGGED "All Purpose" X-Y RECORDER**

The HR-92 is a null-seeking servo-type plotter designed to draw curves in Cartesian coordinates on regular 8½ x 11 graph paper. Control panel has zero set and continuously-variable attenuator for each axis. Separate standby and power switches are provided. Two axes are electrically and mechanically independent.

- Amplifiers easily removed if servicing ever becomes necessary. Electrical connections all contained in two plugs for each amplifier.
- Each amplifier channel (including transformer power supply) independent of rest of system.

**WRITE FOR:**
New X-Y Recorder Circular #792-4 showing complete specifications and photographs.

**houston instrument**
corporation
Box 22234 • Houston 27, Texas
MO 7-7405

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## 15. Geophysical Apparatus.

Southwestern Industrial Electronics Co., Tex., 5sc, 10c, 15s, 20s
Space Electronics Corp., Calif., 5c
Standard Telephones & Cables, Ltd., England, 15s
Stocker & Yale, Inc., Mass., 10sc
Summers & Mills, Inc., Tex., 5c
Technical Measurement Corp., Conn., 5c
Texas Instruments Incorporated, Geosciences & Instrumentation Div., Tex., 5s, 10s, 15s, 20s
Triad Transformer Corp., Div. Litton Industries, Calif., 10sc
United Electrodynamics, Inc., Calif., 5c 10c, 15c, 20c
U. S. Science Corp., Calif., 10c
**Varian Associates, Instrument Div., 611 Hansen Way, Palo Alto 42, Calif., 5s, Tel: DAvenport 6-4000**
**See ad on page 176**
Virginia Electronics Co., Inc., D.C., 10c

## 16. Graphic Recorders.

5. Boards—plotting
10. Charts & papers
15. Ink writing
20. Inkless types
25. Fixed speed types
30. Variable speed types

Aeroflex Corp., The, Aeroflex Laboratories Div., N.Y., Airborne c
Airborne Instruments Lab., Div. Cutler Hammer, Inc., N.Y., 15s
**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 10, 20, 25, 30, Tel: FOrest 6-4467**
**See ad on page 276**
Alden Systems Co., Mass., 20s, 30s
Alfax Paper & Engineering Co., Inc., Mass., 20s, 25s
**Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 30c, Tel: HAncock 6-2150**
**See ad on page 590**
Allison Labs., Inc., Calif., 30s
**American Time Products, Inc., 61-20 Woodside Ave., Woodside 77, L.I., N.Y., 30sc, Tel: OLympia 1-7800**
**See ad on page 348**
Antlab, Inc., Ohio, 15s, 30s
Associated Electrical Industries Limited, Instrumentation Div., England 15s, 25s, 30s
Atomic Accessories, Inc., N.Y., 10s, 30
Austin Electronics, N.Y., 5c
Automatic Timing & Controls, Inc., Pa 10sc, 25sc, 30sc
Benson-Lehner Corp., Calif., 5c
Bristol Co., Conn., 10c, 15c, 20c, 25c, 30
Brooks & Perkins, Inc., Mich., 5c
Bruel & Kjaer, A/S, Denmark, 15s, 20 30s
Brush Instruments, Div. Clevite Corp., Ohio, 10s, 15s, 20s
Bunnell & Co., J. H., N.Y., 15sc
Burke & James, Inc., Ill., 15s
California Computer Products, Inc., Calif., 5sc, 30sc
Centronix, Inc., Fla., 10s, 20c, 30c
Century Electronics & Instruments, Inc., Okla., 25s, 30s
Chesapeake Instrument Corp., Md., 30s
Clearprint Paper Co., Calif., 10
Computing Systems, Inc., N.Y., 5sc
**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 5c, Tel: ALgonquin 4-5106**
**See ad on page 249**





# Directory I. Complete Equipment

## 16. Graphic Recorders.

Corbett Science Laboratories, F. W., Calif., 20sc, 25c, 30sc
Dalmo Victor Co., Div. of Textron, Inc., Calif., 15c, 30c
Daystrom, Inc., Weston Instrument Div., N.J., 10s, 15s
Dicon Corporation, N.Y., 5c, 25c, 30c
Duralith Corp., Pa., 5c
Dynatran Electronics Corp., N.Y., 15c
E P I C, Inc., N.Y., 5s, 15s
Electric Autolite Co., The, Ohio, 15sc, 20sc
Electro Instruments, Inc., Calif., 5s, 15s
Electro-Medical Laboratory, Inc., Vt., 15c, 20c, 25c, 30c
Electro Radiation, Inc., Calif., 5c
Electronic Associates, Inc., N.J., 5sc, 15s
Engineering Associates, Ohio, 15c, 25c, 30c
Epsco Worcester, Mass., 10s, 15s, 20s, 25s, 30s
Fenske, Fedrick & Miller, Inc., Calif., 5sc, 20s
General Electric Co., Apparatus Sales Div., N.Y., 10s, 15s, 20s, 25s, 30s
**General Radio Co., 22 Baker Ave., West Concord, Mass., 15s, 30s, Tel: EMerson 9-4400**
**See ad on Cover 4**
Geotechnical Corp., The, Tex., 20s, 25s, 30s
Gilmore Industries, Inc., Ohio, 15c, 25c, 30c
Hallicrafters Co., The, Ill., 15c, 20c
Hathaway Instruments, Inc., Colo., 20s, 25s, 30s
**Houston Instrument Corp., P.O. Box 22234, Houston 27, Tex., 15 X-Y s, 30 X-Y s, Tel: MOhawk 7-7405**
**See ad on page 298**
Impact-O-Graph Corp., The, Ohio, 20s
Industrial Engravers, Inc., N.Y., 5c
Itek Corp., Mass., 20c
Larson Instrument Co., N.Y., 20sc, 25sc, 30sc
Leeds & Northrup Co., Pa., 10s, 15s
Librascope Div., General Precision, Inc., Calif., 30sc
Litton Industries, Maryland Div., Md., 5
MacLaren & Co., Inc., F. B., N.Y., 5c
**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 15c, 20c, Tel: ROgers 9-5312**
**See ad on page 364**
Manning, Maxwell & Moore, Inc., Conn., 25s
Massa Division, Cohu Electronics, Inc., Mass., 10s, 15s, 20s, 25s, 30s
Mast Development Co., Inc., Iowa, 30c
Melpar, Inc., Special Products Dept., Va., 5c
Midwestern Instruments, Inc., Okla., 20s, 25s, 30s
Milgo Electronic Corp., Fla., 5sc, 15sc
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 10s, 15s, 25s, 30s
Minneapolis-Honeywell Regulator Co., Fall River Div., Mass., 15c, 25c
Moseley Co., F. L., Calif., 5s, 15s, 25s, 30s
Muirhead & Co., Ltd., England, 20s, 25s, 30s
Nashua Corp., N.H., 10sc
Nichols, Ltd., R. H., Canada, 15s, 20s, 30s
Offner Electronics, Inc., Ill., 10s, 15sc, 20sc, 25c, 30sc
Philips Electronic Instruments, N.Y., 15s, 25s, 30s
Philips Electronics Industries, Ltd., Canada, 10s, 15s, 20s, 30s
**Photo Chemical Products, 999 Stewart Ave., Garden City, L.I., N.Y., 5, Tel: PIoneer 1-6500**
**See ad on page 636**
Photron Instrument Co., Ohio, 10s, 15s, 20s, 25s, 30s
Radiometer, Denmark, 15s
Research Industrial Laboratory of Electronics, Pa., 15s
Robertshaw-Fulton Controls Co., A & I Div., Calif., 15s, 25s
Rue Industrial Co., Inc., The, N.H., 10sc, 20sc, 30sc
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 10s, 15s, 20s, 30s, Tel: TWinbrook 4-6300**
**See ad on pages 64-65**
Sangamo Electric Co., Ill., 10s, 15s, 25s
Scientific-Atlanta, Inc., Ga., 10s, 15s
Seiscor, Div. Seismograph Service Corp., Okla., 5c, 20c
Servo Consultants, Ltd., N.Y., 5c
Servo Corp. of America, N.Y., 5c
Stillcocks Miller Co., The, N.J., 5c, 10c
Southwestern Industrial Electronics Co., Tex., 30s
Specialty Electronics Development Corp., N.Y., 5c
Sperry Piedmont Co., Div. Sperry Rand Corp., Va., 5c, 25sc
Sun Dial Corp., N.J., 5c
Sunshine Scientific Instrument, Pa., 5s, 10s, 15s
Systron-Donner Corp., Calif., 15s, 30s
Tally Register Corp., Wash., 5s
Technical Products Co., Calif., 15s, 30s
**Technical Sales Corp., Subsid. Graphic Controls Corp., 189 Van Rensselaer St., Buffalo 10, N.Y., 10s, Tel: MAdison 7500**
**See ad on page 298**
Texas Instruments Incorporated, Geosciences & Instrumentation Div., Tex., 10s, 15s, 25s, 30s
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 2c
U.S. Recording Co., D.C., 15c
**Varian Associates, Instrument Div., 611 Hansen Way, Palo Alto 42, Calif., 10s, 15s, 20s, 25s, Tel: DAvenport 6-4000**
**See ad on page 176**
Vinson Co., E. R., Calif., 25c
West Instrument Corp., Ill., 15s
Western Union Telegraph Co., The, N.Y., 10s, 20s, 25s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 10s, 20s, 25s, Tel: JUdson 2-3030**
**See ad on page 704**
Westronics, Inc., Tex., 15c, 20c, 30c

**Grid dip meters:**
See class 14

**Ground control approach equipment:** See class 1

**Guidance equipment, inertial:**
See class 1

**Gyro testers:**
See class 14

**Gyroscopes:**
See class 4

**Headphones:**
See class 56

**Humidity indicators:**
See class 58

**Humidity testers:**
See class 14

**Impedance meters:**
See class 28

**Inertial guidance equipment:**
See class 1

## 17. Infrared Equipment.

5. Amplifiers
10. Black body sources
15. Detectors
20. Lenses
25. Optical transmitting materials
30. Optical filters
35. Power supplies
40. Pyrometers
45. Radiometers
50. Windows

AC Spark Plug, The Electronics Div. of General Motors, Wis., 5c, 20c, 35c, 45c
ACF Electronics Div., ACF Industries, Inc., Md., 15c
Aerolux Light Corp., N.Y., 10c
Aeronutronic, Div. Ford Motor Co., Calif., 5c, 15c
Aircraft Electronics, Ariz., 5c, 35c
American Development Electronics Co., N.J., 5c
**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 5c, Tel: DUnkirk 5-7401**
**See ad on page 164**
American Research & Mfg. Corp., Md., 35s

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Kodak optical and detection elements for infrared systems

**Kodak Irtran Optical Material**



800°C doesn't blind it.

This is a new development in infrared-transmitting materials for the 1- to 8μ region, with the following characteristics:

- transmission in structurally adequate thickness of more than 90% of impinging energy from 3 to 6 microns
- excellent resistance to severe heating, thermal shock, weathering, humidity, and abrasion
- retention of high transmittance at 800°C and beyond, to counter the "hot window" problem
- low waste of energy by reflection
- useful microwave properties in several frequency ranges.

Kodak Irtran Optical Material is readily ground and polished into lenses, domes, prisms, and flats.

Interference filters can be produced on Kodak Irtran substrates.

**Kodak Far Infrared Filters**

They transmit to 30μ in the far infrared.

At the short wavelength they are supplied with standard cut-ons between 1 and 5μ in 0.5μ steps. (The cut-on point is defined as the wavelength at which transmission reaches 3%.)

The filters are made by applying a suitable coating to both sides of a silver chloride substrate. Because silver chloride is hygroscopic, it is often desirable to mount the filters in plastic to prevent saline corrosion. Most plastics serve the purpose. Or, the filters may be ordered with a polystyrene coating which both reduces corrosion and protects the coating from abrasion.

Kodak Far Infrared Filters are available in standard sizes, round and square, from 1" x 1", or 1" diameter to 5" x 5" or 5" diameter. Non-standard sizes are available on special order.

**Kodak Ektron Detectors**

They can be made very tiny and in complex arrays.

These semi-conductive resistors consist of lead sulfide or lead selenide deposited on glass.

Fitted with leads, they are available either unmounted, mounted in pronged housings, or embedded in infrared-collecting lenses. Photosensitive area may be of any size or shape. Kodak Ektron Detectors provide the following unique combination of characteristics:

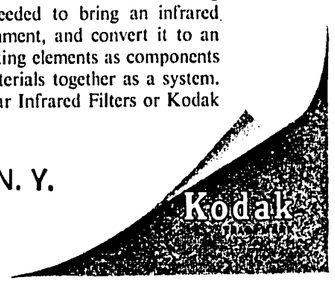
- Wide spectral response • high signal-to-noise ratio in the infrared • over-all ruggedness and insensitivity to vibration • availability in very small size and in complex, precise arrays and mosaics.

Order of response of Kodak Ektron Detectors to tungsten illumination approximates emissive-type phototubes of same sensitive area. Sensitivity peaks at about 2.2μ in the infrared. Various kinds have time constants from 10 to 1000 microseconds, some with appreciable sensitivity to 5μ when cooled.

Whether you are concerned with an exotic guidance system or a commercial heat-sensing and actuating mechanism, Kodak can furnish everything needed to bring an infrared signal into a system, to separate the signal from its environment, and convert it to an electrical impulse. We will be glad to work with you in selecting elements as components of a system. In addition, we have the capability to put the materials together as a system.

For further information on Kodak Irtran Optics, Kodak Far Infrared Filters or Kodak Ektron Detectors, write Special Products Sales,

**EASTMAN KODAK COMPANY,** Rochester 4, N. Y.









# Directory I. Complete Equipment

## 17. Infrared Equipment.

**Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 50c, Tel: EDgewood 4-8770**
**See ad on page 379**
Atlantic Research Corp., Va., 20c
Bache & Co., Semon, N.Y., 20sc, 30s, 50s
**Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 5c, 15c, 20c, 30c, 50c, Tel: UNiversity 4-7420**
**See ad on page 280**
Barnes Engineering Co., Conn., 5c, 10s, 15s, 20c, 25c, 35c, 40s, 45s, 50c
Bausch & Lomb Incorporated, N.Y., 20sc, 25sc, 30sc
Bendix Corp., The, Bendix-Pacific Div., Calif., 5c
Block Associates, Inc., Mass., 5sc, 10c, 15c, 20c, 25c, 30c, 35sc, 40c, 45sc, 50c
Bright Radio Labs., Inc., N.Y., 5c, 35c
Bristol Co., Conn., 15c, 40c
Budd Electronics, Inc., N.Y., 5c, 15c, 35c
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 5c, 15sc
Camera Equipment Co., Inc., N.Y., 20c
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 35c
Cathodeon, Ltd., Meadowcroft Labs., England, 15c
Cetron Electronic Corp., Ill., 15sc
Chicago Aerial Industries, Inc., Ill., 15c, 20c, 25c, 30c
Cleveland Metal Specialties Co., Ohio, 5c
Coils-Electronics Co., Pa., 5sc, 15sc
Community Engineering Corp., Pa., 5c
Connecticut Instrument Corp., Conn., 25c, 50c
Consolidated Electrodynamics Corp., Calif., 20s
Cook Technological Center, Div. Cook Electric Co., Ill., 15c
Cooper Development Div., The Marquardt Corp., Calif., 10c
Crosley Division, Avco Corp., Ohio, 15s, Scanners s
Davidson Optronics, Inc., Calif., 20c, 25c, 50c
Daystrom, Inc., Weston Instrument Div., N.J., 40sc
Decker Corporation, The, Pa., 25c
**Del Electronics Corp., Dept. RE, 521 Homestead Ave., Mount Vernon, N.Y., 35sc, Tel: OWens 9-2000**
**See ads on pages 282, 481, 567**
Dell Optics Co., Ltd., N.J., 20c, 25c, 30c
Designers For Industry, Inc., Ohio, 5c, 15c, 35c
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 15c
Direct T/V Replacements, Ltd., England 5c
Djordjevic Engineering Co., Djeco Div., Ill., 5c, 35c
E.M.I. Electronics, Ltd., England, 15s
**Eastman Kodak Co., 343 State St., Rochester 4, N.Y., 15sc, 20c, 25sc, 30c, 50c, Tel: LOcust 2-6000**
**See ad on page 300**
Edmund Scientific Co., N.J., 15s, 20s, 30s, 35s
Elcon Lab., Inc., Mass., 30c, 40c, 45c
Electro Instruments, Inc., Calif., 5s
Electro Radiation, Inc., Calif., 15c
**Electron Arc Div., Ionics, Inc., 244 Broad St., Lynn, Mass., 5c, 35c, Tel: LY 8-2100**
**See ad on page 485**
Electronic Communications, Inc., Fla., 5c, 35c
Electronic Specialty Co., Calif., 5c, 35c
Electronica Industrial, Ltda., Brazil, 10sc
Electronics Corp. of America, Mass., 15sc, 40s
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 20sc, 25sc, 30sc, Tel: BIgelow 2-2700**
**See ad on page 170**
Eppley Laboratory, Inc., The, R.I., 15s, 45sc
Fairfield Engineering Corp., Conn., 35c
Farwest Mfg. Div., Inc., Wash., 5c, 10c, 35c
Fecker Division, J. W., American Optical Co., Pa., 5c, 20sc, 30sc, 35c, 40c, 50c
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 15s, Tel: CHerry 6-2811**
**See ads on pages 267, 354, 423, 457, 525, 620**
**Filmohm Corp., 48 W. 25th St., New York 10, N.Y., 15c, 30c, Tel: WAtkins 4-6605**
**See ad on page 525**
Fish-Schurman Corp., N.Y., 25sc, 30s
Fluke Manufacturing Co., Inc., John, Wash., 35s
Franklin Fibre-Lamitex Corp., N.Y., 50c
Garrett Corp., The, Calif., Detector Coolers c
General Electric Co., Apparatus Sales Div., N.Y., 35sc, 40s
Good Electronic Corp., Fla., 5c, 30c
Hallicrafters Co., The, Ill., 5c, 35c
Hamilton Standard Div., United Aircraft Corp., Conn., 5c
Hamner Electronics Co., Inc., N.J., 35sc
Hanson-Gorrill-Brian, Inc., N.Y., 40s
**Hughes Aircraft Co., Hughes Semiconductor Div., P.O. Box 278, Newport Beach, Calif., 20c, 30c, Tel: LIberty 8-0671**
**See ads on pages 188, 538**
Hughes Aircraft Co., Santa Barbara Research Center, Calif., 5s, 10s, 15s, 25c, 45s, 50c, Coolers s
Hycon Mfg. Co., Calif., 15c
Ilex Optical Co., N.Y., 20c, 25c
Infrared Industries, Inc., Mass., 5sc, 10sc, 15sc, 30sc, 35sc, 40c, 45c
Instrument Development Laboratories, Inc., Mass., 40c
Intelex Systems, Inc., N.Y., 30sc, 50sc
International Electronics Corp., Mullard Products, N.Y., 15s
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 25c, 30c, 35c, 45c
Isomet Corp., N.J., 20c, 25s, 50s
Itek Corp., Mass., 15c, 20c, 25c, 30c, 50c
**J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 24, 46, Tel: STate 7-5825**
**See ads on pages 460, 546, 550**
Kaiser Electronics, Inc., N.J., 35c
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 15c
Keller, Jr., Hugo P., N.Y., 25s
Kidde & Co., Inc., Walter, N.J., 5c, 15c, Coolers c
Knapic Electro-Physics, Inc., Calif., 20c
Lear, Inc., Calif., 5c, 15c
**Leesona Corp., P.O. Box 1605, Providence 1, R.I., 5c, 15c, 35c, Tel: WIlliams 1-5200**
**See ad on page 674**
Levinthal Electronic Products, Inc., Calif., 35c
Librascope Div., General Precision, Inc., Calif., 15c, 30c
Lignes Telegraphiques et Telephoniques, France, 15s, 40s
**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 35sc, Tel: CYpress 2-6610**
**See ads on pages 252, 364, 418**
Marstan Electronics Corp., N.Y., 5s, 15c
Martin Co., The, Md., 5c, 10c, 15c, 40c, 45c
Mason Instrument Co., N.Y., 5c, 15sc, 40c, 45c
Meller Co., Adolf, R.I., 20c, 25sc, 50sc
Metavac, Inc., N.Y., 30
Micro Systems, Inc., Calif., 15c
Microwave Chemicals Laboratory, Inc., N.Y., 25
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 5s, 40s
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 15c
Minneapolis-Honeywell Regulator Co., Semiconductor Prods. Div., Minn., 15c
Montek Associates, Inc., Utah, 5c, 35c
Motorola, Inc., Military Electronics Div., Ariz., 25c
National Standard Electronics, Inc., N.Y., 15c
Network Industries, Inc., N.J., 35c
Networks Electronic Corp., Calif., 5s, 10s, 15s, 35s
New London Instrument Co., Conn., 35s
Nippon Electric Co., Ltd., Japan, 15c, 40s
Northern Electronic & Vacuum Industries, Canada, 15c
Optical Coating Laboratory, Inc., Calif., 30c
Osborne Electronics Sales Corp., Ore., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c
Otis Elevator Co., Defense & Industrial Div., N.Y., 50c
PEK Labs., Inc., Calif., 10c, 50c
Patterson Moos Research, Div. Leesona Corp., N.Y., 5c, 15c, 35c
**Peschel Electronics, Inc., Towners, R.F.D. #1, Patterson, N.Y., 35c, Tel: TRinity 8-3251**
**See ad on page 289**
Philco Corporation, Pa., 5c, 15sc, 35c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## 17. Infrared Equipment.

Philco Corporation, Govt. & Industrial Group, Pa., 5sc, 15sc
Philips Electronics Industries Ltd., Canada, 15s
Phoenix Precision Instrument Co., Inc., Pa., 5c, 15c, 20c, 25c 30c, 35c, 50c
Photobell Co., Inc., N.Y., 15sc
Plastics & Electronics Corp., N.Y., 15sc
Polacoat, Inc., Ohio, 25c, 30c
**Power Designs, Inc., 1700 Shames Dr., Westbury, L.I., N.Y., 35c, Tel: EDgewood 3-6200**
**See ad on page 486**
Precise Electronics & Development Corp., N.Y., 5c, 35sc
**Precise Measurements Co., Millbrook Lane, P.O. Box 172, Flemington, N.J., 35sc, Tel: STate 2-3000**
**See ad on page 488**
Precision Lapping Co., Inc., N.Y., 20c, 30c, 50c
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 15c, 35c
Q.O.S. Corp., N.Y., Viewers s
Radiation Electronics Co., Ill., 5s, 10s, 15s, 25s, 30s, 40s, 45s, 50s
Radio Corp. of America, Astro-Electronic Products Div., N.J., 15c
Radio Corp. of America, Defense Electronic Products, N.J., 5c, 15c, 30c, 50c
Raytheon Co., Equipment Div., Mass., 5c, 15c, 20c, 30c, 35c, 45c, 50c
Raytheon Co., Microwave & Power Tube Div., Mass., 15sc
Republic Electronic Industries Corp., N.Y., 35c
Republic Lens Co., Inc., N.Y., 20c, 25c, 30c, 50c
Resitron Laboratories, Inc., Calif., 50c
Reuter-Stokes Electronic Components, Inc., Ohio, 15c, 50c
Ruge Associates, Inc., Arthur C., N.H., 45sc
Semi-Elements, Inc., Pa., 20c, 25sc, 30c, 50c
**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 15c, Tel: CRestview 4-8542**
**See ad on page 507**
Servo Corp. of America, N.Y., 10s, 15s, 20s, 25s, 40s, 50s
Sillcocks-Miller Co., The, N.Y., 50c
Sinclair Radio Labs., Inc., N.Y., 40sc
Singer Mfg. Co., The, Conn., 25
Solar Systems, Inc., Ill., 15c
Southwestern Industrial Electronics Co., Tex., 35c
Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., N.Y., 5c, 35c, 40c
Spectracoat, Inc., Calif., 20c, 30c, 50c
Standard Telephones & Cables Ltd., England, 30s
Stereatronics, Inc., Mass., 5c, 35c
Sylvania Electric Products Inc., Chemical & Metallurgical Div., Pa., 20c
TRG, Incorporated, N.Y., 5c, 15c
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 35c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 15sc, 20c, 25c, 30c, 45c, 50c
Thompson Ramo Wooldridge Inc., Calif., 15c, 20c, 30c, 50c
Transistor Specialties, Inc., N.Y., 35s
Transval Electronics Corp., Calif., 35c
United Aircraft Corp., Norden Div., Conn., 5s
U. S. Science Corp., Calif., 5c
U. S. Semiconductor Products, Div. United Industrial Corp., Ariz., 15c, 20c, 25c, 50c
U. S. Stoneware Co., Alite Div., Ohio, 15c, 50c
Valor Instruments, Inc., Calif., 35sc
Valpey Crystal Corp., Mass., 20sc, 50sc
Varo Mfg. Co., Inc., Tex., 35sc
West Instrument Corp., Ill., 40s
Westinghouse Electric Corp., Air Arm Div., Md., 5s, 15s, 25s, 45s
**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 15s, Tel: REgent 9-3611**
**See ad on page 580**
Westinghouse Electric Corp., Semiconductor Dept., Pa., 15sc
Wickes Engineering & Construction Co., N.J., 35c
Wollensak Optical Co., N.Y., 20c, 25c, 50c
Zenith Optical Laboratory, N.Y., 20c, 30c, 50c

**Instrument panels:**
**See class 84**

**Insulating materials:**
**See class 93**

**Insulation testers:**
**See class 14**

**Integrators, pulse count:**
**See class 24**

**Inter-coms:**
**See class 32**

**Intermodulation meters:**
**See class 3**

**Ionization chambers & gages:**
**See class 24**

**Isotopes:**
**See class 24**

**Keyers, frequency shift:**
**See class 35**

**Klystrons:**
**See class 79**

**Lenses, television camera:**
**See class 34**

**Lighting equipment, studio:**
**See class 34**

**Lighting equipment, tower:**
**See class 39**

**Loudspeakers:**
**See class 56**

**Magnetic clutches:**
**See class 30**

**Magnetic recorders:**
**See class 29**

**Magnetic recording accessories:**
**See class 65**

**Magnetizers:**
**See class 96**

**Magnetrons:**
**See class 79**

## 18. Marine Equipment.

**5. Direction finders 10. Radiotelephones 15. Shipborne communications equip. 20. Sonar**

AC Spark Plug, The Electronics Div. of General Motors, Wis., 5c
**Acton Labs., Inc., 500-B Main St., Acton, Mass., 15s, Tel: COlonial 3-7756**
**See ad on page 346**
American Development Electronics Co., N.J., 10c
Applied Electronics Co., Subsid. Raytheon Co., Calif., 5s, 10s, 15s, 20s
Atlantic Research Corp., Va., 20sc
Bendix Corp., The, Bendix-Pacific Div., Calif., 5c, 10c, 15sc, 20c
Bendix Corp., The, Bendix Systems Div., Mich., 5c
Budd Electronics, Inc., N.Y., 15c
Bunnell & Co., J. H., N.Y., 10c, 15c
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 20c
Cadre Industries Corp., N.Y., 5c, 10sc
Canadian Marconi Co., Canada, 5s, 10s, 15s
Canadian Westinghouse Co., Ltd., Canada, 15c, 20c
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 15c, 20c
Chesapeake Instrument Corp., Md., 20sc
Chisholm Industries Ltd., Canada, 10sc, 15sc
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 15s, Tel: OAKwood 7-6800**
**See ad on page 308**
Clipper Gear & Machine Co., Mich., 5c
Co Engineering Co., N.J., 5c
Collins Radio Co., Iowa, 15sc
Collins Radio Co., Central Sales Office, Tex., 5c, 10sc, 15sc
Continental Electronics Corp., N.Y., 10c, 15c
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 5sc, Tel: HAmilton 7-7961**
**See ad on page 440**
Cook Electric Co., Ill., 20c
Cook Technological Center, Div. Cook Electric Co., Ill., 20c
Cosmic, Inc., D.C., 5s, 10s, 15s
Crosley Division, Avco Corp., Ohio, 5s, 20s
Dalmo Victor Co., Div. of Textron, Inc., Calif., 20c







# Directory I. Complete Equipment

## 18. Marine Equipment.

Davis Electronics, Inc., Calif., 5s, 20s
Devol Research Corp., Conn., 5s, 10s
Dicon Corporation, N.Y., 5c, 10c, 15c, 20c
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 15c, 20c, Tel: HAlifax 6-7491**
**See ad on page 400**
E.M.I.-Cossor Electronics, Ltd., Canada, 5c, 20c
Edo Corp., N.Y., 20s
Electric Specialty Co., Conn., 20c
Electro-Voice, Inc., Mich., 15s, 20s
Electronet Div., Rue Prods., Calif., 10c, 15c
Electronic Applications, Inc., Conn., 15s
Electronic Research Associates, Inc., N.J., 20s
Elliott-Automation Limited, England, 5s
Erdco Engineering Corp., Ill., 15c
Executone, Inc., N.Y., 15s
Federal Manufacturing & Engineering Corp., N.Y., 5c, 15c
Fisher Research Lab., Inc., Calif., 5c, 10c, 15c
General Electric Co., Communication Products Dept., Va., 10c
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 15c, 20c, Tel: GRanite 6-4411**
**See ads on pages 263, 267, 435, 437, 501, 621**
General Electric Co., Ordnance Dept., Mass., 5s
General Electric Co. Ltd. of England, The, Telephone Works, England, 15s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 20c
Giannini Controls Corp., Calif., 20c
Gray Radio Co., Inc., Fla., 10s
Gulton Industries, Inc., N.J., 20sc
Hallett Mfg. Co., Calif., 10s
Hallicrafters Co., The, Ill., 10c, 15c
Harris Transducer Corp., The, Conn., 20sc
Harrison Electrosonics, Inc., B. M., Mass., 20sc
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 15c, 20c
Heath Co., Subsid. Daystrom, Inc., Mich., 5s, 20s
Henschel Corp., Mass., 15c
Hoffman Electronics Corp., Calif., 15sc, 20sc
Hoover Electronics Co., Md., 5c
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c, 15c, 20c
International Telephone & Telegraph Corp., ITT Laboratories, Calif., 5c, 20c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 15c, 20c
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c
Kaar Engineering Corp., Calif., 5s, 10s, 15s
**LEL, Inc., 75 Akron St., Copiague, N.Y., 10c, Tel: AMityville 4-2200**
**See ad on page 365**
Lear, Inc., Calif., 5c, 15c, 20c
Litton Industries, Maryland Div., Md., 5, 15
Lockheed Electronics Co., Stavid Division, N.J., 20c
MB Electronics, Div. Textron Electronics, Inc., Conn., 20s
Madigan Electronic Corp., N.Y., 15c
Maico Electronics, Inc., Minn., 15c, 20c
Mallory & Co., Inc., P. R., Ind., 5c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s, 15s
Marine Electric Corp., N.Y., 15sc
Marine View Electronics, N.Y., 15c
Massa Division, Cohu Electronics, Inc., Mass., 20c
McKiernan-Terry Corp., N.J., 20c
Minicord Corp. of America, N.J., 5s, 10s, 15s
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 20c
Motorola Aviation Electronics, Inc., Calif., 5c
Motorola, Inc., Military Electronics Div., Ariz., 5c, 15c, 20c
Multi Products Co., Mich., 10s, 20s
Munzig International, Inc., Calif., 20s
National Company, Inc., Mass., 5c, 10c, 15c
**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 5, Tel: NOrmandie 5-4800**
**See ad on page 614**
Nippon Electric Co., Ltd., Japan, 10c, 15c, 20s
North Electric Co., Ohio, 15c
**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 15s, Tel: WAtkins 9-9117**
**See ad on pages 36-39**
Nuclear Electronics Corp., Pa., 10c, 15c
Olympic Radio & Television, Div. Siegler Corp., N.Y., 5c
Ortronix, Inc., Fla., 15c
Pacific Mercury Electronics, Thomas Organ Co., Calif., 10s, 20s
Pam Associates, Inc., Md., 20c
Pearce-Simpson, Inc., Fla., 5c, 10sc, 15sc, 20sc
Peer, Incorporated, Texas, 10c, 15c, 20c
Philco Corporation, Govt. & Industrial Group, Pa., 15c, 20c
Philips Electronics Industries Ltd., Canada, 10s
Philmore Mfg. Co., Inc., N.Y., 5s
**Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 5c, 15c, Tel: EXeter 2-4500**
**See ad on pages 107-108**
Powertron Ultrasonics Corp., N.Y., 20c
Precise Electronics & Development Corp., N.Y., 5c, 15c, 20c
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 5c, 15c
Pye Telecommunications Ltd., England, 10s, 15s
RCA Victor Co., Ltd., Canada, 5s, 10s, 15s, 20s
Radio Corp. of America, N.J., 5s, 10s, 15s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10sc, 15sc, 20c
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, 15c, Tel: EVergreen 8-6000**
**See ad on page 506**
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 5s, 10s, 20s
Raytheon Co., Equipment Div., Mass., 20c
Remler Co., Calif., 15sc
Rowe Industries, Ohio, 10s, 15s
Savoy Electronics, Inc., Fla., 10c
Schaevitz Engineering, N.J., 5c
Secode Corp., Calif., 10c
Servo Corp. of America, N.Y., 5s
Simmonds Precision Products, Inc., N.Y., 5c
Sinclair Radio Labs., Inc., N.Y., 15sc
Skiatron Electronics & Television Corp., N.Y., 5c
Sorensen Industrial Electronic Co., N.J., 5c, 20c
Southwestern Industrial Electronics Co., Tex., 15c
Special Instruments Laboratory, Inc., Tenn., 20c
Specialty Electronics Development Corp., N.Y., 5c, 15c
Sperry Gyroscope Co. of Canada Ltd., Canada, 5c, 20c
Sperry Piedmont Co., Div. Sperry Rand Corp., Va., 5s, 10c, 15s, Gyrocompasses c, Loran c
Spilsbury & Tindall Ltd., Canada, 10s
Standard Telephones & Cables Ltd., England, 5c, 10c, 15c
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 15c, 20c
Sturrup, Inc., Conn., 15s
Sylvania Electric Products Inc., N.Y., 15c
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 5c, 10c, 15c, 20c
TMC (Canada) Ltd., Canada, 15sc
TRG, Incorporated, N.Y., 20c
Technology Instrument Corp., Mass., 10s
Telecomputing Corp., Calif., 15c
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5sc, 15c, Tel: YE 2-8600**
**See ad on page 338**
Telephonics Corp., N.Y., 20c
Tensor Electric Development Co., Inc., N.Y., 15c
Texas Instruments Incorporated, Apparatus Div., Tex., 15c, 20c
Thompson Ramo Wooldridge Inc., Calif., 20c
Topping Electronics Ltd., F. V., Canada, 10c
**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 5c, Tel: ULysses 5-5131**
**See ad on page 438**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## 18. Marine Equipment.

United Aircraft Corp., Norden Div., Conn., 15c
United Shoe Machinery Corp., Mass., 15c
United States Instrument Corp., Va., 15c
U. S. Science Corp., Calif., 5c, 15c, 20c
Vickers, Inc., Electric Products Div., Mo., 20c, Degaussing Systems c
Vinco Electronics Corp., Conn., 5s, 10s
Virginia Electronics Co., Inc., D.C., 10c, 15c
Vocaline Co. of America, Inc., Conn., 10sc, 15c
Webcor, Inc., Electronics Div., Ill., 5c, 20c
Westinghouse Electric Corp., Electronics Div., Md., 15c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 15sc, Tel: JUdson 2-3030**
**See ad on page 704**
Winston Electronics, Div. Jetronic Industries, Inc., Fla., 10s

**Marker generators, microwave: See class 21**

**Marker generators, radio frequency: See class 28**

**Marker generators, television: See class 37**

**Mass spectrometers: See class 14**

## 19. Medical Equipment.

5. Electrocardiographs
10. Diathermy
15. Electronic cauterizing
20. Electroencephalographs
25. Stimulators
30. X-Ray equipment

Allen Electric & Equip. Co., Mich., 5c
American Cystoscope Makers, Inc., N.Y., 10s
**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 25s, Cardio s, Tel: WAlnut 5-8780**
**See ad on page 369**
American Geloso Electronics, Inc., N.Y., 5s
**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 5c, 20c, Tel: LIberty 9-1500**
**See ad on page 353**
Applied Radiation Corp., Calif., 30c
Atronic Products, Inc., Pa., 25s
**Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 30s, Tel: UNiversity 4-7420**
**See ad on page 280**
Beattie-Coleman, Inc., Calif., 30sc
Berman Laboratories, N.Y., Metal Detectors sc
Biophysical Electronics, Inc., Pa., 25c, Systolic Monitors s
Black Light Eastern Corp., N.Y., Ultra-Violet c
Bracke-Seib X-Ray Co., Inc., N.Y., 30c
Burke Electric & X-Ray Co., Ltd., Canada, 30c
Chicago Electronic Div., Land-Air, Inc., Ill., 30sc
Chrono-Log Corp., Pa., 5c
Corbett Science Laboratories, F. W., Calif., 25sc
Cosmic, Inc., D.C., 30s
Dallons Semiconductors, Div. Dallons Laboratories, Inc., Calif., 5sc, 10sc, 20sc, 25sc
Decker Corporation, The, Pa., 5sc
Design Tool Corp., N.Y., 25c
Designers For Industry, Inc., Ohio, 5c
Dicon Corporation, N.Y., 25c
E.M.I. Electronics Ltd., England, Nuclear s
Elcon Laboratory, Inc., Mass., Ultra-Violet c
Electro-Medical Laboratory, Inc., Vt., 20s, 25s
Electrodyne Co., Inc., Mass., 5s, 25s
**Electron Arc Div., Ionics, Inc., 244 Broad St., Lynn, Mass., 30c, Tel: LY 8-2100**
**See ad on page 485**
Electronic Control Corp., Mich., 30s
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 10s, Tel: BIgelow 2-2700**
**See ad on page 170**
Ensco, Inc., Utah, 5c, 20c, 5c
Epsco Worcester, Mass., 5s, 20s
Essential Electronics Corp., Ohio, Medical Oscilloscopes sc
Exact Electronics, Inc., Ore., 25s
Farrall Instrument Co., Neb., 5c, 20c, 25s, Cardiac Equipment c, Tachistoscopes c
Fidelity Amplifier Co., Ill., 25c
Fisher Co., Inc., Oscar, N.Y., 30s
GPL Division, General Precision, Inc., N.Y., Pupillographs sc
Good Electronic Corp., Fla., 5s
Gulton Industries, Inc., N.J., 5sc, Gages, Readouts, etc. sc
Hallicrafters Co., The, Ill., 25c
Hallikainen Instruments, Calif., Heart-Lung c
Harworth Mfg. Co., Calif., Metal Detectors Veterinary s
Hathaway Instruments, Inc., Colo., 5c
High Voltage Engineering Corp., Mass., 30s
Horwitron Electro-Medical Co., Pa., 25s
Iconix, Inc., Calif., Tachistoscopes sc
Industrial Development Labs., Inc., N.J., 5s
Interstate Electronics Corp., Calif., 30c
Jansky & Bailey, Inc., D.C., 5c
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 30c
Kurtston Electronics, N.Y., 25c
**Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 25sc, Tel: GRaceland 7-7900**
**See ad on page 454**
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 30sc
Landsverk Electrometer Co., Calif., 30s
Litton Industries, Electronic Equipments Div., Calif., Biological Telemetry c
Loyola Laboratories, Calif., 20c
MacLeod & Hanopol, Inc., Mass., 25s
Maico Electronics, Inc., Minn., Audiometers c
Medistor Instrument Co., Wash., 5s, 20s
Merit Short Wave Diathermy Co., Calif., 10s
Meter-Makers, Inc., Ill., 25sc
Mooradian High Frequency Labs., N.J., 10s, 15s, 25s, Cardiac Equipment s
Multitone of Canada Ltd., Canada, 25s
Munzig International, Inc., Calif., 5s, 20s
National Standard Electronics, Inc., N.Y., 25c
Nichols Ltd., R. H., Canada, 5c
Offner Electronics, Inc., Ill., 5sc, 20sc, Electromyographs sc
Ortronix, Inc., Fla., 25c
Osborne Electronics Sales Corp., Ore., 5c, 20c, 30c
**PRD Electronics, Inc., Subsidiary of Harris-Intertype Corp., 202 Tillary St., Brooklyn 1, N.Y., 25c, Tel: ULster 2-6800**
**See ad on pages 68-69**
Pacific Technical Co., Calif., 5c, 20c, 25c
Par Products Corp., Calif., 5c
Philips Electronic Instruments, N.Y., 30s, Nuclear s, Electron Guns s
Philips Electronics Industries Ltd., Canada, 5s, 30s
Plectron Corp., Neb., 25s
Process & Instruments, N.Y., 25c
Ram Meter, Inc., Mich., 25c
Rank Cintel Ltd., England, Particle Counters & Sizers s
Republic Electronic Industries Corp., N.Y., 5c, 20c, 25c
Research Industrial Laboratory of Electronics, Pa., 20c
Resitron Laboratories, Inc., Calif., 30c
Rosemount Engineering Co., Minn., Osmometers c
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 5s, Tel: TWinbrook 4-6300**
**See ad on pages 64-65**
Sorensen Industrial Electronic Co., N.J., 30c
Sorrels-Johnson Corp., Mass., Electro-Magnetic Hypodermics s
Staples-Hoppmann, Inc., Va., 30s
Starling Corp., Calif., 5c, 20c, Heart-Lung c, Digital Recorders c
Teca Corp., N.Y., 25s, Electromyographs s
Thomas Instrument Co., N.Y., 30c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 20c
Topper Mfg. Co., Inc., N.Y., 20sc
Tracerlab, Inc., Mass., 30sc, Nuclear Instruments sc
Turner Associates, G. K., Calif., Fluorometers s
Ultra Violet Products, Inc., Calif., Ultra-Violet sc
United States Radium Corp., N.J., 30c
U. S. Recording Co., D.C., Audiometers c
**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 30c, Tel: DAvenport 6-4000**
**See ad on pages 116-117**
Western Coil & Electrical Co., Wis., 10c





# Directory I. Complete Equipment

**Megaphones, power: See class 32**

**Megohmmeters: See class 14**

**Memory devices for computers: See class 9**

**Meter panels: See class 84**

**Meters (indicating instruments): See class 58**

**Micro-ammeters: See class 58**

**Microphones & stands: See class 59**

**Microphones, geophysical: See class 15**

**Microwave amplifiers: See class 38**

**Microwave antennas: See class 39**

**Microwave attenuators: See class 40**

## 20. Microwave Communications.

5. Receivers
10. Relay equipment
15. Transmitters

ACF Electronics Div., ACF Industries, Inc., Md., 5sc, 15sc
A.R.F. Products, Inc., Ill., 5c
Adler Electronics, Inc., N.Y., 5sc, 10sc, 15sc
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 5s, 10c, 15c
Airtron, Inc., Div. Litton Industries, Inc., N.J., 5c, 10c, 15c
Alto Scientific Co., Inc., Calif., 5sc
Amerac, Inc., Mass., 15sc
Ansco Division, General Aniline & Film Corp., N.Y., 10c
Antlab, Inc., Ohio, 5s
Applied Technology, Inc., Calif., 5c
Automation Dynamics Corp., N.J., 5c, 15c
Baldwin Piano Co., The, Industrial Products Div., Ohio, 5c, 10c, 15c
Bell Aircraft Corp., Avionics Div., N.Y., 5c, 10c, 15c
Bendix Corp., The, Bendix-Pacific Div., Calif., 5c, 15c
Budd Electronics, Inc., N.Y., 5c, 10c, 15c
Budelman Electronics Corp., Conn., 5s, 10s, 15s
Canadian Marconi Co., Canada, 5s, 10s, 15s
Canadian Westinghouse Co., Ltd., Canada, 5c, 10c, 15c
Canoga Division, Calif., 5s
Capehart Corp., N.Y., 5c, 10c, 15c
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, 15s, Tel: OAkwood 7-6800**
**See ad on page 308**
Clipper Gear & Machine Co., Mich., 5c, 10c, 15c
Collins Radio Co., Iowa, 5s, 10sc, 15s
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s
Collins Radio Co., Texas Division, Tex., 5s, 10s, 15s
**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 10c, Tel: EVergreen 1-1135**
**See ad on page 156**
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 5c, 10c, 15c, Tel: HAmilton 7-7961**
**See ad on page 440**
Cook Technological Center, Div. Cook Electric Co., Ill., 5c, 10c, 15c
Cosmic, Inc., D.C., 5s, 10s, 15s
Crosley Division, Ohio, 5s, 15s
Dayton Electronic Prods. Co., Ohio, 5c
Designers For Industry, Inc., Ohio, 5c, 10c, 15c
Dicon Corporation, N.Y., 5c, 10c, 15c
Dynamics Corp. of America, N.Y., 5c, 15c
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, 15c, Tel: HAlifax 6-7491**
**See ad on page 400**
E.M.I.-Cossor Electronics, Ltd., Canada, 5c, 10c, 15c
E.M.I. Electronics Ltd., England, 5s, 10s, 15s
Electronic Applications, Inc., Conn., 5s, 10s, 15s
Electronic Communications, Inc., Fla., 5c, 15c
Electronic Specialty Co., Calif., 10sc
Electronic Systems, Mich., 10s
Elliott-Automation Limited, England, 5sc, 10sc, 15sc
**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 5sc, Tel: VIctor 2-8400**
**See ads on pages 307, 309, 313, 315, 379, 584**
Engineering Associates, Ohio, 5c, 15c
**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 5c, 10c, 15c, Tel: RAvenswood 1-9000**
**See ad on pages 125-128**
Farinon Electric Co., Calif., 5sc, 10sc, 15sc
Federal Manufacturing & Engineering Corp., N.Y., 5c, 10c, 15c
**General Communication Co., 677 Beacon St., Boston 15, Mass., 10sc, Tel: COpley 7-6030**
**See ad on page 331**
General Devices, Inc., N.J., 15c
General Electric Co., Communication Products Dept., Va., 5sc, 10sc, 15sc
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 5c, Tel: GRanite 6-4411**
**See ads on pages 263, 267, 435, 437, 501, 621**
General Electric Co., Light Military Electronics Dept., N.Y., 5c
General Electric Co. Ltd. of England, Telephone Works, England, 5s, 10s, 15s
General Electronic Laboratories, Inc., Mass., 5sc, 10sc, 15sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c
Gorham Electronics, R.I., 10c, 15c
Granger Associates, Calif., 5c, 15c
Hallicrafters Co., The, Ill., 5c, 10c, 15c
Intelex Systems, Inc., N.Y., 5s, 10s, 15s
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5s, 10s, 15s
International Telephone & Telegraph Corp., ITT Laboratories, Calif., 5c, 10c, 15c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c

**L. LEVINTHAL ELECTRONIC PRODUCTS**
Subsidiary of Radiation Incorporated

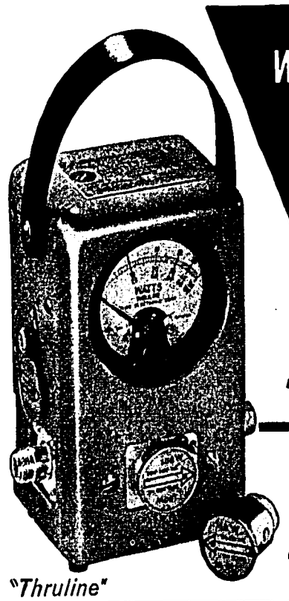
Levinthal designs and builds troposcatter communications systems in all sizes and frequency ranges.

One example of such a system is an $800,000 project including four troposcatter power amplifiers for Page Communications Engineers. These are part of a 500-mile link between England and Spain for the U. S. Air Force.

**FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL**
**BURLINGAME ASSOCIATES**
MOUNT VERNON, N.Y. • MOunt Vernon 4-7530
WALTHAM .....TWinbrook 4-1955
SYRACUSE ..... GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400
For details, circle #227 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# when rf power must be absorbed or accurately measured...



"Thruline"

50 OHM NOMINAL

**NEW** 2-30 mc plug-in elements usable with new or existing Model 43 Wattmeters

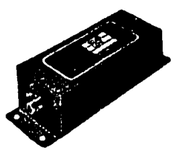
You will find dependable coaxial line instruments and accessories at Bird Electronic. Specialization in this field, backed by a constantly growing engineering staff and enlarged physical facilities, has resulted in the continuous development of new designs to meet specific requirements. If you are searching for more than a standard product for field or laboratory use, turn to Bird Electronic. Our years of experience in this field may assist you in the solution of your problem.

## DIRECTIONAL RF WATTMETERS

Direct reading . . . "thru" type . . . for measuring forward or reflected power in complete systems under operating conditions . . . inserted between transmitter and antenna or load . . . full scale power and frequency range determined by plug-in elements.

| Model | Line | Impedance | Frequency ELEMENTS Power | | Connector |
|---|---|---|---|---|---|
| 43 | RG-8/U etc. | 50 ohms | 25-60; 50-125 100-250; 250-500; 400-1000 mc | 10; 25; 50; 100; 250; 500 W | N; C; HN; UHF |
| 4712 | 1⅝ | 50 ohms | 200-500 400-1000 mc | .5; 1.0; 1.5; 2.5; 5.0 KW | Rlma Std. |
| 460 | 3⅛ | 50 ohms | 200-500 mc | 1; 2.5; 5; 10 | Flange |
| 480 | 3⅛ | 51.5 ohms | 400-1000 mc | 25; 50 KW | Sleeve Bullet |
| 490 | 6⅛ | 51.5 ohms | 200-500 mc | 25; 50 and 100 KW | |

## COAXIAL RF FILTERS



Designs utilize both distributed and lumped constant . . . insertion loss and VSWR are very low in pass band . . . high attenuation in stop band . . . new miniature filters as light as 5 ounces. Will produce in quantity to your specs.

| | Low Pass | Low Pass | Low Pass | Low Pass | High Pass | Band Pass |
|---|---|---|---|---|---|---|
| Models | 5310 | 5311 | 522 | 819-1200 | 530 | 5131 |
| Cut Off | 90 mc | 160 mc | 400 mc | 1200 mc | 420 mc | 45 mc & 105 mc |
| Stop Band | 100-180 mc | 180-320 mc | 500-1200 mc | 1900-4000 mc | 100-375 mc | 33.7-39.7 mc 120-1000 mc |
| Max. Power | 100W | 100W | 150W | 3.5KW | 50W | 25W |
| Min. Stop Band Atten. | 55db | 55db | 55db | 40db | 60db | 25db 40db |
| VSWR in p.b. | 1.5 | 1.5 | 1.35 | 2 to 1 | 2.5 | 1.6 |
| Connectors | Female N | | Male-Female N | | | Female BNC |

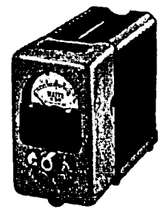
Chart shows characteristics of typical Filters

## "Termaline" RF ABSORPTION WATTMETERS

Portable . . . direct reading . . . non-radiating "load" type wattmeter . . . used in field or laboratory to measure and absorb power . . . accuracy ± 5% of full scale . . . VSWR 1.1 to 1 maximum over operating range.

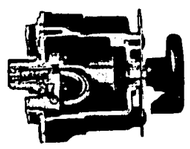
| Model | Freq. Range | Max. Power | Power Range Scales | Input Connector |
|---|---|---|---|---|
| 611 | 30-500 mc | 60W | 0-15; 0-60 | Female N |
| 612 | 30-500 mc | 80W | 0-20; 0-80 | |
| 67 | 30-500 mc | 500W | 0-25; 0-100; 0-500 | Coplanar with Adapter to UG-21/U (optional) RG-17 & RG-19 cable assemblies: adapters to rigid lines |
| 67C* | 30-500 mc | 2500W | 0-100; 0-500; 0-2500 | |
| 824* | 30-220 mc | 5000W | 0-5000 | |

*Water cooled (other available models described in specification sheets)



## COAXIAL SWITCHES

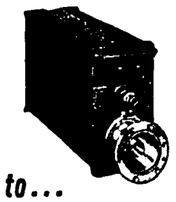
Small compact design permits the "Coaxwitch" selector to be incorporated into many electronic units where repeated channel switching is required. Finger-tip operation: pull knob, rotate and push in to make contact.



| Model | 74 | 71B | 72R | 62-2 |
|---|---|---|---|---|
| Positions | Six | Eight | Reversing Switch | Two |
| Coaxial Circuits | One | One | Two | Two |
| Connector | Type N female connectors are standard on all models to receive UG-21/U series plug. Use adapters with other cables and connectors. | | | |

## "Termaline" RF LOAD RESISTORS

Reflection-free terminations for 50 ohm coaxial lines . . . low VSWR . . . non-radiating . . . water cooled ratings 2500 W to 50 KW . . . air cooled rating to 1500 W.



| Model | Max. Power | Freq. Range | Max.* VSWR | Connector |
|---|---|---|---|---|
| 80 | 5W | 0-1KMC | 1.1 | "N", "C", "BNC" |
| 80A | 20W | 0-500MC | 1.1 | |
| 81 | 50W | 0-1KMC | 1.1 | N Female |
| 81B | 80W | 0-1KMC | 1.1 | |
| 82A | 500W | 0-1KMC | 1.1 | Coplanar with Adapter to UG-21/U |
| 883 | 1.2KW | 0-1KMC | 1.1 | LC |
| 888 | 1.5KW | 0-1KMC | 1.1 | 3⅛ Flanged |

*Other VSWR requirements can usually be met by special selection.

turn to...

BIRD ELECTRONIC CORP.

CHurchill 8-1200

30303 Aurora Road, Cleveland 39, Ohio

*Western Representative:*

VAN GROOS COMPANY, Woodland Hills, Calif.






# Directory I. Complete Equipment

## 20. Microwave Communications.

Jetronic Industries, Inc., Pa., 5c, 15c

Kellogg Switchboard & Supply Co., Ill., 5s, 10s, 15s

Knight Corp., Ewen, Mass., 5c

**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 5s, 10c, 15c, Tel: AMityville 4-2200**

See ad on page 365

Lear, Inc., Calif., 5c, 10c, 15c

Lenkurt Electric Co., Inc., Calif., 5s, 10s, 15s

Levinthal Electronic Products, Inc., Calif., 15c

Lignes Telegraphiques et Telephoniques, France, 5s, 15c

Litton Industries, Maryland Div., Md., 5, 10, 15

Lockheed Electronics Co., Stavid Division, N.J., 5c, 15c

Madigan Electronic Corp., N.Y., 10c

Maico Electronics, Inc., Minn., 5c, 15c

**Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 15c, Tel: DAvis 5-1391**

See ad on pages 96-97

Marconi's Wireless Telegraph Co., Ltd., N.Y., 10s

Martin Co., The, Md., 5c, 15c

Mechanical Products, Inc., Mich., 5sc, 10sc, 15sc

Melabs, Inc., Calif., 5s, 10c, 15c

**Menlo Park Engineering, 711 Hamilton Ave., Menlo Park, Calif., 5sc, Tel: DAvenport 6-9080**

See ad on page 366

Microwave Development Laboratories, Inc., Mass., 5sc, 10sc, 15sc

Missile Systems Corp., Calif., 5s, 10s, 15s

Moore Associates, Inc., Calif., 10sc

Motorola, Inc., Ill., 5s, 10s, 15s

Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c, 15c

Narda Microwave Corp., The, N.Y., 15sc

National Company, Inc., Mass., 5c, 10c, 15c

Nippon Electric Co., Ltd., Japan, 5c, 10s, 15c

Peer, Incorporated, Tex., 5c, 10c, 15c

Philco Corporation, Pa., 5sc, 10sc, 15sc

Philco Corporation, Govt. & Industrial Group, Pa., 5sc, 10sc, 15sc

Philips Electronics Industries Ltd., Canada, 5s, 10s, 15s

**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 5c, 15c, Tel: WEstmore 9-4092**

See ad on page 592

**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 5c, 15c, Tel: WEstmore 9-8900**

See ad on page 383

Production Research Corp., Subsid. Radio Condenser Co., N.Y., 15c

Pye Telecommunications Ltd., England, 5s, 15s

**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 5c, Tel: DAvenport 1-1130**

See ad on page 243

Radio Corp. of America, N.J., 5s, 10s, 15s

Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s

Radio Engineering Laboratories, Inc., N.Y., 5sc, 10sc, 15sc

**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, 15c, Tel: EVergreen 8-6000**

See ad on page 506

Raytheon Co., Commercial Apparatus & Systems Div., Mass., 5s

Raytheon Co., Equipment Div., Mass., 5s, 10s, 15s

Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c

Resdel Engineering Corp., Calif., 15c

Sierra Electronic Corp., Div. Philco Corp., Calif., 15c

Sigma Electronics Research Corp., Wash., 5c, 10c, 15c

Specialty Electronics Development Corp., N.Y., 5c, 10c, 15c

Spectralab Instruments, Calif., 5c, 15c

Sperry Gyroscope Co., Sunnyvale Development Center, Calif., 5c, 15c

Standard Telephones & Cables Ltd., England, 5sc, 10sc, 15sc

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c, 15c

Sylvania Electronic Systems, Div. Sylvania Electric Products Inc., Mass., 5c, 15c

Systems, Inc., Fla., 5c

Telechrome Mfg. Corp., N.Y., 15sc

Telecomputing Corp., Calif., 10c

Telecomtrol Corp., N.J., 5sc, 10sc, 15sc

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 15c, Tel: YE 2-8600**

See ad on page 338

Telerad Mfg. Corp., N.Y., 5sc, 15sc

Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c, 15c

Thompson Ramo Wooldridge Inc., Calif., 5c, 10c, 15c

Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 10c

**Tower Construction Co., 2725 Hawkeye Dr., Sioux City 2, Iowa, 10sc, Tel: 5-7653**

See ad on page 378

United Shoe Machinery Corp., Mass., 5c, 10c, 15c

U. S. Science Corp., Calif., 5c, 15c

Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 15c, Tel: DAvenport 6-4000

See ad on pages 116-117

**Watkins-Johnson Co., 3333 Hillview Ave., Stanford Industrial Park, Palo Alto, Calif., 5c, Tel: DAvenport 6-8830**

See ad on page 236

Wave/Particle Corp., Calif., 5, 10, 15

Webcor, Inc., Electronics Div., Ill., 5c

Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5c, 15c, Tel: JUdson 2-3030

See ad on page 704


Microwave filters:
See class 52

Microwave power supplies:
See class 63

Microwave receivers:
See class 20


## 21. Microwave Test Equipment.

5. Absorption wattmeters
10. Bolometers
15. Calorimeters
20. Frequency meters
25. Marker generators
30. Mixers
35. Noise & field intensity meters
40. Oscillators
45. Power meters
50. Pulse generators
55. Slotted lines & measuring accessories
60. Spectrum analyzers
65. SWR meters
70. Time delay generators
75. Wavemeters

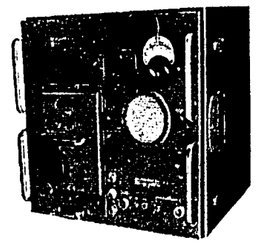
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 20s, 35s, 40s, 45s

**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 5s, 10s, 15c, 30c, 40s, 45s, 50s, 55s, 65s, 75s, Tel: COpley 7-9115**

See ad on page 309

Aircraft Armaments, Inc., Md., 45c, 75c


*When Reliability is a must...*
**specify EMPIRE**



NOISE AND FIELD INTENSITY METER

Model NF-112 • 1 KMC to 10 KMC

Companion unit to NF-105. Four interchangeable tuning heads. Excellent shielding effectiveness. Bandwidth 1 MC and 5 MC. Calibration by means of built-in impulse generator. Compact. Simple to operate.

*Send for our Catalog No. 604*

edp **EMPIRE DEVICES PRODUCTS CORPORATION**

AMSTERDAM, N.Y. Victor 2-8400

MANUFACTURERS OF FIELD INTENSITY METERS
DISTORTION ANALYZERS · IMPULSE GENERATORS
COAXIAL ATTENUATORS · CRYSTAL MIXERS

For details, circle #229 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# SPECIAL INSTRUMENTS

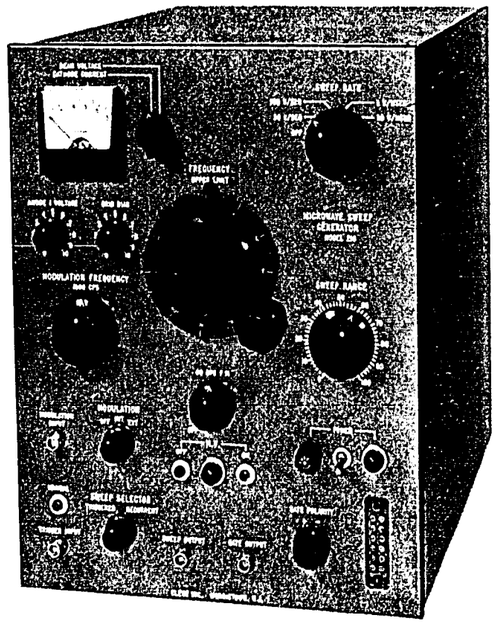
*Made to your Specifications*

**• PULSE GENERATORS, AMPLIFIERS, IMPEDANCE BRIDGES • SWEPT VOLTAGE REGULATED POWER SUPPLIES • VHF TRANSMITTERS and POWER SOURCES • REGULATED POWER SUPPLIES • TEST CONSOLES • FREQUENCY SYNTHESIZERS**

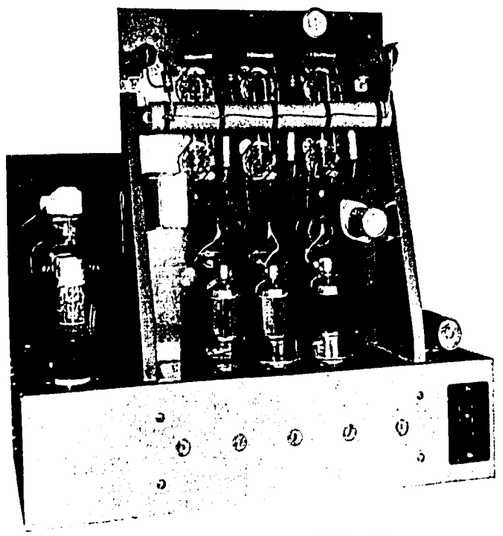
Clegg Laboratories' facilities and engineering staffs are geared to designing, engineering, and manufacturing custom-built instrumentation to your specifications. You get the benefits of low cost—whether you specify a single instrument or production runs—and the fastest possible delivery.



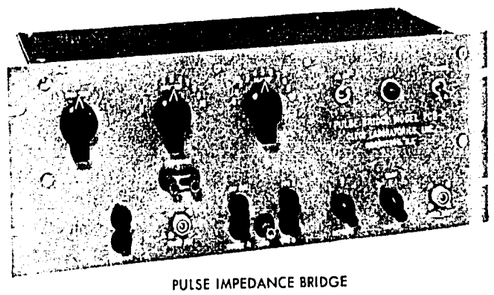
PULSE BURST GENERATOR FOR HIGH LEVEL TWT TEST SET



PRECISION SWEPT POWER SUPPLY
FOR BWO AND BWA APPLICATIONS



MODEL 319 DISTRIBUTED PULSE AMP.
500 V, 150 ohm output—.03 μsec rise time



PULSE IMPEDANCE BRIDGE

*Write or call us today for complete information!*

**Clegg LABORATORIES**
DIVISION OF CLEGG, INC.

Rt. 53 • Mt. Tabor, New Jersey
Phone: OAkwood 7-6800

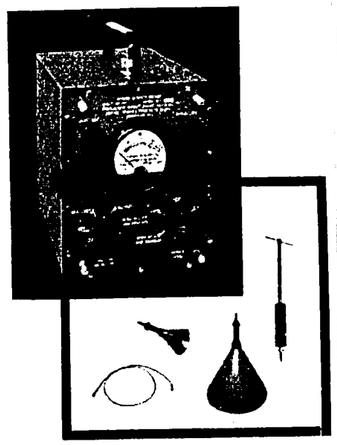


For details, circle #230 on Reader Service Card



# BROADBAND POWER DENSITY METER Model NF-157

*For fast, accurate determination of RF power density and location of areas presenting RF hazards to personnel*



*Description:* A broadband device providing direct reading of RF power densities from 1 mw/cm² to 1000 mw/cm² (mid-scale readings), over the continuous frequency range from 200 to 10,000 MC.

*Features:*

- Direct reading of power density insures immediate awareness of hazardous areas.
- Broad frequency range and high accuracy permit universal application to mapping of high level RF fields from VHF to X-Band.
- Accurate built-in step attenuator provides capability of handling power densities over a dynamic range of 10,000 to 1.
- Three constant-gain calibrated probes permit direct reading in mw/cm² over the continuous frequency range from 200 to 10,000 MC.
- Physical separation of probes from main unit vastly increases flexibility of applications.
- Battery-powered, light-weight design permits complete portability.
- Convenient carrying case simplifies transportation of instrument.
- Efficient shielding prevents stray RF pick-up.
- Conservative design insures resistance to over-load.
- Main unit may be used independently as an accurate, rugged RF power meter over a wide power range.

*Send for our Catalog No. 604*

**edp EMPIRE DEVICES PRODUCTS CORPORATION**

**AMSTERDAM, N. Y. Victor 2-8400**

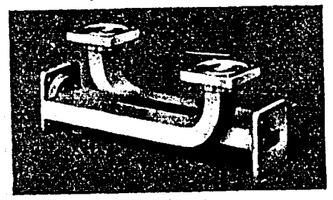
**MANUFACTURERS OF FIELD INTENSITY METERS**
**DISTORTION ANALYZERS • IMPULSE GENERATORS**
**COAXIAL ATTENUATORS • CRYSTAL MIXERS**

For details, circle #231 on Reader Service Card

## MICROWAVE COMPONENTS

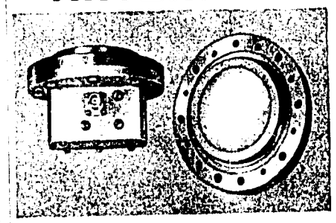
Series and Shunt Tees
Hybrid Tees
Precision Bends
Coax-Waveguide Adapters
Straight Sections
Twists
Tapered Transitions
Waveguide Stands

## MICROWAVE TEST EQUIPMENT



Cross-Guide Couplers
High-directivity Couplers
Crystal Mounts
Bolometer Mounts
Attenuators
Fixed Loads
Sliding Loads
Sliding-screw Tuners
Sliding Shorts
E-H Tuners
Double Stub Tuners
Sliding-line Phase Shifters
Hybrid Phase Shifters
Dielectric Phase Shifters

## ANTENNAS



Missile Beacon Antennas
Missile Telemetering Antennas
Gain Standard Horns
Gain Standard Dipoles
Helix Antennas
Horns

## MICROWAVE INSTRUMENTS

Klystron Supplies
VSWR Amplifier
Power Meter
Crystal Calibrator

**AIRCOM INCORPORATED**

**48 CUMMINGTON ST., BOSTON, MASS.**

For details, circle #232 on Reader Service Card



# Directory I. Complete Equipment

## 21. Microwave Test Equipment.

Airtec, Inc., 139 East 1st Ave., Roselle, N.J., 10s, 20sc, 30sc, 55sc, 65sc, Tel: CHestnut 5-2990
See ad on page 589
Airtron, Inc., Div. Litton Industries, Inc., N.J., 5c, 50c, 55c
Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 55s, Tel: HAncock 6-2150
See ad on page 590
Alfred Electronics, Calif., 40s, 50s
Alto Scientific Co., Inc., Calif., 50c
Amerac Inc., Mass., 20sc, 30sc, 40sc, 45sc, 50sc, 75sc
Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 55c, Tel: EDgewood 4-8770
See ad on page 379
Antlab, Inc., Ohio, 10s
Applied Dynamics Corp., Mass., 25s, 60s, Multi-Phase Gates s
Applied Radiation Corp., Calif., 40c, 50c
Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 60c, Tel: POrt Washington 7-8707
See ad on page 360
Artronic Instrument Co., The, Md., 25c, 50c, 70c
Avionics Ltd., Canada, 30s, 55s, 65s, 75s
BJ Electronics, Borg-Warner Controls, Calif., 40sc, 50sc, 55sc, 65sc
Beckman Instruments, Inc., Berkeley Div., Calif., 20s
Bendix Corp., The, Red Bank Div., Electron Tube Products, State Highway #35, Eatontown, N.J., 40s, Tel: LIberty 2-2000
See ad on page 574
Biddle Co., James G., Pa., 20s, 40s
Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 5sc, 75sc, Tel: CHurchill 8-1200
See ad on page 306
Brocker Laboratories, Calif., 50c
Bruno-New York Industries Corp., N.Y., 10c
Brunswick Instruments, N.J., 45c
Budd Electronics, Inc., N.Y., 40c, 50c
Budd-Stanley Co., Inc., N.Y., 20c, 30c, 55c, 75c
Budelman Electronics Corp., Conn., 20s
Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 50c, 70c, Tel: ORiole 8-3070
See ad on page 479
CGS Laboratories, Inc., Conn., 40s
California Technical Industries, Div. Textron, Inc., Calif., 40, 55, 65, Radome test
Canadian Marconi Co., Canada, 5s, 35s, 40s, 50s, 60s, 75s
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c, 70c, 75c

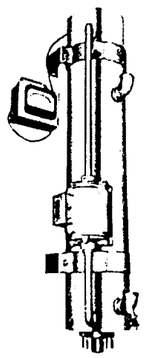
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240

*NEW! HI-POWER COAXIAL*

## CALORIMETRIC POWER METER

**DIRECT READING—5 to 50 KW**

**DC—1000 MC • VSWR less than 1.3**



These power meters are greatly simplified Calorimeters which use water to carry the heat away, for economy of space and cost.

The instrument is fully self-contained, portable, water cooled and requires only connection to the power line and water supply. It does not use any flow meters, thermometers or any other controls. There is only the "ON" and "OFF" switch for the operator to use on the front panel, when a measurement is to be made. A sensitive thermopile and microammeter measure the power dissipated in the R.F. load. The microammeter is calibrated in watts, is direct reading and can be remotely located.

The radio frequency load has a low VSWR between DC to 1000 MC. This feature makes it possible to calibrate this instrument at 60 cps against an accurate laboratory type wattmeter, and then use it at any frequency up to 1000 MC. Thus an accuracy at 2% can be easily accompished. This recalibration is necessary only when measurements are made at extreme temperatures or when wear is suspected.

This calorimeter is particularly recommended for field service where a rugged and yet accurate Power Meter is required for use by unskilled personnel.

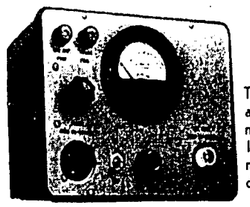
| Model | Power Rating | Connector | Max. VSWR | Water Supply | Price |
|---|---|---|---|---|---|
| CX-5 | 5 KW | 1-5/8" | 1.3 | 1.5 G.P.M. | $1050.00 |
| CX-10 | 10 KW | 3-1/8" | 1.3 | 3 G.P.M. | 1250.00 |
| CX-20 | 20 KW | 3-1/8" | 1.3 | 6 G.P.M. | 2250.00 |
| CX-50 | 50 KW | 6-1/8" | 1.3 | 15 G.P.M. | 4500.00 |

## Average Reading R.F. POWER METERS



These broad band R.F. Power Meters are of the absorption-type consisting of an oil filled, air cooled, coaxial load resistor and a voltmeter calibrated to read watts. The power meter is suitable for use as a field or laboratory test instrument, is completely shielded and non-radiating, permitting transmitter testing and adjustment without interference. The meter box is easily detached, permitting location of the load resistor at a remote point. In cases where power measurements are not required the load resistor may be used as a dummy load. No correction curve is necessary to cover the frequency range. The spurious response usually associated with directional couplers and capacitative voltage dividers is absent in this purely resistive voltage divider. Since this is a resistive voltage divider which has the same voltage division at DC, 60 cycle AC, and at high radio frequencies, this instrument can be calibrated and its calibration can be checked frequently on 60 cycle supply voltages.

| Model | Power Ranges In Watts | Max. Power Dissipation | Price |
|---|---|---|---|
| PM-3 | 60, 150 | 150 watts | $220.00 |
| PM-6 | 1.5, 6 | 10 watts | 95.00 |
| PM-7 | 150, 600 | 600 watts | 285.00 |
| PM-8 | 1.5, 6, 15, 60 | 100 watts | 225.00 |
| PM-9 | 2.5, 10 | 10 watts | 105.00 |
| PM-10 | 15, 60 | 90 watts | 145.00 |
| PM-14 | 25, 100, 500 | 500 watts | 325.00 |
| PM-16 | 150, 600, 1500 | 1500 watts | 375.00 |
| PM-18 | 1.5, 6, 15, 60, 150, 600 | 600 watts | 485.00 |
| PM-19 | 1.5, 6, 60, 150 | 100 watts | 275.00 |



## PEAK READING R.F. POWER METERS

The peak reading power meters listed are designed to accurately measure the peak power of pulsed R.F. signals in the range of .2 to 700 MC with PRF of 800 to 10,000 pps and pulse duration of .5 microseconds or more, and less than specified maximum average power dissipation.

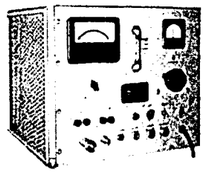
| Model | Peak Range | VSWR | Max. Average Power Dissipation | Connector | Impedance | Supply Voltage | Accuracy | Freq. Range | Price |
|---|---|---|---|---|---|---|---|---|---|
| PM-12 | 0-50kw | 1.15 | 60 watts | Type HN | 51.5 | 115V,60-1600cps | ±10% | .2-700Mc | $350.00 |
| TS-305 | 0-50kw | 1.15 | 50 watts | Type HN | 51.5 | 115V,60-1600cps | ±10% | 220-330Mc | $350.00 |
| PM-13 | 0-100kw | 1.15 | 100 watts | Type HN | 51.5 | 115V,60-1600cps | ±10% | .2-700Mc | $425.00 |

## ELECTRO IMPULSE Laboratory

208 River Street • Red Bank, N.J. • Phone: SHadyside 1-0404

*DIRECT READING*

## CALORIMETER BRIDGE



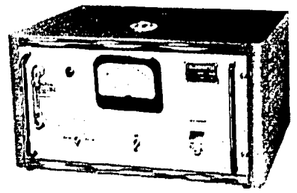
**with Self-Contained Calorimeter Loads, Cooling System & Circulating System.**

This Calorimeter is completely self-contained with its own circulating system, cooling system and the radio frequency dummy load and requires only connection to the regular power line. The R.F. power is read directly on a 4½" meter in watts. A single coaxial dummy load is available to cover the frequency range from DC to 10,000 Mc and for the power range from 1 to 1000 watts. The overall accuracy of this Calorimeter is 3%. However, this accuracy can be improved greatly by calibrating the Calorimeter by means of an external laboratory-type wattmeter.

| Model | Range | Frequency | Price |
|---|---|---|---|
| CB-11 | 1 watt | DC-4 KMC | $1100.00 |
| CB-12 | 5 watts | " | 1100.00 |
| CB-13 | 25 watts | " | 1350.00 |
| CB-14 | 150 watts | " | 1350.00 |
| CB-15 | 500 watts | " | 1450.00 |
| CB-16 | 1000 watts | " | 1650.00 |
| CB-17 | 3000 watts | " | 2400.00 |
| CB-18 | 6000 watts | " | 3000.00 |
| CBW-1 | 1 watt | 7-12 KMC | 1450.00 |
| CBW-2 | 5 watts | " | 1450.00 |
| CBW-3 | 25 watts | " | 1450.00 |
| CBW-4 | 150 watts | 2.4-12 KMC | 1400.00 |
| CBW-5 | 750 watts | 1-12 KMC | 1500.00 |
| CBW-6 | 3000 watts | " | 2400.00 |
| CBW-7 | 6000 watts | " | 3000.00 |

*DIRECT READING*

## Calorimetric Power Meter



These power meters are greatly simplified Calorimeters, which use an accurate metering pump of the gear type driven by an over-powered synchronous motor to keep the fluid flow constant. The instrument is fully self-contained, portable, self-cooled and requires only connection to the power line. It does not use any flow meters, thermometers or any other controls. There is only the "ON" & "OFF" switch for the operator to use on the front panel when a measurement is to be made. A sensitive thermopile and microammeter measures the power dissipated in the R.F. load. The microammeter is calibrated in watts and is direct reading. These Calorimeters are available with either a coaxial or a waveguide load.

**COAXIAL CALORIMETERS**

| Type | Full Scale Power | Freq. Range KMC | Price |
|---|---|---|---|
| CPM-10 | 10 | DC-10 | $880.00 |
| CPM-50 | 50 | DC-10 | 880.00 |
| CPM-100 | 100 | DC-10 | 880.00 |
| CPM-500 | 500 | DC-10 | 880.00 |
| CPM-5000 | 5000 | DC-1 | 1400.00 |
| CPM-10000 | 10000 | DC-1 | 2000.00 |
| CPM-20000 | 20000 | DC-1 | 3250.00 |

**WAVEGUIDE CALORIMETERS**

| Type | Full Scale Power | Price |
|---|---|---|
| CPW-10 | 10 | $850.00 |
| CPW-50 | 50 | 800.00 |
| CPW-100 | 100 | 800.00 |
| CPW-500 | 500 | 800.00 |
| CPW-5000 | 5000 | 1200.00 |
| CPW-10000 | 10000 | 1750.00 |
| CPW-20000 | 20000 | 2950.00 |





For details, circle #233 on Reader Service Card

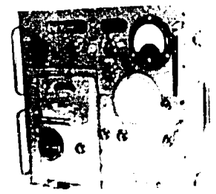



# Directory I. Complete Equipment

## 21. Microwave Test Equipment.


**edp EMPIRE DEVICES**

**Specialists in noise and field intensity measuring equipment, microwave systems and components, and radar instrumentation.**



Noise and Field Intensity Meters
150KC-10,000MC
Illustrated: Model NF-112
1,000-10,000MC



Broadband Power Density Meter Model NF-157
200-10,000MC;
0.1-2,000MW/CM²

**COAXIAL ATTENUATORS**



Model AT-109
DC—4000MC.
12 steps: 0.1 to 6 db/step

Pad and Step attenuators DC—10,000 MC

**Noise and Field Intensity Meters**
**Power Density Meters**
**Impulse Generators**
**Modulation Meters**
**Crystal Mixers**
**Coaxial Attenuators & Terminations**
**Microwave Components**
**Variable Frequency Power Supplies**

**FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL**

**BURLINGAME ASSOCIATES**

MOUNT VERNON, N.Y. • MOunt Vernon 4-7530

WALTHAM .....TWinbrook 4-1955
SYRACUSE .....GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6100
BALTIMORE .....ENterprise 9-6400

For details, circle #234 on Reader Service Card


Carad Corp., Calif., 50

Caswell Electronics Corp. Calif., 55sc

Chemalloy Electronics Corp., Calif., 15sc

**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 20s, 25s, 40s, 50sc, Tel: OAkwood 7-6800**

See ad on page 308


Clipper Gear & Machine Co., Mich., 70c

Collins Radio Co., Central Sales Office, Tex., 20c, 60c

Collins Radio Co., Texas Division, Tex., 5s

Computer-Measurements Co., Div. Pacific Industries, Inc., Calif., 20sc

**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 25c, 45sc, 70c, Tel: HAmilton 7-7961**

See ad on page 440


Cook Technological Center, Div. Cook Electric Co., Ill., 25c, 40c, 50c, 55c

Cosmic, Inc., D.C., 60s

Crown Engineering, N.M., 35c, 40c

Cubic Corp., Calif., 15s, 45s

Dalmo Victor Co., Div. of Textron, Inc., Calif., 65c

Daystrom, Inc., Weston Instrument Div., N.J., 20s

Dayton Electronic Products Co., Ohio, 50c, 55s

DeMornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, Calif., 20s, 30s, 55s, 75s, Tel: SYcamore 2-4142

See ad on pages 52-53


Diamond Antenna & Microwave Corp., Mass., 20sc, 30sc, 55s, 75c

Dielectric Products Engineering Co., Inc., Maine, 55c

Direct T/V Replacements Ltd., England, 50s

Djordjevic Engineering Co., Djeco Div., Ill., 50c

Douglas Microwave Co., 252 E. Third St., Mount Vernon, N.Y., 15c, 20sc, 30sc, 40sc, 45sc, 55sc, 75sc, Tel: MOunt Vernon 8-6900

See ad on pages 90-91


Dunn Engineering Associates, Inc., Mass., 10c

Dymec, Div. Hewlett-Packard Co., Calif., 40sc

Dynamics Instrumentation Co., Calif., 50s

E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 35c, Tel: HAlifax 6-7491

See ad on page 400


E.M.I. Electronics Ltd., England, 50s

Ehrenpreis, David, Consulting Engineers, N.Y., 20c, 35c

Electrical & Physical Instrument Corp., N.Y., 50s

Electro Impulse Laboratory, Inc., 208 River St., Red Bank, N.J., 5sc, 10c, 15c, 20sc, 45sc, 75c, Tel: SHadyside 1-0404

See ad on page 310


Electronic Applications, Inc., Conn., 5s, 20s, 25s, 30s, 40s, 45s, 55s, 60s, 65s, 75s

Electronic Systems, Div. Mechanical Products, Inc., Mich., 20s, 45s

Elk Electronic Labs., Inc., N.Y., 10, 35c, 40c

Emerson Apparatus Co., Mass., 15c

**Empire Devices Products Corp., 47 Prospect St., Amsterdam, N.Y., 30sc, 35sc, 45sc, 50sc, Tel: VIctor 2-8400**

See ads on pages 307, 309, 313, 315, 379, 584


Engineering Associates, Ohio, 10c, 20c, 40c, 50c, 55c, 65c, 75c

Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 20c, 35c, 45c, 50c, 55c

Exact Electronics, Inc., Ore., 75s

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 10s, 15c, 20s, 30c, 40s, 45s, 50s, 55s, 60s, 65s, 75s, Ratiometers s, Tel: RAvenswood 1-9000**

See ad on pages 125-128


Farwest Mfg. Div., Inc., Wash., 40s

Federal Manufacturing & Engineering Corp., N.Y., 20c, 50c

Ferranti Electric, Inc., N.Y., 60s

Ferranti Packard Electric Ltd., Canada, 35c, 60c

Filmohm Corp., 48 W. 25th St., New York 10, N.Y., 5sc, 10c, Tel: WAtkins 4-6605

See ad on page 525


Frequency Standards, Inc., P.O. Box 504, Asbury Park, N.J., 20sc, 30c, 40c, 75sc, Tel: PRospect 4-0500

See ad on page 443


General Communication Co., 677 Beacon St., Boston 15, Mass., 20sc, 45sc, 50sc, 75sc, Tel: COpley 7-6030

See ad on page 331


General Devices, Inc., N.J., 30c, 40sc, 50c

General Electronic Laboratories, Inc., Mass., 20c, 60c, 65c

**General Radio Co., 22 Baker Ave., West Concord, Mass., 40s, 50s, 55s, 70s, Tel: EMerson 9-4400**

See ad on Cover 4


Gertsch Products, Inc., Calif., 20s

Gombos Co., Inc., John, N.J., 20c, 75c

Gorham Electronics, Div. Gorham Mfg Co., R.I., 30c, 55c

Greenray Industries, Pa., 40c

Hallicrafters Co., The, Ill., 10c, 15c, 25c, 30c, 40c, 50c

Hanmer Electronics Co., Inc., N.J., 50c

Hazeltine Electronics Div., Hazeltine Corp., N.Y., 60c

Hermes Electronics Co., 75 Cambridge Pkwy., Cambridge 42, Mass., 40c, 60c, Tel: UNiversity 4-7200

See ads on pages 266, 442


Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 10s, 20s, 30s, 35s, 40s, 45s, 50s, 55s, 70s, 75s, Tel: DAvenport 6-7000

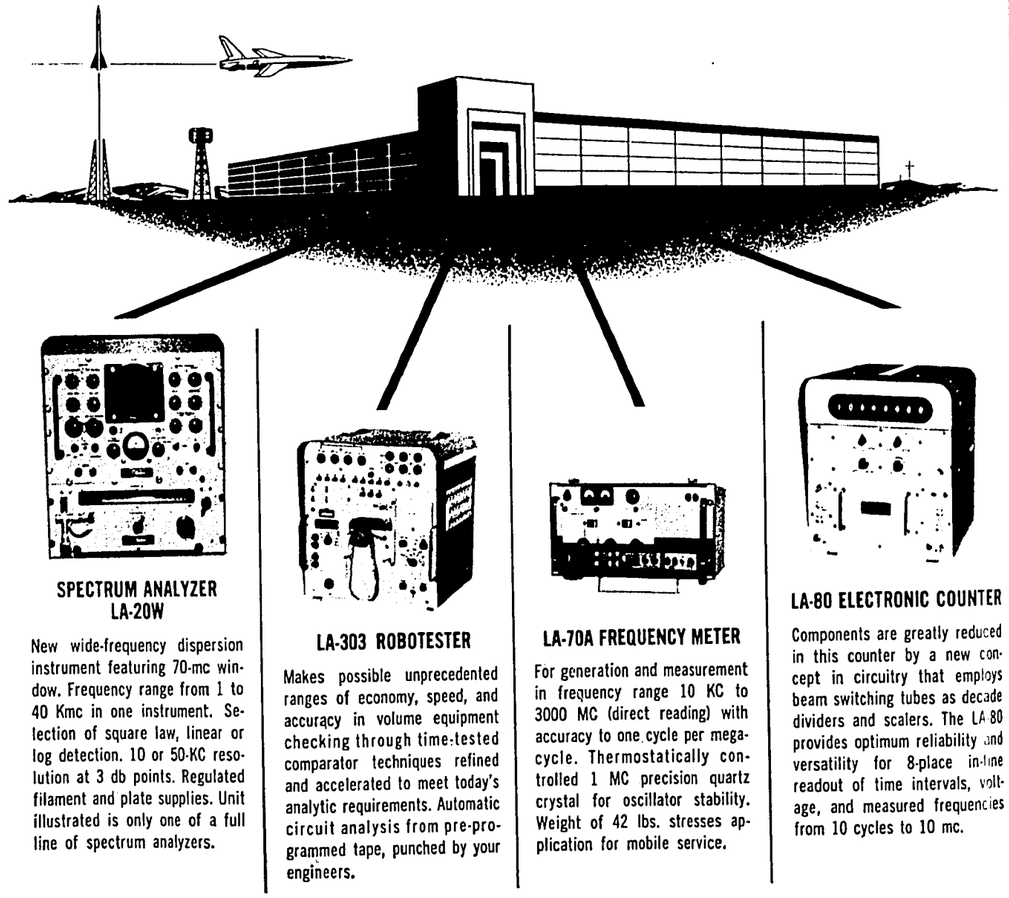
See ad on pages 3-18


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240

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# four roads to precision analysis

In the field of precision analysis, Lavoie Laboratories has combined bold theory and proven techniques to evolve many promising concepts. Such concepts continue to yield new laboratory instruments of predicted accuracy and reliability. The four quality instruments shown are acknowledged the most recently recorded triumphs in the field of precision analysis. They represent trails blazed by Lavoie research, development, and engineering know-how to aid you in solving test problems of the present and to improve your efficiency in approaching problems in the future.



**SPECTRUM ANALYZER LA-20W**

New wide-frequency dispersion instrument featuring 70-mc window. Frequency range from 1 to 40 Kmc in one instrument. Selection of square law, linear or log detection. 10 or 50-KC resolution at 3 db points. Regulated filament and plate supplies. Unit illustrated is only one of a full line of spectrum analyzers.

**LA-303 ROBOTESTER**

Makes possible unprecedented ranges of economy, speed, and accuracy in volume equipment checking through time-tested comparator techniques refined and accelerated to meet today's analytic requirements. Automatic circuit analysis from pre-programmed tape, punched by your engineers.

**LA-70A FREQUENCY METER**

For generation and measurement in frequency range 10 KC to 3000 MC (direct reading) with accuracy to one cycle per megacycle. Thermostatically controlled 1 MC precision quartz crystal for oscillator stability. Weight of 42 lbs. stresses application for mobile service.

**LA-80 ELECTRONIC COUNTER**

Components are greatly reduced in this counter by a new concept in circuitry that employs beam switching tubes as decade dividers and scalers. The LA 80 provides optimum reliability and versatility for 8-place in-line readout of time intervals, voltage, and measured frequencies from 10 cycles to 10 mc.

*Lavoie Laboratories, Inc.*

MORGANVILLE, N. J.






# Directory I. Complete Equipment

## 21. Microwave Test Equipment.

**Hill Electronics, Inc.,** 300 N. Chestnut St., Mechanicsburg, Pa., 40s, Tel: POplar 6-7611
See ad on page 428

Hoffman Electron Tube Corp., N.Y., 10s, 20s, 30s, 35s, 40s, 45s, 50s, 55s, 65s, 75s

Huggins Laboratories, Inc., Calif., 40s

I-T-E Circuit Breaker Co., Special Products Div., Pa., 55sc

International Telephone & Telegraph Corp., ITT Federal Div., N.J., 55s

J-V-M Microwave Co., Ill., 10c, 40sc, 50sc, 75sc

Jetronic Industries, Inc., Pa., 20c, 25c, 30c, 35c, 40c, 50c, 60c

Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., Conn., 5sc, 15s, 45sc, 50s, 65sc

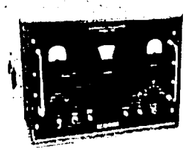
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 60c

**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J.,** 25s, 35s, 40s, 60s, 75s, Tel: CApital 6-4000
See ad on page 330

**Kearfott Div., General Precision, Inc., Little Falls, N.J.,** 30c, 55c, Tel: CLifford 6-4000
See ad on pages 120-121

Kearfott Div., General Precision, Inc., Microwave Products, Calif., 30c, 60c, 75c


MENLO PARK ENGINEERING
Electronics for TWT's & BWO's



*Electronically-Swept BWO Oscillator*

Specializing exclusively in equipment compatible with Traveling Wave Tubes, Electronically-swept BWO's, TWT Amplifiers, Constant-Power Signal Sources, Power Levellers, Power Supplies for TWT's, Solenoids, Solenoid Supplies.

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BURLINGAME ASSOCIATES
MOUNT VERNON, N.Y. • MOunt Vernon 4-7530
WALTHAM .....TWinbrook 4-1955
SYRACUSE .....GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400


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**Laboratory For Electronics, Inc.,** Mass., 20s, 30s, 40s, 60s, Time Jitter Testers s

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 50s

**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J.,** 20s, 50s, 60s, Tel: LOwell 6-2600
See ad on page 312

Lenkurt Electric Co., Inc., Calif., 35s

Levinthal Electronic Products, Inc., Calif., 50c

**Lieco, Incorporated,** 130 Eileen Way, Syosset, L.I., N.Y., 30sc, 50sc, 75c, Tel: WAlnut 1-6300
See ad on page 553

Lignes Telegraphiques et Telephoniques, France, 5s, 20s, 30s, 35s, 45s, 50s, 55s, 60s, 65s, 75s

Loral Electronics Corp., N.Y., Radar calibrators c

**Lumatron Electronics, Inc., Dept. IR,** 116-120 County Courthouse Rd., New Hyde Park, L.I., N.Y., 50s, Trigger Rate Converters s, Tel: PIoneer 7-3200
See ad on page 323

**Manson Laboratories, Inc.,** 375 Fairfield Ave., Stamford, Conn., 25s, 40s, 50c, Tel: DAvis 5-1391
See ad on pages 96-97

**Marconi Instruments,** 111 Cedar Lane, Englewood, N.J., 75s, Tel: LOwell 7-0607
See ad on page 332

Marquardt Corp., The, Pomona Div., Calif., 40c, 75c

Marstan Electronics Corp., N.Y., 20c, 70s

Maxson Corp., The W. L., Instruments Div., N.Y., 40s

Mechanical Products, Inc., Mich., 20s, 75sc

Melabs, Inc., Calif., 5c, 15s, 20s, 30s, 35c, 40s, 45c, 50c, 60s, 65c, 75c

**Menlo Park Engineering,** 711 Hamilton Ave., Menlo Park, Calif., 40s, Tel: DAvenport 6-9080
See ad on page 366

Meridian Metalcraft, Inc., Calif., 30c

**Merrimac Research & Development, Inc.,** 517 Lyons Ave., Irvington 11, N.J., 30c, Tel: ESsex 1-1616
See ad on page 381

Metrologie, Compagnie Generale de, France, 50s

**Mico Instrument Co.,** 79 Trowbridge St., Cambridge 38, Mass., 75s, Tel: KIrkland 7-8660
See ad on page 674

**Microphase Corp.,** 1 Seneca Pl., P.O. Box 1166R, Greenwich, Conn., 30c, Tel: NOrmandy 1-5200
See ad on page 204

Microtech, Inc., Conn., 30c, 55c

Microwave Associates, Inc., Mass., 10s, 15s, 20s, 30sc, 55s, 75s

Microwave Development Laboratories, Inc., Mass., 30sc

Microwave Electronic Tube Co., Inc., Mass., 75c

Missouri Research Laboratories, Inc., Mo., 25sc, 50c, 70c

**Moeller Instrument Co., Inc., Electronics Div.,** 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 50c, Tel: VIrginia 9-2100
See ad on page 588

Mytron, Inc., Mass., 10c, 30c

Narda Microwave Corp., The, N.Y., 10s, 20sc, 30s, 45s, 50sc, 55s, 65s, 75s

National Company, Inc., Mass., 5c, 30c, 45c, 70c

**Navigation Computer Corp.,** 1621 Snyder Ave., Philadelphia 45, Pa., 20c, 25c, 50sc, 70sc, Tel: HOward 5-7700
See ad on page 498

New London Instrument Co., Conn., 50c

Northeast Scientic Corp., Mass., 50 Millimeters c

**Northeastern Engineering, Inc.,** 25 S. Bedford St., Manchester, N.H., 60s, Tel: NAtional 2-6485
See ad on pages 27-30

**PRD Electronics, Inc., Subsidiary of Harris-Intertype Corp.,** 202 Tillary St., Brooklyn 1, N.Y., 10s, 15s, 20s, 35s, 40s, 45s, 50s, 55s, 60c, 65s, Tel: ULster 2-6800
See ad on pages 68-69

**Panoramic Radio Products, Inc.,** 528 S. Fulton Ave., Mount Vernon, N.Y., 60s, Tel: OWens 9-4600
See ad on page 334


*When Reliability is a must...* specify EMPIRE



NOISE AND FIELD INTENSITY METER
Model NF-105 • 14 KC to 1000 MC

Use of the quick-change tuning heads avoids costly repetition of components common to all frequency ranges. Built-in impulse generator serves as calibrator. Carrier and peak reading VTVM. Fully regulated power supply.



NOISE AND FIELD INTENSITY METER
Model NF-205 • 14 KC to 1000 MC

Modified version of Model NF 105.

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DISTORTION ANALYZERS · IMPULSE GENERATORS
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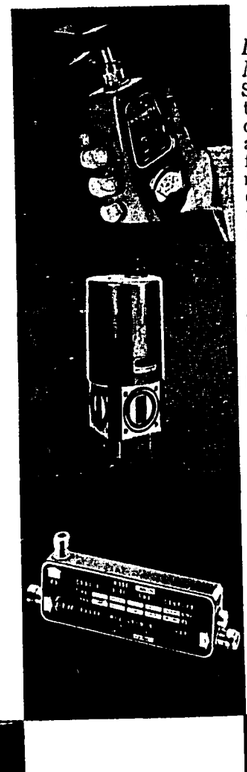
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RAMCOR

*...for advanced concepts in microwave instruments and system components.*

Organized, staffed and equipped to meet the most critical requirements of government and industrial programs, Ramcor offers the scientific knowledge, engineering experience and production capabilities needed to provide next generation concepts—today.

Some of the microwave instruments and system components which have originated at Ramcor are shown on this page. Detailed data on these and other Ramcor products are available on request.



*Densiometer Model 1200*
Specifically engineered to detect unsafe levels of VHF, UHF, L, S, C and X-band energy from tubes and antennas. Battery-powered, direct reading, easily used by non-technical personnel.

*Waveguide Switches*
Covering all frequency ranges. Isolation 50 db or better over entire band. Fully interlocked for magnetron protection. Switching time .05 seconds.

*Coaxial Couplers*
Wide range of models for 10, 20, 30 and 40 db coupling, for frequencies from 225 mc. to 11 k mc. Broadband design permits use at frequencies below specified range with little variation in directivity.



*Also from Ramcor...*

Thermistor Mounts

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Flat couplers

■

Rotary Precision Attenuators

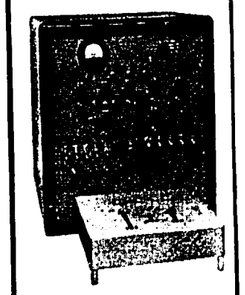
■

Variable attenuators

■

Phase Shifters

■



Ramcor welcomes your inquiries concerning its existing lines of instruments and components, or the use of its facilities and staff for development and manufacturing in support of your production programs.

*For complete product data or questions on specific designs, send opinion or problem requirements, and we will call.*

*Specialized engineering, design and manufacture of microwave assemblies, system components and test equipment.*

RADAR MEASUREMENTS CORPORATION • 190 DUFFY AVENUE, HICKSVILLE, L.I., N.Y.

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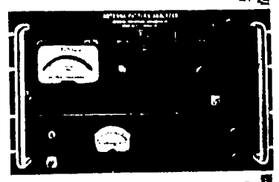
WEINSCHEL

ANTENNA PATTERN ANALYZER MODEL BA-7

Measure 45 db (r. f.) in one step using a maximum of 1 microwatt r. f. power*

*100% square wave modulated at 1000 cps ± .1 cps. Observation time approximately 45 seconds for 45 db; only .2 seconds for 30 db.

Bandwidth variable from 2 to 15 cps with constant gain



MODEL BA-7

The BA-7 is the heart of a video detector system designed primarily for r. f. crystals. For greater versatility, a d. c. biasing circuit is included to permit use of conventional barretters, requiring a d. c. bias between 0 and 10 ma. The unit can be used to measure very high power ratios such as occur in making antenna pattern measurements, to determine the rejection coefficients of r. f. filters, and to calibrate attenuators. It has a wide dynamic linear range, a low noise level, and a wide r. f. frequency range where video crystal mounts are available.

For complete specifications, write for Bulletin No. 141.

Weinschel Fixed Coaxial Attenuators cover the frequency range of DC to 12.4 KMC. Write for complete catalog, specifying frequency range of interest.

WE CO

Weinschel Engineering
KENSINGTON, MARYLAND

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# Directory I. Complete Equipment

## 21. Microwave Test Equipment.

Parsons Company, The Ralph M., Calif., PDM/PAM Simulators c

Pennsylvania Testing Labs., Inc., Pa., 5sc, 20sc, 30sc, 40sc, 55sc, 75sc

**Peschel Electronics, Inc., Towners, R.F.D. 1, Patterson, N.Y., 50c, Tel: TRinity 8-3251**

See ad on page 289


Philips Electronic Instruments, N.Y., 5s, 10s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s

Pitometer Log Corp., N.Y., 30sc, 40sc, Signal Simulators sc

**Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 35sc, 40sc, 45sc, 50sc, 60sc, Tel: EXeter 2-4500**

See ad on pages 107-108


**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 30c, 75c, Tel: WEstmore 9-4092**

See ad on page 592


Precision Microwave Corp., Mass., 20c, 30c

**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 30c, 75c, Tel: WEstmore 9-8900**

See ad on page 383


Production Research Corp., N.Y., 10c, 20c, 60c

Pye Telecommunications, Ltd., England, 50s

RCA Victor Co., Ltd., Canada, 25sc, 40sc, 50sc

Racal Engineering, Ltd., England, 60c

Radar Design Corp., N.Y., 20s, 30c, 55c, 75s

**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 20, 50, 55, 65, 75, Tel: OVerbrook 1-5600**

See ad on page 314


Radio City Products Co., Inc., Pa., 50s

Radio Corp. of America, N.J., 50s

Railway Communications, Inc., Mo., 75sc

Ramage & Miller, Inc., Calif., 25sc, 40sc

Rantec Corporation, Calif., 30c

**Reeves-Hoffman, Div. Dynamics Corp. of America, 45 Cherry St., Carlisle, Pa., 40c, Tel: CHapel 3-5929**

See ad on page 432


Republic Electronic Industries Corp., N.Y., 5c, 10c, 45s, 55c, 60c

Resdel Engineering Corp., Calif., 40s, 50c

Rese Engineering, Inc., Pa., 50s

**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 20s, 40s, 45s, 55s, 75s, Tel: PRescott 3-8010**

See ad on page 246


Rowan Controller Co., The, Md., 20s

Rutherford Electronics Co., Calif., 50sc, 70sc

Sage Laboratories, Inc., Mass., 20c, 30sc, 55s, 75c

Savoy Electronics, Inc., Fla., 20c

Schaevitz Engineering, N.J., 25c, 40c, 50c, 70c

Scientific-Atlanta, Inc., Ga., 30s, 40s

Servo Corp. of America, N.Y., 10s

Sierra Electronic Corp., Div. Philco Corp., Calif., 15s, 45s

Sigma Electronics Research Corp., Wash., 5c, 15sc, 20sc, 35c, 40sc, 45c, 55sc, 60c, 65c, 75c

Sivers Lab., Sweden, 5sc, 20sc, 30s, 40s, 55s, 65s, 75s

Solartron Electronic Group, Ltd., The, England, 65s

Somerset Radiation Laboratory, Inc., N.J., 20s, 25s, 30s, 55s, 75s

Specialty Electronics Development Corp., N.Y., 5s, 20sc, 30sc, 40s, 45sc, 50sc, 60c, 75sc

Spencer-Kennedy Labs., Inc., Mass., 50s

**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 5c, 10s, 15c, 20s, 30s, 35c, 40c, 45sc, 50c, 55sc, 60sc, 65s, 75s, Tel: REdwood 6-4161**

See ad on pages 100-101

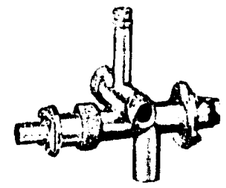

Standard Telephones & Cables, Ltd., England, 50s, 75s

**Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif., 35s, 50s, Tel: HOllywood 4-9292**

See ads on pages 336, 382

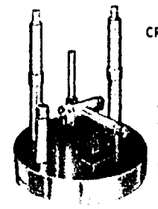


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BROADBAND CRYSTAL MIXER
Model CM-107 • 225 MC to 8200 MC

Ten fixed tuned models. Low noise figure. Laboratory or production applications. Versatile.



BALANCED CRYSTAL MIXERS
Model BCM-107
1000 MC to 5600 MC

Ten models available. Low VSWR, IF and LO lines mutually well isolated. Excellent LO noise cancellation. Push pull or single ended IF input.

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AMSTERDAM, N.Y. Victor 2-8400

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# Directory I. Complete Equipment

## 21. Microwave Test Equipment.

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 50c, 60c
Sunshine Scientific Instrument, Pa., 20s, 25s, 45s, 50s
Systems, Inc., Fla., 40c
TRAK Electronics, Div. CGS Laboratories, Conn., 40s
TRG, Incorporated, N.Y., 10c, 30s, 55s
Technical Research Group, Inc., Microwave & Antenna Dept., Mass., 30s, 55s
Technicraft Div., Electronic Specialty Co., Conn., 55sc
Telecomputing Corp., Calif., 25s, 50s
Telerad Mfg. Corp., N.Y., 20s, 30c, 40sc, 45c, 75sc
**Telonic Engineering Corp., 773 Broadway, Laguna Beach, Calif., 25c, 40c, 50c, Tel: HYatt 4-7581**
**See ad on page 71**
Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 50c
Texas Instruments, Incorporated, Apparatus Div., Tex., 50c
Thompson Ramo Wooldridge Inc., Calif., 50c
**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 20c, 25c, 30c, 55sc, 75c, Tel: ULysses 5-5131**
**See ad on page 438**
United Shoe Machinery Corp., Mass., 20c, 30c, 55c, 75c
Valor Instruments, Inc., Calif., 5s, 10s, 20s, 30s, 40s, 45s, 50s, 55s, 65s, 70s, 75s
Van Norman Industries, Inc., Electronics Div., N.H., 40sc, 50sc
**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 15s, 30s, Tel: DAvenport 6-4000**
**See ad on pages 116-117**
WacLine, Inc., Ohio, 5c, 55c, 75c
Wave/Particle Corp., Calif., 40, 65
Waveline, Inc., N.J., 20s, 55s, 65s
**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 5s, 40s, 45s, 75s, Tel: LOcust 8-6820**
**See ad on page 255**
**Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 40, Tel: LOckwood 4-0121**
**See ads on pages 315, 384**
Wiltron Co., Calif., 60
Winslow Co., Inc., The, N.J., 5c, 20c, 50c, 75c

**Microwave transmitters:**
**See class 20**

**Microwave transformers:**
**See class 76**

**Microwave tuners:**
**See class 80**

**Microwave, waveguides:**
**See class 83**

**Mixers, microwave test:**
**See class 21**

**Mixers, sound:**
**See classes 34 & 51**

## 22. Mobile Equipment.

**5. Central station receivers**
**10. Central station transmitters**
**15. Citizen radio**
**20. Mobile receivers**
**25. Mobile transmitters**
**30. Selective calling equipment**
**35. Transceivers**

AC Spark Plug, The Electronics Div. of General Motors, Wis., 20c, 25c
**Acton Labs., Inc., 500-B Main St., Acton, Mass., 15s, Tel: COlonial 3-7756**
**See ad on page 346**
Advanced Research Associates, Inc., Md., 20c, 25c
Aeronautical Electronics, Inc., N.C., 35s
Aircraft Electronics, Ariz., 15s, 35s
Alpha Corporation, Tex., 5c, 10c, 15c, 20c, 25c, 30c, 35c
American Development Electronics Co., N.J., 30c
American Electronics Co., N.Y., 15s, 20s, 25s
**American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 20s, Tel: CApital 2-3791**
**See ad on page 472**
Applied Electronics Co., Subsid. Raytheon Co., Calif., 5s, 10s, 15s, 20c, 25c
Arnoux Corp., Calif., 20s
Barker & Williamson, Inc., Pa., 15sc, 25c
Bell Aircraft Corp., Avionics Div., N.Y., 20c, 25c
Bell & Gossett Co., Ill., 30sc
Bendix Corp., The, Bendix Radio Div., Md., 5s, 10s, 20s, 25s, 30c, 35s
Biddle Co., James G., Pa., 30s
Budd Electronics, Inc., N.Y., 20c, 25c, 35c
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 35c
Cadre Industries Corp., N.Y., 5c, 10c, 15sc, 20c, 25c, 30c, 35sc
Canadian General Electric Co. Ltd., Electronic Equip. & Tube Dept., Canada, 5s, 10s, 20s, 25s
Canadian Marconi Co., Canada, 5s, 10s, 20s, 25s, 30s, 35s
Capehart Corp., Dynamic Electronics Div., N.Y., 5c
Chicago Electronic Div., Land-Air, Inc., Ill., 20c, 25c, 30c, 35c
Chisholm Industries, Ltd., Canada, 20s, 25s, 35s
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, 10s, 15s, 35s, Tel: OAkwood 7-6800**
**See ad on page 308**
Cletron, Inc., Ohio, 20s
Collins Radio Co., Iowa, 35s
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 20c, 25c, 30c, 35sc
Communications Co., Inc., Fla., 5sc, 10sc, 20sc, 25sc, 35sc
Cook Technological Center, Div. Cook Electric Co., Ill., 5c, 10c, 20c, 25c, 35c
Crosley Division, Avco Corp., Ohio, 20s, 25s, 30s
Davis Electronics, Inc., Calif., 15s, 20s, 25s
Designers for Industry, Inc., Ohio, 5c, 10c, 15c, 20c, 25c, 30c, 35c
Destron Co., Calif., 25c
Dollar Co., The Robert, Communications Equipment Div., Calif., 10s, 20 Pagers s
Dynamics Corp. of America, N.Y., 20c, 25c
E.M.I.-Cossor Electronics, Ltd., Canada, 20c, 25c
Electro-Voice, Inc., Mich., 35s
Electronic Assistance Corp., N.J., 15sc
Electronic Communications, Inc., Fla., 20c, 25c, 35c
Erco Radio Laboratories, Inc., N.Y., 20s, 25s
Federal Manufacturing & Engineering Corp., N.Y., 20c, 25c, 35c
Fisher Research Lab., Inc., Calif., 15c, 35c
Gates Radio Co., Ill., 25c
General Electric Co., Communication Products Dept., Va., 5sc, 10sc, 15s, 20sc, 25sc, 30sc, 35sc
General Electric Co. Ltd. of England, Telephone Works, England, 5c, 10s, 20s, 25s, 30s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 20c, 25c, 35c
Gilfillan Bros., Inc., Calif., 20c, 25c, 35c
Globe Electronics, Iowa, 15s
Gonset Division, Young Spring & Wire Corp., Calif., 15s, 35s
Gyro Electronics Co., N.Y., 15s
Hallicrafters Co., The, Ill., 5c, 10c, 15c, 20c, 25c, 35c
Heath Co., Subsid. Daystrom, Inc., Mich., 5s, 10s, 15s, 20s, 25s, 35s
I.D.E.A., Inc., Ind., 15s, 20s, 30s, 35s
International Crystal Mfg. Co., Inc., Okla., 15s, 25s, 35s
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 20c, 25c, 35c
Interstate Electronics Corp., Calif., 15c, 35c
Jansky & Bailey, Inc., D.C., 30c
Jetronic Industries, Inc., Pa., 15c, 20c, 25c, 30c, 35c
Johnson Co., E. F., Minn., 15s, 25s, 35s
Kaar Engineering Corp., Calif., 5s, 10s, 15s, 20s, 25s, 35s
Kay-Townes Antenna Co., Ga., 15s
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5c, 10c
King Radio Corp., Kan., 5s, 10s, 20s, 25s, 35s
Knight Electronics Corp., Ill., 15s, 35s
**LEL, Inc., 75 Akron St., Copiague, N.Y., 5c, 10c, 15c, 20c, 25c, 35c, Tel: AMityville 4-2200**
**See ad on page 365**
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 20sc, 25sc, 35sc
Lenkurt Electric Co., Inc., Calif., 5s, 10s, 20s, 25s, 30s, 35s
Litton Industries, Maryland Div., Md., 20, 25
Madigan Electronic Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c
Mallory & Co., Inc., P. R., Ind., 5c, 10c, 20c, 25c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s, 20s, 25s, 30s, 35s
Marine Electric Corp., N.Y., 30s
Miratel, Inc., Minn., 15s
Missile Systems Corp., Calif., 5c, 10c
Mobil Electronics, Inc., Div. Radionic Labs., Inc., Ind., 30sc
Morrow Radio Mfg. Co., Ore., 5s, 10s, 15s, 20s, 25s, 30s, 35s
Mosler Research Products, Inc., Conn., 20s, 25s
Motorola, Inc., Ill., 5s, 10s, 15s, 20s, 25s, 30s, 35s
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c, 20c, 25c, 30c, 35c
Multi Products Co., Mich., 5c, 10c, 15s, 20s, 25s, 35sc
Multitone of Canada, Ltd., Canada, 20s, 30 Pagers s
Munzig International, Inc., Calif., 15s, 30s
National Company, Inc., Mass., 5c, 10c
Nippon Electric Co., Ltd., Japan, 5s, 10s, 15c, 20s, 25s, 30c, 35s
Nuclear Electronics Corp., Pa., 5c, 10c, 30 Pagers s
Osborne Electronics Sales Corp., Ore., 15s, 20c, 25c, 35s
Pearce-Simpson, Inc., Fla., 15sc, 35sc
Philco Corporation, Pa., 35c
Philco Corporation, Govt. & Industrial Group, Pa., 20c, 25c, 30c, 35c
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 20s, 25s, 30s, 35s
Philmore Mfg. Co., Inc., N.Y., 15s, 20s, 35s
Plectron Corp., Neb., 20s, 30s
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 15c, 25c, 35c
Pye Corp. of America, N.J., 5s, 10s, 20s, 25s, 35s
Pye Telecommunications, Ltd., England, 20s, 25s, 30s, 35s
Racal Engineering Ltd., England, 5s, 10s, 35s
Radio Corp. of America, N.J., 5s, 10s, 15s, 20s, 25s, 30s, 35s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20s, 25s, 30s, 35s
Radio Engineering Laboratories, Inc., N.Y., 5sc, 10sc, 20sc, 25sc, 35sc
Radio Industries, Inc., Kan., 20s, 25s
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 20c, 25c, 35c, Tel: EVergreen 8-6000**
**See ad on page 506**
Raytheon Co., Equipment Div., Mass., 20c, 25c
Secode Corp., Calif., 30s
**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 30sc, Tel: HOpkins 7-3200**
**See ads on pages 385, 519**
Seiscor, Div. Seismograph Service Corp., Okla., 15s, 35s
Sigma Electronics Research Corp., Wash., 15c
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 35c, Tel: EMpire 4-2271**
**See ad on page 420**
Sorensen Industrial Electronic Co., N.J., 15sc, 25c
Space Electronics Corp., Calif., 20c, 25c
Specialty Electronics Development Corp., N.Y., 20c, 25c, 35c
Spilsbury & Tindall, Ltd., Canada, 35s
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 20c, 25c, 30c, 35c
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 30c
TMC (Canada) Ltd., Canada, 5sc, 10sc
**Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 5s, 10s, 25s, 35s, Tel: OWens 8-4800**
**See ads on pages 344, 345**
Technology Instrument Corp., Mass., 15s, 20s, 25s, 30s, 35s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 15c, 20c, 25c, 30c, Tel: YE 2-8600**
**See ad on page 338**
Texas Instruments Incorporated, Apparatus Div., Tex., 20c, 25c, 35c
Topping Electronics, Ltd., P. Q., Canada, 20c, 25c, 35s
U. S. Science Corp., Calif., 5c, 10c, 20c, 25c, 30c, 35c
Varo Mfg. Co., Inc., Tex., 5sc, 10sc, 20sc, 25sc, 30sc
Vinco Electronics Corp., Conn., 15c
Virginia Electronics Co., Inc., D.C., 5c, 10c, 20c, 25c
Vocaline Co. of America, Inc., Conn., 15s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 20sc, 25sc, 35sc, Tel: JUdson 2-3030**
**See ad on page 704**
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City, 27, Mo., 5sc, 10sc, Tel: BEnton 1-0700**
**See ad on page 573**
Winston Electronics, Div. Jetronic Industries, Inc., Fla., 15s

**Modulators, telemetering:**
**See class 36**

## 23. Monitor Equipment.

**5. Frequency**
**10. Modulation**
**15. Remote**
**20. Video**

A.R.F. Products, Inc., Ill., 10c
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 5s
**Airpax Electronics, Inc., Seminole Div., Fort Lauderdale, Fla., 5s, Tel: LUdlow 3-6160**
**See ad on pages 82-83**
American Research & Mfg. Corp., Md., 5s
Antlab, Inc., Ohio, 10s
Automation Dynamics Corp., N.J., 15c
Automation Management, Inc., Mass., 5sc
Beckman Instruments, Inc., Berkeley Div., Calif., 5s
Biddle Co., James G., Pa., 5s
Blonder-Tongue Laboratories, Inc., N.J., 20s
Budd Electronics, Inc., N.Y., 20c
Budelman Electronics Corp., Conn., 5s, 10s
**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 5c, Tel: NEwtown 9-5700**
**See ad on page 426**
Canadian Marconi Co., Canada, 5s, 10s, 15s, 20s
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 20c
Central Electronics, Inc., Ill., 10s
Century Electronics & Instruments, Inc., Okla., 20s
Chicago Electronic Div., Land-Air Inc., Ill., 5c, 15c
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, 10sc, Tel: OAkwood 7-6800**
**See ad on page 308**
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 20c
Computer-Measurements Co., Div. Pacific Industries, Inc., Calif., 5sc
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 5c, Tel: HAmilton 7-7961**
**See ad on page 440**
DeRyder Electronics, N.J., 20c
Designers for Industry, Inc., Ohio, 5c
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 20sc
Dicon Corporation, N.Y., 15c
Dynapar Corporation, Ill., 5s
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, 15c, 20c, Tel: HAlifax 6-7491**
**See ad on page 400**
E.M.I.-Cossor Electronics, Ltd., Canada, 15c, 20c
E.M.I. Electronics, Ltd., England, 20s
Ebauches S.A., Dept. Oscilloquartz, c/o Freeport Engineering Co., N.Y., 5c
Electrend Products Corp., Mich., 10s
Electric Regulator Corp., Conn., 5sc
Electron Corporation, Tex., 20sc
Electronic Counters, Inc., N.Y., 5s
Electronic Measurements Corp., N.Y., 5s
Electronic Specialty Co., Calif., 5c
**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 10sc, Tel: VIctor 2-8400**
**See ads on pages 307, 309, 313, 315, 379, 584**
Erco Radio Laboratories, Inc., N.Y., 15sc
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5s, Tel: GLendale 6-8592**
**See ad on pages 40-41**
Fecker Division, J. W., American Optical Co., Pa., 5c
Federal Manufacturing & Engineering Corp., N.Y., 5c, 10c
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 20sc, Radar sc, Tel: CEnter 9-6100**
**See ad on page 480**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

GPL Division, General Precision, Inc., N.Y., 20sc
Gates Radio Co., Ill., 5s, 10s
General Electric Co., Communication Products Dept., Va., 20sc
General Electric Co., Light Military Electronics Dept., N.Y., 15c
General Electric Co., Ordnance Dept., Mass., 15s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 20c
**General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, Tel: EMerson 9-4400**
**See ad on Cover 4**
Gertsch Products, Inc., Calif., 10s
Gilfillan Bros., Inc., Calif., 15c, 20c
Grimson Color, Inc., N.Y., 20s
Gulton Industries, Inc., N.J., 5sc
Hallicrafters Co., The, Ill., 20c
Hammarlund Mfg. Co., Inc., N.Y., 15sc
Hathaway Instruments, Inc., Colo., 5c
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 15c, 20c
**Hermes Electronics Co., 75 Cambridge Pkwy., Cambridge 42, Mass., 5s, Tel: UNiversity 4-7200**
**See ads on pages 266, 442**
Hughes Aircraft Co., Industrial Systems Div., Calif., Storage Monitors c
ITI Electronics, Inc., N.J., 20sc
International Telephone & Telegraph Corp., ITT Industrial Products Div., Calif., 20s
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 20c
Jansen Electronics Mfg., Inc., Minn., 15s
Jetronic Industries, Inc., Pa., 5c, 10c
Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., Conn., 10s, 15s
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 20c
Karg Laboratories, Inc., Conn., 10sc
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 15c, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kidde Ultrasonic & Detection Alarms, Inc., N.J., 15sc
**Knights Co., The James, 101 E. Church St., Sandwich, Ill., 5sc, Tel: 2141**
**See ad on page 430**
Laboratory for Electronics, Inc., Mass., 5s, 10s
Lampkin Laboratories, Inc., Fla., 5s, 10s
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 5s, Tel: LOwell 6-2600**
**See ad on page 312**
Litton Industries, Maryland Div., Md., 10
Magnetic Controls Co., Minn., Voltage sc
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 10s, Tel: LOwell 7-0607**
**See ad on page 332**
Marconi's Wireless Telegraph Co., Ltd., N.Y., 20s
Marstan Electronics Corp., N.Y., 5s
Miratel, Inc., Minn., 15s, 20s
Molectronics, A Minneapolis-Moline Subsid., Calif., 20c
Moore Associates, Inc., Calif., 15sc
Motorola, Inc., Ill., 5s, 10s, 15s
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c, 15c, 20c
Naniloa Corporation, Ohio, 15c
New London Instrument Co., Conn., 5s, 10s
Nippon Electric Co., Ltd., Japan, 5c, 20s
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 5s, Tel: NAtional 2-6485**
**See ad on pages 27-30**
**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5s, Tel: WAtkins 9-9117**
**See ad on pages 36-39**
Nuclear Electronics Corp., Pa., 5s, 10s
Olympic Radio & Television, Div. Siegler Corp., N.Y., 5s, 10s, 15s
OPTOmechanisms, Inc., N.Y., Photometric c
Osborne Electronics Sales Corp., Ore., 10s
Packard Bell Electronics Corp., Calif., 15c
Packard Bell Electronics, Service Division, Calif., 20s
**Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., 5s, 10s, 20s, Tel: OWens 9-4600**
**See ad on page 334**
Philco Corporation, Pa., 15sc, 20sc
Philco Corporation, Govt. & Industrial Group, Pa., 20sc
Prescott Television Co., Calif., 20c
Probescope Co., Inc., N.Y., 5s, 10s
RCA Victor Co., Ltd., Canada, 5s, 10s
**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 5, Tel: OVerbrook 1-5600**
**See ad on page 314**
Radio Corp of America, N.J., 5s, 10s, 15s, 20s
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, 15c, 20c, Tel: EVergreen 8-6000**
**See ad on page 506**
Radiometer, Denmark, 10s
Rank Cintel, Ltd., England, 20s
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, Tel: LOckwood 5-4578**
**See ad on page 324**
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 5s, Tel: PRescott 3-8010**
**See ad on page 246**
Rowe Industries, Ohio, 5s
Rust Industrial Co., Inc., The, N.H., 15sc
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 5c
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 20s, Tel: TWinbrook 4-6300**
**See ad on pages 64-65**
Secode Corp., Calif., 15c
**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 5s, Tel: HOpkins 7-3200**
**See ads on pages 385, 519**
Servomechanisms, Inc., Calif., 15c
Setchell-Carlson, Inc., Minn., 20s
Sierra Electronic Corp., Div. Philco Corp., Calif., 5c
Sigma Electronics Research Corp., Wash., 5c
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 15c, Tel: EMpire 4-2271**
**See ad on page 420**
Specialty Electronics Development Corp., N.Y., 15c
Stelma, Inc., Conn., 5c
TRG, Incorporated, N.Y., 5c
Tektronix, Inc., Ore., 20s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 20c, Tel: YE 2-8600**
**See ad on page 338**
**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 15sc, 20sc, Tel: TWining 8-1000**
**See ad on page 260**
Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 10c
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c, 15c
Texas Instruments Incorporated, Geosciences & Instrumentation Div., Tex., 15s
Thompson Ramo Wooldridge Inc., Calif., 15sc, 20sc
Thompson Ramo Wooldridge Inc., Dage Television Div., Ind., 20sc
Torwico Electronics, Inc., N.J., 5c
**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 15sc, Tel: OVerbrook 1-0400**
**See ad on page 294**
U. S. Science Corp., Calif., 10c, 15c
Varo Mfg., Inc., Tex., 5sc
Vicon Corp., Calif., 20s
Vinco Electronics Corp., Conn., 5c
Virginia Electronics Co., Inc., D.C., 15c
Walkirt Co., Calif., 5c
Waltham Electronics Corp., Mass., 10sc
**Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 5c, Tel: GArfield 6-8600**
**See ad on page 322**
Westport Electric, Calif., 5sc
Wheaton Engineering Corp., Ill., 5c

**Motors & generators, servo:**
**See classes 30 & 60**

**Multi-testers:**
**See class 14**

**Multi-vibrators:**
**See class 28**

**Multipliers, servo:**
**See class 30**

**Navigation computers:**
**See class 9**

**Noise analyzers:**
**See class 3**

**Noise & field intensity meters, microwave: See class 21**

**Noise suppressors, dynamic:**
**See class 38**





# Directory I. Complete Equipment

## 24. Nuclear Equipment.

5. Beta gauges
10. Crystals
15. Detectors
20. Dosimeters
25. Ionization chambers
30. Ionization gauges
35. Particle accelerators
40. Pulse count integrators
45. Radiation detectors
50. Scalers
55. Survey meters

Airmec Limited, England, 45s, 50s, 55s
Allied Research Assoc., Inc., Mass., 15s, 20c, 45s
American Development Electronics Co., N.J., 55c
American Machine & Foundry Co., 15c, 20c, 25c, 30c, 35c, 55c
**Anton Electronic Laboratories, Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 5c, 15s, 25c, 40sc, 45sc, 50sc, 55sc, Tel: EVergreen 6-5715**
**See ads on pages 319, 409, 581**
Applied Physics Corp., Calif., 25s
Applied Radiation Corp., Calif., 35c
Atomic Accessories, Inc., N.Y., 10s, 15s, 20s, 25s, 45s, 55s
Automatic Timing & Controls, Inc., Pa., 40c, 55sc
Automation Dynamics Corp., N.J., 45c
Avo Limited, England, 45s, 50s, 55s
BJ Electronics, Borg-Warner Controls, Calif., 15s, 25s, 30s, 40s, 45s, 50s, 55s
**Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 15s, 40s, 45s, 50s, 55s, Tel: UNiversity 4-7420**
**See ad on page 280**
Baldwin Piano Co., Ohio, 10c
Bausch & Lomb, Inc., N.Y., 20sc
Bendix Corp., The, Cincinnati Div., Ohio, 20s
Bon-De Electronic Laboratories, Inc., Mass., 30sc
Brooks Research, Inc., N.Y., 35c, 40c, 50c
**Bulova Watch Co., Inc., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 10c, Tel: NEwtown 9-5700**
**See ad on page 426**
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 15sc, 45sc
Cambridge Thermionic Corp., Mass., 10c
Chicago Electronic Div., Land-Air, Inc., Ill., 15c, 45c
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 40s, 50s, 55s, Tel: OAkwood 7-6800**
**See ad on page 308**
Clipper Gear & Machine Co., Mich., 15c
Computing Devices of Canada, Ltd., Canada, 40s
Consolidated Vacuum Corp., N.Y., 30s
Cook Electric Co., Ill., 30c, Hot Cells c, Reactors c
Cook Technological Center, Div. Cook Electric Co., Ill., 15c, 20c, 25c, 40c, 45c, 50c
Cosmic, Inc., D.C., 20s, 35s, 45s
Daystrom, Inc., Weston Instrument Div., N.J., 45c
Designers for Industry, Inc., Ohio, 40c
Dicon Corporation, N.Y., 15c, 20c, 40c, 45c, 50c, 55c
Douglas Radio Laboratories, Mass., 50s
E-H Research Laboratories, Calif., 50
E.M.I. Electronics, Ltd., England, 25s, 15s, 40s, 45s, 50s
E O Electronics, Inc., N.J., 45c, 55c
**Eastman Kodak Co., 343 State St., Rochester 4, N.Y., 20c, Tel: LOcust 2-6000**
**See ad on page 300**
Eberline Instrument Corp., N.M., 25c, 40s, 45s, 50s, 55s
Edgerton, Germeshausen & Grier, Inc., Mass., 20s
Edwards High Vacuum (Canada) Ltd., Canada, 30s
Elcor, Inc., Va., Current Integrators sc
Eldorado Electronics, Calif., 50sc
Electro Instruments, Inc., Calif., 40s
Electronic Products Co., N.Y., 45sc, 55sc
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 15s, 30s, 45s, Tel: BIgelow 2-2700**
**See ad on page 170**
Engineering Associates, Ohio, 25c, 50c
Eppley Lab., Inc., R.I., Thermopiles s
Etelco Ltd., England, 20sc, 40c, 50sc
Fairchild Camera & Instrument Corp., Defense Prods. Div., N.Y., 45c
Ferranti/Packard Electric, Ltd., Canada, 5c, 20c
Fisher Research Lab., Calif., 40c, 50c
Franklin Electronics, Inc., Pa., 40s
**Franklin Systems, Inc., 2734 Hillsboro Rd., P.O. Box 3250, West Palm Beach, Fla., 5sc, 15sc, 20sc, 40sc, 45sc, 50sc, 55sc, Underwater sc, Tel: TEmple 3-4602**
**See ad on page 320**
Gardiner Electronics Co., Ariz., 15s
General Devices, Inc., N.J., 40c
General Nuclear Corp., N.Y., 15sc, 45sc
Gyra Electronics Corp., Ill., Single-Channel Analyzers c
Hanner Electronics Co., Inc., N.J., 15s, 45s, 50s
Harman-Kardon, Inc., N.Y., 40c, 50c
Harvey-Wells Electronics, Mass., 50
Heath Co., Mich., 45s
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 50s, Tel: DAvenport 6-7000**
**See ad on pages 3-18**
High Vacuum Equipment Corp., Mass., 25c, 30sc
High Voltage Engineering Corp., Mass., 35sc, Isotopes sc
Hoffman Electron Tube Corp., N.Y., 15s, 45s
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 30s

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**ALPHA, BETA, GAMMA AND NEUTRON DETECTORS**



More than 100 types of detectors covering the entire range of nuclear radiation . . . unique configuration and "special application" devices. The Anton Neutron Detector Catalog and the Anton a, b, γ Detector Catalog belongs in your radiation facility reference file.



**AIR PARTICLE MONITORS**

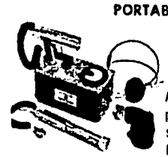
Portable and rack mounted a, b, γ air particle monitoring units. Moving paper and fixed paper instruments available. Produced to latest AEC and military specifications.

**PORTAL "CHECK-OUT" MONITORS**



Convenient, complete uninterrupted "head-to-toe" b, γ monitored exiting. Effective rapid portal monitor offers eight individual alarm channels. Complete with long-lived, thin-walled Anton halogen quenched stainless steel detectors.

**PORTABLE TRANSISTORIZED SURVEY METERS FOR LABORATORY OR FIELD USE.**



Available with beta-gamma probe, headset, carrying-strap, batteries (standard flashlight "D" cells) and complete manual. Type 700. Also available as above with interchangeable end-mica window alpha, beta, gamma probe in place of standard probe. Type 701.



**HAND AND FOOT MONITORS**

For a, b, γ detection and measurement. Equipped with scaler or ratemeter read-out. Auxiliary probes available. Incorporate long-lived, Anton halogen quenched stainless steel counters.

**ANTON ELECTRONIC LABORATORIES, INC.**

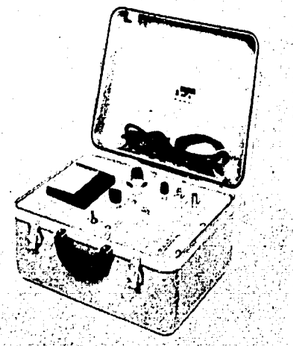
**1226 FLUSHING AVE., BROOKLYN 37, N. Y.**

For details, circle #241 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Iconix, Inc., Calif., 50s
Interstate Electronics Corp., Calif., 10s, 15s, 20s, 25s, 40s, 45s, 50s. Probes s
Isomet Corp., N.J., 10s, 15s
Isotope Developments, Ltd., England, 5s, 10s, 15s, 40s, 45s, 50s, 55s
Isotopes Specialties Co., Div. Nuclear Corp. of America, Calif., 5c, Isotopes c
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 40c, 50c
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 20c, 35s, Pulsed Neutron Generators c
**Kinney Mfg. Div., The New York Air Brake Co., 3631 Washington St., Boston 30, Mass., 30s, Tel: JAmaica 2-7100**
**See ad on page 35**
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 15sc, 25sc, 30c, 45s, 50c, 55sc
Landis & Gyr, Inc., N.Y., 15s, 25s, 45s, 55s
Landsverk Electrometer Co., Calif., 15s, 20sc, 25sc, 45s, 55c
**Leesona Corp., P.O. Box 1605, Providence 1, R.I., 20c, Tel: WIlliams 1-5200**
**See ad on page 674**
Levinthal Electronic Products, Inc., Calif., 10c, 45c
Lignes Telegraphiques et Telephoniques, France, 10c
Lind Instruments, Inc., N.J., 15c


**MODEL 15-2**
**ULTRA-SENSITIVE SCINTILLATION SURVEY METER**



**10,000 c.p.m. background (.01 mr/hr) up to 10,000,000 c.p.m. 7" diameter plastic scintillator, all transistorized**

**FRANKLIN SYSTEMS, INC.**
POST OFFICE BOX 3250
WEST PALM BEACH, FLA.

For details, circle #242 on Reader Service Card


**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 5c, 45s, Tel: ROgers 9-5312**
**See ad on page 364**
Maico Electronics, Inc., Minn., 5c, 15c, 50c, 55c
Martin Co., The, Md., Power Supplies c
Menlo Research Laboratory, Calif., 15s, 20c, 45sc, 50s, 55sc
Milgo Electronic Corp., Fla., 40sc
Minneapolis-Honeywell Regulator Co., Industrial Systems Div., Md., 40s
Naniloa Corporation, Ohio, 40sc, 50c
National Standard Electronics, Inc., N.Y., 20c, 45s
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 40c, 50c, Tel: HOward 5-7700**
**See ad on page 498**
**New York Air Brake Co., Kinney Mfg. Div., 3631 Washington St., Boston 30, Mass., 30s, Tel: JAmaica 2-7100**
**See ad on page 35**
Nichols Ltd., R. H., Canada, 45s, 55s
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 50s, Tel: NAtional 2-6485**
**See ad on pages 27-30**
Northern Electronic & Vacuum Industries, Canada, 10c, 45c
Nuclear-Chicago Corp., Ill., 10s, 15s, 20s, 25s, 30s, 40s, 45s, 50s, 55s
Nuclear Corp. of America, Instrument & Research Div., N.J., 5c, 10sc, 15sc, 20sc, 25c, 30sc, 40sc, 45sc, 50s, 55sc, Isotopes sc
Nuclear Development Laboratory, Mo., 15sc, 25sc, 45sc
Nuclear Electronics Corp., Pa., 15s, 25s, 40s, 45s, 50s, 55s
Nuclear Measurements Corp., Ind., 15s, 20s, 45s, 50s, 55s
Nucleonic Corp. of America, N.Y., 15s, 20s, 40s, 45s, 50s, 55s
Ohmart Corp., The, Ohio, 5c, 15sc, 25sc, 45sc
Pacific Electro-Nuclear Corp., Calif., Pulse Height Analyzers s
Pacific Transducer Corp., Calif., 20s, 45s
Packard Bell Electronics Corp., Calif., 15c, 45c
Patent Button Co. of Tennessee, Inc., The, Tenn., 20c
Patterson Moos Research, Div. Leesona Corp., N.Y., 20c
Peer, Incorporated, Tex., 35c
Philips Electronic Instruments, N.Y., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s, X-Ray s
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s
Philips Laboratories, N.Y., 15c, 40c, 45c
Radiation Dynamics, Inc., N.Y., 35c
Radiation Instrument Development Lab., Inc., Ill., 15s, 20s, 45s, 50s, Pulse Height Analyzers s
Rank Cintel, Ltd., England, 20s, 40s, 50s
Research Industrial Laboratory of Electronics, Pa., 5c
Reuter-Stokes Electronic Components, Inc., Ohio, 15sc, 25sc, 45sc
Riggs Nucleonics Corp., Subsid. International Electronic Research Corp., Calif., 15s, 25s, 45s, 55s
Savoy Electronics, Inc., Fla., 10c
Semi-Elements, Inc., Pa., 10s, 15c, 45c
Servomechanisms, Inc., Calif., 30c
Shepard Laboratories, Inc., N.J., 45c
Sierra Electronic Corp., Div. Philco Corp., Calif., 30s
Sillcocks-Miller Co., The, N.J., 20c, 45c
Special Instruments Laboratory, Inc., Tenn., 25c, 45c
Specialty Electronics Development Corp., N.Y., 20sc, 45sc, 55sc
Sperry Gyroscope Co. of Canada, Ltd., Canada, 5c, 15c, 45c
Stokes Corp., F. J., Pa., 30s
Strand Engineering Co., Mich., 45s, 55sc
Sylvania Electric Products Inc., N.Y., 30s
Systron-Donner Corp., Calif., 50c
TRG, Incorporated, N.Y., 10c, 20c, 45c, 55c
Technical Associates, Calif., 25s, 45s, 50s, 55s, Automatic Sample Changers s, Gamma Ray Spectrometers s
Technical Industries Corp., Calif., 15c, 45c
Technical Measurement Corp., Conn., 15s, 40s, 45s, 50s
Telechrome Mfg. Corp., N.Y., 5sc, 15sc, 20sc, 45s, 50c, 55sc
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 55c, Tel: YE 2-8600**
**See ad on page 338**
Tracerlab Inc., Mass., 5sc, 15sc, 20sc, 25sc, 30sc, 45sc, 50sc, 55sc, Automatic Sample Changers sc, Probes sc
Transistor Specialties, Inc., N.Y., 5c, 15c, 40c, 50c
Trott Electronics, Inc., N.Y., 40c, 50c
Tullamore Electronics Corp., Ill., 40, 50
**Tung-Sol Electric Inc., 1 Summer Ave., Newark 4, N.J., 20, 45, 55, Tel: HUmboldt 2-4200**
**See ad on pages 74-75**
United States Radium Corp., N.J., Isotopes sc
U. S. Science Corp., Calif., 15c
**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 25s, 30s, Tel: AN 1-2660**
**See ad on page 678**
**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 35c, Tel: DAvenport 6-4000**
**See ad on pages 116-117**
**Veeco Vacuum-Electronics Corp., Terminal Drive, Plainview, L.I., N.Y., 15s, 30s, Tel: OVerbrook 1-8300**
**See ad on page 681**
**Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 10s, 15s, 20s, 25s, 30s, 40s, 45s, 50s, 55s, Tel: ENdicott 1-6200**
**See ads on pages 535, 578**
Vinco Electronics Corp., Conn., 50c
Wave/Particle Corp., Calif., 35
**Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick St., Chicago 10, Ill., 30s, Tel: MIchigan 2-2000**
**See ad on page 681**
**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 30s, 45s, Tel: REgent 9-3611**
**See ad on page 580**
Wood Counter Laboratory, N., Ill., 15sc, 45sc





# Directory I. Complete Equipment

**Null indicators:**
**See class 14**

**Ohmmeters:**
**See class 14**

**Optical filters:**
**See class 17**

**Oscillators, beat frequency:**
**See class 3**

**Oscillators, microwave test:**
**See class 21**

**Oscillators, radio frequency test:**
**See class 28**

**Oscillators, telemetering:**
**See class 36**

## 25. Oscilloscopes and Cameras.

5. General purpose oscilloscopes
10. Oscilloscope cameras
15. Oscillosynchroscopes
20. Recording oscillographs
25. Special UHF & pulse analysis equipment
30. Time & voltage calibrators

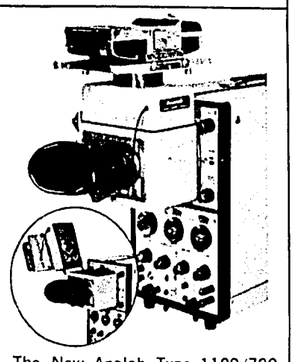
Airmec Limited, England, 5c
Allegany Instrument Co., Inc., Md., 10s, 20sc
Allen Electric & Equip. Co., Mich., 25sc
**Analab Instrument Corp., 30 Canfield Rd., Cedar Grove, N.J., 5s, 10s, 15s, 30s, Tel: CEnter 9-6500**
**See ad on this page**
**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 25c, 30c, Tel: LIberty 9-1500**
**See ad on page 353**
Artronic Instrument Co., The, Md., 25c, 30c
**Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., Airborne Cameras c, Tel: OLiver 8-8911**
**See ad on page 278**
Beattie-Coleman, Inc., Calif., 10sc
Beckman & Whitley, Inc., Calif., 10sc, Research Cameras sc
Benson-Lehner Corp., Calif., 10c
Brush Instruments, Ohio, 20s
**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 5sc, Tel: CLoverdale 3-8931**
**See ad on this page**
Canadian Marconi Co., Canada, 5s
Canoga Division, Underwood Corp., Calif., 25s
Capehart Corp., N.Y., 5c
Central Research Laboratories, Inc., Minn., 20s, 25s
Century Electronics & Instruments, Inc., Okla., 20s

## 25. Oscilloscopes and Cameras.

Chadwick-Helmuth Co., Calif., 10s
Chicago Aerial Industries, Inc., Ill., 10sc
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 25s, 30s, Tel: OAkwood 7-6800**
**See ad on page 308**
Community Engineering Corp., Pa., 25c
Consolidated Electrodynamics Corp., Calif., 20s
Cosmic, Inc., D.C., 20s
Crown Engineering, N.M., 25c
Dayton Electronic Products Co., Ohio, 5sc
Dicon Corporation, N.Y., 20c
Direct T/V Replacements Ltd., England, 5s
EI Laboratories, Calif., 5


**Analab Oscilloscopes and Recording Cameras**

Analab, the originator of precision null-readout oscilloscopes, presents the most flexible series of oscilloscope building blocks yet produced. Sixty-four contacts between the main frame and the plug-in offer the widest versatility for both standard models and special-purpose oscilloscopes. The Analab standard units are:



The New Analab Type 1100/700 Oscilloscope with Type 3000 Oscilloscope Camera.

**Type 1100 Main Frame** as a basic cathode-ray indicator and X-Y plotter. Standard and Rack-mounted units. **Price: $385.00**

**Type 700 Dual-Channel Plug-in** with precision null-readout on sweeps and on identical, high-gain, dual-channel, d-c amplifiers, 100 μv per cm. **Price: $310.00**

**Type 200 Single-Channel Plug-in** with 1 mv per cm calibrated vertical amplifier and calibrated sweep time.

**Type 100 X-Y Plotter** with Type 1100 offers identical amplifiers, d-c to 500 kc, 40 mv per cm. **Price: $37.50**

**Type 3000 Series Oscilloscope Cameras** are designed with equally ingenious building blocks. A complete line of single-frame cameras with Polaroid® and/or Graflex backs, 35 mm or 70 mm continuous-motion backs, and 35 mm or 70 mm electric-pulsed film advance backs. **Price: $340.00-445.00**

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**Analab INSTRUMENT CORPORATION**
30 CANFIELD ROAD, ESSEX COUNTY, CEDAR GROVE, N. J., U. S. A.
CEnter 9-6500
*ANAlytical LABoratory Instruments*

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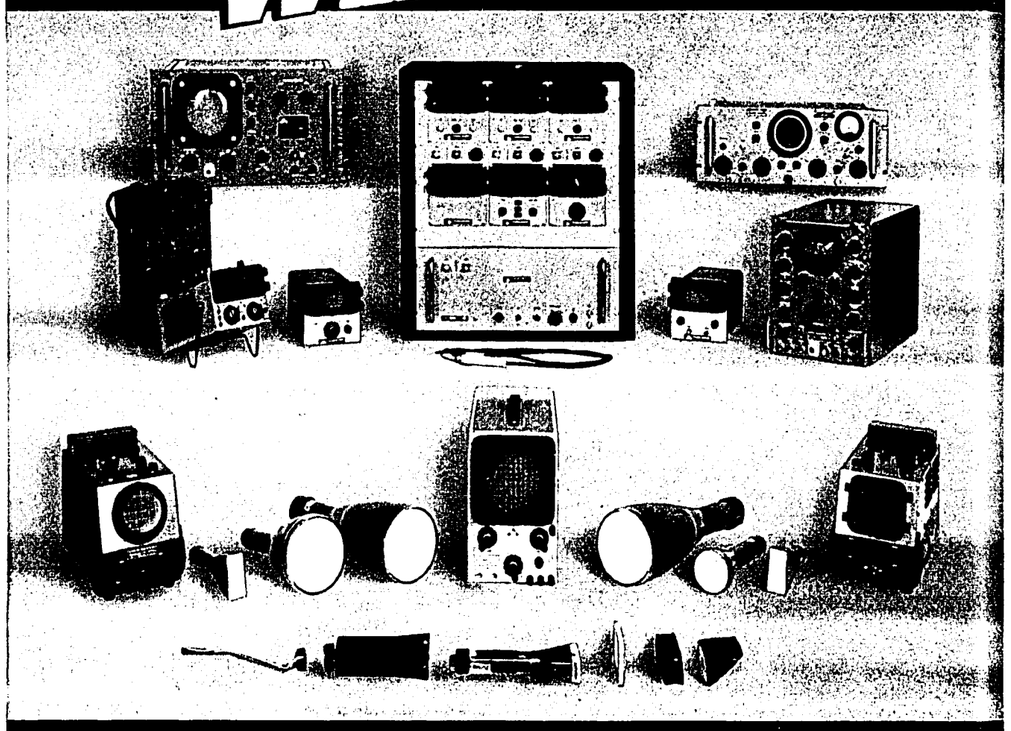
**This PANEL MOUNTED OSCILLOSCOPE, Model 32APM, mounts in a hole 5⅛" wide by 4⅜" high and extends 10½" beyond the front panel. The front panel dimensions are 6" wide by 5¾" high. The input impedance is 1 megohm and the frequency response is linear from 10 cycles to 40,000 cycles. The unit employs identical vertical and horizontal amplifiers, push-pull. The gain is approximately .1-.25 volts RMS per inch. This oscilloscope is complete with low and high voltage power supplies. Weight is 6 lbs.**

**BUILDING BLOCKS ELECTRONIC COMPANY**
**2172 E. 36th St., Brooklyn 34, N.Y. CLoverdale 3-8931**

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

SEE **Waterman** FIRST



FOR YOUR OSCILLOSCOPE AND CATHODE RAY TUBE NEEDS

**SYSTEMATS®**—The up-to-date custom approach to multi-function monitoring. Any number of modules may be mixed or matched. Built to industrial or military standards and uses PANELSCOPES as building blocks.

**PANELSCOPES®**—Standard and custom designed panel mounted oscilloscopes in modular form of 5 7/16" x 5¼". Amplifiers from 2½ mv/inch, up to 10 mc; triggered, repetitive or expanded sweeps; and automatic portrayal available. Rugged and military construction.

**PANELPACKS®**—Power supplies for PANELSCOPES and SYSTEMATS.

**RAKSCOPES®**—Standard and custom built rack mounted industrial and military type oscilloscopes.

**PULSESCOPES®**—A series of versatile pulse synchroscopes for Laboratory, Field and Airborne use.

**CRAFTSCOPES®**—A series of direct reading portable industrial oscilloscopes featuring 5-inch displays, small size (½ to ¾ cu. ft.) and weights as low as 18 lbs.

**POCKETSCOPES®**—A series of extremely portable time-tested industrial oscilloscopes less than ¼ cu. ft. and weight as low as 8 lbs. with wide performance specifications.

**RAYONIC® CATHODE RAY TUBES**—A complete line of 3-inch and 5-inch tubes made to EIA or MIL specs. with rectangular and round cross sections. Tube lengths: from 7 inches. P1, P2, P7, P11 and special phosphors available.

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Probes—Amplifier, Attenuator, Crystal, Cathode Follower
Carrying Cases
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**WATERMAN PRODUCTS CO., INC.**
2445 Emerald Street, Philadelphia 25, Pa.
GArfield 6-8600 • CABLE ADDRESS—Potatoscope

WATERMAN PRODUCTS

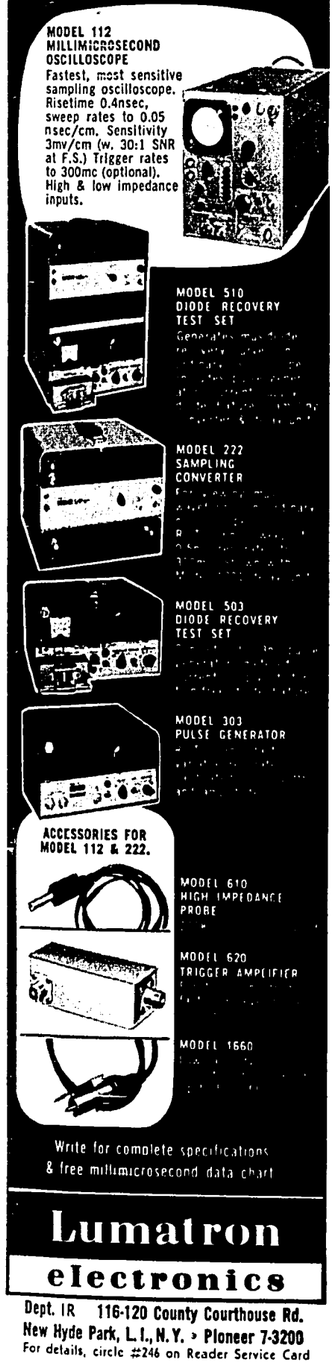
Write for Engineering Data or contact your nearest Waterman representative or authorized industrial distributor.

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**milli-μsec instruments for *every* fast rise time application**




Write for complete specifications & free millimicrosecond data chart

**Lumatron electronics**

Dept. IR 116-120 County Courthouse Rd.
New Hyde Park, L.I., N.Y. • Pioneer 7-3200
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# Directory I. Complete Equipment

## 25. Oscilloscopes and Cameras.

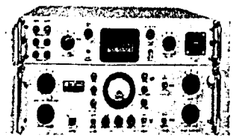
E.M.I.-Cossor Electronics Ltd., Canada, 5s, 10s, 25s
E.M.I. Electronics Ltd., England, 25s, 30s
E P I C, Inc., N.Y., 20s
Edgerton, Germeshausen & Grier, Inc., Mass., 10s, Wide Band s
Elcon Laboratory, Inc., Mass., 20c
Electro Precision Corp., Ark., 15, 25
**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 5s, 30s, Tel: STillwell 6-8700**
See ad on page 283
Electronic Measurements Corp., N.Y., 5s
Electronic Tube Corp., Pa., 5sc, 10sc, 25c
Electronics, Inc. of Pennsylvania, Pa., 5c
Engineering Associates, Ohio, 5c
Epsco Worcester, Mass., 20s
Erdco Engineering Corp., Ill., 15c
Fairchild Camera & Instrument Corp., Defense Prods. Div., N.Y., 10s
Flight Research, Inc., Va., 10s, Radar Recording Cameras s
Furzehill Labs., Ltd., England, 5s
General Electric Co., Apparatus Sales Div., N.Y., 20s
Geotechnical Corporation, The, Tex., 10s, 20s
Gilfillan Bros., Inc., Calif., 15c
Hallicrafters Co., The, Ill., 25c
Hathaway Instruments, Inc., Colo., 10s, 20s
Heath Company, Subsid. Daystrom, Inc., Mich., 5s
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 5s, 10s, 15s, 25s, 30s, Tel: DAvenport 6-7000**
See ad on pages 3-18
Hickok Electrical Instrument Co., The, Ohio, 5s
Hoffman Electron Tube Corp., N.Y., 5s
Hughes Aircraft Co., Industrial Systems Div., Calif., 5s
ITI Electronics, Inc., N.J., 5sc
Instruments of New England, Mass., 25sc
International Telephone & Telegraph Corp., ITT Industrial Products Div., Calif., 5s
Itek Corp., Mass., 20c
Jetronic Industries, Inc., Pa., 5c
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 15c, 30c
Kingston Electronics Div., Kingston Inds. Inc., Mass., 5s
Knight Electronics Corp., Ill., 5s
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 5sc, 25c, Tel: LOwell 6-2600**
See ad on page 312
**Lumatron Electronics, Inc., Dept. IR, 116-120 County Courthouse Rd., New Hyde Park, L.I., N.Y., 5s, 15s, 20s, 25s, Tel: PIoneer 7-3200**
See ad on this page
Mandrel Industries, Inc., Calif., 20s
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 5s, Tel: LOwell 7-0607**
See ad on page 332
Mast Development Co., Inc., Iowa, 5c, 10c
Mauer, Inc., J. A., N.Y., 10sc
Medistor Instrument Co., Wash., 30s
Metrologie, Compagnie Generale de, France, 5s
**Millen Manufacturing Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5sc, 15sc, Tel: DAvenport 4-4108**
See ad on page 402
Mohawk Business Machines Corp., N.Y., 5c
Molectronics, A Minneapolis-Moline Subsid., Calif., 5sc
Munzig International, Inc., Calif., 5s, 15s
National Scientific Laboratories, Inc., D.C., 20c, 25c, 30c
New England Scientific Instruments Co., Mass., 20s
**Norrman Labs., Ernst, Williams Bay, Wis., 30s, Tel: CIrcle 5-5516**
See ad on page 350
**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 5s, Tel: OVerbrook 1-8600**
See ad on page 286
OPTOmechanisms, Inc., N.Y., 10sc
Par Products Corp., Calif., 10c
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 30s, Tel: COmmonwealth 6-5375**
See ad on page 270
Philco Corporation, Govt. & Industrial Group, Pa., 5sc
Philips Electronic Instruments, N.Y., 5s, 10s
Philips Electronics Industries Ltd., Canada, 5s, 10s, 20s
Photron Instrument Co., Ohio, 20s
Precise Electronics & Development Corp., N.Y., 5s, 10c, 15c, 20c, 25c, 30c
Precision Apparatus Co., Inc., N.Y., 5s
Probescope Co., Inc., N.Y., 25s
Pye Telecommunications Ltd., England, 25s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 5s, Tel: HUmboldt 5-3900**
See ad on pages 54-55
Radiometer, Denmark, 5s
Railway Communications, Inc., Mo., 5sc, 15sc
Rank Cintel Ltd., England, 5s, 20s
Republic Electronic Industries Corp., N.Y., 5s, 15s, 20s
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 20s, Tel: TWinbrook 4-6300**
See ad on pages 64-65
Scopes Company, Inc., The, N.Y., 5s, 15s
Sierra Electronic Corp., Div. Philco Corp., Calif., 5s, 25c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

DATA COMMUNICATIONS CAPABILITIES

RIXON

## SPECIFICALLY DESIGNED TO SOLVE YOUR PROBLEMS*



### THE SEBIT-24 DATA TRANSCEIVER

For wireline and other voice communications circuits—up to 2400 bit per second in a 3 kc bandwidth. A fully transistorized transmitter-receiver plus a fast acting AGC and self-contained continuously variable delay equalizer in a single unit—for standard rack mounting—contains integral signal monitor and highly stable, automatically synchronized clock for detection and regeneration of received data pulses. Data input and output is serial, ground-referenced. Features low error rate and reliable performance under wide-range of adverse transmission conditions.

A recent development incorporating design refinements evolving from years of development and field test experience. In addition, emphasis is placed on high reliability.



### FILTERS—NETWORKS

Passive and tunable electronic filters. All types of special designs, prototypes, and production runs. We maintain our own toroidal winding and encapsulating facilities that supplement our extensive design experience.



### SEMICONDUCTOR POWER SUPPLIES

1500 models of packaged supplies available in prototype or production quantities on short notice. High reliability, reasonable pricing and superb service based on modular packages—proven circuits.



### DELAY EQUALIZERS

Improves data transmission accuracy by compensating for envelope delay distortion introduced by voice communications circuits. Relative delays, max. at mid-band and min. at band edges. Frequency of max. delay and compensating delay characteristics can be selected from standard models. Delay range greater than 0.8 to 3.5 ms continuously variable. Input and output 600 ohms. All models for standard 19" rack mounting.



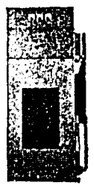
### DATA MODULATORS/ DEMODULATORS

For low cost (non-synchronous) operation at up to 1000 baud (bits/sec) and on-off tone keying for data and signaling, completely transistorized, carrier frequency can be selected. Axis crossing jitter less than ±50 micro seconds.



### LOW NOISE PREAMPLIFIERS

Reliable low noise amplifiers for remote location at or near antenna terminals, provide maximum signal-to-noise ratio. No need for expensive low loss transmission lines and low noise receiver front-ends. Models available for 15-25 mc, 30-40 mc, 36-51 mc, 70-100 mc, 100-170 mc and 400-500 mc.



**DUMMY ANTENNAS** A series of water-cooled dummy-load resistors for 50 kw dissipation over a 2 to 60 mc frequency range. Consists of a carborundum resistor assembly and impedance transforming network to provide wide range of input-impedances. Self-contained calorimeter. Also RELATED HIGH POWER TRANSMITTING EQUIPMENT.

* **DEVELOPMENT ENGINEERING** A wide variety of transistor and other circuit design applications for data processing equipment, instrumentation, high speed switching and signalling relays, and power supplies.

**SUBCONTRACT PRODUCTION** Electronic assemblies ranging from miniature modules to high power transmitters. Complete model shop, assembly, potting and core winding facilities available.

*Write for Engineering Bulletins on any of the above items.*

**RIXON ELECTRONICS, INC.**

2414 Reedie Dr. • Silver Spring, Md. • LO 5-4578

For details, circle #247 on Reader Service Card




## 25. Oscilloscopes and Cameras.

**Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 5s, Tel: ESterbrook 9-1121**
See ad on page 462

Skiatron Electronics & Television Corp., N.Y., 5s

Solartron Electronic Group Ltd., The, England, 5s, 20s

Solartron, Inc., Calif., 5s, 30s

Specialty Electronics Development Corp., N.Y., 5sc

Spivey, Inc., James S., D.C., 5c

Sunshine Scientific Instrument, Pa., 5s, 30s

Tektronix, Inc., Ore., 5s, 15s, 25c, Vectorscopes

Telechrome Mfg. Corp., N.Y., 10sc

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5sc, Tel: YE 2-8600**
See ad on page 338

Tracerlab, Inc., Mass., 15sc

**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 5c, Tel: OVerbrook 1-0400**
See ad on page 294

**Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 5sc, 15sc, 25c, 30sc, Tel: GArfield 6-8600**
See ad on page 322

Waters Mfg., Inc., Mass., 5s

Winslow Co., Inc., The, N.J., 5c, 15c

Wollensak Optical Co., N.Y., 10sc

**Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 5s, Tel: BEekman 3-6720**
See ad on page 296

**Paper, chart:**
See class 16

**Paper, sensitized, for facsimile equipment:**
See class 13

**Particle accelerators:**
See class 24

**Perforators, computer:**
See class 9

**Phase meters, audio frequency:**
See class 3

**Phase meters, radio frequency:**
See class 28

**Phonographs:**
See class 61

**Photo conductors:**
See class 70

**Photo electric equipment:**
See class 4





# Directory I. Complete Equipment

**Pick-ups:**
See class 61

**Picture tubes:**
See class 77

**Playback equipment, computers:**
See class 9

**Playback equipment, sound recording:**
See class 61

## 26. Point to Point Equipment.

5. Receivers 10. Transmitters

Adler Electronics, Inc., N.Y., 5sc, 10sc

Advanced Research Associates, Inc., Md., 5c, 10c

Aeronautical Communications Equip., Inc., Fla., 5s, 10s

Applied Electronics Co., Subsid., Raytheon Co., Calif., 5s, 10s

Applied Technology, Inc., Calif., 5c

Automation Dynamics Corp., N.J., 5c, 10c

Avionics Corp. of America, Pa., 5c

Barker & Williamson, Inc., Pa., 10c

Bristol Co., Conn., 5c, 10c

Budelman Electronics Corp., Conn., 5s, 10s

Bunnell & Co., J. H., N.Y., 10c

Cadre Industries Corp., N.Y., 5c, 10c

Canadian Marconi Co., Canada, 5s, 10s

Capehart Corp., Dynamic Electronics Div., N.Y., 5c

Chisholm Industries, Ltd., Canada, 5s, 10s

**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5sc, 10sc, Tel: OAkwood 7-6800**
See ad on page 308

Collins Radio Co., Iowa, 5s, 10s

Collins Radio Co., Central Sales Office, Tex., 5sc, 10sc

Collins Radio Co., Texas Division, Tex., 5s, 10s

**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 10c, Tel: EVergreen 1-1135**
See ad on page 156

Continental Mfg., Inc., Neb., 5s

Crosley Division, Avco Corp., Ohio, 5s, 10s

Designers For Industry, Inc., Ohio, 5c, 10c

Dollar Co., The Robert, Communications Equipment Div., Calif., 5c, 10c

Dynamics Corp. of America, N.Y., 10c

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, Tel: HAlifax 6-7491**
See ad on page 400

E.M.I.-Cossor Electronics, Ltd., Canada, 5c, 10c

**Electron Arc Div., Ionics, Inc., 244 Broad St., Lynn, Mass., 5c, 10c, Tel: LY 8-2100**
See ad on page 485

## 26. Point to Point Equipment.

Electronet Div., Rue Products, Calif., 5c, 10c

Electronic Applications, Inc., Conn., 5s

Erco Radio Labs., N.Y., 5sc, 10sc

Farinon Electric Co., Calif., 5sc, 10sc

Fisher Research Lab., Inc., Calif., 5c, 10c

GPL Division, General Precision, Inc., N.Y., 5sc, 10sc

General Electric Co., Ltd. of England, Telephone Works, England, 5s, 10s

General Electronic Laboratories, Inc., Mass., 5sc, 10sc

General Instrument Corp., Defense Eng. Products Group, N.Y., 5c, 10c

Gjadny Corp., Richard, N.Y., 5c, 10c

Granger Associates, Calif., 5c, 10c

Hallamore Electronics Co., Calif., 5c

Hallicrafters Co., The, Ill., 5c, 10c

Heath Co., Subsid. Daystrom, Inc., Mich., 5s, 10s

Intelex Systems, Inc., N.Y., 5s, 10s

International Business Machines Corp., N.Y., 5sc, 10sc

International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5s, 10s

International Telephone & Telegraph Corp., ITT Laboratories, Calif., 5c, 10c

International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c

Jetronic Industries, Inc., Pa., 5c, 10c

Johnson Co., E. F., Minn., 10s

Kaar Engineering Corp., Calif., 5s, 10s

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5c, 10c

**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 5c, 10c, Tel: AMityville 4-2200**
See ad on page 365

Lear, Inc., Calif., 5c, 10c

Lenkurt Electric Co., Inc., Calif., 5s, 10s

Levinthal Electronic Products, Inc., Calif., 10c

Lionel Corp., The, N.J., 5, 10

Litton Industries, Maryland Div., Md., 5, 10

Madigan Electronic Corp., N.Y., 5c, 10c

Magnavox Co., The, Ind., 5c, 10c

Mallory & Co., Inc., P. R., Ind., 5c, 10c

Manning, Maxwell & Moore, Inc., Conn., 5s, 10s

Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s

Melabs, Inc., Calif., 5c, 10c

Missile Systems Corp., Calif., 5s, 10s

Motorola, Inc., Ill., 5s, 10s

Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c

National Company, Inc., Mass., 5c, 10c

Nippon Electric Co., Ltd., Japan, 5c, 10c

**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5s, Tel: WAtkins 9-9117**
See ad on pages 36-39

Osborne Electronics Sales Corp., Ore., 5s, 10s

**Ostlund, E. M., P.O. Box 458, Andrew, N.J., 5, Tel: PArkway 9-6635**
See ad on page 629

Pearce-Simpson, Inc., Fla., 5c, 10c

Peer, Incorporated, Tex., 10c

Philco Corporation, Pa., 5sc, 10sc

Philco Corporation, Govt. & Industrial Group, Pa., 5sc, 10sc

Philips Electronics Industries, Ltd., Canada, 5s, 10s

Plectron Corp., Neb., 5s

Precise Electronics & Development Corp., N.Y., 5c, 10c

Production Research Corp., Subsid. Radio Condenser Co., N.Y., 10c

Pye Telecommunications, Ltd., England, 5s, 10s

RCA Victor Co., Ltd., Canada, 5c, 10c

Raval Engineering, Ltd., England, 5s, 10s

Radio Corp. of America, N.J., 5s, 10s

Radio Corp. of America, Defense Electronic Products, N.J., 5sc, 10sc

Radio Engineering Laboratories, Inc., N.Y., 5sc, 10sc

**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, Tel: EVergreen 8-6000**
See ad on page 506

Railroad Electronic Labs. of Omaha, Inc., Neb., 5c, 10c

Raytheon Co., Equipment Div., Mass., 5s, 10s

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 10c, Tel: LOckwood 5-4578**
See ad on page 324

**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 5s, 10s, Tel: PRescott 3-8010**
See ad on page 246

Space Electronics Corp., Calif., 5c, 10c

Specialty Electronics Development Corp., N.Y., 5c, 10c

Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., N.Y., 5c, 10c

Spilsbury & Tindall, Ltd., Canada, 5s, 10s

Standard Telephones & Cables, Ltd., England, 5sc, 10sc

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c

TMC (Canada), Ltd., Canada, 5sc, 10sc

**Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 5s, 10s, Tel: OWens 8-4800**
See ads on pages 344, 345

Telecomtrol Corp., N.J., 5c, 10c

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 10c, Tel: YE 2-8600**
See ad on page 338

**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 5sc, 10sc, Tel: TWining 8-1000**
See ad on page 260

Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c

Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 10c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## 26. Point to Point Equipment.

Topping Electronics, Ltd., F. V., Canada, 5c, 10c
U. S. Science Corp., Calif., 5c, 10c
Van Norman Industries, Inc., Electronics Div., N.H., 5c, 10c
Varo Mfg. Co., Inc., Tex., 5sc, 10sc
Westinghouse Electric Corp., Electronics Div., Md., 5c, 10c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 10sc, Tel: JUdson 2-3030**
**See ad on page 704**
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, 10sc, Tel: BEnton 1-0700**
**See ad on page 573**

**Positioning equipment:**
**See class 4**

**Potentiometers:**
**See class 69**

**Power meters, microwave test:**
**See class 21**

**Power output meters, audio frequency:**
**See class 3**

**Power output meters, radio frequency:**
**See class 28**

**Power supplies:**
**See class 63**

**Pre-amplifiers, phono:**
**See class 38**

**Pressure gages:**
**See class 14**

**Printers, computer:**
**See class 9**

**Processors, film:**
**See class 65**

**Production control equipment:**
**See class 4**

**Programming devices:**
**See class 9**

**Projectors, film:**
**See class 34**

**Public address systems:**
**See class 32**

**Pulse count integrators:**
**See class 24**

**Pulse generators, microwave:**
**See class 21**

**Pyrometers:**
**See class 17**

**"Q" meters:**
**See class 28**

**Racks, aging:**
**See class 14**

**Radar reflectors:**
**See class 39**

## 27. Radar Equipment.

**5. Airborne 15. Marine**
**10. Ground based**

ACF Electronics Div., ACF Industries, Inc., Md., 5s
A.R.F. Products, Inc., Ill., 5c
Admiral Corp., Ill., 5c
Aeronutronic, Div. Ford Motor Co., Calif., 5c, 10c, 15c
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 5c, 10c
American Machine & Foundry Co., D.C., 5c, 10c, 15c
Ansco Division, General Aniline & Film Corp., N.Y., 10c, 15c
**Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 5c, 10c, Tel: EDgewood 4-8770**
**See ad on page 379**
Applied Technology, Inc., Calif., 5c, 10c
Autonetics, Div. North American Aviation, Inc., Calif., 5c
BJ Electronics, Borg-Warner Controls, Calif., 5sc, 10sc
Bell Aircraft Corp., Avionics Div., N.Y., 5c, 10c, 15c
Bendix Corp., The, Bendix-Pacific Div., Calif., 5c, 15sc
Bendix Corp., The, Bendix Radio Div., Md., 5s, 10c
**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 5c, 10c, Tel: ATlas 8-2000**
**See ad on pages 103-106**
Bendix Corp., The, York Division, Pa., 5c, Simulators c, Fuzing c
Budd Electronics, Inc., N.Y., 5c, 10c, 15c
**Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 5c, 10c, 15c, Tel: ORiole 8-3070**
**See ad on page 479**
Canadian Aviation Electronics, Ltd., Canada, 5c
Canadian General Electric Co., Ltd., Electronic Equip. & Tube Dept., Canada, 5c, 10c
Canadian Marconi Co., Canada, 5s, 15s
Canadian Westinghouse Co., Ltd., Canada, 5c, 10c, 15c
Canoga Division, Underwood Corp., Calif., 5s, 10s, 15s
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 15c

## 27. Radar Equipment.

Chance Vought Electronics Div., Tex., 5sc, 10c, 15c
Chapin Electronics, Inc., Mass., 10sc
Chicago Electronic Div., Land-Air, Inc., Ill., 10c
Clipper Gear & Machine Co., Mich., 5c, 10c, 15c
Collins Radio Co., Iowa, 5s
Collins Radio Co., Central Sales Office, Tex., 5s, 10s
Collins Radio Co., Texas Division, Tex., 5s, 10s, 15s
**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 10c, Tel: EVergreen 1-1135**
**See ad on page 156**
Cook Electric Co., Ill., 5c, 10c, 15c
Cook Technological Center Div. Cook Electric Co., Ill., 5c, 10c, 15c
Crosley Division, Avco Corp., Ohio, 10s
**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 5c, 10c, Tel: SWarthmore 1-0100**
**See ad on page 510**
Daystrom, Inc., Military Electronics Div., Pa., 5c, 10c, 15c
Designers For Industry, Inc., Ohio, 5c, 10c, 15c
**Douglas Microwave Co., 252 E. Third St., Mount Vernon, N.Y., 5c, 10c, 15c, Tel: MOunt Vernon 8-6900**
**See ad on pages 90-91**
Dynamics Corp. of America, N.Y., 10c, 15c
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, Tel: HAlifax 6-7491**
**See ad on page 400**
E.M.I.-Cossor Electronics, Ltd., Canada, 5c, 10c, 15c
Edo Corp., N.Y., 15s
Ehrenpreis, David, Consulting Engineers, N.Y., 5c, 10c, 15c
**Electro-Pulse, Inc., 6711 S. Sepulveda Blvd., Los Angeles 45, Calif., 10c, 15c, Tel: OREgon 8-2244**
**See ad on page 264**
Electronic Assistance Corp., N.J., 5c, 10c
Electronic Communications, Inc., Fla., 5c
Electronic Specialty Co., Calif., 5c
Engineering Associates, Ohio, 5c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c
**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 5c, 10c, 15c, Tel: RAvenswood 1-9000**
**See ad on pages 125-128**
Fairchild Engine & Airplane Corp., Fairchild Astrionics Div., N.Y., 5c, 10c, 15c
Federal Manufacturing & Engineering Corp., N.Y., 10c, 15c
Federal Scientific Corp., N.Y., Simulators c
Flight Research, Inc., Va., 5 cameras s
G B Electronics, Subsid. General Bronze Corp., N.Y., 5sc, 10sc, 15s
GPL Division, General Precision, Inc., N.Y., 5sc
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 10c, 15c, Tel: GRanite 6-4411**
**See ads on pages 263, 267, 435, 437, 501, 621**





# Directory I. Complete Equipment

## 27. Radar Equipment.

General Electric Co., Light Military Electronics Dept., N.Y., 5c
General Electric Co., Ltd. of England, Telephone Works, England, 5s, 15s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c
General Mills, Inc., Mechanical Div., Minn., 5c
Gilfillan Bros., Inc., Calif., 5c, 10c, 15c
Goodyear Aircraft Corp., Ariz., 5c, 10c, 15c
Goodyear Aircraft Corp., Ohio, 5c, 10c
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 5c, 10c, 15c
Granger Associates, Calif., 5c, 10c
Granite State Machine Co., Inc., N.H., 10c
Gray Mfg. Co., The, Conn., 5c, 10c
Hallicrafters Co., The, Ill., 5c, 10c, 15c
Hampshire Engineering Co., Mass., 10c, 15c
Hazeltine Electronics Div., Hazeltine Corp., 5c, 10c, 15c
Hoffman Electronics Corp., Calif., 5sc, 10sc
I-T-E Circuit Breaker Co., Special Products Div., Pa., 5sc, 10c, 15c
Intercontinental Electronics Corp., N.Y., 10sc
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c, 15c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 5c, 10c, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kearfott Div., General Precision, Inc., Microwave Products, Calif., 5c, 10c, 15c
Knight Corp., Ewen, Mass., 10c
Kollmorgen Optical Corp., Mass., 15c
**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 5s, 10s, Tel: AMityville 4-2200**
**See ad on page 365**
Laboratory For Electronics, Inc., Mass., 5c, 10c
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 5sc, Tel: LOwell 6-2600**
**See ad on page 312**
Lear, Inc., Calif., 5c, 10c, 15c
Levinthal Electronic Products, Inc., Calif., 5c, 10c, 15c
Litton Industries, Maryland Div., Md., 5, 10, 15
**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 5c, Tel: REgent 9-4321**
**See ad on pages 112-113**
Lockheed Electronics Co., Stavid Division, N.J., 5c, 10c, 15c
Magnavox Co., The, Ind., 5c, 10c, 15c
Magnavox Research Laboratories, Calif., 5c, 10c
**Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 10c, Tel: DAvis 5-1391**
**See ad on pages 96-97**
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s, 15s
Marine View Electronics, Inc., N.Y., 10c
Marstan Electronics Corp., N.Y., 5c
Martin Co., The, Md., 5c, 10c
McKiernan-Terry Corp., N.J., 10c, 15c
Melabs, Inc., Calif., 5c, 10c, 15c
Microwave Electronic Tube Co., Inc., Mass., 5c, 10c, 15c
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 5c
Moran Instrument Corp., Calif., 5c, 15c
Motorola, Inc., Ill., 5s, 10s
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c, 15c
Nippon Electric Co., Ltd., Japan, 5c, 10c, 15c
Osborne Electronics Sales Corp., Ore., 5c, 10c, 15c
Otis Elevator Co., Defense & Industrial Div., N.Y., 5c, 10c
Packard Bell Electronics Corp., Calif., 5c
Pam Associates, Inc., Md., 5c, 10c, 15c
Peer, Incorporated, Tex., 10c
Perkin Engineering Corp., Calif., 5sc
Philco Corporation, Pa., 5c, 10c
Philco Corporation, Govt. & Industrial Group, Pa., 5c, 10c, 15c
Philips Electronic Instruments, N.Y., 5s
Philips Electronics Industries, Ltd., Canada, 10sc, 15sc
RCA Victor Co., Ltd., Canada, 10c, 15s
**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 5c, 10c, Tel: DAvenport 1-1130**
**See ad on page 243**
Radiation, Inc., Fla., 5sc, 10sc
Radio Corp. of America, N.J., 15s
Radio Corp. of America, Defense Electronic Products, N.J., 5sc, 10c, 15sc
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, 15c, Tel: EVergreen 8-6000**
**See ad on page 506**
Ramage & Miller, Inc., Calif., 5sc, 10sc
Raymond Engineering Laboratory, Inc., Conn., 5c, 10c
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 5sc, 10sc, 15sc
Raytheon Co., Equipment Div., Mass., 5c, 10c, 15c
Reeves Instrument Corp., N.Y., 10c
Republic Aviation Corp., N.Y., 5c, 10c, 15c
Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c
Resdel Engineering Corp., Calif., 10c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, Tel: LOckwood 5-4578**
**See ad on page 324**
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 5c
**Sierra Research Corp., P.O. Box 22T, Buffalo 25, N.Y., 5c, 10c, 15c, Tel: NF 2-8823**
**See ads on pages 271, 356, 662**
Sigma Electronics Research Corp., Wash., 5c, 10c, 15c
Skiatron Electronics & Television Corp., N.Y., 5c, 10c, 15c
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 5c, Tel: EMpire 4-2271**
**See ad on page 420**
Space Electronics Corp., Calif., 5c, 10c, 15c
Specialty Electronics Development Corp., N.Y., 5c, 10c, 15c
Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 5c, 10c, 15c
Sperry Gyroscope Co., Sunnyvale Development Center, Calif., 5c, 10c
Sperry Gyroscope Co. of Canada, Ltd., 5c, 10c, 15c
Sperry Piedmont Co., Va., 10c, 15sc
Standard Telephones & Cables, Ltd., England, 5sc, 10sc
Strand Engineering Co., Mich., 5c, 10c
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c, 15c
Sylvania Electric Products Inc., N.Y., 5c, 10c, 15c

L. LEVINTHAL ELECTRONIC PRODUCTS
Subsidiary of Radiation Incorporated



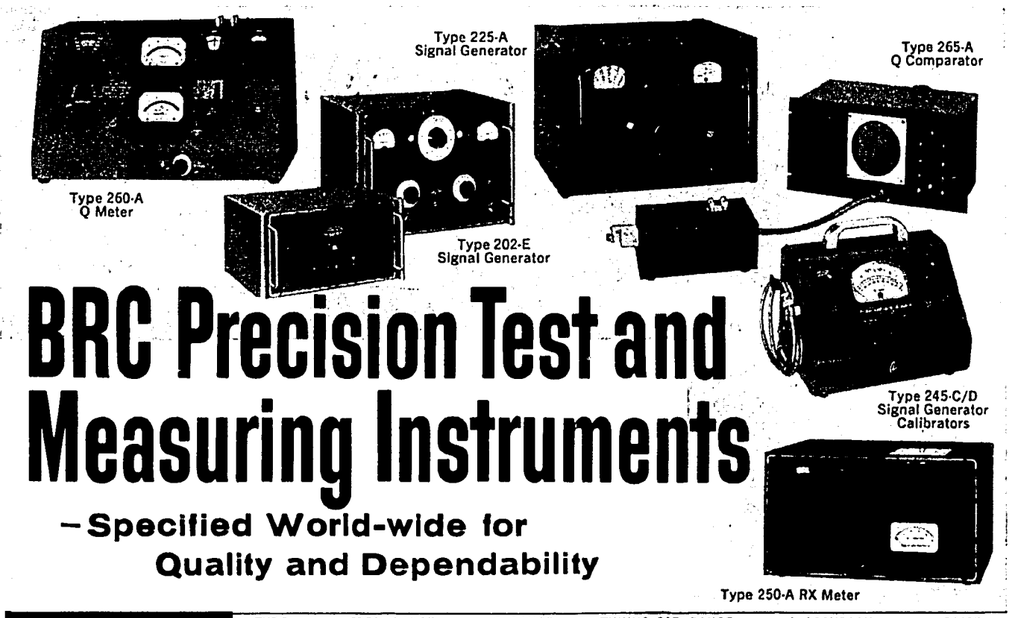
*Levinthal Model 215T Klystron Transmitter for long-range radar. In the 700- to 900-mc band, it produces 50KW peak power with 45db power gain*

One example from the many custom-produced Levinthal radar systems ranging from kilowatts to multi-megawatts. An expert capability has been developed for klystron power amplifiers and modulators as well as large power supplies.

FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL
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WALTHAM .....TWinbrook 4-1955
SYRACUSE .....GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400
For details, circle #248 on Reader Service Card



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.




# BRC Precision Test and Measuring Instruments

**—Specified World-wide for Quality and Dependability**

| | TYPE | FREQ. RANGE | Q RANGE | TUNING CAP. RANGE | Q ACCURACY | PRICE |
|---|---|---|---|---|---|---|
| Q Meters | 260-A | 50KC to 50MC | 10 to 625 | 30 to 460$\mu\mu$f | 5% to 30MC | $850.00 |
| | 190-A | 20 to 260MC | 5 to 1200 | 7.5 to 100$\mu\mu$f | 7% to 100MC | $875.00 |
| | 280-A | 200 to 600MC | 20 to 25000 | 4 to 25$\mu\mu$f | | |

| | TYPE | FREQ. RANGE | Q RANGE | L RANGE | C RANGE | R RANGE | PRICE |
|---|---|---|---|---|---|---|---|
| Q Comparators | 265-A | 200KC to 70MC | 30 to 500 | .15$\mu$h to 15mh | 5$\mu\mu$f to .01$\mu$f | 500$\Omega$ to 20M$\Omega$ | $795.00 |

| | TYPE | FREQ. RANGE | OUTPUT RANGE | FM MOD. | AM MOD. | PRICE |
|---|---|---|---|---|---|---|
| FM-AM Signal Generators | 202-E | 54 to 216MC | 0.1$\mu$v to 0.2 v | 0 to 240KC | 0 to 50% | $1125.00 |
| | 202-G | 195 to 270MC | 0.1$\mu$v to 0.2 v | 0 to 240KC | 0 to 100% | $1100.00 |
| | 225-A | 10 to 500MC | 0.1$\mu$v to 0.1 v | 0 to 60KC | 0 to 30% | $ 945.00 |

| | TYPE | FREQ. RANGE | OUTPUT RANGE | SWEEP RANGE | AM MOD. | MARKERS | PRICE |
|---|---|---|---|---|---|---|---|
| Sweep Signal Generators | 240-A | 4.5 to 120MC | 1$\mu$v to 0.3v. Sweep<br>.1$\mu$v to 0.1v. CW & AM | ±1% to ±30% of center freq. | 30% | crystal and pip. | $1820.00 |

| | TYPE | FREQ. RANGE | OUTPUT RANGE | MODULATION | MODULATING FREQ. | PRICE |
|---|---|---|---|---|---|---|
| Aircraft VOR ILS Signal Generators | 211-A | 88 to 140MC | 0.1$\mu$v to 0.2v. | 0-100% AM | 400 & 1000 cps | $1890.00 |
| | 232-A | 329.3 to 335MC | 1$\mu$v to 0.2v. | 0-100% AM | 90/150 & 1000 cps | $1990.00 |

| | TYPE | FREQ. RANGE | OUTPUT RANGE | POWER RANGE |
|---|---|---|---|---|
| Aircraft DMET ATC Test Set | 235-A | 960 to 1215MC | −10 to −100 dbm | 23 to 33 dbw |

| | TYPE | $\alpha$ RANGE | $\beta$ RANGE | Hib RANGE | PRICE |
|---|---|---|---|---|---|
| Transistor Test Set | 275-A | 0 to 0.9999 | 0 to 200 | 0.30 to 3000$\Omega$ | $935.00 |

| | TYPE | FREQ. RANGE | R RANGE | C RANGE | L RANGE | PRICE |
|---|---|---|---|---|---|---|
| RX Meters | 250-A | 500KC to 250MC | 15$\Omega$ to 100,000$\Omega$ | 0 to 20$\mu\mu$f | 0.001$\mu$h to 100mh | $1525.00 |

| | TYPE | FREQ. RANGE | CALIBRATED INPUT | CALIBRATED OUTPUT | % AM RANGE | PRICE |
|---|---|---|---|---|---|---|
| Signal Generator Calibrators | 245-C | 500KC to 1000MC | 0.025, 0.05, 0.1v | 5, 10 or 20$\mu$v | 10-100% | $390.00 |
| | 245-D | 500KC to 1000MC | 0.025, 0.05, 0.1v | 0.5, 1.0, or 2.0$\mu$v | 10-100% | $385.00 |

| | TYPE | FREQ. RANGE | OUTPUT RANGE | FM MOD. | AM MOD. | ACCESSORY TO: | PRICE |
|---|---|---|---|---|---|---|---|
| Univerters | 207-E | 100KC to 55MC | 1$\mu$v to 0.1v. | 0 to 240KC | 0 to 50% | 202-E | $430.00 |
| | 207-G | 100KC to 55MC | 1$\mu$v to 0.1v. | 0 to 240KC | 0 to 100% | 202-G | $520.00 |
| | 203-B | 100KC to 25MC | 1$\mu$v to 0.1v. | 0 to 15MC | 30% | 240-A | $420.00 |

| | TYPE | MEASURES | THICKNESS | PRICE |
|---|---|---|---|---|
| Film Gauge | 255-A | Non-magnetic Metals | 0.000004" to 0.0002" | $575.00 |

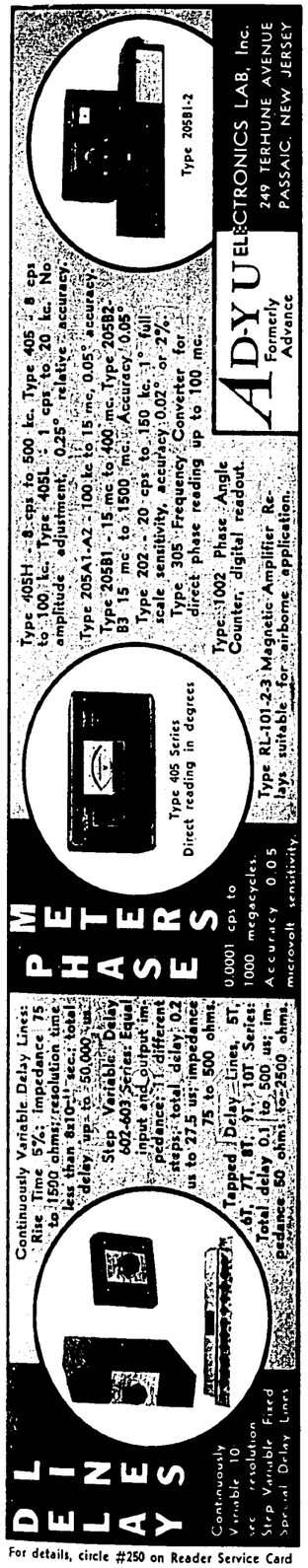
BRC Precision Test Equipment is engineered and manufactured to the highest standards of the industry—standards that have made the BRC trademark a recognized symbol of precision and dependability throughout the world. Highly qualified representatives—specialists in electronic test equipment—stand ready to solve customer problems in every major foreign and domestic area. Write today for the illustrated BRC catalog.

**Boonton Radio Corporation**
*Precision Electronic Instruments since 1934*
BOONTON • NEW JERSEY




For details, circle #249 on Reader Service Card




For details, circle #250 on Reader Service Card




# Directory I. Complete Equipment

## 27. Radar Equipment.

**Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 5, 10, 15, Tel: YOrkshire 8-6211**
See ad on pages 48-49
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 5c, 10c, 15c
Systems, Inc., Fla., 5c
TRG, Incorporated, N.Y., 5sc, 10c
Telecomputing Corp., Calif., 5c, 10c, 15c
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 10c, Tel: YE 2-8600**
See ad on page 338
**Teltronics, Inc., 277 Main St., Nashau, N.H., 5c, 10c, Tel: TUxedo 2-6264**
See ad on page 337
Temco Electronics, Tex., 5c, 10c
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c, 15c
Thompson Ramo Wooldridge Inc., Calif., 10c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 10c
Transdyne Corp., N.Y., 10c
United Aircraft Corp., Norden Div., Conn., 5sc
United Shoe Machinery Corp., Mass., 5c, 10c, 15c
U. S. Science Corp., Calif., 5c, 10c, 15c
**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 5c, 10c, 15c, Tel: DAvenport 6-4000**
See ad on pages 116-117
Washington Aluminum Co., Inc., Md., 5c, 10c, 15c
Webcor, Inc., Ill., 5c, 10c, 15c
Westinghouse Electric Corp., Air Arm Div., Md., 5s
Westinghouse Electric Corp., Electronics Div., Md., 10c, 15c
Wickes Engineering & Construction Co., N.J., 10c
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, Tel: BEnton 1-0700**
See ad on page 573
Wiley Electronics Co., Ariz., 5c

**Radiation detectors:**
**See class 24**

## 28. Radio Frequency Test Equipment.

| | |
|---|---|
| 5. Field strength meters | 45. RF power output meters |
| 10. Impedance & admittance meters | 50. RF signal generators |
| 15. Marker generators | 55. Signal generators, AM |
| 20. Multi-vibrators | |
| 25. Noise & field intensity meters | 60. Signal generators, FM |
| 30. Oscillators | 65. Signal generators, SSB |
| 35. Phase meters | |
| 40. "Q" meters | 70. Sweep generators |

**Acton Labs., Inc., 500-B Main St., Acton, Mass., 10s, 35s, Tel: COlonial 3-7756**
See ad on page 346

## 28. Radio Frequency Test Equipment.

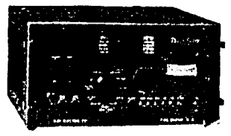
**Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 35sc, Tel: GRegory 2-5622**
See ad on this page
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 30s
Aircraft Radio Corp., N.J., 50s
Airmec Limited, England, 5s, 25s, 30s, 35c, 50s, 55s, 60s, Modulation Meters s, RF Voltmeters s
Alfred Electronics, Calif., 55s, 70s
American Development Electronics Co., N.J., 5c
American Quartz Laboratories, Inc., N.Y., 30c
American Research & Mfg. Corp., Md., 30c
Antlab, Inc., Ohio, 45sc
**Arenberg Ultrasonic Laboratory, Inc., 94 Green St., Jamaica Plain 30, Mass., 30s, Tel: JAmaica 2-8640**
See ad on page 435
Avionics Corp. of America, Pa., 50c, 55c, 60c
Avo Limited, England, 50s, 55s, 60s
BJ Electronics, Borg-Warner Controls, Calif., 50sc, 55sc, 60sc
Babcock Radio Engineering, Inc., Calif., 50sc, 60sc
Barker & Williamson, Inc., Pa., 45sc
Bellaire Electronics, Inc., N.J., 5c, 30c
**Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 45sc, Tel: CHurchill 8-1200**
See ad on page 306
Blonder-Tongue Laboratories, Inc., N.J., 5s
**Boonton Electronics Corp., 738 Speedwell Ave., Morris Plains, N.J., 25s, Tel: JEfferson 9-4210**
See ad on page 256
**Boonton Radio Corp., 50 Intervale Rd., Boonton, N.J., 10, 40, 50, 55, 60, 70, Tel: DEerfield 4-3200**
See ad on page 328
Bruno-New York Industries Corp., N.Y., 45c, 50c
Brunswick Instruments, N.J., 45c
**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 30sc, Tel: NEwtown 9-5700**
See ad on page 426
Canadian Marconi Co., Canada, 5s, 10s, 25s, 30s, 40s, 45s, 50s, 55s, 60s, 70s
Canadian Westinghouse Co., Ltd., Canada, 45sc
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 45c, 50c, 55c, 60c, 70c
Chesapeake Instrument Corp., Md., 10sc
Chicago Electronic Div., Land-Air, Inc., Ill., 5c
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 30s, 50s, 55s, 60s, 65sc, 70s, Tel: OAkwood 7-6800**
See ad on page 308

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# KAY Electronic Test & Measuring Instruments

• Sweeping Oscillators • Noise Figure Measurement • TV Picture & Sound Signal Sources • Marker Generators • Pulsed Carrier Generators • Signal Generators • Attenuators • Sound Spectrographs • Gain and Loss Test Sets • Spectrum Analyzers • Vibration Analyzers • Vacuum Tube Voltmeters • Transistorized Test Instruments • Voltmeters • Audio-Oscillator • Fluttermeter •

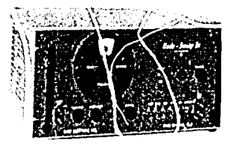
## SWEEPING OSCILLATORS



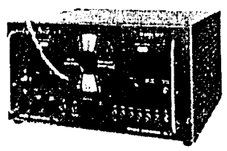
*Vari-Sweep*®

| INST. | RANGE | TUNING | WIDTH | OUTPUT | PRICE* |
|---|---|---|---|---|---|
| MEGA-SWEEP® | 50kc-1000mc | continuous | 0-40mc | 100mv | $525.00 |
| CALIB. MEGA-SWEEP | 50kc-950mc | single dial | 0-40mc | 50mv | $625.00 |
| MEGA-SWEEP 111A | 10mc-500mc<br>400mc-950mc | zero level<br>beep line | 0-40mc | .15V rms 70 ohms<br>3V rms 300 ohms | $625.00 |
| VARI-SWEEP® | 2-220mc Fund. | continuous | Up to 30mc plus | 1.0V rms 70 ohms | $795.00 |
| VARI SWEEP 400 | 15-470mc | continuous | 30mc plus | 1.0V rms<br>70 ohms | $895.00 |
| MAGNA-SWEEP MODEL "S" | 2700-3800mc | continuous | 1600mc | 1V rms AGC | $3,950.00 |

## SWEEPING OSCILLATORS WITH MARKS



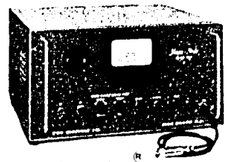
*Rada-Sweep*® *Sr.*



*Ligna-Sweep*® *SKV*

| INST. | RANGE | TUNING | WIDTH | MARKERS | OUTPUT | PRICE* |
|---|---|---|---|---|---|---|
| MARKA-SWEEP®<br>MODEL VIDEO | 50kc-20mc | 3 ranges<br>50kc-20mc | complete<br>range | 6 Crystals | 0.2V rms<br>70 ohms | $575.00 |
| MARKA-SWEEP<br>MODEL VIDEO TTV | 50kc-8mc | | 0.8mc | 5 Crystals<br>1 Variable | 1.5V rms<br>70 ohms | $795.00 |
| MARKA-SWEEP<br>MODEL VIDEO 70 | 50kc-60mc | contin. | 4.50mc<br>contin. variable | 8 Crystals | 1.0V P-P<br>70 ohms | $845.00 |
| VARI-SWEEP<br>MODEL RADAR<br>AND MODEL IF | 10-145mc<br>Fund.<br>4-120mc<br>Fund. | contin.<br>contin. | 30mc+<br>30mc+ | 11 Crystals<br>1 Variable<br>11 Crystals<br>1 Variable | 1.0V rms<br>70 ohms<br>1.0V rms<br>70 ohms | $985.00<br>$985.00 |
| RADA-SWEEP® SR | 1-260mc<br>Fund. | 6 switched<br>Bands | 60-70mc | 24 Crystals | 0.5V rms<br>70 ohms | $725.00<br>plus crystals |
| KILO-SWEEP® | 50kc-2mc<br>5mc<br>10mc | contin. | contin. to 100kc | 6 Crystals | 0.25V rms<br>70 ohms | $595.00-$895.00 |
| SONA-SWEEP®<br>MODEL M | 20cps-200kc | contin. | 500c-20kc<br>2kc-200kc | 10 Crystals | 5V rms<br>600 ohms | $895.00 |
| RALA-SWEEP | 20-40mc<br>50-70mc | | 20mc or 3mc | 9 Crystals | .25V rms<br>70 ohms | $450.00 |
| LIGNA-SWEEP® CP | 100kc-220mc | 6 switched<br>Bands | 10-60mc<br>contin. variable | 18 Crystals | 1.0V rms<br>70 ohms | $795.00<br>plus crystals |
| LIGNA-SWEEP SKV | 200kc-220mc | 1 Audio<br>3 Video<br>9 VHF<br>8 Cust. Sel. | 1kc-12mc<br>10-220mc<br>20kc-12mc | Optional<br>Internal | 1.0V rms<br>600 ohms &<br>70 ohms | $1295.00 |

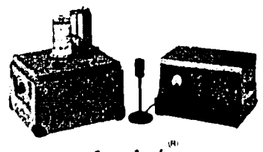
## NOISE FIGURE MEASUREMENT . . . NOISE GENERATORS



*Mega-Node*® 3000

| INST. | RANGE | NOISE FIG. RANGE | PRICE* |
|---|---|---|---|
| MEGA-NODE® | 5-220mc | 0-16db @ 50 ohms<br>0-23.bdb @ 300 ohms | $375.00 |
| MEGA-NODE 3000 | 1-3000mc | 0-20.db @ 50 ohms | $795.00 |
| MICROWAVE<br>MEGA-NODES | 1120-26 500mc | Fluorescent Tubes 15.8 ± .25db<br>Inert Gas Tubes 15.28 ± .1db | $175.00-$595.00<br>(with power supply) |
| MEGA-NODE 403-A | 3-500mc | 0-19db, 50 ohms | $375.00 |
| THERMA-NODE | 2-1100mc | ± 0.1db @ 50 ohms-unbal. | $550.00 |

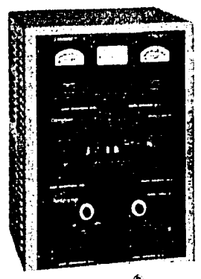
## SPECTRUM ANALYSIS



*Sona-Graph*®

| INST. | DESCRIPTION | FREQ. RANGE | FEATURES | PRICE* |
|---|---|---|---|---|
| VIBRALYZER® | Vibration Frequency Analyzer. | 4-4400cps | Displays amplitude vs frequency vs time. Provides permanent record. | $2495.00 |
| SONA-GRAPH® | Sound spectrograph for frequency analysis of audio energy. | 85-8000cps | Records frequency and intensity to time. | $2410.00 |
| ECHO-VOX® SR. | Provides variable periods of time delay at audio frequencies. | 40-12,000cps | 20 to 1600 millisecond delay range. | $2150.00 |
| SONALYZER®<br>MODEL 30 | A 30-Channel all-electronic spectrum analyzer providing immediate visible display of complex waveforms up to 20,000 cps. | | | $1995.00 |
| SONOGRAM<br>DISPLAY UNIT | Accessory for use with Sonalyzer to provide a 3-dimensional—frequency vs intensity vs time—display on long persistence scope. | | | $495.00 |
| VARI-VOX® | A compressor and expander for audio signals; slows to 1/3 or doubles normal tempo with no loss of intelligibility. | | | $1695.00 |

## OTHER INSTRUMENTS



*Transalyzer*®

| INST. | RANGE | RANGE OF MEASUREMENT | FEATURES | PRICE* |
|---|---|---|---|---|
| DRD METERS® | 1.1-18Kmc | Direct reading digital frequency meters with coupling elements for waveguide or coaxial line. Accuracy ±0.1%. | | $465.00-<br>$785.00 |
| MICROLTER 50 VTVM | 100cps-50mc | Full scale: 1mv-1V in 7 ranges. May be used as 50mc video amp. | | $695.00 |
| TRANSALYZER | 50kc-50mc | Measures Alpha and Alpha Cutoff-Collector and Emitter Current, 3 Voltages—Emitter to Base, Emitter to Collector, and Base to Collector. | | $2195.00 |
| MEGA-MATCH® | 10mc-1000mc | Contin. tuned sweeping oscillator. | Displays reflected energy. Checks matching impedance. | $895.00 |
| UTILATOR | 4.5-220mc | Fundamental Freq. Utility Oscillator. | 0.7V rms into 70 ohms metered AGC'd. | $395.00 |
| GAIN SET® | Complete Equipment for Making Precision Measurements of Gain or Loss in Components and Systems. | | | $2195.00 |
| MEGA-PIX® | TV Sound-Picture. | Color or Black and White Transmitter. | .25 output into 70 ohms. | $995.00 |
| RADA-PULSER® SR. | Pulsed-Carrier pulse width. | Generator, 12-80mc. Continuously variable carrier frequency and | | $795.00 |
| AUDIOLATOR | 15cps-15kc | Transistorized audio oscillator, battery operated. Flat to ±0.5 db over range. Output 1.0V rms at 600 ohms. | | $1995.00 |
| TRANSIFIER® | 15cps-25mc<br>20cps-15mc | Transistorized battery operated amplifier giving 10db and 20db gain. | | $1295.00 |
| MEGAVOLTER | 1kc-200mc | ±1%—1kc-10mc<br>±2%—to 50mc<br>±3%—to 200mc | | $295.00 |

*All Prices f.o.b. factory

# KAY ELECTRIC COMPANY

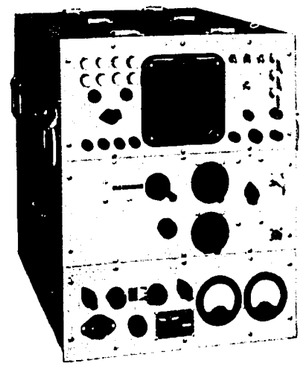
*DESIGNERS & MANUFACTURERS OF PRECISION ELECTRONICS TEST AND MEASURING INSTRUMENTS*

Dept. ID-10 — MAPLE AVE., PINE BROOK, NEW JERSEY — CApital 6-4000



For details, circle #251 on Reader Service Card





Model PCS-1A

## PULSE POWER CALIBRATOR

Model PCS-1A is a precision instrument for the direct measurement of radio frequency peak pulse power with greater accuracy than heretofore achieved by other than calorimetric means. The functions are independent of duty ratio.

The display, essentially a notch-watt-meter, is free from parallax. This equipment provides laboratory performance with simplicity adaptable to the production line.

Similar equipment for other frequencies under development.

*Frequency Range:* 925 mcs to 1225 mcs
*Power Level Range:* −10 dbm to +63 dbm
*Accuracy:* 0.5 db

**General Communication Company**

677 Beacon Street — Boston 15, Mass.

RESEARCH — DEVELOPMENT
ENGINEERING — MANUFACTURING

*creative electronics*

## Other Typical Products...

### RADAR BEACONS

**"S" Band Beacon — Model RCX**

Radar Beacon RCX is a miniature S-band transponder equipment for use in tracking missiles, drones and other types of aircraft. It has excellent selectivity and sensitivity characteristics and can be used as a transmission medium for telemetering information from auxiliary systems. Many new and unique features make it a reliable and versatile equipment, keeping pace with the current progress in the guided missile field.

### MICROWAVE COMPONENTS

The General Communication Company makes a very complete line of high quality coaxial switches (manual, motorized and relay operated) that meet a variety of applications, including transmit/receive selection of antennas, and other features required in the field of guided missiles.

### MICROWAVE TEST EQUIPMENT

Test Set BDS is a portable equipment combining the features of a signal generator, power meter and frequency meter. Its design assures ease and versatility in testing radar and beacon equipments in the 8500-mc to 9600-mc frequency range.

*G.C.C. Invites inquiries on its products and R & D services.*

For details, circle #252 on Reader Service Card



# Directory I. Complete Equipment

## 28. Radio Frequency Test Equipment.

Clough-Brengle Co., The, Ill., 50s, 55s, 70s

Coils-Electronics Co., Pa., 20c

Collins Radio Co., Central Sales Office, Tex., 5s, 25c, 35s, 55c, 60c, 65c

**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 15c, 35sc, 45c, Tel: HAmilton 7-7961**
See ad on page 440

Crosby-Teletronics Corp., N.Y., 65s

Daystrom, Inc., Weston Instrument Div., N.J., 10sc, 35sc, 45sc

Designers For Industry, Inc., Ohio, 30c, 55c, 60c

Diehl Mfg. Co., N.J., Phase Shifters sc

Direct T/V Replacements, Ltd., England, 55s

Dymec, Div. Hewlett-Packard Co., Calif., 70sc

E-H Research Laboratories, Calif., 50

Ehrenpreis, David, Consulting Engineers, N.Y., 20c

**Electro Impulse Laboratory, Inc., 208 River St., Red Bank, N.J., 45c, Tel: SHadyside 1-0404**
See ad on page 310

Electronic Applications, Inc., Conn., 10s, 30s, 45s, 50s, 55s, 60s, 70s

**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 15s, 50s, 60s, 70s, Tel: STillwell 6-8700**
See ad on page 283

Electronic Measurement Corp., N.Y., 50s, 55s

Electronics, Inc. of Pennsylvania, Pa., 15c, 30c, 70c

Elgeneo, Inc., Calif., Random Noise Generators c

Elk Electronic Labs., Inc., N.Y., 5c, 10c, 25c, 30c, 40c, 45c, 50c, 55c, 60c, 65c, 70c

**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 5sc, 10s, 25sc, 45sc, 55s, Tel: VIctor 2-8400**
See ads on pages 307, 309, 313, 315, 379, 584

Engineering Associates, Ohio, 5c, 20c, 40c, 50c, 55c, 60c, 70c

Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 55c, 60c, 65c, 70c

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 50c, Tel: RAvenswood 1-9000**
See ad on pages 125-128

Federal Manufacturing & Engineering Corp., N.Y., 55c, 60c, 65c, 70c

Fenske, Fedrick & Miller, Inc., Calif., 5s

Ferris Instrument Co., N.J., 5c, 25c, 50c, 55c, 60c, 65c

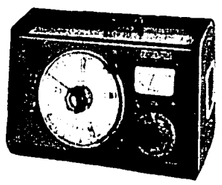
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 15c, Tel: CEnter 9-6100**
See ad on page 480

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# MORE THAN 120 MARCONI INSTRUMENTS FROM VLF TO EHF

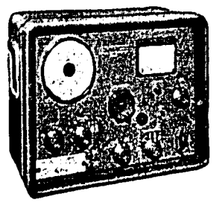
**DESIGNED TO MEET YOUR NEEDS**

For a quarter of a century, Marconi Instruments have set a standard of reliability and accuracy in the design and manufacture of precision electronic equipment. We offer more than 120 instruments, many of them unique, designed to meet the needs of military and civilian communications engineers. The latest short-form Catalog is now freely available.



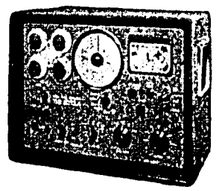
**UNIVERSAL BRIDGE**
**Model 868B**

Measures inductance and capacitance at 1 or 10 kc, resistance at d.c. Direct reading: 1μH to 100 henrys; 1μμF to 100μF; 0.1 ohm to 100MΩ.



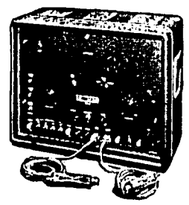
**CARRIER DEVIATION METER**
**Model 791D**

4 to 1,024 Mc, directly calibrated. Crystal-lock facilities. Can be supplied for rack mounting.



**FM/AM SIGNAL GENERATOR**
**Model 995A/5**

1.5 to 220 MC. Narrow-deviation model for mobile radio; stepped as well as fine incremental tuning gives discrimination better than 0.5 kc.



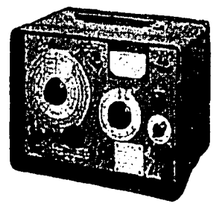
**20-MC SWEEP GENERATOR**
**Model 1099**

A high-quality video-response analyser providing 100-kc to 20-MC sweep signal, 1-MC marker pips, and time-base drive for external 'scope.



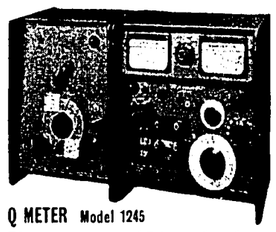
**FM SIGNAL GENERATOR**
**Model 1066A**

10 to 470 MC. Rack mounting version, Model 1066A/1, available.



**VHF SIGNAL GENERATOR**
**Model 1064A/2**

For mobile radio testing. RF outputs of 30 to 50, 118 to 185, and 450 to 470 MC.



**Q METER Model 1245**

Direct measurement of Q-factors from 5 to 1,000 over the frequency range 1 kc to 300 MC. Indirect measurements: inductance, capacitance, dielectric loss, phase angle, resistance power factor, etc.

**NOW AVAILABLE**
**—The Marconi short-form catalog**

Newest—
Low Capacitance Bridge Model 1342: 0.002μμF to 1,111μμF; 3-terminal transformer ratio-arm bridge designed for precision measurement of extremely low capacitance.

*Designers and Manufacturers of* AM & FM SIGNAL GENERATORS · VOLTMETERS
AUDIO & VIDEO OSCILLATORS · FREQUENCY METERS · OSCILLOSCOPES, SPECTRUM & RESPONSE ANALYSERS · POWER METERS · DISTORTION METERS · DEVIATION METERS
TRANSMISSION MONITORS · Q METERS & BRIDGES

## MARCONI INSTRUMENTS

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MARCONI INSTRUMENTS LTD · ST. ALBANS · HERTS · ENGLAND

TC174





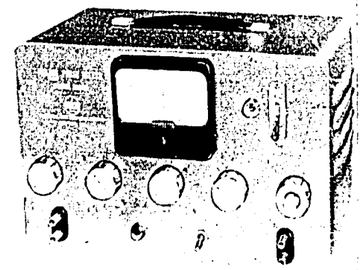

# Directory I. Complete Equipment

## 28. Radio Frequency Test Equipment.

**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 40s, Tel: EVergreen 6-1300**
See ad on page 566
Furzehill Laboratories, Ltd., England, Spectrum analyzers s
**General Communication Co., 677 Beacon St., Boston 15, Mass., 45sc, 50sc, 60sc, Tel: COpley 7-6030**
See ad on page 331
General Devices, Inc., N.J., 30sc
General Electronic Laboratories, Inc., Mass., 5sc, 25sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 70c
**General Radio Co., 22 Baker Ave., West Concord, Mass., 10s, 30s, 50s, 55s, 70s, Tel: EMerson 9-4400**
See ad on Cover 4
Greenray Industries, Pa., 15c, 20c, 30c, 50c
Hallicrafters Co., The, Ill., 15c, 30c, 50c, 55c, 60c, 65c
Harman-Kardon, Inc., N.Y., 20sc
Heath Co., Subsid. Daystrom, Inc., Mich., 5s, 30s, 40s, 45s, 50s, 55s, 60s, 70s
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 25s, 30s, 50s, 55s, 70s, Noise Sources s, Tel: DAvenport 6-7000**
See ad on pages 3-18
Hickok Electrical Instrument Co., Ohio, 15s, 25s, 35s, 40s, 50s, 55s, 60s, 70s
Hill Electronics, Inc., 300 N. Chestnut St., Mechanicsburg, Pa., 30s, Tel: POplar 6-7611
See ad on page 428
Hoffman Electron Tube Corp., N.Y., 50s
IFI Electronics, Inc., N.J., 5c
**Industrial Test Equipment Co., 55 East 11th St., New York 3, N.Y., 35, Tel: GRamercy 3-4684**
See ad on this page
Instant Circuits, N.Y., 65c
Intercontinental Dynamics Corp., N.J., Random Noise Generators c
Interference Testing & Research Labs., Inc., Mass., 5c
International Crystal Mfg. Co., Inc., Okla., 30s
International Electronics Mfg. Co., Md., 5c, 15c, 25c
Jampro Antenna Co., Calif., Power Dividers c
Jansky & Bailey, D.C., 5c, 25c, 35c, 50c
**Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 5s, 15sc, 70sc, Tel: BAldwin 6-3456**
See ad on pages 114-115
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c, 70c
Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., Conn., 45sc
**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 15s, 25s, 30s, 40s, 45s, 50s, 55s, 60s, 65s, 70s, Tel: CApital 6-4000**
See ad on page 330
Kidde Ultrasonic & Detection Alarms, Inc., N.J., 5s
**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 30c, 45c, 50sc, 55sc, Tel: STillwater 3-5000**
See ad on page 415
Knight Electronics Corp., Ill., 50s, 55s, 60s, 70s
**Knights Co., The James, 101 E. Church St., Sandwich, Ill., 30sc, Tel: 2141**
See ad on page 430
Laboratory For Electronics, Inc., Mass., 30c
Lampkin Laboratories Inc., Fla., 50s
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 50s, Tel: LOwell 6-2600**
See ad on page 312
Lenkurt Electric Co., Inc., Calif., 25s
Levinthal Electronic Products, Inc., Calif., 50c
Magnaflux Corp., Subsid. General Mills, Ill., 5s, 25s
**Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 30s, 50s, Tel: DAvis 5-1391**
See ad on pages 96-97
Manufacturers Engineering & Equipment Corp., Pa., 70c
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 5s, 30s, 40s, 45s, 50s, 55s, 60s, 65s, 70s, Tel: LOwell 7-0607**
See ad on page 332
Marconi's Wireless Telegraph Co., Ltd., N.Y., 70s
Marine View Electronics, Inc., N.Y., 45c, 55c, 60c
Marstan Electronics Corp., N.Y., 45c
Mayberry Electronics Co., Calif., 20c
**Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 25s, 30s, 50s, 55s, 60s, Tel: DEerfield 4-2131**
See ad on page 335
Melabs, Inc., Calif., 5c, 70s
Metrologie, Compagnie Generale de, France, 55s, 60s
Metropolitan Electronic & Instrument Co., N.Y., 55s, 60s, 65s
Miller Labs., August E., N.J., 35c
Missouri Research Laboratories, Inc., Mo., 15sc
Motorola, Inc., Ill., 60s
National Company, Inc., Mass., 5c, 30c, 45c
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 20s, Tel: HOward 5-7700**
See ad on page 498
Nems-Clarke Co., Div. Vitro Corp. of America, Md., 5sc, 35sc


PHAZOR PAT PEND

**PHASE METER**



MODEL 200AB

PRICE $449.00

- 2° absolute accuracy
- Readings not affected by noise and harmonics
- Frequency range 15 CPS — 30KC
- Accuracy to .01 degree with simple circuit techniques
- High sensitivity on input & reference channels
- Can measure in-phase & quadrature voltage component

For further information contact your nearest representative or write for brochure

ITECO **INDUSTRIAL TEST EQUIPMENT CO**
55 E 11th ST · NEW YORK 3 · GR 3-4684

For details, circle #254 on Reader Service Card

*Manufacturers of:*

PHASE METERS
•
NULL DETECTORS
•
IMPEDANCE COMPARATORS
•
POWER OSCILLATORS
•
FREQUENCY STANDARDS
•
AUTOMATIC HI-POT
•
*Other Electronic Test Equipment*


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

*spectrum analyzers...*

*frequency response plotters...*

*for communications systems analyzers...*

*telemetering test instruments*

# LOOK FIRST TO THE COMPANY THAT IS FIRST... Panoramic

## in advanced design...applications...acceptance

RADIO PRODUCTS, INC.

**PANORAMIC BROADBAND SPECTRUM ANALYZERS—0.5 cps to 25 mc.**
A matchless series of 5 easy-to-operate direct reading instruments plot amplitude vs. frequency of input signals with display on 5" CRT or chart. Features include: "quick look" broadband plus highly selective narrow band analysis with adjustable center frequency, sweep width, and selectivity (resolution). Linear and 40-db log calibrated amplitude scales.

**APPLICATIONS:** vibration-noise analysis, distortion measurements and general Fourier analysis.

**Model LF-2a.** 0.5 cps to 2,500 cps. Exceptional stability, to 0.05 cps/hr. for narrow-band analysis with 0.1 cps resolution. Built-in recorder gives 12" x 4½" chart. **Model LF-2aM** with automatic center frequency advance thru 0.5-2,000 cps range.

**Model LP-1a.** 20 cps to 22,500 cps. Exceptional stability: better than 5 cps/hr. "Quick look" 40 cps-20 kc log sweep in 1 sec, plus magnifying linear sweeps. Famous for noise and vibration analysis. **Auxiliary Function Unit C** adds variable IF filter bandwidth (10 cps-1 kc), smoothing filter and 10 second scan interval for more convenient analysis of random signal spectra and other critical applications.

**Model SB-7bZ.** 200 cps-300 kc (Similar to Analyzer KS 15872 specified by Bell System). Features discriminator linearized and stabilized sweep circuitry. Resolution capability to 100 cps. Proven reliable and easy-to-use under extreme environmental conditions for over a decade.

**Model SB-15a.** 100 cps-600 kc. Complete, compact, yet only 8¾" high. Many advanced features. 100 cps resolution capability.

**Models SPA-3,** 200 cps-15 mc; and **SPA-3/25,** 200 cps-25 mc. Resolution capability is 200 cps. For application where broad frequency coverage is a must.

**ACCESSORIES for PANORAMIC Broadband Spectrum Analyzers:**
Increase Application Areas

**Spectral Density Analyzer, Model PDA-1** for random waveform analysis. **Time-Frequency Analyzers, Models PS-20** and **TFA-1,** for 3-dimensional time-frequency-amplitude studies of transients. Valuable for high intercept probability of intermittent signals.

**Recorder and Sawtooth Wave Generator, Model RC-3a Series,** for unattended graphic spectrum plots. **Also Signal Alternator, Model SW-1; Triangular Wave Generator, Model TW-1; Multi-Bandwidth Crystal Filter, Model CF-1; Oscilloscope Camera SM-200A,** and many others.

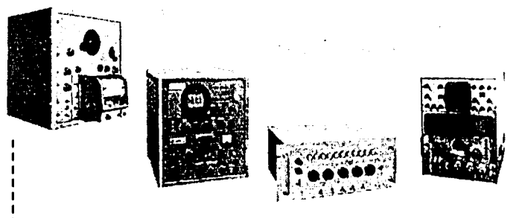
**Automatic FREQUENCY RESPONSE PLOTTERS 0.5cps to 15mc**
Automatically plot amplitude response vs. frequency of amplifiers, transducers, filters, etc. Combines Panoramic Spectrum Analyzer and companion sweep generator for these unique advantages: single-line display, unlimited dynamic range, response to **fundamental frequency** only, discrimination against spurious and noise. Use **Model G-5** with **LP-2a, G-2** with **LP-1a, G-3a** with **SB-7bZ, G-15** with **SB-15a, G-6** with **SPA-3** and **SPA-3/25.**

**Communications Systems Analyzers**
**Panalyzor**—for wide range RF Spectrum Analysis. **Three models: SB-3, SB-8b,** and **SB-12a** (in various types) cover the frequency range up to 1000 mc (use external mixer above 1000 mc), supplying broad choice of sweep widths up to 10 mc, sensitivity, resolution capabilities up to 10 cps, and other factors. Widely used for analysis of locally generated AM, Single Sideband, FM, and pulsed transmissions, for general RF spectrum study, and spotting spurious frequency components.

**FASTER SINGLE SIDEBAND SPECTRUM ANALYSIS** with preset operational modes: **the new Model SSB-3a** incorporates a 60 db dynamic range Panalyzor with a stable 2-40 mc tuning head, new and improved two-tone audio source (**Model TTG-2,** see below), unique self-checking features. High selectivity allows hum sideband measurements to —60 db. **Model REC-1** (optional) extends SSB-3a range down to 100 cps.

**Two-Tone AF Generator, Model TTG-2.** New, distortion-free modulation source. Also for filter linearity and distortion measurements. Continuously variable 100 cps-10kc, metered output.

**Two-Tone RF Generator, Model TTG-5.** Low distortion output tones (2mc-40mc) for receiver linearity tests and as exciter driver for RF power amplifiers and filters.



**PANADAPTORS—Basic Models SA-8b and SA-3 (in over 20 types).** Used with Communication and Special Purpose Receivers, provides continuous monitoring for detecting interference, spurious, intermittent and off-frequency transmissions, as tuning aid for telemetry and SSB signals. Adaptable to receivers with non-standard IF. Specify companion receiver when inquiring.

**PANORAMIC MICROWAVE SPECTRUM ANALYZERS 10 mc to 44 kmc**
Direct-reading instruments for pulsed AM, FM and CW signal analysis, with ± 1% frequency accuracy. Features: continuously adjustable IF filter bandwidths and sweep speeds; linear, log, and power amplitude scales; calibrated frequency markers, and others.

**Model SPA-4a,** 10 mc to 44 kmc. Single tuning head. Highly stable, with 0-70 mc and 0-5 mc dispersion ranges. Extreme sensitivity. Calibrated on 8 individual slide rule scales. IF bandwidth range variable 1 kc to 80 kc.

**Model SPA-1,** 50 mc-4 kmc. Two plug-in tuning heads, 0-10 mc dispersion. Extreme sensitivity to —100 dbm with optional preamplifier. IF bandwidth range is 9 kc to 100 kc.

**TELEMETERING TEST INSTRUMENTS (for IRIG FM/FM Systems).**

**Model TMI-1a,** Telemetering Indicator, analyzes 350 cps-85kc band. Used for subcarrier spectrum analysis, pre-emphasis, distortion measurement.

**Model TMC-1,** Telemetering Subcarrier Deviation and 3-point calibrator. Used with TMI-1a for precise analysis of individual channel deviation; also provides 3 frequencies for each channel (including ± 15% upper channels) for discriminator calibration to 0.5% (0.002% optional).

**Model TMC-11,** Simultaneous 11-Point Frequency Calibrator. Low cost, completely transistorized, only 7½" high. Provides 11 precise equally spaced frequencies for all standard plus ± 15% (3 KC) IRIG FM/FM channels, multiple frequency references in data reduction. Accuracy better than 0.01%. Composite 18 channel output permits simultaneous calibration of a complete telemetry package.

Sec. 2900

Dependable CERTIFIED SPECIFICATIONS for accurate data

the pioneer is the leader

Panoramic RADIO PRODUCTS, INC

Send for PANORAMIC's convenient CATALOG DIGEST, containing detailed specification data and ordering information. Contact PANORAMIC's engineers for assistance in determining the model best suited to your needs.

**528 South Fulton Avenue,**
**Mount Vernon, N. Y.**
**Telephone: OWens 9-4600**
**TWX: MT-V-NY-5229**
Cables: Panoramic, Mount Vernon, New York State

For interesting application information, put your name on our mailing list for THE PANORAMIC ANALYZER No charge, of course.



For details, circle #255 on Reader Service Card



# EXTENDED FREQUENCY RANGE

## with these STANDARD SIGNAL GENERATORS

**MODEL 80**
**2 Mc to 400 Mc**
**MODEL 80-R**
**5 Mc to 475 Mc**



**FEATURES**

- Direct-Reading scales and dials; individually calibrated.
- Convenient microvolt and DBM output scales.
- Accurate indication of output voltages at all levels.
- Low residual FM due to hum and noise.
- Provision for external pulse modulation.

**SPECIFICATIONS**

**FREQUENCY RANGE:** (Model 80) 2 to 400 Mc in 6 bands. (Model 80-R) 5 to 475 Mc in 6 bands.
**FREQUENCY ACCURACY:** ± 0.5%
**FREQUENCY DRIFT:** Less than .1% after warm-up.
**OUTPUT VOLTAGE:** Continuously variable from 0.1 to 100,000 microvolts (—7 to —127 DBM).
**OUTPUT ACCURACY:** ±10% at 0.1 volt from 5 to 200 Mc. ±15% at 0.1 volt from 200 to 475 Mc.
**MODULATION:** AM is continuously variable from 0 to 30%. Internal modulation, 400 and 1000 cycles. External modulation, 50 to 10,000 cycles.
**RESIDUAL FM:** Less than 500 cps at 450 Mc for Model 80-R, and correspondingly lower for both models at lower frequencies.
**POWER SUPPLY:** 117v, 50-60 cycles, 70 watts.

*Laboratory Standards*

**MEASUREMENTS**
A McGraw-Edison Division
BOONTON, NEW JERSEY

# Megacycle Meter

**0.1 Mc to 940.0 Mc**

Determines resonant frequency of tuned circuits, antennas, transmission lines, by-pass condensers, chokes, etc. Measures inductance and capacitance. Also used as a signal generator, wave meter, frequency meter, and in many other applications.

This compact, lightweight grid-dip meter is available in the frequency ranges indicated.

| | |
|---|---|
| Standard Model 59 complete | $168.00 |
| UHF Model complete | $198.00 |
| LF Model complete | $168.00 |
| Combination all ranges | $380.00 |

F.O.B. Boonton, N.J.

*Write for Bulletin*



Model 59 Oscillator 2.2 Mc - 420 Mc



Model 59-LF Oscillator 100 Kc - 4.5 Mc



Model 59-UHF Oscillator 420 Mc - 940 Mc

*Laboratory Standards*

**MEASUREMENTS**
A McGraw-Edison Division
**BOONTON, NEW JERSEY**

For details, circle #256 on Reader Service Card



# Directory I. Complete Equipment

## 28. Radio Frequency Test Equipment.

New London Instrument Co., Conn., 30s, 50sc, 55s, 60sc
Nichols, Ltd., R. H., Canada, 50s, 55s, 60s
Nilsen Mfg. Co., Ill., 35sc
Norrman Labs., Ernst, Williams Bay, Wis., 20s, Tel: CIrcle 5-5516
See ad on page 350
North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 35s, Tel: OVerbrook 1-8600
See ad on page 286
Nuclear Electronics Corp., Pa., 50s, 55c, 60c, 70c
OPTOmechanisms, Inc., N.Y., Interferometers c
Pacific Automation Products, Inc., Calif., 20c, 30c
Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., 70s, Spectrum Analyzers s, Tel: OWens 9-4600
See ad on page 334
Peer, Incorporated, Tex., 50c
Philco Corporation, Pa., 5c, 55c, 60c, 65c
Philips Electronic Instruments, N.Y., 5s, 10s, 15s, 20s, 30s, 35s, 45s, 50s, 55s, 60s, 70s
Philips Electronics Industries, Ltd., Canada, 15s, 30s, 50s, 55s, 60s, 70s
Philmore Mfg. Co., Inc., N.Y., 5s
Pitometer Log Corp., N.Y., 30sc
Plectron Corp., Neb., 50s, 60s
Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 5sc, 25sc, 30sc, 55sc, 60sc, 70sc, Tel: EXeter 2-4500
See ad on pages 107-108
Precise Electronics & Development Corp., N.Y., 10c, 15s, 30s, 50s, 55s, 60c, 65c, 70c
Precision Apparatus Co., Inc., N.Y., 15s, 30s, 50s, 55s, 70s
Probescope Co., Inc., N.Y., 70s
RCA Victor Co., Ltd., Canada, 15sc, 30sc, 45sc, 55sc, 60sc, 70sc
R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 25s, Tel: DAvenport 1-1130
See ad on page 243
Racal Engineering, Ltd., England, 70c
Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 5, 10, 50, Tel: OVerbrook 1-5600
See ad on page 314
Radio City Products Co., Inc., Pa., 50sc
Radio Corp. of America, N.J., 5s, 10s, 15s, 25s, 30s, 35s, 45s, 50s, 55s, 60s, 70s
Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 15s, 50s, 70s, Tel: HUmboldt 5-3900
See ad on pages 54-55

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# INTERFERING

## conducted energy or radiated electromagnetic energy within the frequency range of 30 cps to 10.7 kmc

**...can be investigated, analyzed, monitored and measured to the highest practical degree of accuracy with Stoddart RFI Measuring Systems.**

Stoddart RFI Measuring Equipment is approved for use by all departments of the Department of Defense. Military and commercial equipments are identical . . . were designed and manufactured to Military Equipment Specifications to meet the requirements of Military Measurement Specifications. Equipments are portable, dripproof, dustproof, and ruggedized for all-weather field use . . . precise and dependable for sensitive-selective laboratory measurements.

Applications include interference measurement and location, frequency conservation and allocation studies, spectrum signatures, antenna propagation studies, field intensity surveys, RF energy surveillance and monitoring, and verification of the electronic compatibility of modern weapons systems, i.e., missile firing and guidance, computer, telemetering and communications; the measurement of all rotating electrical devices, transmitting and receiving equipment, or any system or equipment capable of producing unwanted radiated or conducted electrical disturbances.

Stoddart instruments are available as individual self-contained units covering specific frequency ranges, or in rack-mounted console systems for laboratory, mobile, airborne and marine use.

Equipments are approved for interference measurements required by the following Mil-Specs:

MIL-I-16910A (Ships), Amend. #2, Class 1; MIL-I-26600 (U. S. A. F.), Category A; MIL-I-6181B and MIL-I-6181D, Class 1, Category A; MIL-I-11748B (Sig. C.). Approved by S.A.E.; supplied with C. I. S. P. R. recommended detector time constants.

**NM-40A (AN/URM-41)**

30 cps to 15 kc



**SELECTIVE OPERATION / Specifications**

**Sensitivity:** For a one-to-one signal-to-noise ratio, the sensitivity of the NM-40A is better than 0.15 $\mu$v from 1000 to 15,000 cps, 0.25 $\mu$v from 300 to 1000 cps and 1.0 $\mu$v from 30 to 300 cps, when used as a sensitive frequency-selective voltmeter with its narrowest bandwidth and an input impedance of 100,000 ohms.

**Spurious Responses:**

$2\ F_o' > 60$ db down from $F_o$
$3\ F_o' > 55$ db down from $F_o$
All others $> 75$ db down
} where $F_o$ is any input signal using selective operation

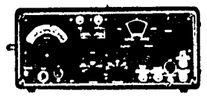
**WIDEBAND OPERATION / Specifications**

**Frequency Response:** 30 cps to 15 kcs, $\pm 0.5$ db.

**Sensitivity:** 15 $\mu$v sensitvity at input impedance of 100,000 ohms.

**Input impedance:** 50, 600, 10,000 and 100,000 ohms.

The NM-40A may also be used as an ultra-sensitive AUDIO frequency WAVE ANALYZER.



**NM-10A (AN/URM-6B)**
14 kc to 250 kc

**SPECIFICATIONS:**

**Sensitivity and voltage measurement range:** As a sensitive frequency-selective voltmeter, either balanced or unbalanced, one $\mu$v to one volt. Using rod antennas, one $\mu$v/meter to 2 volts/meter. Using shielded loop antennas, 10 $\mu$v/meter to 100 volts/meter.

**Effective random noise bandwidth:** Varies from approximately 55 cps to 400 cps over the frequency range.

**Image rejection:** $>50$ db.

**I-F rejection:** $>60$ db.

**NM-20B**
**(AN/PRM-1A)**

150 kc to 25 mc



**SPECIFICATIONS:**

**Sensitivity and voltage measurement range:** As a sensitive frequency-selective voltmeter, either balanced or unbalanced, one $\mu$v to one volt. Using rod antenna, 2 $\mu$v/meter to 2 volts/meter. Using shielded loop antenna: SMALL LOOP, 10 $\mu$v/meter to 10,000 $\mu$v/meter; LARGE LOOP, 2 $\mu$v/meter to 20,000 $\mu$v/meter.

**Image rejection:** $>50$ db.

**I-F rejection:** $>45$ db.

**BFO** is provided for CW reception.

**NM-30A (AN-URM-47A)**

20 mc to 400 mc



**SPECIFICATIONS:**

**Sensitivity:** Radiated pickup using a calibrated, tuned dipole (without reflector), 0.3 to 60 $\mu$v/meter, depending on frequency. Conducted pickup via 50-ohm matched coaxial line, 0.5 to 2 $\mu$v from 20 to 240 mc, less than 6 $\mu$v from 240 to 400 mc.

**Spurious response rejection:** $>40$ db.

**I-F rejection:** $>60$ db.

**NM-52A**

375 mc to 1000 mc

***NEW***



**SPECIFICATIONS:**

**Sensitivity:** 50-ohm input, 1 to 2 $\mu$v; tuned dipole antenna, 10 to 60 $\mu$v/meter. **Bandwidth:** 6 db bandwidth is 480 kc and constant within $\pm 3\%$ over the tuning range. **Oscillator radiation:** $<10$ micro-microwatts, over 40 times better than Mil-Specs require. **I-F rejection:** $>100$ db, band 1; $>70$ db, band 2. **Spurious response rejection:** $>80$ db. **Single knob tuning. New power supply:** 0.5% regulation for filament, bias and plate voltages; 50, 60 or 400 cycles, single phase operation. **Panel outputs:** Video, audio, I-F, remote meter and recorder.

Stoddart is the manufacturer of the AN/URM-42 radio interference-field intensity measuring system covering the frequency range of 1000 mc to 10.7 kmc.

OUR SALES ENGINEERING DEPARTMENT will give you individual consideration and information in the areas of interference problems or measurement with which you are particularly concerned . . . provide engineering bulletins, Military Specification information, descriptions of new measurement techniques and applications . . . class or individual instruction in the operation, calibration, and maintenance of Stoddart instruments. For prompt service please call "Sales Engineering," HOllywood 4-9292.

Lease-purchase and lease-rental agreements available. Immediate delivery from stock. Send for complete literature.

**STODDART**
**AIRCRAFT RADIO CO., INC.**
6644 Santa Monica Blvd., Hollywood 38, Calif. HO 4-9292

***serving 33 countries in radio interference control***



For details, circle #257 on Reader Service Card





# Directory I. Complete Equipment

## 28. Radio Frequency Test Equipment.

**Radio Receptor Company, Inc., Subsid. General Instrument Corp.,** 242 Wythe Ave., Brooklyn 11, N.Y., 70c, Tel: EVergreen 8-6000
See ad on page 506
Radio Specialty Mfg. Co., Ore., F. M. Deviation Meters c
Radiometer, Denmark, 40s, 50s, 55s, 60s, 70s
**Radionics, Inc.,** 76 Cambridge St., Burlington, Mass., 30c, Tel: BRowning 2-1233
See ads on pages 291, 343
Ramage & Miller, Inc., Calif., 50sc, 55sc, 70sc
Rank Cintel, Ltd., England, 30s
**Rawson Electrical Instrument Co., Inc.,** 118 Potter St., Cambridge 42, Mass., 45sc, Tel: KIrkland 7-4041
See ad on page 461
**Reeves-Hoffman, Div. Dynamics Corp. of America,** 145 Cherry St., Carlisle, Pa., 30c, Tel: CHapel 3-5929
See ad on page 432
Republic Electronic Industries Corp., N.Y., 5s, 40s, 45s
Resdel Engineering Corp., Calif., 30s, 50s
**Rixon Electronics, Inc.,** 2414 Reedie Dr., Silver Spring, Md., 5c, 20c, 30c, 50c, 55c, 60c, 65c, Tel: LOckwood 5-4578
See ad on page 324
**Rohde & Schwarz,** 111 Lexington Ave., Passaic, N.J., 5s, 10s, 30s, 35s, 40s, 45s, 50s, 55s, 60s, 65s, 70s, Tel: PRescott 3-8010
See ad on page 246
Rototest Laboratories Inc., Calif., Random Noise Generators c
Sanders Associates, Inc., N.H., 35c
Schaevitz Engineering, N.J., 70c
Scientific-Atlanta, Inc., Ga., 5s, 10s, 30s, 50s
Scott, Inc., H. H., Mass., 25s, Random Noise Generators s
Servo Consultants, Ltd., N.Y., 30s
Sierra Electronic Corp., Div. Philco Corp., Calif., 10s, 45s, 50s, 60s
Sigma Electronics Research Corp., Wash., 5c, 10c, 25c, 30c, 35c, 40c, 45sc, 50c
**Simpson Electric Co.,** 5218 W. Kinzie St., Chicago 44, Ill., 5s, 15s, 50s, 70s, Tel: EStebrook 9-1121
See ad on page 462
**Solid State Electronics Co., Dept. I,** 15321 Rayen St., Sepulveda, Calif., 30c, Tel: EMpire 4-2271
See ad on page 420
Specialty Electronics Development Corp., N.Y., 45c, 50sc, 55sc, 60c, 65c, 70c
Spectralab Instruments, Calif., 50sc
Sprague Electric Co., Mass., 25s
State Testing Laboratory, Inc., Conn., 30c
**Stoddart Aircraft Radio Co., Inc.,** 6644 Santa Monica Blvd., Hollywood 38, Calif., 5s, 25s, Tel: HOllywood 4-9292
See ads on pages 336, 382
Strand Labs., Inc., Mass., 50sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 50c, 65c
Sullivan, Ltd., H. W., N.Y., 30s
Summers & Mills, Inc., Tex., 50c, 55c
Sunshine Scientific Instrument, Pa., 15s, 55s, 60s, 70s
Systems, Inc., Fla., 65c, U.S. Generators c
Systron-Donner Corp., Calif., 35s
TMC (Canada), Ltd., Canada, 25c
Taffet Electronics, Inc., N.Y., 30c, 55c, 60c, 65c
**Technical Materiel Corp.,** 700 Fenimore Rd., Mamaroneck, N.Y., 30s, 50s, 65s, Tel: OWens 8-4800
See ads on pages 344, 345
Technology Instrument Corp., Mass., 10s, 35s
Tektronix, Inc., Ore., 15s
Tel-Instrument Electronics Corp., N.J., 30s, 50s, 55s, 60s, 70s
**Telectro Industries Corp.,** 35-18 37th St., Long Island City 1, N.Y., 5sc, 25sc, Tel: YE 2-8600
See ad on page 338
Telerad Mfg. Corp., N.Y., 50c
**Telonic Engineering Corp.,** 773 Broadway, Laguna Beach, Calif., 15c, 30c, 50c, 70c, Tel: HYatt 4-7581
See ad on page 71
**Telonic Industries, Inc.,** 60 N. First Ave., Beech Grove, Ind., 15s, 30s, 50s, 70s, RF Detectors s, Tel: STate 7-7241
See ad on page 70
**Teltronics, Inc.,** 277 Main St., Nashua, N.H., 30c, 35c, 70s, Tel: TUxedo 2-6264
See ad on this page
Theta Instrument Corp., N.J., 35s
Thompson Ramo Wooldridge Inc., Calif., 50c
Topping Electronics, Ltd., E. V., Canada, 30s, 50s, 55s
**Trepac Corp. of America,** 30 W. Hamilton Ave., Englewood, N.J., 45, Tel: LOwell 7-3810
See ad on page 520
U. S. Science Corp., Calif., 65c
Valor Instruments, Inc., Calif., 40s, 60s
Valpey Crystal Corp., Mass., 30sc
Van Norman Industries, Inc., Electronics Div., N.H., 15sc, 20sc, 30sc, 50sc, 55sc, 60sc, 70sc
**Vari-L Company, Inc.,** 207 Greenwich Ave., Stamford, Conn., 30s, 70c, Tel: FIreside 8-0091
See ad on page 406
Virginia Electronics Co., Inc., D.C., 5c, 50c, 60c
WacLine, Inc., Ohio, 45c
Waltham Electronics Corp., Mass., 30c, 40sc, 55sc, 60sc
Wave/Particle Corp., 50, 70
**Wayne Kerr Corp.,** 1633 Race St., Philadelphia 3, Pa., 10s, 30s, Tel: LOcust 8-6820
See ad on page 255
**Weinschel Engineering & Mfg. Corp.,** 10503 Metropolitan Ave., Kensington, Md., 5, 30, 50, Tel: LOckwood 4-0121
See ads on pages 315, 384
**Westrex Corp., Div. Litton Industries,** 540 W. 58th St., New York 19, N.Y., 65s, Tel: JUdson 2-3030
See ad on page 704
Wiancko Engineering Co., Calif., 30c, Comparators c
Winslow Co., Inc., The, N.J., 5c, 10c, 30c, 55c, 60c, 65c, 70c
Wintronics, Calif., 35sc

**Radio receivers:**
See class 6

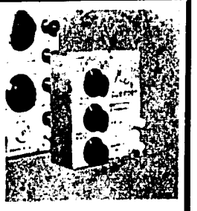
**Radio transmitters:**
See class 7

**Radiometers:**
See class 17

**Radiotelephones, ship-to-shore:**
See class 18

**Radomes:**
See class 39

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INC.



Presenting MICRO-SWEEPER—The stable sweep and frequency generator that attaches directly to your oscilloscope without cables or batteries! Ready for immediate operation, any sweep up to 1 µs/cm can be used from those on your scope—five ranges are available that cover the IF frequencies, and by range switching, most wide band amplifiers can be tested. Write for complete details.

Capably staffed with qualified engineering personnel, we can assist you in varying fields ● transistor circuit design ● ultrasonics-magnetostriction transducer type applications ● customer specified test equipment ● design & development toward complete systems.

**TELTRONICS, INC. 277 Main St., Nashua, N.H. TU 2-6264**

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



MODULAR MAGNETIC TAPE SYSTEMS

Telectro Recorders/Reproducers Now Provide New Dimensions in Versatility and Performance

Building modular magnetic tape systems is Telectro's major occupation . . . has been for over a decade. The advancement in reliability and performance reflected in a Telectro-built magnetic tape recorder reproducer is the culmination of years of experience. Hundreds of evolutionary units, each successively improving the Telectro breed, have given today's Telectro equipment the finest heritage of all tape systems ■ Telectro Modular Magnetic Tape Recording Systems are used in Data Processing • Satellite Tracking • Professional Sound Systems • Laboratory • Traffic Control • Computers • Simulators • Ground Checkout • Automatic Processing • Numerical Machine Tool Control ■ For full technical data write

TELECTRO INDUSTRIES CORP.
35 18 37th Street L I C 1, N Y

Exceptional Professional Opportunities for Engineers

For details, circle #259 on Reader Service Card



Random noise generators: See class 28

Rear projection equipment: See class 34

Receivers, airborne & airport: See class 1

Receivers, amateur: See class 2

Receivers, broadcast (AM, FM, TV, UHF, VHF): See class 6

Receivers, facsimile: See class 13

Receivers, microwave: See class 20

Receivers, mobile: See class 22

Receivers, point to point: See class 26

Receivers, radar: See class 27

Receivers, single sideband: See class 31

Receivers, telegraph & teleprinter: See class 35

Receivers, telemetering: See class 36

Record players and changers: See class 61


## 29. Recorders.

5. Dictation equipment
10. Digital tape types
15. Disk types
20 Embossing types
25. Magnetic tape types
30. Magnetic wire types
35. Video tape types

Advanced Instrument Corp., Calif., 10s
Advanced Research Associates, Inc., Md., 10c

**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 25sc, 35sc, Tel: DUnkirk 5-7401**
See ad on page 164

American Geloso Electronics, Inc., N.Y., 5s, 25s
Ampex Corp., Ampex Data Products Co., Calif., 10sc, 25sc, 35sc
Ampex Corp., Professional Prods. Co., Audio Div., Calif., 25s
Ampex Military Prods. Co., Calif., 25sc, 35sc
Amplifier Corp. of America, N.Y., 25c



## 29. Recorders.

**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 25c, 35c, Tel: LIberty 9-1500**
See ad on page 353

Applied Magnetics Corp., Calif., 25c, 30c
Audio-Master Corp., N.Y., 25sc
Audiotronics Corp., Calif., Audio-Visual Aids s
Autonetics, Div. North American Aviation, Inc., Calif., 25c
BJ Electronics, Borg-Warner Controls, Calif., 25sc
Bach Auricon, Inc., Calif., 25s, 35s
Bailey, Inc., P. A., Conn., Audio-Visual c
Bendix Corp., The, Computer Div., 10s, 25s
Bendix Corp., The, York Division, Pa., 10s
Benson-Lehner Corp., Calif., 10c, 25c
Bergen Laboratories, Inc., N.J., 25c
Bogen-Presto Co., N.J., 15s, 25s
Broadcast Equipment Specialties Corp., N.Y., 25s
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 25c, 35c
Chrono-Log Corp., Pa., 10c
Co Engineering Co., N.J., 25sc
Collins Radio Co., Central Sales Office, Tex., 25s
**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 10c, 25c, Tel: ALgonquin 4-5106**
See ad on page 249

Consolidated Electrodynamics Corp., Calif., 25s
Control Data Corp., Minn., 10c, 15c
Cook Electric Co., Data-Stor Div., Ill., 10s, 25s
Cook Technological Center, Div. Cook Electric Co., Ill., 10c, 25c
Corbett Science Laboratories, F. W., Calif., 25c
Designers For Industry, Inc., Ohio, 25c, 35c
Dictaphone Corp., N.Y., 5s, 20s, 25s
Direct T/V Replacements Ltd., England, 25s
Du Kane Corp., Ill., Audio-Visual Aids s
Dymec, Div. Hewlett-Packard Co., Calif., 10c
E.M.I.-Cossor Electronics Ltd., Canada, 5sc, 10sc, 25sc
E.M.I. Electronics Ltd., England, 25s
Edwards Engineering Co., N.Y., 25s
Electro Instruments, Inc., Calif., 10s
Electronic Applications, Inc., Conn., 25
Electronic Associates, Inc., N.J., 25c
Electronic Teaching Laboratories, Inc., D.C., 25sc, Audio-Visual Aids sc
Executone, Inc., N.Y., Audio-Visual Aids sc
Fairchild Recording Equipment Corp., N.Y., 15s
Fen-Tone Corp., N.Y., 25s, 35s
Gates Radio Company, Ill., 25s
General Electronic Laboratories, Inc., Mass., Audio-Visual Aids c
General Kinetics, Inc., Va., 25sc
General Transistor Corp., Magne-Head Div., Calif., 25c
Geotechnical Corporation, The, Tex., 25c
Giannini Controls Corp., Calif., 10sc
Gotham Audio Sales Co., Inc., N.Y., 15s





# Directory I. Complete Equipment

## 29. Recorders.

Gray Mfg. Co., The, Conn., 5s, 10c, 15s, 20c, 25c, 30c, 35c
Gregory Research Engineering Group, N.Y., 25c
Hallicrafters Co., The, Ill., 35c
Hanson-Gorrill-Brian, Inc., N.Y., 10sc
Heath Company, Subsid. Daystrom, Inc., Mich., 25s
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 10s, Tel: DAvenport 6-7000**
See ad on pages 3-18

Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 10c, 35c
**Leach Corporation, 18435 Susana Rd., Compton, Calif., 25sc, Tel: NEvada 6-1061**
See ad on page 514

**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 25c, 35c, Tel: REgent 9-4321**
See ad on pages 112-113

**Lytle Corporation, 1404 San Mateo S.E., Albuquerque, N.M., Audio-Visual Aids c, Tel: ALpine 5-8169**
See ad on page 201

Magnasync Corp., Calif., 25c
Magnavox Co., The, Ind., 25s
Maico Electronics, Inc., Minn., 25c, 35c
Mayberry Electronics Co., Calif., 25sc
Midwestern Instruments, Inc., Okla., 10sc, 25sc
Mincom Division, Minnesota Mining & Manufacturing Co., Calif., 25c, 35c
Minicord Corp. of America, N.J., 5s, 25s, 30s
Minneapolis-Honeywell Regulator Co., Industrial Systems Div., Md., 10sc, 25sc
Minnesota Mining & Mfg. Co., Magnetic Products Div. & Electrical Prods. Div., Minn., 5s, 25s, 35s
Mohawk Business Machines Corp., N.Y., 5c, 25c
Monroe Calculating Machine Co., Inc., Div. Litton Industries, Calif., 10c
Monroe Calculating Machine Co., Inc., Div. Litton Industries, N.J., 10s
Moran Instrument Corp., Calif., 10sc
Muirhead & Co. Ltd., England, 25s
Munzig International, Inc., Calif., 5s, 25s
Newcomb Audio Products Co., Calif., 25s
Olympic Radio & Television, Div. Siegler Corp., N.Y., 25sc
Packard Bell Electronics Corp., Calif., 25sc
Philips Electronics Industries Ltd., Canada, 5s, 25s
Potter Instrument Co., Inc., N.Y., 10s, 25s, 30s, 35c
Precision Instrument Co., Calif., 25sc
Prescott Television Co., Calif., 35c
**Presin Co., 2014 Broadway, Santa Monica, Calif., 10s, Tel: EXbrook 3-9738**
See ad on page 519

RCA Victor Co., Ltd., Canada, 25s
Radio Corp. of America, N.J., 15s, 25s
Radio Corp. of America, Defense Electronic Products, N.J., 10c, 25sc, 35sc
Raymond Engineering Laboratory, Inc., Conn., 25c
Rek-O-Kut, Inc., N.Y., 15s
Rheem Califone Corp., Calif., 25c, Audio-Visual Aids c
Roberts Electronics, Inc., Calif., 25sc
Sangamo Electric Co., Ill., 10c, 25c
Scully, Inc., Conn., 15s
Shepherd Industries, Inc., N.J., 10sc, 15c, 25sc, 35c
Solartron Electronic Group Ltd., England, Audio-Visual Aids s
Soroban Engineering, Inc., Fla., 10sc
SoundScriber Corp., The, Conn., 5s, 15s, 20s, 25s
Southwestern Industrial Electronics Co., Tex., 25sc
Stancil-Hoffman Corp., Calif., 10c, 25s
Starling Corp., Calif., 10c
Sylvania Electric Products Inc., Data Systems Operations, Mass., 10c
Systron-Donner Corp., Calif., 10s
Tandberg of America, Inc., N.Y., 25s
Technisonic Studios, Inc., Mo., 15c
Technitrol Engineering Co., Inc., Pa., 10c
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 10c, 25sc, 30sc, 35c, Tel: YE 2-8600**
See ad on page 338

**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 15c, Tel: MIdway 6-7211**
See ads on pages 456, 556

Texas Instruments Incorporated, Geosciences & Instrumentation Div., Tex., 15s
United Shoe Machinery Corp., Mass., 10c
Viewlex, Inc., N.Y., 25sc
Wang Laboratories, Inc., Mass., 5c, 10c
Warwick Mfg. Corp., Ill., 25c
Webcor, Inc., Electronics Div., Ill., 25c
Webster Electric Co., Wis., 25s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 10c, 15s, 25sc, 35c, Tel: JUdson 2-3030**
See ad on page 704


Recorders, data, telemetering: See class 36

Recorders, graphic: See class 16

Recording accessories: See class 65

Recording equipment, computers: See class 9

Recording galvanometers: See class 15

Recording oscillographs: See class 25

Recording tape & wire: See class 65

Rectifiers: See class 66

Rectifiers, vacuum tube: See class 67

Reflectors, radar: See class 39

Refrigeration equipment: See class 96

Relay equipment, carrier current: See class 8

Relay equipment, microwave: See class 20

Relay testers: See class 14

Relays: See class 68

Remote controls: See class 4

Resistor testers: See class 14

Resistors: See class 69

Rotators: See class 39

STL equipment: See class 7

SWR meters: See class 21

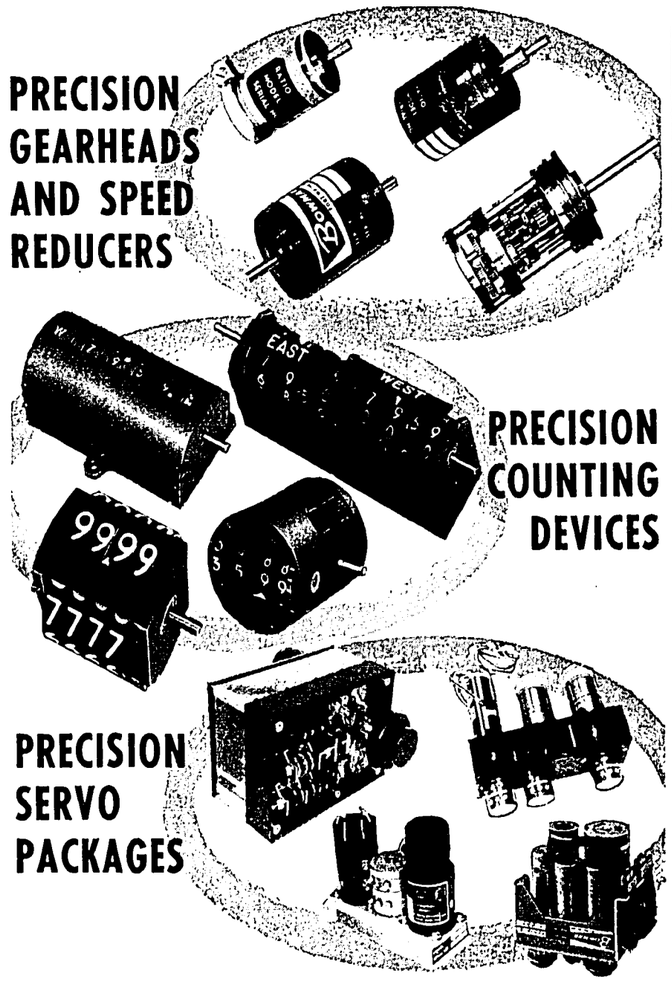
Scalers, nuclear: See class 24

Selective calling equipment: See class 22

Semiconductor testers: See class 14

Servo analyzers: See class 14


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.




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Optimum performance and reliability of precision electronic control systems are dependent upon the components and servo packages of which they are comprised.

Bowmar's sound, imaginative approaches to components and package design have led many projects to new high levels of reliability and accuracy, while often reducing critical weight and size. This experience and pioneering have improved the state of the art in many types of precision systems including **weapons control, inertial guidance, navigation, autopilot** and **tracking.** Bowmar experience is displayed by its successful history of performance in the most advanced missile and aircraft programs.

Why not let Bowmar skills contribute to your project? Bowmar's engineering and production capabilities are equal to any task, regardless of complexity.



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*Represented in the Principal Cities*

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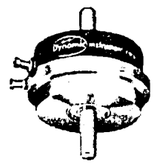
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MAGNETIC CLUTCHES and BRAKES



Dynamic
INSTRUMENT CORP.



5 FRAME SIZES:
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OVER 15 MODELS TO CHOOSE FROM
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*EDgewood 3-1600*

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# Directory I. Complete Equipment

## 30. Servo-Mechanisms.

5. Brakes
10. Clutches, magnetic
15. Controls
20. Couplings
25. Gears, gear-trains, etc.
30. Repeaters
35. Resolvers
40. Servo amplifiers
45. Servo multipliers
50. Servo motors & generators

ACF Electronics Div., ACF Industries, Inc., Md., 40s

Advance Instrument Corp., N.J., 15c, 30c, 40c

Advanced Research Associates, Inc., Md., 25sc, 40sc

Aeroflex Corp., The, Aeroflex Laboratories Div., N.Y., 40s

**Aetna Electronics Corp., Readington Rd., North Branch, N.J., 40c, Tel: RAndolph 5-1000**
See ad on page 277

Airborne Accessories Corp., N.J., 15c

Aircraft Armaments, Inc., Md., 25c, 40c

**Airpax Electronics Incorporated, Seminole Div., Fort Lauderdale, Fla., 15c, 40c, Tel: LUdlow 3-6160**
See ad on pages 82-83

**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 10c, 35c, 50c, Tel: DUnkirk 5-7401**
See ad on page 164

American Insulator Corp., Pa., 25c

American Measurement & Control, Inc., Mass., 15c, 40s

American Research & Mfg. Corp., Md., 40s, 45s

Analogue Controls, Inc., N.Y., 25c, 40c, 45c

Ansco Division, General Aniline & Film Corp., N.Y., 25sc, 40sc, 45sc

Applied Dynamics, Inc., Mich., 30c, 35c, 40c, 45c

Arch Gear Works, Inc., Mass., 25c

Arma Div., American Bosch Arma Corp., N.Y., 50c

Atlas Precision Products Co., Pa., 25sc

Austin Electronics, N.Y., 15c, 40c

Automatic Timing & Controls, Inc., Pa., 15sc, 30sc, 40sc

Autotronics, Inc., Mo., 5s, 10s

Avion, Inc., N.Y., 15c, 40c

Avionics Corp. of America, Pa., 40c

**Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 40c, 45c, Tel: UNiversity 4-7420**
See ad on page 280

**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 50sc, Tel: WOodland 8-6833**
See ad on page 465

Barnes & Reinecke, Ill., 15c, 40c

Beckman Instruments, Inc., Berkeley Div., Calif., 45s

Beckman Instruments, Inc., Helipot Div., Calif., 50sc

Bekey Electric Div., Geniseo, Inc., Calif., 50sc

Bell Aircraft Corp., Avionics Div., N.Y., 15c, 40c, 45c

Bendix Corp., The, Bendix-Pacific Div., Calif., 5c, 10c, 25c, 40c, 50c

**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 25c, 30sc, 35sc, 50sc, Tel: ATlas 8-2000**
See ad on pages 103-106

Bendix Corp., The, Industrial Controls Section, Mich., 15sc, 50s

Bendix Corp., The, Montrose Div., Pa., 40c

**Bowmar Instrument Corp., 8000 Bluffton Rd., Box 2835, Fort Wayne, Ind., 15c, 25c, 40c, 45c, Tel: SHerwood 3121**
See ad on page 340

Brach Mfg. Corp., Div General Bronze Corp., N.J., 40c

Brevel Products Corp., N.Y., 25s, 50s

Bristol Co., Conn., 15c, 40c

**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 40sc, Tel: NEwtown 9-5700**
See ad on page 426

Burton-Rodgers, Inc., Ohio, 25c, 40c

Bytrex Corp., Mass., 40c

Cadre Industries Corp., N.Y., 40c

Canadian Aviation Electronics, Ltd., Canada, 25c, 40c

Carmody Corp., N.Y., 5sc, 10sc, 15sc, 20sc

Cedar Engineering Div., Control Data Corp., Minn., 5c, 10c, 15c, 30c, 35c, 40c, 50c

Central Dynamics Ltd., Canada, 25c, 35c, 40c, 50c

Chance Vought Electronics Div., Tex., 15c, 40c, 45c

Chicago Aerial Industries, Inc., Ill., 15c, 25s

Clark Controller Co., The, Ohio, 15c

Clifton Precision Products Co., Inc., Pa., 35sc, 50sc

Clipper Gear & Machine Co., Mich., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c

Collins Radio Co., Central Sales Office, Tex., 25c, 40s, 45s

**Computer Instruments Corp., 90 Madison Ave., Hempstead, N.Y., 35sc, Tel: IVanhoe 3-8200**
See ad on page 264

Computing Systems, Inc., N.Y., 35s, 40s, 45s

Computing Devices of Canada Ltd., Canada, 40sc

**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 15c, Tel: ALgonquin 4-5100**
See ad on page 249

Consolidated Airborne Systems, Inc., N.Y., 30c, 40c

Consolidated Controls Corp., Conn., 15c, 40c

Control Instrument Co., Inc., Subsid. Burroughs Corp., N.Y., 15c, 25c

Cook Technological Center, Div. Cook Electric Co., Ill., 40c

Croname, Inc., Ill., 25c

Crosley Division, Avco Corp., Ohio, 40s

Cutler-Hammer Inc., Wis., 5s, 10s, 15s

Daco Instrument Co., N.Y., 10c, 15c, 25c, 40c

Dalmo Victor Co., Div. of Textron, Inc., Calif., 15c, 25c, 40c

Datex Corp., Calif., 30sc

Daystrom, Inc., Weston Instrument Div., N.J., 50c

Daystrom, Inc., Transcoil Div., Pa., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s

Dayton Aircraft Products Inc., Fla., 40c

DeLandry Precision Elements Co., Inc., N.Y., 25c

Dial Products Co., N.J., 5s, 10s, 20s

Di An Controls, Inc., Mass., 40sc

Diehl Mfg. Co., N.J., 25s, 35sc, 40sc, 50sc

Dorobevac Engineering Co., Dicro Div., Ill., 15c

Donner Scientific Co., Subsid. Systron Donner Corp., Calif., 40s

Dycktro Corp., Mass., 30s

Dynamic Gear Co., Inc., N.Y., 25s

**Dynamic Instrument Corp., 59 New York Ave., Westbury, L.I., N.Y., 5sc, 10sc, Tel: EDgewood 3-1600**
See ad on page 340

Dynamics Corp. of America, N.Y., 10c, 25c, 35c, 40c, 45c, 50c

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 35c, 40c, Tel: HAlifax 0-7491**
See ad on page 400

Eastern Industries, Inc., Conn., 40

Edison Industries, Thomas A. Instrument Div., N.J., 5c, 10c, 25sc, 50s

Ercor Division, The Scranton Corp., Ill., 5c

Electric Exc Equipment Co., Ill., 30c

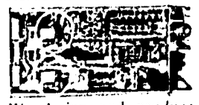
Electric Machinery Mfg. Co., Minn., 50s


ELECTRO-MECHANICAL DEVICES



**Forbes and Wagner Electro-Mechanical Clutch and Brake Assembly**

The Aerocom Transmitter built by Aeronautical Communications Equipment Inc. uses two F&W drives as circled. The Aerocom Tuner uses one F&W Drive.



**Aerocom Transmitter**

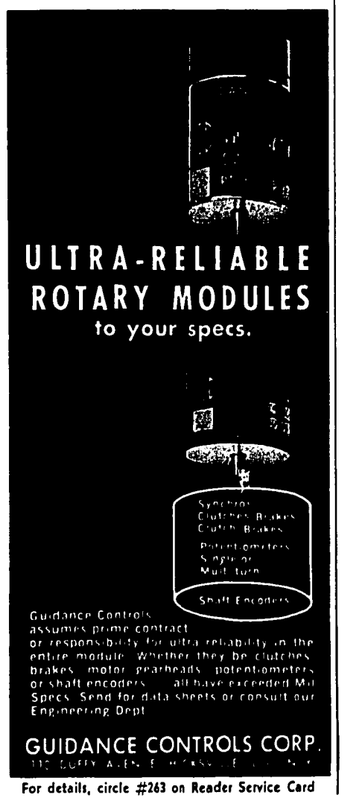
We design and produce components and assemblies for Commercial and Military Applications. Let us help you with your Electronic Problems.

*forbes and wagner, inc.*
**350 Central Avenue**
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Electric Regulator Corp., Conn., 40c
Electric Specialty Co., Conn., 50c
Electro Development Corp., Wash., 40c
Electro Instruments, Inc., Calif., 40s
Electro Precision Corporation, Ark., 40, 45
Electronic Associates, Inc., N.J., 40c, 45c
Electronic Communications, Inc., Fla., 40c
Electronic Specialty Co., Calif., 10c, 20c, 25c, 40c
Electronics Research, N.J., 15c
Ensco, Inc., Utah, 40c
Exact Engineering & Mfg. Inc., Calif., 25sc
Exactel Instrument Co., Calif., 15s, 40s
Fairfield Engineering Corp., Conn., 15c, 40c
Falcon Division, General Thermodynamics Corp., Mass., 20s
Farwest Mfg. Div., Inc., Wash., 40c
Fecker Division, J. W., American Optical Co., Pa., 40sc
Federal Manufacturing & Engineering Corp., N.Y., 15c, 25c
Feedback Controls, Inc., Mass., 15sc, 25sc, 30c, 40sc, 45sc
**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., Electro-Mechanical Clutch & Brake Assemblies, Tel: YEllowstone 4-2691**
**See ads on pages 341, 399, 403, 437, 563, 569**
Franke Gear Works, Inc., Armac Gear Division, Ill., 25sc
G-M Laboratories, Inc., Ill., 50sc

For details, circle #263 on Reader Service Card


Galaxy Engineering Corp., Calif., 20s
Gap Instrument Corp., N.Y., 20s, 25sc
Garrett Corp., The, Calif., 40c, 50c
Gear Specialties, Inc., Ill., 25c
Geartronics Corp., Actuator Products Div., Mass., 10sc, 25sc
Geartronics Corp., Massachusetts Gear Div., Mass., 25c
Gemco Electric Co., Mich., 15c, 40c
General-Electro Mechanical Corp., N.Y., 5sc, 10sc
General Electronic Control, Inc., Minn., 15c, 40sc
General Electronic Laboratories, Inc., Mass., 40sc
General Mills, Inc., Mechanical Div., Minn., 25c
Genisco, Incorporated, Calif., 50sc
Giannini Controls Corp., Calif., 15sc, 20c, 30sc, 35sc, 50s
Globe Industries, Inc., Ohio, 5c, 10c, 25c, 50c, Actuators c
Good Electronic Corp., Fla., 40c
Granite State Machine Co., Inc., N.H., 15c, 20c, 25c, 40c
Greenleaf Mfg. Div., Mandrel Industries, Inc., Mo., 50c
**Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 25sc, Tel: NEw Rochelle 3-8600**
**See ad on page 643**
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 15c, 40c, Tel: CHesapeake 3-1100**
**See ad on page 512**
**Guidance Controls Corp., 110 Duffy Ave., Hicksville, L.I., N.Y., 5sc, 10sc, 20sc, 25sc, 50sc, Tel: WElls 8-9500**
**See ad on this page**
Gulton Industries, Inc., N.J., 40sc
Hall-Barkan Instruments, Inc., N.Y., 5c, 10c, 15c, 20c, 25c
Hamilton Standard Div., United Aircraft Corp., Conn., 40c
Hansen Mfg. Co., Inc., Ind., 50c
Hanson-Gorrill-Brian, Inc., N.Y., 40sc
Harowe Precision, Inc., Pa., 30c, 35c, 50c
Heinze Electric Co., Mass., 50s
Henschel Corp., Mass., 40c
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 40c
Hoffman Electronics Corp., Calif., 25sc
Holtzer-Cabot Motor Div., National Pneumatic Co., Inc., Mass., 50sc
Hoover Electric Co., Calif., 5c, 10c, 15c, 25c, 40c, 50c
Hoover Electronics Co., Md., 15c, 30c, 35c, 40c, 45c
Hydro-Aire Co., Calif., 40c
I-T-E Circuit Breaker Co., Special Products Div., Pa., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c
Induction Motors of California, Div. IMC Magnetics Corp., Calif., 35sc, 50sc
Industrial Control Co., N.Y., 15sc, 25sc, 40sc, 45sc
**Industrial Test Equipment Co., 55 East 11th St., New York 3, N.Y., 40c, Tel: GRamercy 3-4684**
**See ad on page 333**
Insco Company, Div. Barry-Wright Corp., Mass., 25s
Instru-Lec Corp., N.Y., 25sc
Instruments of New England, Mass., 40c
Interstate Electronics Corp., Calif., 15c
Jan Hardware Mfg. Co., Inc., N.Y., 15s, 20s, 25s
Jordan Controls, Inc., Wis., 40s
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 50sc, Valves sc, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kidde & Co., Inc., Walter, N.J., 15c, 40c
Kollmorgen Optical Corp., Mass., 10c
**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 5sc, 10sc, 15sc, 30sc, 35sc, 40sc, 45sc, 50sc, Tel: TWining 9-5600**
**See ad on page 268**
Kollsman Motor Corp., Pa., 30c, 35c, 50c
Lear, Inc., Calif., 5sc, 10sc, 15sc, 25sc, 35sc, 40sc, 50sc
Lear, Incorporated, Mich., 5sc, 10sc, 15sc, 20sc, 35c, 40c, 50sc
Librascope Div., General Precision, Inc., Calif., 40sc, 50sc
Link Division, General Precision, Inc., N.Y., 15c, 20sc, 25sc, 40sc, 45sc
Link Division, General Precision, Inc., Palo Alto Lab., Calif., 40c, 50c
Liquidometer Corp., The, N.Y., 40c
Litton Industries, Maryland Div., Md., 5, 15, 20, 25, 30, 35, 40, 45, 50
MB Electronics, Div. Textron Electronics, Inc., Conn., 40s
MacLaren & Co. Inc., F. B., N.Y., 25c, 40s, 45c
Madigan Electronic Corp., N.Y., 40c
**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 15c, 40sc, Tel: CYpress 2-6610**
**See ads on pages 252, 364, 418**
Magnetic Circuit Elements, Inc., Calif., 40c
**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 40c, Tel: ROgers 9-5312**
**See ad on page 364**
**Magnetico, Inc., 6 Richter Ct., East Northport, N.Y., 40sc, Tel: ANdrew 1-4502**
**See ad on page 366**
Magtrol, Inc., N.Y., 5c, 10c, 15c, 50c
Maico Electronics, Inc., Minn., 40c, 45c
Mandrel Industries, Inc., Calif., 25c, 40c, 50c
Marquardt Corp., The, Pomona Div., Calif., 40c, 45c
Marstan Electronics Corp., N.Y., 15c
Martin Co., The, Md., 25c, 40c, 45c
Maurer, Inc., J. A., N.Y., 25c 40c
Mayberry Electronics Co., Calif., 40sc
McKiernan-Terry Corp., N.J., 15c, 25c
Mechatrol, Div. Servomechanisms, Inc., N.Y., 10sc, 25sc, 40s, 50sc
Mergenthaler Linotype Co., N.Y., 40c
Metron Instrument Co., Colo., 20s, 25sc
Micro Gee Products, Inc., Calif., 40s
Midwestern Instruments, Inc., Okla., 40s
Milgo Electronic Corp., Fla., 30c, 40c, 45c
**Millen Manufacturing Co., Inc., James, 150 Exchange St., Malden 48, Mass., 20sc, Tel: DAvenport 4-4108**
**See ad on page 402**
Milro Controls Co., Inc., N.J., 10c, 15c, 40c
Minneapolis-Honeywell Regulator Co., Boston Div., Mass., 50sc





# Directory I. Complete Equipment

## 30. Servo-Mechanisms.

Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 40s, 50s
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 10c, 50sc
Minneapolis-Honeywell Regulator Co., Twin Cities, Minn., 40sc
Missouri Research Laboratories, Inc., Mo., 15c
**Mittelmann, Eugene, 549 W. Washington Blvd., Chicago 6, Ill., 15c, Tel: CEntral 6-2983**
**See ad on page 629**
**Moeller Instrument Co., Inc., Electronics Div., 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 40c, Tel: VIrginia 9-2100**
**See ad on page 588**
Montek Associates, Inc., Utah, 40c
Moran Instrument Corp., Calif., 40c
Moseley Co., F. L., Calif., 40s
Motorola Aviation Electronics, Inc., Calif., 10s
Motorola, Inc., Military Electronics Div., Ariz., 25c, 35c
Muirhead & Co. Ltd., England, 15s, 25s, 35s, 40s, 50s
Muirhead Instruments, Inc., N.Y., 25s, 35s, 40s, 50s
Naniloa Corporation, Ohio, 40c
National Standard Electronics, Inc., N.Y., 15c
Newton Co., The, Conn., 15c, 40c
Nichols Ltd., R. H., Canada, 50s
Nilsen Mfg. Co., Ill., 20sc, 25c, 35c
**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 30s, 40s, Tel: OVerbrook 1-8600**
**See ad on page 286**
Offner Electronics, Inc., Ill., 40s
Oilgear Co., The, Servocontrol Div., Mass., 15sc, 40s
Olympic Radio & Television, Div. Siegler Corp., N.Y., 40c
OPTOmechanisms, Inc., N.Y., 40c
**Oster Mfg. Co., John, Avionic Div., 1 Main St., Racine, Wis., 35sc, 50sc, Tel: MElrose 7-4445**
**See ad on page 466**
Otis Elevator Co., Defense & Industrial Div., N.Y., 15c, 25c, 40c
Ovitron Corp., N.Y., 15c, 40sc, 45sc
PIC Design Corp., N.Y., 5s, 10s, 20s, 25s
Pegasus Laboratories, Inc., Mich., 15s, 40s, Valves s
Performance Measurements Co., Mich., 40sc
Perkins Machine & Gear Co., Mass., 25c
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 40s, Tel: COmmonwealth 6-5375**
**See ad on page 270**
Philips Electronic Instruments, N.Y., 15s, 30s
Philips Electronics Industries Ltd., Canada, 40s, 50s
Phoenix Precision Instrument Co., Inc., Pa., 40c
**Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, L.I., N.Y., 50sc, Tel: ORiole 6-8000**
**See ad on page 500**
Planet Instrument, Inc., Ind., 25sc
Plug-In Instruments, Inc., Tenn., 40sc
Precision Mechanisms Corp., N.Y., 15c, 20s, 25sc, 30sc
Precision Specialties, Inc., N.J., 10sc
Printed Motors, Inc., N.Y., 50
Radio Condenser Co., N.J., 10c
**Radionics, Inc., 76 Cambridge St., Burlington, Mass., 40s, Tel: BRowning 2-1233**
**See ads on pages 291, 343**
Ram Meter, Inc., Mich., 40c, 45c
Raymond Engineering Laboratory, Inc., Conn., 10sc
Reeves Instrument Corp., N.Y., 10s, 20s, 25sc, 35s, 40s, 45s
Renbrandt, Inc., Mass., 20sc
Republic Electronic Industries Corp., N.Y., 15c, 40c, 45c
Research, Inc., Minn., 15c, 40s, 45c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 30c, 35c, 40c, 45c, Tel: LOckwood 5-4578**
**See ad on page 324**
Robinette Co., W. C., Calif., 15c, 50c
Rockwell Engineering Co., Ind., 15c
**Rotating Components, Inc., 267 Green St., Brooklyn 22, N.Y., 25c, 50c, Tel: EVergreen 9-3490**
**See ad on page 389**
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 40c
Sanders Associates, Inc., N.H., 40c
Scientific-Atlanta, Inc., Ga., 30s, 40sc
Servo Corp. of America, N.Y., 40s
Servo Development Corp., N.Y., 15sc, 20sc, 25sc, 30c, 40sc
Servo-Tek Products Co., N.J., 25s, 35s, 40s, 50s
Servomechanisms, Inc., Calif., 15c, 25c, 40s, 50s
Shepard Laboratories, Inc., N.J., 5c, 10c, 40c
Sier-Bath Gear & Pump Co., Inc., N.J., 25
**Sierra Research Corp., P.O. Box 22T, Buffalo 25, N.Y., 40c, 45c, Tel: NF 2-8823**
**See ads on pages 271, 356, 662**
Solartron Electronic Group Ltd., England, 40s, 45s
Southwestern Industrial Electronics Co., Tex., 40c
Special Instruments Laboratory, Inc., Tenn., 40c
Spectrol Electronics Corp., Calif., 15c, 40c, 45c


RADIONICS Model SPA-1 VELOCITY SERVO POWER AMPLIFIER

is a 90 watt amplifier specifically designed for use with low inertia close coupled a.c. servo tachometer combinations to provide a truly high performance velocity servo system.

The following performance characteristics substantiate the above:



- Undistorted power output: 90 watts at 60 cps.
- Output impedances: Output voltages of 70 and 115 volts, with a buck-boost winding of 5, 10, and 20 volts, for maximum stall-torque adjustment.
- Inputs: AC servo drive signal and a-c tach signal mixed with separate gain controls. 20 mv to either channel for full output. Amplifier hum and noise referred to input is 20 microvolts.
- Provisions for velocity servo operation:
  - Excitation and reference phase shift networks for both servo motor and tachometer.
  - Center-tapped drive-signal voltage source for direction of rotation reversal.
  - Adjustable tachometer feedback release control to allow maximum slewing rates as a straight servo.
  - Compensation for tachometer residual hum prevents motor drift with no signal.

*For further information write for technical data on Model SPA-1 amplifier.*

**RADIONICS, INC.**
76 CAMBRIDGE STREET • BURLINGTON, MASS.

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PRECISION COMPONENTS
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Sperry Gyroscope Co. of Canada Ltd., Canada, 15c, 40c, 50c
Sperry Piedmont Co., Div. Sperry Rand Corp., Va., 15c, 30c, 40c
**Sterling Components, Div. of Sterling Precision Corp., 5 Sintsink Dr. East, Port Washington, L.I., N.Y., 5sc, 10sc, 15c, 20sc, 25sc, 30c, 35c, 40c, 45c, Tel: POrt Washington 7-8200**
See ad on page 343
**Stewart Corp., F. W., 4311-13 Ravenswood Ave., Chicago 13, Ill., 25c, Tel: GRaceland 2-6600**
See ad on page 653
**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 50s, Tel: LUdlow 2-9561**
See ads on pages 412, 468, 494, 572, 586
Technical Industries Corp., Calif., 40c
Technology Instrument Corp., Mass., 5sc, 10sc, 15c, 25c
Technology Instrument Corp. of Calif., Calif., 5c, 10c
Telechrome Mfg. Corp., N.Y., 15c, 25c, 30c, 40c, 45c
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 40c, Tel: YE 2-8600**
See ad on page 338
**Teltronics, Inc., 277 Main St., Nashua, N.H., 40c, Tel: TUxedo 2-6264**
See ad on page 337
Temco Electronics, Tex., 40c
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40sc, 45c, 50sc
**Torotel, Inc., 5512 E. 110th St., Kansas City 34, Mo., 40sc, Tel: SOuth 1-6314**
See ad on page 405
**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 15c, 40c, Tel: OVerbrook 1-0400**
See ad on page 294
Ultronix, Inc., Calif., 10c
United Aircraft Corp., Norden Div., Conn., 35s, 40s, 50s
United Aircraft Corp., Norden Div., Ketay Dept., N.Y., 35sc, 40sc, 50sc
United Control Corp., Wash., 15c, 40sc
United Shoe Machinery Corp., Mass., 15c, 40c
U. S. Gear Corp., Mass., 25sc
U. S. Science Corp., Calif., 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c
Universal Match Corp., Armament Div., Mo., 15c, 40c
Univox Corp., N.Y., 15c, 30c
Vap-Air Div., Vapor Heating Corp., Ill., 15c
Vapor Recovery Systems Co., Calif., 40s
Varo Mfg. Co., Inc., Tex., 15sc, 40sc
VecTrol Engineering, Inc., Conn., 15c, 40c
**Vernitron Corp., 131 Old Country Rd., Carle Place, L.I., N.Y., 35s, Tel: PIoneer 1-4130**
See ad on page 469
Vickers, Inc., Electric Products Div., Mo., 5s, 10s, 40c
Viking Industries, Inc., Calif., 40c
Vogue Instrument Corp., N.Y., 15, 25
Warner Electric Brake & Clutch Co., Wis., 5s, 10s, 15s, 20s
Waugh Engineering Co., Calif., 40c
Western Gear Corp., Electro-Products Div., Calif., 25c, 50c
Westinghouse Electric Corp., Air Arm Div., Md., 40s
Whittaker Gyro Div., Telecomputing Corp., Calif., 15c
Wintronics, Calif., 40c
**Wright Machinery Co., Div. Sperry Rand Corp., Durham, N.C., 35c, 50c, Tel: 2-8161**
See ad on page 469
**Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 50s, Tel: BEekman 3-6720**
See ad on page 296
Yuba-Dalmotor Div., Yuba Consolidated Industries, Inc., Calif., 35s, 45s, 50c

**Shielded enclosures: See class 14**

**Shielding materials: See class 102**

**Shift converters & keyers: See class 35**

**Shift registers: See class 9**

**Ship-to-shore communications equipment: See class 18**

**Shunts: See class 58**

**Signal generators, radio frequency: See class 28**

**Signal generators, telemetering: See class 36**

**Signal generators, television: See class 37**

**Simulators, radar: See class 27**

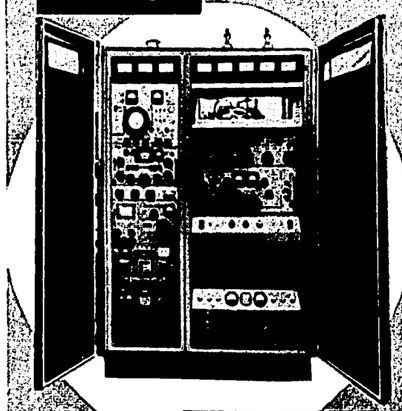
## 31. Single Sideband.

5. Receivers 10. Transmitters

Admiral Corp., Ill., 5c, 10c
American Geloso Electronics, Inc., N.Y., 5s
Barber Labs., Alfred W., N.Y., 5c, 10c
Barker & Williamson, Inc., Pa., 5sc, 10sc
Cadre Industries Corp., N.Y., 5c, 10c


10,000 WATTS
SINGLE SIDEBAND HI-POWER TRANSMITTER

GPT-10K



The TMC Model GPT-10K, Radio Transmitter, is a conservatively rated, general purpose unit capable of providing 10 kw PEP output throughout the range of 4 to 28 megacycles. Containing all components within a single attractive enclosure, the GPT-10K includes exciter, spectrum analyzer, F.S. Exciter, and complete on the air testing circuitry.

AN/FRT-39

SEND FOR BULLETIN 207B

THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK

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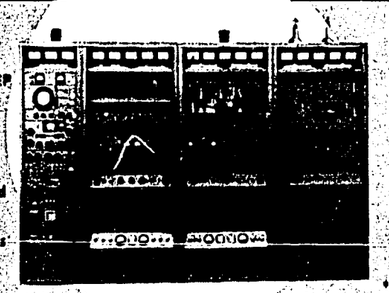



# Directory I. Complete Equipment

## 31. Single Sideband.

Canadian Marconi Co., Canada, 5s, 10s
Capehart Corp., Dynamic Electronics Div., N.Y., 5c
Central Electronics, Inc., Ill., 15s
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, 10sc, Tel: OAkwood 7-6800**
See ad on page 308
Collins Radio Co., Iowa, 5s, 10s
Collins Radio Co., Central Sales Office, Tex., 5s, 10s
Collins Radio Co., Texas Division, Tex., 5s, 10s
Communications Co., Inc., Fla., 5sc, 10sc
**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 10c, Tel: EVergreen 1-1135**
See ad on page 156
Crosby-Teletronics Corp., N.Y., 5s, 10s
Dalmo Victor Co., Div. Textron, Inc., Calif., 5c, 10c
Designers For Industry, Inc., Ohio, 5c, 10c
Dynamics Corp. of America, N.Y., 5sc, 10sc
Electro-Voice, Inc., Mich., 5s
Electronic Communications, Inc., Fla., 5c, 10c
Elk Electronic Labs., Inc., N.Y., 5c, 10c
Federal Manufacturing & Engineering Corp., N.Y., 5c, 10c
Gates Radio Company, Ill., 5s, 10s
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c
Gonset Division, Young Spring & Wire Corp., Calif., 5s, 10s
Hallicrafters Co., The, Ill., 5sc, 10sc
Hammarlund Mfg. Co., Inc., N.Y., 5s, 10s
Hoffman Electronics Corp., Calif., 5c, 10c
Intelex Systems, Inc., N.Y., 5s, 10s
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 10c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c
Jansky & Bailey, Inc., D.C., 10c
Johnson Co., E. F., Minn., 10s
Kahn Research Laboratories, Inc., N.Y., 5s, 10s, Adapters s
Kellogg Switchboard & Supply Co., Communications Div., ITT Corp., Ill., 5c, 10c
Knight Electronics Corp., Ill., 10s
**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 5c, 10c, Tel: AMityville 4-2200**
See ad on page 365
Lear, Inc., Calif., 5c, 10c
Madigan Electronic Corp., N.Y., 5c, 10c
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 5s, Tel: LOwell 7-0607**
See ad on page 332
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s
Microwave Development Laboratories, Inc., Mass., 5sc, 10sc
Morrow Radio Mfg. Co., Ore., 5s, 10s
Motorola, Inc., Ill., 5c, 10c
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c
National Company, Inc., Mass., 5c, 10c
**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 5, Tel: NOrmandie 5-4800**
See ad on page 614
Nems-Clarke Co., Div. Vitro Corp. of America, Md., 5c
Nippon Electric Co., Ltd., Japan, 5c, 10c
Ortronix, Inc., Fla., 10s
Peer, Incorporated, Tex., 10c
Philco Corporation, Pa., 5c, 10c
Philips Electronics Industries Ltd., Canada, 5s, 10s
Racal Engineering Ltd., England, 5s, 10s
Radio City Products Co., Inc., Pa., 5c
RCA Victor Co., Ltd., Canada, 5s, 10s
Radio Corp. of America, N.J., 5s, 10s
Radio Corp. of America, Defense Electronic Products, N.J., 5sc, 10sc
Radio Engineering Laboratories, Inc., N.Y., 5sc, 10sc
Radio Industries, Inc., Kansas, 10c
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, Tel: EVergreen 8-6000**
See ad on page 506
Railway Communications, Inc., Mo., 5sc
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, Tel: LOckwood 5-4578**
See ad on page 324
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 5s, Tel: PRescott 3-8010**
See ad on page 246
Sorensen Industrial Electronic Co., N.J., 5c, 10c
Specialty Electronics Development Corp., N.Y., 5c, 10c
Spilsbury & Tindall, Ltd., Canada, 5c, 10c
Standard Telephones & Cables, Ltd., England, 5sc, 10sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c
TMC (Canada), Ltd., Canada, 5s, 10s
Tapetone, Inc., Mass., 5s
**Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 5s, 10s, Tel: OWens 8-4800**
See ads on pages 344, 345
Telechrome Mfg. Corp., N.Y., 5s, 10s
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c
U. S. Science Corp., Calif., 5c, 10c
Van Norman Industries, Inc., Electronics Div., N.H., 5c, 10c
Westinghouse Electric Corp., Electronics Div., Md., 5c, 10c


GPT-40K AN/FRT-40



- 4 to 28mc.
- 40,000 watts PEP
- ALDC
- Filtered air cooling
- Semi-pressurized cabinet
- Safety interlocks throughout
- ISB*
- SSB*
- DSB*
- CW
- AM
- FS
- FAX

*Suppressed carrier

40,000 WATTS

SEND FOR BULLETIN 206C

The TMC transmitter, Model GPT-40K, is a completely self contained unit including all power supplies and ventilating equipment. All components are housed in four modular assemblies occupying only 40 square feet of floor space.
The transmitter includes equipment for immediate monitoring and testing of all vital operating points.
To provide for complete flexibility in operation, 1 Kw or 10 Kw outputs are readily available for reduced power or emergency operation.
The unit is available with or without synthesizer control.

THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK

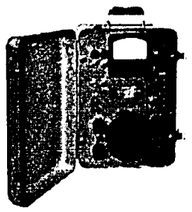
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# ACTON LABORATORIES, INC.

## Laboratory Instruments of Exceptional Precision

### IMPEDANCE MEASUREMENT



**TYPE 310-B Z-ANGLE® METER** — Measures in polar form the impedance, phase angle, dissipation factor, and storage coefficient of any RLC combination. One balancing control permits accurate analyses to be made more quickly and easily than with conventional ac bridges. Measures impedances from 0.5 to 100 k ohms. Frequency range: 30 cps to 40 kc. Accuracy of impedance magnitude is ±1% to 20 kc and ±2 degrees for phase angle. Unit has internal 400 cps and 60 cps signals.

**TYPE 314-A LOW-IMPEDANCE Z-ANGLE® METER** — Frequency of 30-1000 cps, impedance-magnitude range of 0.005-1000 ohms accurate to ±1%, and dissipation-factor range of 0 to infinity. Phase angles measured from −90° to 0° to +90° with accuracy of ±1° from 30°-90° and ±2° from 5°-30°.

### TRANSMISSION AND DELAY MEASURING SETS



Measures the absolute amplitude and relative delay characteristics of 600 ohm transmission circuits in the frequency range from 200 cycles to 24 kc. The instrument consists of two basic units: the 451-A Transmitter and the 452-A Receiver. Overall precision and accuracy of ±50 microseconds and a drift rate not exceeding ±50 microseconds per 30 minutes.

**NEW**

**TYPE 453-A TRANSMISSION AND DELAY MEASURING SET** — Frequency range 500 cycles to 50 kc. Accuracy ±5 microseconds.

### PACKAGED PRECISION DRIVE UNITS

**TYPES PDW-1, DSD-2, DSD-3** — Complete units in themselves, requiring no additional parts or assembling. Type PWD-1 is worm gear, shaft positioner, accuracy 1 min. of arc. Type DSD-2 is dual speed drive, accuracy 6 mins. of arc. Type DSD-3 is dual speed drive, accuracy 12 mins. of arc. All meet Mil-E-4970(USAF), feature no backlash. Use with syncros, potentiometers, inductors, capacitors, tuning coils, etc.



### RESEARCH AND DEVELOPMENT

Acton Laboratories, Inc., also has complete facilities and experienced engineering staff to provide specialized research in and development of electronic components and instruments.

### ENVIRONMENTAL TESTING

Testing to military and commercial specifications in a fully equipped Environmental Testing Laboratory is another important service provided by Acton Laboratories, Inc.

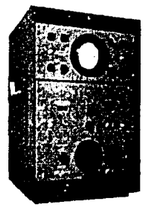
### PHASE MEASUREMENT, GENERATION

**TYPE 320-AB PHASE METER** — Measures phase difference between 2 signals (10 cps to 100 kc) of any wave shape and indicates phase angle on large meter with separate ranges of 360°, 180°, 90°, and 36°. Accuracy is ±(1% of full scale + 3 degrees). Requires no adjustments, corrections, or balancing operations. Amplitude range is .7 to 120 volts rms. Input impedance of 10 meg and 13 mmf. Modifications allow operation to 1 cps. Also available as 320-ABR (rack mount).



**TYPE 328-A TRANSISTORIZED PHASE METER** — Frequency range 10 cps to 50 kc. Direct reading from 0 to 360° in 6 ranges of 60° each on large 5" meter scale. Absolute accuracy of 1° from 10 cps to 10 kc. Amplitude range .25 to 170 volts peak except at low frequencies. Input impedance: one megohm shunted by 20 mmf. for each channel. Internal output impedance is approx. 100,000 ohms. Recorder connector provided. Power: 105-125 volts, 60 cycle ac, 20 watts. Terminals provided for operating from an external 45 volt battery, 50 mil drain.

**TYPE 709-A BROADBAND SECONDARY PHASE STANDARD** — Accurately calibrates phase measuring instruments but can also measure phase when used in conjunction with oscilloscope. Develops 2 sinusoidal signals continuously variable from 0° to 360° with respect to each other when fed from oscillator. Range is 20 cps to 20 kc. Accuracy of ±1° from 20 cps to 10 kc; ±3° from 10 kc to 20 kc. High input impedance, low output impedance. Inherent distortion less than 1%. 0.5 to 5-volt output varies less than ±2% with phase shift. Also available as 709-AR (rack mount).



**TYPE 7000-B AUDIO PRIMARY PHASE STANDARD** — Designed for calibration of phase detectors and phase shifting devices but can also be used to measure phase shift. Consists of Type 703-A Oscilloscope, Type 704-B Secondary Phase Standard, and Type 707-B Lissajous Generator. Supplies 2 sinusoidal signals of same frequency whose phase relationship is continuously variable from 0° to 360° with ±0.05° accuracy. Any single frequency available from 30 cps to 20 kc. Output of 1 to 12 volts rms from impedance of approximately 200 ohms.

**TYPE 706-A ULTRA-SONIC PRIMARY PHASE STANDARD** — Calibrates high frequency phase meters, phase detectors, and phase-shifting devices. Generates 2 sine-wave signals having variable phase difference 0° to 360° at any specified single frequency 20 kc to 200 kc. Phase angle accuracy of ±0.1 degree set by observation of multiple frequency Lissajous pattern on built-in scope. Also available as 706-AR.

**NEW**

**TYPE 714-A PRECISION PHASE STANDARD** — A fixed frequency (400 cps) device that produces accurately-known phase angles at its output terminals. Can be used as a phase shifter or phase standard, does not require application of precise input frequency. Has excellent phase angle stability, and is extremely simple to operate. Phase angle selector offers choice of settings: 0°, 30°, 60°, 90°, 120°, 150°, and 180° with others on special order. Is accurate to ±0.1°. Also available as 714-AR (rack mount).

**TYPE 335-A ULTRA-LOW FREQUENCY PHASE METER** — Covers from .0001 cps. to 1 cps. Direct reading from 0° to 360° in 6 ranges of 60° each on large 5" meter scale. Accuracy ±1°

### POTENTIOMETER TESTING EQUIPMENT

**TYPE 394-A PONOGOMETER®** — Measures equivalent noise resistance (ENR) of single or multiturn precision potentiometers. Provides for establishing threshold level of ENR from 10-2000 ohms. ENR's above threshold level established produce both visual and audio indication. Frequency response flat to 50 kc. Accuracy is ±(3% of threshold value + 3 ohms). Recovery time is 1.5 seconds maximum. Also available as 394-AR (rack mount). Ideal for incoming inspection of laboratory analysis.

**TYPE 395-C PONOGOMETER® STANDARD** — Calibrates 394-A.

**TYPE 396-B PONOGOMETER® ATTENUATOR** — Extends range of threshold resistance of 394-A to 100 k ohms. Available as 396-BR (rack mount).

ACTON LABORATORIES, INC.
SUBSIDIARY OF
TECHNOLOGY INSTRUMENT CORPORATION

500-B Main St., Acton, Mass.
COlonial 3-7756
Los Angeles, Calif.
UPton 0-9516






# Directory I. Complete Equipment

## 31. Single Sideband.

Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 10sc, Tel: JUdson 2-3030
See ad on page 704

Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, 10sc, Tel: BEnton 1-0700
See ad on page 573

**Slotted lines:** See class 21

**Smoke nuisance controls:** See class 4

**Sonar equipment:** See class 18

**Sound level meters:** See class 3

**Sorting equipment:** See class 4

## 32. Sound Systems.

5. Inter-com's 10. Public address

Aircraft Electronics, Ariz., 5c, 10c
Altec Lansing Corp., Calif., 5s, 10s
Altec Service Co., N.Y., 10c
American Communications Corp., N.Y., 5c, 10c
American Development Electronics Co., N.J., 5c, 10c
American Geloso Electronics, Inc., N.Y., 5s, 10s
Ampex Corp., Ampex Data Products Co., Calif., 10sc
Amplivox Ltd., England, 5c
Audax, Inc., N.Y., 10s
Audio-Master Corp., N.Y., 10sc
Audiotronics Corp., Calif., 10s
Bailey, Inc., P. A., Conn., 10c
Bliss Electronic Corp., N.J., 5s, 10s
Blonder-Tongue Laboratories, Inc., N.J., 5s
Bogen-Presto Co., N.J., 5s, 10s
Bright Radio Labs., Inc., N.Y., 5c
Bruno-New York Industries Corp., N.Y., 5c
Budelman Electronics Corp., Conn., 10c
Calbest Electronics, Calif., 5s, 10s
Capehart Corp., N.Y., 5sc, 10sc
Clark Co., Inc., Mass., 5c
Collins Radio Co., Central Sales Office, Tex., 10s
Continental Mfg., Inc., Neb., 5s, 10s
Crown Engineering, N.M., 5c
Dicon Corporation, N.Y., 10c
Dictograph Products, N.Y., 5sc, 10sc
Dominion Electrohome Industries, Ltd., Canada, 5s
Du Kane Corp., Ill., 5s, 10s
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, Tel: HAlifax 6-7491**
See ad on page 400
Electro-Sonic Labs., Inc., N.Y., 10c
Electronic Engineers, Inc., Ill., 5c, 10c
Electronic Systems Engineering Co., Okla., 10s
Electronics, Inc. of Pa., Pa., 5c, 10c
Etelco, Ltd., England, 5sc
Executone, Inc., N.Y., 5s, 10s
Fanon Electronic Industries, Inc., N.J., 5s, 10s
Feiler Engineering & Mfg. Co., Ill., 5sc
Fidelity Amplifier Co., Ill., 5sc
Fisher Berkeley Corp., Calif., 5sc, 10c
Flush Wall Radio Co., Fla., 5c
General Automatics, Inc., Calif., 5c
Gilfillan Bros., Inc., Calif., 5c
Godfrey Mfg. Co., Ill., 5s
Gotham Audio Sales Co., Inc., N.Y., 10s
HRB-Singer, Inc., Pa., 10c
Heath Company, Subsid. Daystrom, Inc., Mich., 5s, 10s
ITI Electronics, Inc., N.J., Power Megaphones s
Intelex Systems, Inc., N.Y., 5s
**Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5c, 10c, Tel: LUdlow 4-6200**
See ads on pages 355, 487
Jetronic Industries, Inc., Pa., 5c, 10c
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5s
Knight Electronics Corp., Ill., 5s
Lake Manufacturing Co., Calif., 5sc
Loge Electronics, Inc., Calif., 5s, 10s
M P Engineering Co., Conn., 10c
Marine Electric Corp., N.Y., 10sc
Marine View Electronics, Inc., N.Y., 5c
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 5c, 10c
Multitone of Canada, Ltd., Canada, 5sc
Munzig International, Inc., Calif., 5s, 10s
Naniloa Corporation, Ohio, 5c
Neptune Electronics Co., N.Y., 5c, 10c
Newcomb Audio Products Co., Calif., 10s
Nippon Electric Co., Ltd., Japan, 5c, 10s
North Electric Co., Ohio, 5c, 10c
Nutone, Inc., Ohio, 5 Stereo
Ortronix, Inc., Fla., 10c
Precise Electronics & Development Corp., N.Y., 5c, 10c
Precision Electronics, Inc., Ill., 10s
Pye Corp. of America, N.J., Power Megaphones s
RCA Victor Co., Ltd., Canada, 5sc, 10sc
Radio Corp. of America, N.J., 5s, 10s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, Tel: EVergreen 8-6000**
See ad on page 506
Railroad Electronic Labs. of Omaha, Inc., Neb., 5c, 10c
Rek-O-Kut, Inc., N.Y., 10s
Remler Co., Calif., 5c, 10c
Republic Electronic Industries Corp., N.Y., 5s
Rheem Califone Corp., Calif., 10s
Simpson Mfg. Co., Inc., Mark, N.Y., 5s, 10s
Sorensen Industrial Electronic Co., N.J., 5sc, 10sc
Specialty Electr. Dev. Corp., N.Y., 10c
Spivey, Inc., James S., D.C., 5c
Standard Telephones & Cables, Ltd., England, 5sc, 10sc
Stereatronics, Inc., Mass., 5c
Talk-A-Phone Co., Ill., 5s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5sc, 10sc, Tel: YE 2-8600**
See ad on page 338
Telephonics Corp., N.Y., 5c, 10s
Tensor Electric Dev. Co., Inc., N.Y., 10c
Texas Instruments Inc., Apparatus Div., Tex., 5c
Thompson Ramo Wooldridge Inc., Calif., 5sc, 10sc
Transelectric Mfg. Co., Pa., 5s
Ultraudio Products, Calif., 10s
U. S. Recording Co., D.C., 10c
U. S. Science Corp., Calif., 5c
University Loudspeakers, Inc., N.Y., Megaphones sc
Vinco Electronics Corp., Conn., 5sc, 10sc
Virginia Electronics Co., Inc., D.C., 5c
Vocaline Co. of America, Inc., Conn., 5sc
Webster Electric Co., Wis., 5s, 10s
Westlab, Inc., N.Y., 5s, 10sc
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 10sc, Tel: JUdson 2-3030**
See ad on page 704
Wintronics, Calif., 5 Underwater c, 10c

**Spectrometers:** See class 14

**Spectrum analyzers, audio frequency:** See class 3

**Spectrum analyzers, microwave:** See class 21

**Spectrum analyzers, radio frequency:** See class 28

**Speed controls, variable:** See class 4

**Square wave generators:** See class 3

## 33. Standard Signals.

5. Capacitance
10. Elapsed time measuring equipment
15. Inductance
20. Primary standards of frequency
25. Primary standards of time
30. Resistance
35. Secondary standards of frequency
40. Secondary standards of time
45. Tuning forks
50. Voltage, AC
55. Voltage, DC

Accurate Instrument Co., Tex., 20sc, 25sc, 35sc, 40sc, 45sc
**Acton Labs., Inc., 500-B Main St., Acton, Mass., 10c, Primary Standards of Phase s, Secondary Standards of Phase s, Tel: COlonial 3-7756**
See ad on page 346

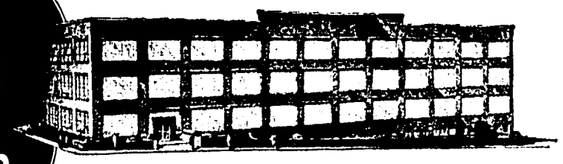
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

OUR NEW HOME, DOUBLING OUR FORMER CAPACITY

Watch Master ELECTRONICS

Precision

# FREQUENCY STANDARDS AND FORK OSCILLATOR UNITS



Our instruments, 40 to 30,000 cycles, are used extensively by industry and on government projects where enduring accuracy and maximum durability are required. Your inquiries on related products are invited.

## PRECISION FORK OSCILLATOR UNITS

### TYPE 2003



*Size 1½" dia. x 4½" H. Wght. 8 oz.*

Frequencies: 200 to 4000 cycles

Accuracies:—
Type 2003 (±.02% at —65° to 85°C)
Type R2003 (±.002% at 15° to 35°C)
Type W2003 (±.005% at —65° to 85°C)

Double triode and 5 pigtail parts required.

Input, Tube heater voltage and B voltage

Output, approx. 5V into 200,000 ohms

### TYPE 2007-6



TRANSISTORIZED, Silicon Type

*Size 1½" dia. x 3½" H. Wght. 7 ozs.*

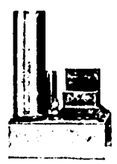
Frequencies: 360 to 1000 cycles

Accuracies:
2007-6 (± .02% at —50° to + 85°C
R2007-6 (±.002% at +15° to + 35°C
W2007-6 (±.005% at —65° to + 85°C

Input: 10 to 30 Volts, D. C., at 6 ma.

Output: Multitap, 75 to 100,000 ohms

### TYPE 2001-2



*Size 3¾" x 4½" x 6" H., Wght. 26 oz.*

Frequencies: 200 to 3000 cycles

Accuracy: ±.001% at 20° to 30°C

Output: 5V. at 250,000 ohms

Input: Heater voltage, 6.3 - 12 - 28

B voltage, 100 to 300 V., at 5 to 10 ma.

### ACCESSORY UNITS FOR 2001-2



L—For low frequencies multi-vibrator type, 40-200 cy.

D—For low frequencies counter type, 40-200 cy.

H—For high freqs, up to 30 KC.

M—Power Amplifier, 2W output.

P—Power supply.

## PRECISION FREQUENCY STANDARDS

### TYPE 2005A



*Size 8" x 8" x 7¼" High*
*Weight, 14 lbs.*

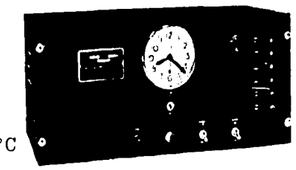
Frequencies:
50 to 400 cycles (Specify)

Accuracy:
±.001% from 20° to 30°C

Output, 10 Watts at 115V

Input, 115V. (50 to 400 cy.)

### TYPE 2121A



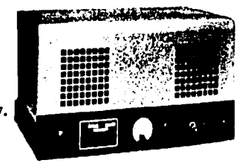
*Size*
*8¾" x 19" panel*
*Weight, 25 lbs.*

Output: 115V
60 cycles, 10 Watt

Accuracy:
±.001% 20° to 30°C

Input,
115V (50 to 400 cy.)

### TYPE 2111C



*Size, with cover*
*10" x 17" x 9" H.*
*Panel model*
*10" x 19" x 8¾" H.*
*Weight, 25 lbs.*

Frequencies: 50 to 1000 cy.

Accuracy:
(±.002% at 15° to 35°C)

Output: 115V, 75W.

Input: 115V, 50 to 75 cy.

WHEN REQUESTING INFORMATION, PLEASE SPECIFY TYPE NUMBER

ATP

*American Time Products Inc.*
*61-20 Woodside Avenue*
*Woodside 77, N. Y.*





# Directory I. Complete Equipment

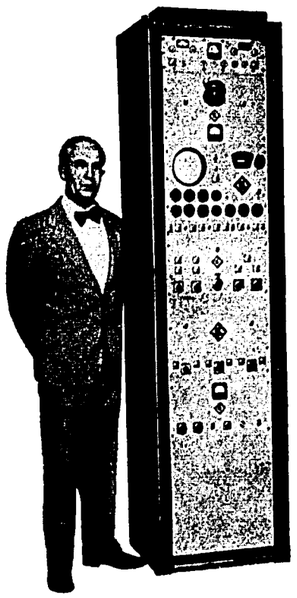
## 33. Standard Signals.

Airmec Limited, England, 10s, 20s, 35s
Airtronics International Corp., Fla., 35c, 50c, 55c
**American Time Products, Inc., 61-20 Woodside Ave., Woodside 77, L.I., N.Y., 35sc, 40sc, 45sc, Tel: OLympia 1-7800**
See ad on page 348
Autlab, Inc., Ohio, 45sc
Arco Electronics, Inc., N.Y., 5sc
Artronic Instrument Co., The, Md., 10c, 35c, 40c
Automatic Timing & Controls, Inc., Pa., 25sc
Avien, Inc., N.Y., 50c, 55c
Bailey, Inc., P. A., Conn., 35sc
Barnes & Reinecke, Ill., 40c
Bell & Gossett Co., Ill., 45sc
Bergen Laboratories, Inc., N.J., 10s
Biddle Co., James G., Pa., 35s
**Bliley Electric Co., 200 Union Station Bldg., Erie, Pa., 35sc, Tel: GLendale 6-7561**
See ad on pages 92-93
**Boonton Electronics Corp., 738 Speedwell Ave., Morris Plains, N.J., 5c, Tel: JEfferson 9-4210**
See ad on page 256
**Boonton Radio Corp., 50 Intervale Rd., Boonton, N.J., "Q" standards, Tel: DEerfield 4-3200**
See ad on page 328
**Borg Equipment Div., Amphenol-Borg Electronics Corp., 120 S. Main St., Janesville, Wis., 20c, 25c, 35c, 40c, Tel: PLeasant 4-6616**
See ad on page 524
Bristol Co., Conn., 10c
**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 10sc, 20sc, 25sc, 35sc, 40sc, Tel: NEwtown 9-5700**
See ad on page 426
Bunnell & Co., J. H., N.Y., 45c
Canadian Marconi Co., Canada, 20s
Collins Corp., G. L., Calif., 50sc
Consolidated Avionics Corp., N.Y., 55s
Consolidated Controls Corp., Conn., 50c, 55c
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 35sc, 40sc, Tel: HAmilton 7-7961**
See ad on page 440
Control Equipment Corp., Mass., 10c
Crown Engineering, N.M., 45sc
Datex Corp., Calif., 10sc
Delta-F, Inc., Ill., 20c, 25c, 35sc, 40sc, 45sc, 50c
Designers for Industry, Inc., Ohio, 20c, 25c, 35sc, 40sc
Diamond Electronics Corp., N.Y., 5sc
Djordjevic Engineering Co., Djeco Div., Ill., 35c
Dynapar Corporation, Ill., 35s, 40s
E H Research Laboratories, Calif., 35
Ebauches, S.A., Dept. Oscilloquartz, c/o Freeport Engineering Co., N.Y., 20c, 25c, 35c, 40c
Electro Instruments, Inc., Calif., 10s, 50s, 55s
Electro Scientific Industries, Ore., 5sc, 30sc
Electronic Applications, Inc., Conn., 5s, 20s, 35s
Electronic Specialty Co., Calif., 10c
Elk Electronic Labs., Inc., N.Y., 20c, 35c, 50c, 55c
Engineering Associates, Ohio, 20c, 35c
Eppley Laboratory, Inc., R.I., Standard Cells s
Erwood, Inc., Ill., 45c
Ferris Instrument Co., N.J., 35c
Furzehill Laboratories, Ltd., England, 45s
**General Communication Co., 677 Beacon St., Boston 15, Mass., 35c, Tel: COpley 7-6030**
See ad on page 331
**General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 45s, Tel: EMerson 9-4400**
See ad on Cover 4
Geotechnical Corporation, The, Tex., 35s, 40s, 50s
Gertsch Products, Inc., Calif., 35s, 50s
Gibbs Mfg. & Research Corp., Wis., 10c, 35sc, 40c, 45c
Gray Instrument Co., Pa., 30s
Greenray Industries, Pa., 35sc, 40c
Gulton Industries, Inc., N.J., 50sc, 55sc
Gyrex Corp., The, Calif., 35sc, 40sc, 45sc
Hallicrafters Co., The, Ill., 25c, 35c, 40c
Hammarlund Mfg. Co., N.Y., 35s
Hathaway Instruments, Inc., Colo., 35sc, 40s, 45sc, 50s, 55s
Haydon Company, The A. W., Conn., 10c
Hermes Electronics Co., 75 Cambridge Pkwy., Cambridge 42, Mass., 20s, 25s, 35s, 40s, Tel: UNiversity 4-7200
See ads on pages 266, 442
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 10s, 20c, 25c, 35s, Tel: DAvenport 6-7000**
See ad on pages 3-18
**Hill Electronics, Inc., 300 N. Chestnut St., Mechanicsburg, Pa., 20c, 35c, Tel: POplar 6-7611**
See ad on page 428
Holt Instrument Laboratories, Wis., 50s, 55s
Hoover Electronics Co., Md., 10c
**Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 35s, 45s, 50s, Tel: GRamercy 3-4684**
See ad on page 333
International Electronic Research Corp., ELIN Div., Calif., 50s
Invar Electronics Corp., 35c, 55sc
**J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 10, Tel: STate 7-5825**
See ads on pages 460, 546, 550
Julie Research Laboratories, Inc., N.Y., 30sc, 55sc
**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., P.O. Box 623, San Diego 11, Calif., 50s, 55s, Tel: BRowning 7-6700**
See ad on pages 110-111
**Knights Co., The James, 101 E. Church St., Sandwich, Ill., 20sc, 35sc, Tel: 2141**
See ad on page 430
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 20s, 35s, Tel: LOwell 6-2600**
See ad on page 312
Lee Electric, Inc., N.J., 50s, 55s
MacLeod & Hanopol, Inc., Mass., 5c
**Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 35s, Tel: DAvis 5-1391**
See ad on page 96-97
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 20s, 35s, Tel: LOwell 7-0607**
See ad on page 332
Marconi's Wireless Telegraph Co., Ltd., N.Y., 20s
Marstan Electronics Corp., N.Y., 10sc, 20s, 25s, 35s, 40s, 50c, 55c
Medistor Instrument Co., Wash., 50s, 55s
Meter-Makers, Inc., Ill., 50sc, 55sc
Minneapolis-Honeywell Regulator Co., Rubicon Instruments, Pa., 30sc
Muirhead & Co., Ltd., England, 45s, 55s
Muirhead Instruments, Inc., N.Y., 5s, 35s, 45s, 55s
Munzig International, Inc., Calif., 35s, 45s
Murata Mfg. Co., Ltd., Japan, 45c
National Company, Inc., Mass., 10c, 20s, 25c, 35s, 40c
**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 20, Tel: NOrmandie 5-4800**
See ad on page 614
National Standard Electronics, Inc., N.Y., 20s, 25s, 35s
New England Scientific Instruments Co., Mass., 5s, 15s, 30s
New London Instrument Co., Conn., 35s
Nichols, Ltd., R. H., Canada, 45s
**Norrman Labs., Ernst, Williams Bay, Wis., 10s, 20s, 25s, 35s, 40s, Tel: CIrcle 5-5516**
See ad on page 350
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 35s, Tel: NAtional 2-6485**
See ad on pages 27-30
**Northern Engineering Laboratories, Inc., 372 Wilmot Ave., Burlington, Wis., 35sc, Tel: ROckwell 3-3591**
See ad on page 433
Owen Laboratories, Inc., Calif., 55c
Pacific Automation Products, Inc., Calif., 10c, 35c, 40c, 50c, 55c
Palmer Instruments, Calif., 35c
Parsons Company, The Ralph M., Electronics Div., Calif., 10sc
Pennwood Numechron Co., Pa., 10c
Philamon Laboratories, Inc., N.Y., 20c, 35sc, 45sc
Philips Electronics Industries, Ltd., Canada, 10sc
Pickard & Burns, Inc., Mass., 20c, 25c, 35c, 40c
Pitometer Log Corp., N.Y., 35c
**Rawson Electrical Instrument Co., Inc., 118 Potter St., Cambridge 42, Mass., 50sc, 55sc, Tel: KIrkland 7-4041**
See ad on page 461

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# MODEL 111 FREQUENCY-TIME STANDARD

*Space Satellite Timer*



After over a year's extensive testing and comparison with other units the SMITHSONIAN INSTITUTION selected the unit pictured above for their satellite tracking stations located around the earth. It was established that this unit will keep time within 1/10,000 second per day. We guarantee a stability of 1 x $10^{-9}$ and supply a continuous record to prove this. DON'T BUY ANY FREQUENCY STANDARD CLAIMING THIS STABILITY UNLESS THE SUPPLIER PROVIDES A *CONTINUOUS* RECORD TO PROVE IT. DO NOT ACCEPT ASSERTIONS OR EVEN "PLOTTED CURVES."

## GENERAL SPECIFICATIONS

Frequency Stability .....1 x $10^{-9}$ per day
Time Stability .....1/10000 second/day
Time Measuring Resolution .....
10 micro-seconds

Time Transmission Synchronized with WWV (mechanical cam) accurate to ....
1/1000 second

Time Transmission by electronic seconds pulse (repetition stability) .....
10 micro-seconds

| OUTPUTS | Sine Wave | Pulse |
|---|---|---|
| | 1 mc | 1 mc |
| | 100 kc | 100 kc |
| | 10 kc | 10 kc |
| Single phase | 1 kc | 1 kc |
| 3-phase | 1 kc | |
| | 100 cps | 100 cps |
| Single phase | 60 cps | 10 cps |
| 3-phase | 60 cps | 1 cps |

## TIME-OF-DAY CLOCK

Shows hours, minutes and seconds.

## MICRO CLOCK

Reads time to 0.001 second. Micro-clock is provided with a cam system that can be synchronized with WWV time signal ticks and used as a time signal repeater. Can be used to study and measure outside phenomena.

## OSCILLOSCOPE

*Circular sweeps of 100 cps, 1 kc, and 10 kc time received pulses within a few micro-seconds. Separate inputs to study outside phenomena.*

## TIME SIGNAL AMPLIFIER

Amplifier designed to receive time signals through heavy interference. Filter eliminates tone signal modulation on WWV signals so "ticks" can be received when tone is on. A switch cuts out filter from the circuit when not desired.

## PHASE SHIFT CIRCUIT

Electronic phase shifter provided to change phase of outputs.

## 50 other Models of FREQUENCY STANDARDS

1. SUBASSEMBLIES: Models 52, 54, 56, 124, 126 and many others not listed here.
2. GENERAL PURPOSE UNITS: Models 61, 63, 65, 67, 128
3. MOTOR AMPLIFIERS: Models 71, 101-6L6, 103, 104, 119, 140, 141, 200-IN, 201-IN.
4. FREQUENCY MEASUREMENT UNITS: Models 105, 110, 129, 138
5. TIME KEEPING UNITS: Models 25L6B, 35L6B, 103, 104, 110, 111
6. FREQUENCY DIVIDERS: 107, 115, 117, 130
7. TRANSISTOR STANDARDS Models 73, 301, 302, 304, 309
8. CRYSTAL CLOCKS FOR SIDERAL TIME

**ERNST NORRMAN LABORATORIES**
**WILLIAMS BAY, WIS.**
TEL. Circle 5-5516
For details, circle #270 on Reader Service Card




## 33. Standard Signals.

Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c
Riverbank Laboratories, Dept. of Engineering, Ill., 35sc, 40c, 45sc
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 10c, 20c, 25c, 35c, 40c, Tel: LOckwood 5-4578**
**See ad on page 324**
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 5s, 20s, 25s, 35s, 40s, Tel: PRescott 3-8010**
**See ad on page 246**
**Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N.Y., 30c, 55c, Standard Cells c, Tel: BEverly 5-2300**
**See ad on page 292**
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 15c, 30c, Tel: WOodlawn 5-2341**
**See ad on page 258**
Smith-Florence, Inc., Wash., 50s
Somerset Radiation Laboratory, Inc., N.J., 35s, 40s
Southwestern Industrial Electronics Co., Tex., 5s, 30s, 50s, 55s
Spectralab Instruments, Calif., 35sc
Strand Labs., Inc., Mass., 20sc, 35sc
Sullivan, Ltd., H. W., N.Y., 5s, 15s, 30s, 45s, 50s
Sunshine Scientific Instrument, Pa., 10s, 35s, 40s, 45sc, 50s, 55s
Systron-Donner Corp., Calif., 10s, 35s, 40s
TRG, Incorporated, N.Y., 20c
Technology Instrument Corp., Mass., Primary Standards of Phase s
Telechrome Mfg. Corp., N.Y., 20sc
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, Tel: YE 2-8600**
**See ad on page 338**
Texas Instruments Incorporated, Apparatus Div., Tex., 20c, 25c, 35c, 40c
Ultronix, Inc., Calif., 30c
Valpey Crystal Corp., Mass., 35sc, 40sc
Van Norman Industries, Inc., Electronics Div., N.H., 20c, 35c
Varo Mfg. Co., Inc., Tex., 35sc, 45sc, 50sc, 55sc
Viking Industries, Inc., Calif., 50s
Walkirt Co., Calif., 10c, 35c
**Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick St., Chicago 10, Ill., 45s, Tel: MIchigan 2-2000**
**See ad on page 681**
Westport Electric, Calif., 10sc
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 25s, 35s, 45s, Tel: JUdson 2-3030**
**See ad on page 704**
Winslow Co., Inc., N.J., 5sc, 15c, 30sc, 50c, 55c

**Stands, microphone: See class 59**

**Storage devices for computers: See class 9**

**Storage mechanisms, data: telemetering: See class 36**





# Directory I. Complete Equipment

**Strain gages: See class 14**

**Stroboscopes: See class 14**

## 34. Studio Equipment.

5. Consoles & speech input equipment
10. Dollies
15. TV cameras
20. TV camera control equipment
25. TV camera lenses
30. TV film projectors
35. TV studio lighting equipment
40. Tripods
45. Turntables

Advanced Research Associates, Inc., Md., 20c
Altec Lansing Corp., Calif., 5s
Altec Service Co., Div. Altec Companies, Inc., N.Y., 5c
**Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 5s, 10s, Tel: UNderhill 7-8500**
**See ad on page 623**
Argonne Electronics Mfg. Corp., N.Y., 45s
Artisan Metal Works Co., Ohio, 10c
Atlantic Research Corp., Va., 25sc
Bach Auricon, Inc., Calif., 20s, 40s, 45s
Bache & Co., Semon, N.Y., 25sc
Bausch & Lomb Incorporated, N.Y., 25sc
Beattie-Coleman, Inc., Calif., 10s, 40s
Blonder-Tongue Laboratories, Inc., N.J., 5s, 15s
Bogen-Presto Co., N.J., 45s
Brooks & Perkins, Inc., Mich., 10c
Burke & James, Inc., Ill., 25s
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 5c
Camera Equipment Co., Inc., N.Y., 10sc, 25sc, 40sc
Canadian Marconi Co., Canada, 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s
Central Dynamics, Ltd., Canada, 5c
Chicago Aerial Industries, Inc., Ill., 25c
Cetec Corporation, Calif., Video Displays s
Chrono-Log Corp., Pa., 5sc
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5s, Tel: OAkwood 7-6800**
**See ad on page 308**
Collins Radio Co., Central Sales Office, Tex., 5s, 45s
Components Corp., N.J., 45s
Corbett Science Laboratories, F. W., Calif., 35s
Daven Co., The, N.J., 5s
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 15sc, 20sc
E.M.I.-Cossor Electronics, Ltd., Canada, 5c, 10s, 15s, 20s, 40s, 45s
E.M.I. Electronics, Ltd., England, 15s, 20s
**Eastman Kodak Co., 343 State St., Rochester 4, N.Y., 25sc, 30c, Tel: LOcust 2-6000**
**See ad on page 300**
Electron Corporation, Tex., 5sc, 10c, 15sc, 20sc, 25s, 30s, 35s, 40s
Electronic Applications, Inc., Conn., 5s, 45s
Electronic Enclosures, Inc., Calif., 5c
Electronic Teaching Laboratories, Inc., D.C., 5sc
Fairchild Recording Equipment Corp., N.Y., 45s
Federal Manufacturing & Engineering Corp., N.Y., 10c, 15c, 30c, 35c
Fisher Berkeley Corp., Calif., 5c
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 15sc, 20sc, Tel: CEnter 9-6100**
**See ad on page 480**
GPL Division, General Precision, Inc., N.Y., 15sc, 20sc, 30sc
Gates Radio Company, Ill., 5s, 45s
General Electric Co., Communication Products Dept., Va., 15s, 20s
Gotham Audio Sales Co., Inc., N.Y., 45s
Grimson Color, Inc., N.Y., 15s, 20c, 25 Wide-Screen s
Hallamore Electronics Co., Calif., 15s, 20s
Henry & Miller Industries, Inc., N.J., 10c
Hoffman Electron Tube Corp., N.Y., 15s, 20s
Houston Fearless Corp., Calif., 10s, 40s
Ilex Optical Co., N.Y., 25s
Intercontinental Electronics Corp., N.Y., 15s
International Telephone & Telegraph Corp., ITT Industrial Products Div., Calif., 15sc
Interstate Electronics Corp., Calif., 15s, 20s
Jacksonville Metal & Plastics Co., Fla., 5c, 10c
Kahn Research Laboratories, Inc., N.Y., 5s
Kemlite Laboratories, Inc., Ill., 35c
Madigan Electronic Corp., N.Y., 15c, 20c, 25c
Magnasync Corp., Calif., 5s
Mandrel Industries, Inc., Calif., 35s
Marantz Co., N.Y., 5
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5sc, 10s, 15s, 20s, 25s, 30s, 35sc, 40s
Mastertone Recording Studios, Inc., N.Y., 5c
McKiernan-Terry Corp., N.J., 10c
Miratel, Inc., Minn., 20s
Mole-Richardson Co., Calif., 35s
National Cine Equipment, Inc., N.Y., 10sc, 25sc, 35sc, 40sc
Nippon Electric Co., Ltd., Japan, 5c, 15s, 20c, 30c
Packard Bell Electronics, Service Division, Calif., 15s, 20s
Par Products Corp., Calif., 25c
Philco Corporation, Pa., 5sc, 15sc, 20sc
Philco Corporation, Govt. & Industrial Group, Pa., 15sc, 20sc, 25s, 40s
Pickering & Co., Inc., N.Y., 45sc
Prescott Television Co., Calif., 35c
RCA Victor Co., Ltd., Canada, 5s, 15s, 20s
REF Manufacturing Corp., N.Y., 5c
Radio Corp. of America, N.J., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 15s, 20s, 30s
Rank Cintel, Ltd., England, 5s, 20s, 30s
Rek-O-Kut, Inc., N.Y., 45s
Sorensen Industrial Electronic Co., N.J., 10c
Special Instruments Laboratory, Inc., Tenn., 20c
Stancil-Hoffman Corp., Calif., 5c
Standard Telephones & Cables, Ltd., England, 5sc
Staples-Hoppmann, Inc., Va., 30c
**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 35s, Tel: LUdlow 2-9561**
**See ads on pages 412, 468, 494, 572, 586**
TMC (Canada), Ltd., Canada, 5s
Telechrome Mfg. Corp., N.Y., 15s, 20s
Telecomtrol Corp., N.J., 5sc
Television Zoomar Corp., N.Y., 25s
Thompson Ramo Wooldridge Inc., Calif., 15sc, 20sc
Thompson Ramo Wooldridge Inc., Dage Television Div., Ind., 15s, 20s
Trans-Lux Corp., N.Y., 35s, Rear Projection s
Ultraudio Products, Div. Oberline, Inc., Calif., 5s
U. S. Recording Co., D.C., 5sc
Vickers, Inc., Electric Products Div., Mo., 35sc
Vicon Corp., Calif., 15s, 20s, 25s, 30s, 40s
Virginia Electronics Co., Inc., D.C., 5c
**Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 20sc, Tel: GArfield 6-8600**
**See ad on page 322**
**Western Devices, Inc., 600 W. Florence Ave., Inglewood 1, Calif., 5c, 10c, Tel: OREgon 8-7827**
**See ad on page 624**
Westlab, Inc., N.Y., 5c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 20c, 30sc, Tel: JUdson 2-3030**
**See ad on page 704**
Wollensak Optical Co., N.Y., 25sc

**Styli, cutting: See class 65**

**Styli, playback: See class 61**

**Survey meters: See class 24**

**Sweep generators, radio frequency: See class 28**

**Sweep generators, television: See class 37**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Synchronizing generators:**
**See class 37**

**Tachometers:**
**See class 60**

**Tape & wire, recording:**
**See class 65**

**Tape phonographs & playback equipment: See class 61**

**Tape recorders:**
**See class 29**

**Tape recording equipment, computer: See class 9**

**Tape splicing equipment:**
**See class 65**

**Telegraph test equipment:**
**See class 3**

## 35. Telegraph & Teleprinter Equipment.

5. Frequency shift converters
10. Frequency shift keyers
15. Receivers
20. Transmitters

Adage, Inc., Mass., Multiplexers s
Aeronautical Communications Equip., Inc., Fla., 10s, 15s, 20s
**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 10c, Tel: LIberty 9-1500**
**See ad on page 353**
Barker & Williamson, Inc., Pa., 5c, 10c, 15c, 20c
Bell & Gossett Co., Ill., 5c, 10c, 15sc, 20sc
Bunnell & Co., J. H., N.Y., 5c, 15c, 20c
Central Electronics, Inc., Ill., 20s
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 15s, 20s, Tel: OAkwood 7-6800**
**See ad on page 308**
Collins Radio Co., Central Sales Office, Tex., 5sc, 10sc, 15sc, 20sc
Collins Radio Co., Western Div., Calif., 5s, 10s, 15s, 20s
**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 20c, Tel: EVergreen 1-1135**
**See ad on page 156**
Dollar Co., The Robert, Communications Equipment Div., Calif., 10s
Electronic Controls, Inc., Conn., 15c
Erco Radio Laboratories, Inc., N.Y., 5s, 10s, 15s
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 10c, Tel: CEnter 9-6100**
**See ad on page 480**
GPL Div., General Precision, Inc., N.Y., 5sc, 10sc, 15sc, 20sc, Multiflex sc
Gates Radio Company, Ill., 20s
General Electric Co., Ltd., of England, Telephone Works, England, 15s, 20s



General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 20c
Gjadny Corp., Richard, N.Y., 5c, 10c, 15c, 20c
Gray Mfg. Co., The, Conn., 5c, 10c, 15c, 20c
Hallicrafters Co., The, Ill., 15c, 20c
Hammarlund Mfg. Co., Inc., N.Y., 5s, 10s
Jansky & Bailey, Inc., D.C., 5c, 10c, 20c
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5c, 10c, 15c, 20c
Lear, Inc., Calif., 5c, 10c, 15c, 20c
Lenkurt Electric Co., Inc., Calif., 5s, 10s, 15s, 20s
Lignes Telegraphiques et Telephoniques, France, 15s, 20s
Lynch Carrier Systems, Inc., Calif., 5s, 10s
MacLeod & Hanopol, Inc., Mass., 5c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 10s, 15s, 20s
Marine View Electronics, Inc., N.Y., 10c
Marquardt Corp., The, Pomona Div., Calif., 5c
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 5c, 10c, 15c
Moore Associates, Inc., Calif., 10c
National Company, Inc., Mass., 5c, 10c, 15c, 20c
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 5c, Tel: HOward 5-7700**
**See ad on page 498**
Nems-Clarke Co., Div. Vitro Corp. of America, Md., 5c, 10c, 15c, 20c
Nippon Electric Co., Ltd., Japan, 5c, 10c, 15c, 20c
**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 5s, 10s, 15s, Tel: WAtkins 9-9117**
**See ad on pages 36-39**
**Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., Signal Generators, Two-Tone c, Tel: OWens 9-4600**
**See ad on page 334**
Peer, Incorporated, Tex., 20c
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 15s, 20s
Pye Telecommunications, Ltd., England, 20s
Racal Engineering, Ltd., England, 5c, 10s, 15s, 20s
Radio Corp. of America, Defense Electronic Products, N.J., 5c, 10c, 15c, 20c
Radio Engineering Products, Canada, 5s, 10s, 15s, 20s
**Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 5s, Tel: DEerfield 4-3100**
**See ad on page 290**
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 5c, 10c, 15c, 20c, Tel: EVergreen 8-6000**
**See ad on page 506**
Railroad Electronic Labs. of Omaha, Inc., Neb., 15c, 20c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, 20c, Tel: LOckwood 5-4578**
**See ad on page 324**
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 15s, Tel: PRescott 3-8010**
**See ad on page 246**
Specialty Electronics Development Corp., N.Y., 5c
Stelma, Inc., Conn., 5c, 10c
TMC (Canada), Ltd., Canada, 5s, 10s, 15s, 20s
**Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 5s, 10s, 15s, 20s, Tel: OWens 8-4800**
**See ads on pages 344, 345**
Telechrome Mfg. Corp., N.Y., 10c, 15sc, 20sc
Telkor, Inc., Ohio, 15c, 20c
Topping Electronics, Canada, 5s, 10s
**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., Repeaters and relays, Tel: LOwell 7-3810**
**See ad on page 520**
Virginia Electronics Co., D.C., 5c, 10c
Wang Laboratories, Inc., Mass., 20c
Western Union Telegraph Co., The, N.Y., 10s, 15s, 20s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 10sc, 15sc, 20sc, Tel: JUdson 2-3030**
**See ad on page 704**
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 10s, 15sc, 20sc, Tel: BEnton 1-0700**
**See ad on page 573**

## 36. Telemetering Equipment.

5. Calibrators
10. Commutators
15. Data recorders
20. Data storage mechanisms
25. Decommutators
30. Modulators
35. Multicoders
40. Oscillators
45. Receivers
50. Signal generators
55. Translators
60. Transmitters

ACF Electronics Div., Md., 40s, 60s
AMP Incorporated, Pa., 20s, 30s
A R & T Electronics, Inc., Ark., 60c
ASCOP, N.J., 5s, 10sc, 15s, 25sc, 35sc, 55sc, 60sc
Advanced Electronics Corp., N.Y., 40sc, 60sc
Advanced Instrument Corp., Calif., 15s
Advanced Research Associates, Inc., Md., 10c, 25c, 35c, 45c
Aeronutronic, Div. Ford Motor Co., Calif., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 50c, 55c, 60c
**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 45c, 60s, Tel: COpley 7-9115**
**See ad on page 309**
Aircraft Armaments, Inc., Md., 45c
**Airflyte Electronics Co., 537 Avenue A, Bayonne, N.J., 10sc, Tel: HEmlock 6-2230**
**See ad on page 408**
**Airpax Electronics, Inc., Cambridge Div., Jacktown Rd., Cambridge, Md., 30sc, Tel: AC 8-4600**
**See ad on pages 82-83**
**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 15, Tel: FOrest 6-4467**
**See ad on page 276**





# Directory I. Complete Equipment

## 36. Telemetering Equipment.

Alto Scientific Co., Calif., 30sc, 45sc
**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 15c, 20c, Tel: DUnkirk 5-7401**
**See ad on page 164**
American Instrument Co., Inc., Md., 15s
Ampex Corp., Ampex Data Products Co., Calif., 15sc
**Amtron Corp., 17 Felton St., Waltham 54, Mass., 45sc, 60sc, Tel: TWinbrook 4-5020**
**See ad on page 591**
**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc, 55sc, 60sc, Tel: LIberty 9-1500**
**See ad on this page**
**Applied Research, Inc., 76 S. Bayles Ave., Port Washington, L.I., N.Y., 45sc, Tel: POrt Washington 7-8707**
**See ad on page 360**
Armstrong Whitworth Equipment, England, 10sc, 45s
Arnoux Corp., Calif., 10s, 25s
Atlantic Research Corp., Va., 5c, 10c, 30c, 40c, 60c
Automation Dynamics Corp., N.J., 45c
Automation Management, Inc., Mass., 15sc
BJ Electronics, Borg-Warner Controls, Calif., 10c, 20c, 25c, 30c, 40c, 55c
Babcock Radio Engineering, Inc., Calif., 10c, 25c, 45c, 50c, 60c
Bailey Meter Co., Ohio, 15c
**Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 20c, 25c, 40c, 50c, Tel: UNiversity 4-7420**
**See ad on page 280**
Beckman Systems Division, Calif., 15c
Bell Aircraft Corp., Avionics Div., N.Y., 25c, 35c, 45c, 50c, 55c, 60c
Bell & Gossett Co., Ill., 30sc, 40sc, 45sc, 50c, 55c
Bendix Corp., The, Bendix-Pacific Div., Calif., 10sc, 25c, 40sc, 45sc, 55sc, 60c
Bendix Corp., The, Bendix Systems Div., Mich., 25c
Biddle Co., James G., Pa., 40s
**Boonton Radio Corp., 50 Intervale Rd., Boonton, N.J., 50, Tel: DEerfield 4-3200**
**See ad on page 328**
Bristol Co., Conn., 15c, 45c, 60c
Brooks Research, Inc., N.Y., 20c
Budd Electronics, Inc., N.Y., 15c, 20c, 35c, 40c, 45c, 50c, 60c
**Bulova Watch Co., Inc., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 5c, 40c, Tel: NEwtown 9-5700**
**See ad on page 426**
CBS Laboratories, Div. Columbia Broadcasting System, Inc., Conn., 15c, 45c
CGS Laboratories, Inc., Conn., 55c
California Computer Products, Inc., Calif., 10c
Canadian Marconi Co., Canada, 15s, 20s, 30s, 35s, 40s, 45s, 50s, 55s, 60s
Canoga Division, Calif., 45s, 60s
Centronix, Inc., Fla., 15c
Chicago Aerial Industries, Inc., Ill., 15c
Chicago Electronic Div., Land-Air Inc., Ill., 15c, 20c, 45c, 50c, 60c
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 30s, 40s, 45s, 50s, 60s, Tel: OAkwood 7-6800**
**See ad on page 308**
Cleveland Metal Specialties Co., Ohio, 10c, 40c
Clough-Brengle Co., The, Ill., 40s, 50s
Collins Radio Co., Central Sales Office, Tex., 15c, 20c, 45c, 55c, 60c
**Computer Control Co., Inc., Eastern Div., 983 Concord St., Framingham, Mass., 20c, 55c, Tel: TRinity 5-6185**
**See ad on page 264**
**Computer Control Co., Inc., Western Div., 2251 Barry Ave., Los Angeles 64, Calif., 20c, 55c, Tel: BRadshaw 2-9135**
**See ad on page 264**




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***Metuchen, N. J.***

***King 9-6772***
***Washington, D. C.***

***WEbster 1-1041***
***Los Angeles, California***

For details, circle #271 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Computer Instruments Corp., 90 Madison Ave., Hempstead, L.I., N.Y., 10sc, Tel: IVanhoe 3-8200**
**See ad on pages 528-529**

**Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 15c, 20c, 45c, 60c, Tel: ALgonquin 4-5106**
**See ad on page 249**

Consolidated Avionics Corp., N.Y., 5c, 10c, 25c, 35c, 55c
Consolidated Electrodynamics Corp., Calif., 15s, 20s
Control Corp., Minn., 20c, 40c, 45c, 50c, 60c
Control Instrument Co., Inc., Subsid. Burroughs Corp., N.Y., 20c
Cook Electric Co., Ill., 15c, 20c
Cook Electric Co., Data-Stor Div., Ill., 15c, 20c
Cook Technological Center, Div. Cook Electric Co., Ill., 15c, 20c, 35c
Crosby-Teletronics Corp., N.Y., 40s
Crown Engineering, N.M., 40s

**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 60c, Tel: SWarthmore 1-0100**
**See ad on page 510**

Dalmo Victor Co., Div. Textron, Inc., Calif., 20c
Data Products Co., Inc., Md., 10c, 25c, 30c, 35c
Datex Corp., Calif., 15c, 20sc, 55sc
Daystrom, Inc., Military Electronics Div., Pa., 30c, 60c
Designers for Industry, Inc., Ohio, 40c, 45c, 50c, 55c, 60c





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Di/An Controls, Inc., Mass., 10c, 15c, 20sc
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 30c, 40c, 45c, 50c, 60c
Dicon Corporation, N.Y., 5c, 20c, 25c, 35c, 55c
Digitran Co., The, Div. Endevco Corp., Calif., 10s
Dorsett Electronics Labs., Inc., Okla., 30sc, 40sc, 60sc
Durant Manufacturing Co., Wis., 15sc
Dymec, Div. Hewlett-Packard Co., Calif., 15sc
Electro Instruments, Inc., Calif., 10s, 15s
Electro-Mechanical Research, Inc., Fla., 5s, 10s, 25s, 30s, 35s, 40s, 50s, 55s, 60s
Electro-Miniatures Corp., N.J., 10sc
Electro Tec Corp., N.J., 10c
Electronic Communications, Inc., Fla., 15c, 45c, 60c
Electronic Controls, Inc., Conn., 15c
Electronic Specialty Co., Calif., 35c
Emerson Electric Mfg. Co., The, Mo., 60c
Etelco Ltd., England, 5c, 10c, 15c, 20sc, 30c, 35c, 35c, 40c, 45c, 50c, 55c, 60c
Exact Electronics, Inc., Ore., 50s
Farinon Electronic Co., Calif., 40sc, 45sc, 60sc
Federal Manufacturing & Engineering Corp., N.Y., 50c, 55c
Fenske, Fedrick & Miller, Inc., Calif., 5s, 15s, 55s

**Ferroxcube Corp. of America, 50 E. Bridge St., Saugerties, N.Y., 20sc, Tel: CHerry 6-2811**
**See ads on pages 267, 354, 423, 457, 525, 620**

Fischer & Porter Co., Pa., 15s, 60s
Gemco Electric Co., Mich., 15c, 20c, 35c, 40c, 45c, 50c
General Automatics, Inc., Calif., 40c
General Devices, Inc., N.J., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc, 55sc, 60sc
General Electric Co., Apparatus Sales Div., N.Y., 45s, 60s
General Electric Co., Light Military Electronics Dept., N.Y., 20c
General Electric Co., Ordnance Dept., Mass., 15s, 20s
General Electronic Laboratories, Inc., Mass., 5sc, 10sc, 25sc, 30sc, 40sc, 45sc, 50sc, 60sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 15c, 20c, 30c, 35c, 40c, 45c, 60c
General Kinetics, Inc., Va., 15c

**General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N.J., 30c, Tel: PIlgrim 8-2400**
**See ads on pages 484, 485**

Geotechnical Corporation, The, Tex., 15s, 20c, 30s, 40s, 45s
Giannini Controls Corp., Calif., 10sc, 15sc
Gilfillan Bros., Inc., Calif., 30sc, 40c, 55c, 60sc
Gjaduy Corp., Richard, N.Y., 60s
Granger Associates, Calif., 60c
Greenray Industries, Pa., 40sc

**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 5c, 20c, 25c, 30c, 55c, 60c, Tel: CHesapeake 3-1100**
**See ad on page 512**

Gulton Industries, Inc., N.J., 15sc
Hallamore Electronics Co., Calif., 5c, 40s, 45c
Hallicrafters Co., The, Ill., 15c, 20c, 40c, 45c, 50c, 55c, 60c
Hammarlund Mfg. Co., Inc., N.Y., 35sc, 40sc, 45sc, 60sc
Harman-Kardon, Inc., N.Y., 10c, 20sc, 25c
Hathaway Instruments, Inc., Colo., 15c
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 45c, 60c

**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 15s, 40s, Tel: DAvenport 6-7000**
**See ad on pages 3-18**

Hickok Electrical Instrument Co., The, Ohio, 50s
Holt Instrument Laboratories, Wis., 5s
Hoover Electronics Co., Md., 5c, 40c
ITI Electronics, Inc., N.J., 45c
Instrument Development Laboratories, Inc., Mass., 10sc
Instruments For Industry, Inc., N.Y., 45c, 60c
Intercontinental Electronics Corp., N.Y., 55c, 60c

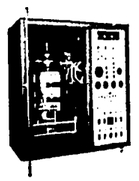
**Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 40c, 60c, Tel: LUdlow 4-6200**
**See ads on pages 355, 487**

International Telephone & Telegraph Corp., ITT Laboratories, Calif., 45c, 60c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 15c, 20c, 30c, 40c, 45c, 55c, 60c





*Model 324T Levinthal L-Band Power Amplifier delivers 2-kw continuous-wave in the frequency range 400 to 450 mc with a minimum power gain of 30db*



Where a telemetering system requires an increase in power capabilities, various Levinthal power amplifiers can be recommended over a wide power range. The example shown is one of the smaller units that have been used for this purpose.

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MOUNT VERNON, N.Y. • MOunt Vernon 4-7530
WALTHAM .....TWinbrook 4-1955
SYRACUSE .....GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400
For details, circle #273 on Reader Service Card






# Directory I. Complete Equipment

## 36. Telemetering Equipment.

Interstate Electronics Corp., Calif., 5c
Invar Electronics Corp., Calif., 50sc

**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 40s, Tel: CApital 6-4000**
**See ad on page 330**

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 15c, 20c, 35c, 40c, 45c, 55c, 60c
Kinetics Corp., Calif., 10c
Knight Corp., Ewen, Mass., 45c

**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 45s, Tel: AMityville 4-2200**
**See ad on page 365**

Laboratory For Electronics, Inc., Mass., 20c
Landis & Gyr, Inc., N.Y., 45s, 60s
La Pointe Industries, Inc., Conn., 10c, 40c

**Leach Corporation, 18435 Susana Rd., Compton, Calif., 15sc, 20sc, 60c, Tel: NEvada 6-1061**
**See ad on page 514**

Lear, Inc., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
Lenkurt Electric Co., Inc., Calif., 45s, 60s
Lind Instruments Inc., N.J., 10s
Litton Industries, Maryland Div., Md., 15, 20, 30, 45, 60

**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 60c, Tel: REgent 9-4321**
**See ad on pages 112-113**

Lockheed Electronics Co., Stavid Division, N.J., 45c, 60c
Loral Electronics Corp., N.Y., Signal analyzers c

**M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 40s, Tel: GRamercy 3-5899**
**See ad on page 419**

Madigan Electronic Corp., N.Y., 55c, 60c
Magnavox Research Laboratories, Calif., 10sc, 20c, 25sc, 30c, 35c
Magnetics Research Co., Inc., N.Y., 10c, 20sc, 25c, 55c
Marstan Electronics Corp., N.Y., 45c, 60c
Mayberry Electronics Co., Calif., 55sc

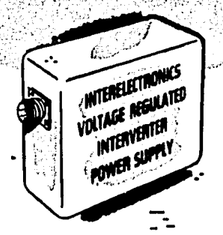
**Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 5s, 30s, 40s, 50s, Tel: DErfield 4-2131**
**See ad on page 335**

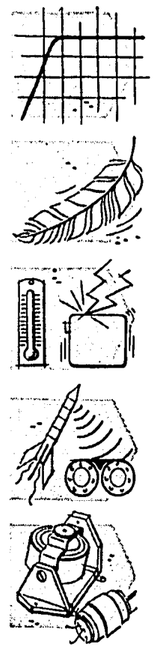
Midwestern Instruments, Inc., Okla., 15sc, 20sc, 40sc
Milgo Electronic Corp., Fla., 20c
Mincom Division, Minnesota Mining & Manufacturing Co., Calif., 15c
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 15s, 45s, 60s
Minneapolis-Honeywell Regulator Co., Industrial Systems Div., Md., 15s
Monitor Products Co., Calif., 40sc
Monroe Calculating Machine Co., Inc., Div. Litton Industries, Calif., 15c, 20c
Moore Associates, Inc., Calif., 10sc, 20sc, 35sc, 60sc
Motorola, Inc., Military Electronics Div., Ariz., 15c, 20c, 40c, 45c, 55c, 60c
Mycalex Electronics Corp., N.J., 10c, 30c, 45c
Naniloa Corporation, Ohio, 20c
National Company, Inc., Mass., 30c, 40c, 45c, 50c, 60c
National Scientific Laboratories, Inc., D.C., 20c, 55c
Nems-Clarke Co., Md., 45sc, 60c

**New London Instrument Co., Conn., 25sc, 50sc**
Nichols Ltd., R. H., Canada, 20c, 45c, 60c
Nippon Electric Co., Ltd., Japan, 45c, 60c

**Northeastern Engineering Inc., 25 S. Bedford St., Manchester, N.H., 60s, Tel: NAtional 2-6485**
**See ad on pages 27-30**


**PROVEN RELIABILITY—**
**SOLID-STATE POWER INVERTERS**
**over 260,000 logged hours— voltage-regulated, frequency-controlled, for missile, telemeter, ground-support, 135°C all-silicon units available now—**



Interelectronics all-silicon thyratron-like gating elements and cubic-grain toroidal magnetic components convert DC to any desired number of AC or DC outputs from 1 to 10,000 watts.

Ultra-reliable in operation (over 260,000 logged hours), no moving parts, unharmed by shorting output or reversing input polarity. Wide input range (18 to 32 volts DC), high conversion efficiency (to 92%, including voltage regulation by Interelectronics patented reflex high-efficiency magnetic amplifier circuitry).

Light weight (to 6 watts/oz.), compact (to 8 watts/cu. in.), low ripple (to 0.01 mv. p-p), excellent voltage regulation (to 0.1%), precise frequency control (to 0.2% with Interelectronics extreme environment magnetostrictive standards or to 0.0001% with fork or piezoelectric standards).

Complies with MIL specs. for shock (100G 11 misc.), acceleration (100G 15 min.), vibration (100G 5 to 5,000 cps.), temperature (to 150 degrees C), RF noise (I-26600).

AC single and polyphase units supply sine waveform output (to 2% harmonics), will deliver up to ten times rated line current into a short circuit or actuate MIL type magnetic circuit breakers or fuses, will start gyros and motors with starting current surges up to ten times normal operating line current.

Now in use in major missiles, powering telemeter transmitters, radar beacons, electronic equipment. Single and polyphase units now power airborne and marine missile gyros, synchros, servos, magnetic amplifiers.

Interelectronics—first and most experienced in the solid-state power supply field produces its own all-silicon solid-state gating elements, all high flux density magnetic components, high temperature ultra-reliable film capacitors and components, has complete facilities and know how—has designed and delivered more working KVA than any other firm!

For complete engineering data, write Interelectronics today, or call LUdlow 4-6200 in New York.

**INTERELECTRONICS CORPORATION**
**2432 Grand Concourse, New York 58, N. Y.**
For details, circle #274 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Northern Radio Co., Inc., 147 W. 22nd St., New York 11, N.Y., 45sc, 60sc, Tel: WAtkins 9-9117**
**See ad on pages 36-39**
Nuclear Electronics Corp., Pa., 45c
Ortronix, Inc., Fla., 20c, 25c, 35c, 40c, 55c
Osborne Electronics Sales Corp., Ore., 50c
Pacific Automation Products, Inc., Calif., 5c, 55c
Pacific Mercury Electronics, Thomas Organ Co., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
Packard Bell Computer Corp., Calif., 20c
**Panoramic Radio Products, Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., System Test c, Tel: OWens 9-4600**
**See ad on page 334**
Parsons Company, The Ralph M., Electronics Div., Calif., 25sc, 60sc
Patterson, Inc., Wayne D., Calif., 5s
Pearce-Simpson, Inc., Fla., 5c
Peer, Incorporated, Tex., 30c, 60c
Philamon Laboratories, Inc., N.Y., 40sc
Philco Corporation, Pa., 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
Philco Corporation, Govt. & Industrial Group, Pa., 10c, 20c, 30c, 35c, 40c, 50c, 60c
Philips Electronics Industries, Ltd., Canada, 20s, 40s, 45s, 55s, 60s
Photron Instrument Co., Ohio, 15s
Poly-Scientific Corp., Va., 10c




**TELEMETERING EQUIPMENT**

COMMUTATORS
DECOMMUTATORS
MODULATORS
MULTICODERS

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*Research Corporation*

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Potter Instrument Co., Inc., N.Y., 15c, 20s, 50c, 55c
Precision Instrument Co., Calif., 15sc
Probescope Co., Inc., N.Y., 5s
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 15c, 60c
Radiation, Inc., Florida, 15s, 50c, 60s
**Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 45s, 60s, Tel: DEerfield 4-3100**
**See ad on page 290**
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 15c, 20c, 30c, 35c, 40c, 45c, 60c, Tel: EVergreen 8-6000**
**See ad on page 506**
Railroad Electronic Labs. of Omaha, Inc., Neb., 45c, 60c
Radio Corp. of America, Defense Electronic Products, N.J., 5c, 15c, 20c, 35c, 45c, 50c, 55c, 60c
Rank Cintel Ltd., England, 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
**Reeves-Hoffman, Div. Dynamics Corp. of America, 145 Cherry St., Carlisle, Pa., 40c, Tel: CHapel 3-5929**
**See ad on page 432**
Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
Resdel Engineering Corp., Calif., 60c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 30c, 40c, 45c, 55c, 60c, Tel: LOckwood 5-4578**
**See ad on page 324**
Rust Industrial Co., Inc., The, N.H., 15sc
San Diego Scientific Corp., Calif., 10sc
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 15s, Tel: TWinbrook 4-6300**
**See ad on pages 64-65**
Schaevitz Engineering, N.J., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
Secode Corp., Calif., 25c
Servo Corp. of America, N.Y., 45s
Servomechanisms, Inc., Calif., 10c, 30c, 35c, 40c, 55c
Shepherd Industries, Inc., N.J., 15sc, 20sc, 30c, 40c
Sierra Electronic Corp., Div. Philco Corp., Calif., 45c, 50s, 60c
**Sierra Research Corp., P.O. Box 22T, Buffalo 25, N.Y., 10sc, 25sc, 30c, 35s, Tel: NF 2-8823**
**See ads on pages 271, 356, 662**
Solartron Electronic Group Ltd., The, England, 10s, 15s, 20s
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 10c, 30c, 40c, 55c, 60c, Tel: EMpire 4-2271**
**See ad on page 420**
Soroban Engineering, Inc., Fla., 15c, 20c
Southwestern Industrial Electronics Co., Tex., 20c, 30c, 35c, 40c, 45c, 50c, 60c
Space Electronics Corp., Calif., 20c, 25c, 30c, 35c, 40c, 45c, 55c, 60c
Specialty Electronics Development Corp., N.Y., 45c
Spectralab Instruments, Calif., 40sc, 50sc, 60sc
Sperry Gyroscope Co., Sunnyvale Development Center, Calif., 30c, 35c, 45c, 50c, 60c
Standard Telephones & Cables Ltd., England, 45sc, 60sc
Stelma, Inc., Conn., 20c
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 15c, 20c, 45c, 50c, 55c, 60c
Sylvania Electric Products Inc., Data Systems Operations, Mass., 20c, 55c
Systron-Donner Corp., Calif., 5c, 15sc
TRAK Electronics, Div., CGS Laboratories, Conn., 55c
Technitrol Engineering Co., Inc., Pa., 15c
Telechrome Mfg. Corp., N.Y., 10c, 25c, 30sc, 40s, 45sc, 50sc, 60sc
Telecomputing Corp., Calif., 25sc
Telecomputing Corp., Data Instruments Div., Calif., 25sc
Telecomtrol Corp., N.J., 45sc, 60sc
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 15sc, 20sc, 40c, 45c, 50c, Tel: YE 2-8600**
**See ad on page 338**
Telemeter Magnetics, Inc., Calif., 20c, 40s, 55c
**Telex, Inc., 1633 Eustis Ave., St. Paul 1, Minn., 20c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**
Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 20c, 30c, 50c
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 60c
Thompson Ramo Wooldridge Inc., Calif., 5sc
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 45c, 60c
**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 20c, 40c, Tel: OVerbrook 1-0400**
**See ad on page 294**
**Triplett Electrical Instrument Co., 286 Harmon Rd., Bluffton, Ohio, 50sc, Tel: 3231**
**See ad on page 174**
United Electrodynamics, Inc., Calif., 30c, 40s, 60s
U. S. Science Corp., Calif., 30c, 35c, 40c, 45c, 55c, 60c
Valor Instruments, Inc., Calif., 20c
Valpey Crystal Corp., Mass., 40sc
Vapor Recovery Systems Co., Calif., 45sc, 55sc, 60sc
**Vari-L Company, Inc., 207 Greenwich Ave., Stamford, Conn., 40sc, Tel: FIreside 8-0091**
**See ad on page 406**
Victor Adding Machine Co., Ill., 15
Walkirt Co., Calif., 40s, 50s
Waltham Electronics Corp., Mass., 5sc, 30sc, 50sc
Wang Laboratories, Inc., Mass., 10c, 15c, 20c, 35c, 50c
Warren Mfg. Co., Mass., 45sc, 60sc
Waveforms, Inc., N.Y., 40s
Western Union Telegraph Co., The, N.Y., 15s, 20s
Westinghouse Electric Corp., N.J., 45c, 60c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 15c, 45c, 60c, Tel: JUdson 2-3030**
**See ad on page 704**
Wiancko Engineering Co., Calif., 5c






# Directory I. Complete Equipment

**Television boosters:**
**See class 38**

**Television monitors:**
**See class 23**

**Television picture tubes:**
**See class 77**

**Television receivers:**
**See class 6**

**Television tape recorders:**
**See class 29**

## 37. Television Test Equipment.

5. Calibrators
10. Marker generators
15. Signal generators
20. Sweep generators
25. Synchronizing generators
30. UHF-VHF generators

Avionics Corp. of America, Pa., 5c, 15c, 20c
Avo Limited, England, 15s
B & K Mfg. Co., Ill., 15s, 20s
**Boonton Radio Corp., 50 Intervale Rd., Boonton, N.J., 15, 20, Tel: DEerfield 4-3200**
**See ad on page 328**
**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 10c, Tel: NEwtown 9-5700**
**See ad on page 426**
Canadian Marconi Co., Canada, 20s
DeRyder Electronics, N.J., 25c
E.M.I.-Cossor Electronics Ltd., Canada, 5s, 10s, 20s, 25s
E.M.I. Electronics Ltd., England, 10s
**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 10s, 15s, 20s, Tel: STillwell 6-8700**
**See ad on page 283**
Electronic Measurements Corp., N.Y., 15s
General Devices, Inc., N.J., 5c
**General Radio Co., 22 Baker Ave., West Concord, Mass., 20s, 30s, Tel: EMerson 9-4400**
**See ad on Cover 4**
Hallamore Electronics Co., Calif., 25s
Heath Company, Subsid. Daystrom, Inc., Mich., 20s
Hickok Electrical Instrument Co., The, Ohio, 5s, 10s, 15s, 20s
Jackson Electrical Instrument Co., The, Ohio, 15s
**Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 10sc, 20sc, Tel: BAldwin 6-3456**
**See ad on pages 114-115**
Jetronic Industries, Inc., Pa., 5c, 10c, 15c, 20c, 25c, 30c
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 5c, 20c, 25c

## 37. Television Test Equipment.

**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 15s, 20s, 30s, Tel: CApital 6-4000**
**See ad on page 330**
Knight Electronics Corp., Ill., 10s, 20s
Magnetics Research Co., Inc., N.Y., 25sc
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 15s, 20s, Tel: LOwell 7-0607**
**See ad on page 332**
Marconi's Wireless Telegraph Co., Ltd., N.Y., 10s, 15s, 20s, 25s
**Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 5s, 15s, 30s, Tel: DEerfield 4-2131**
**See ad on page 335**
Meter-Makers, Inc., Ill., 5c
Metrologie, Compagnie Generale de, France, 10s, 15s, 20s, 30s
Metropolitan Electronic & Instrument Co., N.Y., 10s, 15s
Packard Bell Electronics, Service Division, Calif., 10s, 15s, 25s
Philips Electronics Industries Ltd., Canada, 5s, 10s, 15s, 20s, 30s
Potter Instrument Co., Inc., N.Y., 10c, 15c
Precise Electronics & Development Corp., N.Y., 10s, 15s
Precision Apparatus Co., Inc., N.Y., 10s, 15s, 20s
RCA Victor Co., Ltd., Canada, 5sc, 10sc, 15sc, 20sc, 25s, 30sc
Radio Corp. of America, N.J., 10s, 15s, 20s, 25s, 30s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20s, 25s, 30s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 5s, 10s, 15s, 20s, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Radiometer, Denmark, 20s
Rank Cintel Ltd., England, 15s, 20c
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 15s, Tel: PRescott 3-8010**
**See ad on page 246**
**Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 10s, 15s, 20s, 30s, Tel: EStebrook 9-1121**
**See ad on page 462**
Spectralab Instruments, Calif., 15c, 30sc
Sunshine Scientific Instrument, Pa., 5s, 10s, 15s, 20s, 25s, 30s
**Superior Instruments Co., 2435-41 White Plains Rd., New York 67, N.Y., 10s, 15s, Tel: TUlip 2-6880**
**See ad on page 295**
Tel-Instrument Electronics Corp., N.J., 10s, 15s, 20s, 25s, 30s
Telechrome Mfg. Corp., N.Y., 5s, 10s, 15s, 25s, 30sc, Special Effects Generators sc
**Telonic Engineering Corp., 773 Broadway, Laguna Beach, Calif., 10c, 15c, 20c, 30c, Tel: HYatt 4-7581**
**See ad on page 71**
**Telonic Industries, Inc., 60 N. First Ave., Beech Grove, Ind., 10s, 15s, 20s, 30s, Tel: STate 7-7241**
**See ad on page 70**
**Triplett Electrical Instrument Co., 286 Harmon Rd., Bluffton, Ohio, 10s, 15s, 20s, 30s, Tel: 3231**
**See ad on page 174**
Valor Instruments, Inc., Calif., 15s, 30s
Wiltron Co., Calif., 10
Winston Electronics, Div. Jetronic Industries, Inc., Fla., 15s

**Television transmitters:**
**See class 7**

**Test benches:**
**See class 84**

**Test chambers, environmental:**
**See class 14**

**Test equipment, audio frequency:**
**See class 3**

**Test equipment, general:**
**See class 14**

**Test equipment, microwave:**
**See class 21**

**Test equipment, radio frequency:**
**See class 28**

**Test equipment, television:**
**See class 37**

**Time delay generators:**
**See class 21**

**Time standards:**
**See class 33**

**Timing equipment, automatic control: See class 4**

**Timing motors:**
**See class 60**

**Tower lighting equipment:**
**See class 39**

**Towers:**
**See class 39**

**Transceivers, airborne & airport:**
**See class 1**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Transceivers, mobile:
See class 22

Transducers:
See class 75

Transformers:
See class 76

Transistor testers:
See class 14

Transmitters, airborne & airport:
See class 1

Transmitters, amateur:
See class 2

Transmitters, broadcast (AM, FM, TV, UHF, VHF): See class 7

Transmitters, facsimile:
See class 13

Transmitters, microwave:
See class 20

Transmitters, mobile:
See class 22

Transmitters, point to point:
See class 26

Transmitters, radar:
See class 27

Transmitters, single sideband:
See class 31

Transmitters, telegraph & teleprinter: See class 35

Transmitters, telemetering:
See class 36

Tripods:
See class 34

Tube testers:
See class 14

Tubes, receiving:
See class 77

Tubes, special purpose:
See class 78

Tubes, transmitting:
See class 79

Tuners:
See class 80

Tuning coils:
See class 45

Tuning forks:
See class 33

Turntables:
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UHF-VHF generators:
See class 37

UHF-VHF receivers:
See class 6

UHF-VHF transmitters:
See class 7

Ultra-violet equipment:
See class 19

Ultrasonic generators:
See class 14

Ultrasonic testers:
See class 14

VOR equipment:
See class 1

Vacuum controls:
See class 4

Vacuum furnaces:
See class 92

Vacuum gages:
See class 14

Vacuum tube testers:
See class 14

Vacuum tube voltmeters:
See class 14

Vacuum tubes, receiving:
See class 77

Vacuum tubes, special purpose:
See class 78

Vacuum tubes, transmitting:
See class 79

Vibration analyzers:
See class 14

Vibration controls:
See class 81

Video monitors:
See class 23

Voltage converters:
See class 47

Voltage dividers:
See class 14

Voltage regulators:
See class 82

Voltage standards:
See class 33

Voltmeters:
See class 58

Voltmeters, audio frequency:
See class 3

Voltmeters, digital:
See class 14

Voltmeters, vacuum tube:
See class 14

Volume level meters:
See class 58

Walkie-talkies:
See class 12

Wattmeters, absorption:
See class 21

Wattmeters & watt-hour meters:
See class 58

Waveguides and accessories:
See class 83

Wavemeters:
See class 21

Wire & tape, recording:
See class 65

Wire recorders:
See class 29

X-ray equipment:
See class 19

Yokes, deflection:
See class 45



# 1961 IRE DIRECTORY

# Directory II Components

## 46 major groups 457 products

The products and services of the radio-electronics industry have been organized into three basic directories:

I. Complete Equipment

II. Components

III. Materials & Services

Within these three basic directories, 104 major product and service groups are numbered consecutively throughout. Under each of these 104 classes a further breakdown is given, showing in detail by a system of code numbers after each firm listed what specific products within the class are manufactured by that firm.

For a terminology cross-index listing the 932 subproducts in alphabetical order, consult the pink section preceding page 1.

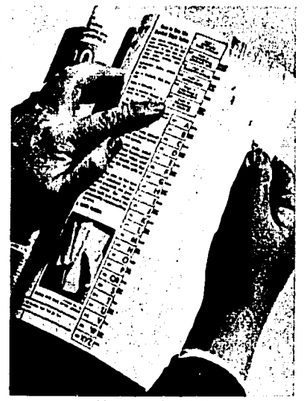
### The first few times you use this EDGE INDEX

follow the "How to use" instructions slowly—one step at a time. After that you will be able to open easily and almost instantly to the section that you seek.

Machol edge indexes covering the alphabetical section and each of the three major directory groups will be found on pages 135, 241, 359, and 597.

### HOW TO USE

1. Bend the Directory almost double with the back cover page on the inside.
2. Hold in your right hand with your four fingers near to the bound edge and your right thumb near the middle of the open side of this page.
3. From the heavy or light line symbol adjacent to the subject you seek, run your eyes across the page edges until you reach the horizontally corresponding symbol.
4. OPEN THERE!



LICENSE NO. 25G
MACHOL EDGE INDEX PATENT #2680630

For complete list of products and services, arranged alphabetically for fast reference, see the pink section preceding page 1.


| | |
|---|---|
| 1 | COMPLETE DATA SPREADS |
| 135 | ALPHABETICAL DIRECTORY |
| 241 | DIRECTORY I COMPLETE EQUIPMENT |
| 359 | DIRECTORY II COMPONENTS |
| 597 | DIRECTORY III MATERIALS & SERVICES |


## INDEX TO COMPONENTS DIRECTORY


| Product No. | Page No. |
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| 39 Antennas & Accessories | 369 |
| 40 Attenuators | 378 |
| 41 Batteries | 385 |
| 42 Blowers & Cooling Fans | 387 |
| 43 Capacitors: Fixed | 389 |
| 44 Capacitors: Variable | 397 |
| 45 Coils | 398 |
| 46 Connectors | 407 |
| 47 Converters | 417 |
| 48 Cores and Core Materials | 422 |
| 49 Crystals & Accessories | 427 |
| 50 Delay Lines | 433 |
| 51 Equalizers<br>52 Filters | 438<br>439 |
| 53 Fuses and Fuse Holders | 449 |
| 54 Hermetic Seals | 451 |
| 55 Jacks, Jack Fields & Plugs | 453 |
| 56 Loudspeakers<br>57 Magnets | 456<br>457 |
| 58 Meters (Indicating Instruments) | 458 |
| 59 Microphones & Stands<br>60 Motors & Synchros | 463<br>463 |
| 61 Phonographs, Pick-ups, Record Changers, etc.<br>62 Pilot and Indicator Lights | 470<br>470 |
| 63 Power Supplies | 473 |
| 64 Printed & Packaged Circuits | 495 |
| 65 Recording Accessories | 503 |
| 66 Rectifiers | 505 |
| 67 Rectifiers, Vacuum Tube<br>68 Relays | 509<br>509 |
| 69 Resistors | 521 |
| 70 Semiconductors | 537 |
| 71 Sockets | 543 |
| 72 Switches & Contacts | 546 |
| 73 Terminals | 556 |
| 74 Thermostats<br>75 Transducers | 560<br>561 |
| 76 Transformers | 563 |
| 77 Tubes, Receiving | 575 |
| 78 Tubes, Special Purpose | 577 |
| 79 Tubes, Transmitting | 583 |
| 80 Tuners | 584 |
| 81 Vibration Controls<br>82 Voltage Regulators | 587<br>587 |
| 83 Waveguides & Accessories | 589 |

# RF

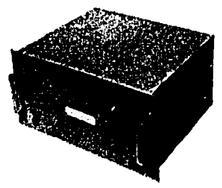
components demonstrating exceptional performance characteristics

broadband amplifiers • low noise amplifiers
tunable amplifiers • bandpass filters
multicouplers • multiplexers • converters
coaxial attenuators • terminations
impedance matching transformers

## Broadband RF Amplifiers

**40-1500 mcps**

Model HFW Amplifiers cover an octave of frequency. Their truly exceptional performance features low noise, high gain with low power drain.



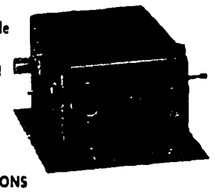
SPECIFICATIONS (condensed)

| | |
|---|---|
| Freq range | 40-1500 mcps |
| Z in/out | 50 or 75 ohms |
| Noise figure | 5-11 db |
| Gain | 10-30 db or greater if desired |

## Bandpass Filters

**30-2000 mcps**

Model HFF and HFF-T Bandpass Filters are rugged, reversible in operation, remarkable in performance (which approximates theoretical expectations). Advanced filter designs are also available for antenna couplers and diplexers.

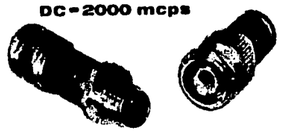


SPECIFICATIONS (condensed)

| | HFF | HFF-T |
|---|---|---|
| $F_o$, mcps | 30-1000 | 200-2000 |
| Bandwidth | 5-25% $F_o$ | 1-15% $F_o$ |
| Insertion loss | ≦1 db | ≦1 db |
| VSWR | ≦1.2 in passband | |

## Attenuators and Terminations

**DC-2000 mcps**



Impedances of 52.5 and 75 ohms
VSWR 1.2 maximum
Nominal attenuation from 1 to 20 db
BNC, TNC, or N connectors

## Impedance Transformers

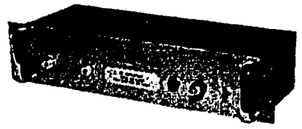


DC to 1000 mcps
VSWR 1.2 maximum
Minimum loss
Matching any pair of 50, 75, 93 ohms
BNC connectors

## Low Noise RF Amplifiers

**30-300 mcps**

Model UH-2(A)SP Amplifiers offer broadband response, high gain, and low noise figure, with additional advantages of simplicity, high reliability, ruggedness, small size and low weight.



SPECIFICATIONS (condensed)

| | |
|---|---|
| Freq. range | $F_o$ preset between 30 and 300 mcps |
| Gain | Greater than 20 db |
| Bandwidth | Up to 10% of $F_o$ |
| Noise Figure | <1 db at 30 mcps to <3 db at 300 mcps |

telephone or write for full information

**Applied Research inc.**

76 S. Bayles Avenue, Port Washington, N.Y. Port Wash. 7-8707

For details, circle #276 on Reader Service Card





ATR tubes:
See class 79

Adapters:
See class 71

Aging racks:
See class 14

Air speed indicators:
See class 58

Ammeters:
See class 58

Amplifiers, infrared:
See class 17


## 38. Amplifiers.

2. DC amplifiers
4. Audio
6. Decade
8. Differential
10. Dynamic noise suppressors
12. Hearing aid
14. High fidelity
16. IF amplifiers
18. Linear
20. Magnetic
22. Maser
24. Microwave
26. Null
28. Parametric
30. Peak limiting
32. Phono pre-amplifiers
34. Photocell
36. Power
38. Printed circuit
40. Pulse
42. RF amplifiers
44. Servo
46. Strain gage
48. TV amplifiers
50. TV boosters
52. Transistor
54. Ultrasonic
56. Vibration pick-up
58. Wideband

A C Electronics, Inc., Calif., 2s, 4c, 16c, 20sc

**ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 20c, Tel: VIctoria 9-2414**
**See ad on page 474**

ACF Electronics Div., ACF Industries, Inc., Md., 20sc

AMP Incorporated, Pa., 38s, 40s

A R & T Electronics, Inc., Ark., 42c, 48c, 58c

**Acme Electric Corp., 44 Water St., Cuba, N.Y., 2c, 20sc, 36c, 52c, Tel: CUba 4**
**See ad on page 476**

Acoustical Mfg. Co., Ltd., England, 14s

Acromag, Incorporated, Mich., 18s, 20s, 44s, 46s

**Acton Labs., Inc., 500-B Main St., Acton, Mass., 6s, 36s, Tel: COlonial 3-7756**
**See ad on page 346**

**Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 4sc, Tel: GRegory 2-5622**
**See ad on page 329**

Adage, Inc., Mass., 2sc, 8sc, 30sc, High Impedance sc

Advance Instrument Corp., N.J., 38c, 44c, 52c

Advanced Electronics, Inc., Conn., 50s

Advanced Research Associates, Inc., Md., 2sc, 16c, 26sc, 36sc, 44sc, 52sc

Aeroflex Corp., The, Aeroflex Laboratories Div., N.Y., 2s, 20s, 44s, 52s

Airborne Accessories Corp., N.J., 2sc, 20sc, 36sc, 52sc

Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 16c, 28sc, Computer s





# Directory II. Components

## 38. Amplifiers.

**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 24s, Tel: COpley 7-9115**
**See ad on page 309**

Aircraft Electronics, Ariz., 2c, 4c, 16c, 36c

Airdesign Corp., Pa., 4c

Airmec Limited, England, 2s, 4s, 14s, 36s

**Airpax Electronics, Inc., Cambridge Div., Jacktown Rd., Cambridge, Md., 2sc, Tel: AC 8-4600**
**See ad on pages 82-83**

**Airpax Electronics, Inc., Seminole Div., Fort Lauderdale, Fla., 2s, 8s, 18s, 20s, 26s, 36s, 44s, 46s, Tel: LUdlow 3-6160**
**See ad on pages 82-83**

**Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 22c, 24sc, Tel: CHestnut 5-2990**
**See ad on page 589**

Airtron, Inc., Div. Litton Industries, Inc., N.J., 24c, 28c

Airtronics International Corp., Fla., 38c

Alcar Instruments, Inc., N.J., 54c

Alcon Metal Products, Inc., Ill., 38c

**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 2, 34, 36, Tel: FOrest 6-4467**
**See ad on page 276**

Alfred Electronics, Calif., 2s, 24s

Allegany Instrument Co., Inc., Md., 2s, 8s, 46s

Allied Allegri Co., Inc., N.J., 38c

Altec Lansing Corp., Calif., 4s

Alto Scientific Co., Inc., Calif., 16c

Amerac, Inc., Mass., 24sc, 36sc

American Communications Corp., N.Y., 4c, 48s

American Development Electronics Co., N.J., 2c, 4c, 6c, 10c, 16c, 36c

**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 2s, 8s, 58s, Tel: WAlnut 5-8780**
**See ad on page 369**

**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 44c, Tel: DUnkirk 5-7401**
**See ad on page 164**

American Geloso Electronics, Inc., N.Y., 4s, 12s, 14s

American Instrument Co., Inc., Md., 46s

American Measurement & Control, Inc., Mass., 2sc, 8sc, 44sc, 46c

American Research & Mfg. Corp., Md., 2s, 8c, 20s, 28c, 30c, 34c, 38s, 44s, 46c, 52s

Ampex Corp., Professional Prods. Co., Audio Div., Calif., 4s

Amplifier Corp. of America, N.Y., 4c, 30c, 52c, AVC c

Amplivox Ltd., England, 52sc

Anadex Instruments, Inc., Calif., 26s

Analogue Controls, Inc., N.Y., 2c, 44c

Ansco Division, General Aniline & Film Corp., N.Y., 24sc, 44sc

Applied Dynamics Corp., Mass., 16sc

Applied Dynamics, Inc., Mich., 2s, 8s, 44c

Applied Radiation Corp., Calif., 24c

**Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 16c, 24sc, 42sc, 48sc, 50sc, 52sc, 58sc, Tel: POrt Washington 7-8707**
**See ad on page 360**

Applied Technology Corp., N.Y., 2s, 8c

Applied Technology, Inc., Calif., 16c, 24c, 28c, 36c, 40c, 42c, 58c

Ardente Acoustic Labs., Ltd., England, 12sc

**Arenberg Ultrasonic Laboratory, Inc., 94 Green St., Jamaica Plain 30, Mass., 54sc, Tel: JAmaica 2-8640**
**See ad on page 435**

Argonne Electronics Mfg. Corp., N.Y., 12s, 34s

Arkay Products Mfg. Co., Calif., 4s

Armstrong Whitworth Equipment, England, 2s, 16s, 46s, 52s, 56s

Arnold Magnetics Corp., Calif., 20c

Arnoux Corp., Calif., 2s, 8s, 20s, 52s

Associated Electrical Industries Ltd., Instrumentation Div., England, 2s

Atlantic Research Corp., Va., 54c, 56c, 58c, High Impedance c

Atlantis Electronics Corp., Texas, 2s

Atlas Engineering Co., Inc., Mass., 2c, 18c, 20c, 40c, 44c

Audiotronics Corp., Calif., 14s

Austin Electronics, N.Y., 44c

Automatic Timing & Controls, Inc., Pa., 18sc, 26sc, 44sc, 56sc

Automation Dynamics Corp., N.J., 34c, 38c, 44c, 52c

Automation Industries, Inc., Calif., 54c

Automation Industries, Inc., Magnetic Div., Calif., 20c

Avien, Inc., N.Y., 2c, 8c, 46c, 52c

Avionics Ltd., Canada, 38c

Avo Limited, England, 2s, 42s

B & F Instruments, Inc., Pa., 46s

BI Electronics, Borg-Warner Controls, Calif., 24c, 38c, 40c, 46c, 52c

Bach Auricon, Inc., Calif., 4s, 48s

Bailey, Inc., P. A., Conn., 4sc, 14c, 38c, 52c, 56c

Baldwin-Lima-Hamilton Corp., Electronics & Instrumentation Div., Mass., 46c

Baldwin Piano Co., The, Industrial Products Div., Ohio, 2c, 4c, 42c, 58c

**Ballantine Laboratories, Inc., Boonton, N.J., 6s, Tel: DEerfield 4-1432**
**See ad on page 144**

**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 26sc, 44sc, Tel: WOodland 8-6833**
**See ad on page 465**

Barker & Williamson, Inc., Pa., 4c, 16c, 18sc, 36sc, 42sc

Beckman Instruments, Inc., Scientific & Process Instruments Div., Calif., 2s

Beckman Systems Division, Calif., 2s, 8s, 46s, 58s

**Behlman Engineering Co., 2911 Winona Ave., Burbank, Calif., 4c, 36c, Tel: VIctoria 9-5733**
**See ad on page 477**

Bell Aircraft Corp., Avionics Div., N.Y., 2c, 4c, 6c, 8c, 10c, 18c, 20c, 24c, 36c, 40c, 44c

Bell & Gossett Co., Ill., 2c, 4c, 6c, 8c, 20c, 38c, 40c, 52c

Bellaire Electronics, Inc., N.J., 4c, 16c, 42c

Bellandi Co., Inc., M., Ill., 38c

Bendix Corp., The, Bendix-Pacific Div., Calif., 16c, 24c, 40c, 42c, 52c

**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 44c, Tel: ATlas 8-2000**
**See ad on pages 103-106**

Bendix Corp., The, Friez Instrument Div., Md., 8s

Bendix Corp., The, Industrial Controls Section, Mich., 38s, 52s

Bendix Corp., The, Montrose Div., Pa., 44c

Bendix Corp., The, Pioneer-Central Div., Sonic Energy Products, Iowa, 54sc

Bently Scientific Co., Calif., 2sc, 18sc, 44sc, 52sc, 56sc

Bergen Laboratories, Inc., N.J., 20c, 26c, 52c

Bliss Electronic Corp., N.J., 2s

Block Associates, Inc., Mass., 2c, 4c, 34c

Blonder-Tongue Laboratories, Inc., N.J., 4s, 14s, 42s, 48sc, 50s, 58s

Bo Myte Co., The, Pa., 38c

Bogen-Presto Co., N.J., 4s, 14s, 32s, 36s, 52s

**Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 24sc, Tel: WAlker 2-6000**
**See ad on page 150**

**Bowmar Instrument Corp., 8000 Bluffton Rd., Fort Wayne, Ind., 44c, Tel: SHerwood 3121**
**See ad on page 340**

Bozak Mfg. Co., The R. T., Conn., 4s

Brach Mfg. Corp., Div. General Bronze Corp., N.J., 2c, 20sc, 36sc, 42c, 44sc, 52c

Branson Ultrasonic Corp., Conn., 54s

Bright Radio Labs., Inc., N.Y., 4c

Bristol Co., Conn., 2c, 8c, 44c, 46c

Brocker Laboratories, Calif., 34c, 52c

Brooks Research, Inc., N.Y., 2c, 4c, 8c, 16c, 20c, 36c, 58c

Bruel & Kjaer, A/S, Denmark, 4s, 18s, 46s, 56s, 58s

Bruno-New York Industries Corp., N.Y., 2c, 4c

Brush Instruments, Div. Clevite Corp., Ohio, 2s, 46s

Buck Instrument Co., Colo., 26c

Buckbee Mears Co., Minn., 38c

Budelman Electronics Corp., Conn., 18c

**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 4c, Tel: CLoverdale 3-8931**
**See ad on page 321**

**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 38c, 40c, 42c, 44sc, 52sc, Tel: NEwtown 9-5700**
**See ad on page 426**

Bundy Electronics Corp., N.J., 4c, 20c

**Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 40c, Tel: ORiole 8-3070**
**See ad on page 479**

Burr-Brown Research Corp., Ariz., 2s, 4s, 6s, 8s, 18s, 26s, 38s, 44s, 46s, 52s, 54s, 58s

Burton-Rodgers, Inc., Ohio, 38c, 44c

Bytrex Corp., Mass., 46c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

C.E.S. Electronic Products, Inc., Calif., 4s
Cable Specialists of Conn., Conn., 52c, 56c
Cadre Industries Corp., N.Y., 2c, 4c, 16c, 18c, 36c, 38c, 42c, 44c, 52c
Canadian Aviation Electronics, Ltd., Canada, 2c, 24c, 28c, 44c
Canadian Marconi Co., Canada, 4s, 30s, 42s, 48s
Canadian Westinghouse Co., Ltd., Canada, 16c, 24c, 58c
Canoga Division, Underwood Corp., Calif., 16c, 24c, 38c, 40c, 44c, 52c, 58c
Capehart Corp., Dynamic Electronics Div., N.Y., 2c, 4sc, 8c, 14sc, 16sc, 18c, 24c, 28c, 32sc, 34c, 36sc, 38sc, 40c, 42sc, 48sc, 50sc, 52c, 54c, 56c, 58c
Cedar Engineering Div., Control Data Corp., Minn., 20c, 44c
**Celco—Constantine Eng. Labs. Co., 70 Island Ave., Mahwah, N.J., 20c, Tel: DAvis 7-1123**
**See ads on pages 60-61, 84-85**
Central Dynamics, Ltd., Canada, 4c, 8c, 18c, 32c, 44c, 48c
**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 4s, 52sc, Tel: WOodruff 2-9200**
**See ad on page 152**
Centronix, Inc., Fla., 30c, 52c
Century Electronics & Instruments, Inc., Okla., 18s
Chance Vought Electronics Div., Texas, 28c, 44c
Chemalloy Electronics Corp., Calif., 24c
Chesapeake Instrument Corp., Md., 4sc, 56c
Chicago Electronic Div., Land-Air Inc., Ill., 16c, 42c, 56c
**Chicago Electronic Engineering Co., 3223 W. Armitage Ave., Chicago 47, Ill., 20s, Tel: CApitol 7-3130**
**See ad on page 565**
**Chicago Magnetic Control, 1616 N. Damen Ave., Chicago 47, Ill., 20c, Tel: ARmitage 6-7400**
**See ad on page 565**
Cinaudagraph, Inc., Ill., 4c
**Circo Ultrasonic Corp., 51 Terminal Ave., Clark, N.J., 54sc, Tel: FUlton 8-8600**
**See ad on page 669**
Clark Co., Inc., Mass., 4c
Cleveland Metal Specialties Co., Ohio., 2c, 4c, 38c, 52c
Coil Co. of America, Inc., N.J., 20c
Coil Winders, Inc., N.Y., 20c
Coilcraft, Inc., Ill., 20c
Coils-Electronics Co., Pa., 2sc, 4sc, 8sc, 38c
Collins Radio Co., Central Sales Office, Texas, 2sc, 4sc, 6sc, 8c, 16sc, 18sc, 22c, 24c, 28c, 30s, 32s, 34c, 36s, 38c, 40c, 42sc, 44sc, 52sc, 58sc
Collins Radio Co., Texas Division, Texas, 18s, 24s, 42s
Colvin Laboratories, Inc., N.J., 52c
**Communication Accessories Co., 50 Highway & 71 By-Pass, Lee's Summit, Mo., 20sc, Tel: BRoadway 1-1700 (Kansas City)**
**See ad on page 182**
**Communication Measurements Laboratory, Inc., 348 Leland Ave., Plainfield, N.J., 36sc, 54s, Tel: PLainfield 4-5502**
**See ad on page 479**
Community Engineering Corp., Pa., 16c, 18c, 48sc, 58sc
Components Corp., Ill., 20c, 44c
Computer Engineering Associates, Inc., Calif., 2s, 8s, 46s, 56s, 58s
Computing Devices of Canada, Ltd., Canada, 44sc
Computing Systems, Inc., N.Y., 2s
Consolidated Controls Corp., Conn., 2c, 44c
Consolidated Electrodynamics Corp., Calif., 18s, 46s, 56s
Continental Electronics Corp., N.Y., 4c, 16c
**Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 24c, 40c, 42c, 58c, Tel: EVergreen 1-1135**
**See ad on page 156**
Continental Mfg., Inc., Neb., 4s, 14s, 16s
Continental Sound Engineering, Inc., Wis., 4s, 36s
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 16c, 24c, 28c, 52c, 58c, Tel: HAmilton 7-7961**
**See ad on page 440**
Control Equipment Corp., Mass., 4s, 18s, 38s, 40s, 52s, 54c
Control, Div. Magnetics, Inc., Pa., 20sc
Cook Electric Co., Ill., 38c
Cook Electric Co., Data-Stor Div., Ill., 34s
Corbett Science Laboratories, F. W., Calif., 2sc, 54sc
Cornwell Electronics Corp., Conn., 14c, 20c, 32c
Cosmic, Inc., D.C., 2s
Crown Engineering, N.M., 4c, 16c
Crystalonics, Inc., Mass., 52sc
Cycle Transformer Corp., N.J., 20c
D & R, Ltd., Calif., 20c
Dalmo Victor Co., Div. Textron, Inc., Calif., 44c
Daven Co., The, N.J., 2c, 4c, 6c, 16c, 48c, 52c, 58c
Davenport Mfg. Co., Ill., 2c
Dawe Instruments Ltd., England, 56s
Daystrom, Inc., Transicoil Div., Pa., 44s
Daystrom, Inc., Weston Instrument Div., N.J., 2c
Dayton Aircraft Products, Inc., Fla., 44c
Dayton Electronic Products Co., Ohio, 2sc, 4sc, 6sc, 14sc, 16c, 28c, 36sc, 38sc, 40sc, 42sc, 44sc, 52sc, 58sc
Daytronic Corp., Ohio, 46s, 56s
Decker Corporation, The, Pa., 2c, 8s
Deltron, Inc., Pa., 26s, 44c, 58s
Designers For Industry, Inc., Ohio, 2c, 4c, 8c, 28c, 38c, 42c, 44c, 52c, 58c
De Wald Radio Div., United Scientific Labs., N.Y., 4sc
Di/An Controls, Inc., Mass., 44sc
Dicon Corporation, N.Y., 2c, 4c, 8c, 14c, 32c, 34c, 36c, 40c, 46c, 52c, 54c, 58c
Dictograph Products, Inc., N.Y., 4s
Diehl Mfg. Co., N.J., 44s
Djordjevic Engineering Co., Djeco Div., Ill., 2c, 4c, 8c, 18c, 20c, 36c, 40c, 52c, 58c
Dominion Electrohome Industries, Ltd., Canada, 4s, 14s, 36s
Donner Scientific Co., Subsid. Systron-Donner Corp., Calif., 2sc, 6c, 8c, 18s, 38sc, 44c, 52sc, 56c
Dorsett Electronics Labs., Inc., Okla., 2sc, 42sc, 46c
Du Kane Corp., Ill., 4s, 32s, 42s
Dwyer Engineering Co., Inc., N.H., 2c, 4c, 12c, 16c, 36c, 38c, 42c, 52c
Dychro Corp., Mass., 34c
Dyna Magnetic Devices, Inc., N.Y., 12sc
Dynair Electronics, Inc., Calif., 48s
Dynamics Corp. of America, N.Y., 4c, 16c, 18c, 24c, 36c, 42c, 44c, 48c
Dynamics Instrumentation Co., Calif., 2sc, 8sc, 18s, 46s, 52s, 56s, 58s
Dytronics Company, Ohio, 26s
E-H Research Laboratories, Calif., 2, 8, 40
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 2c, 4c, 6c, 8c, 14c, 16c, 18c, 20c, 24c, 32c, 36c, 38c, 40c, 42c, 44c, 52c, Tel: HAlifax 6-7491**
**See ad on page 400**
E.M.I.-Cossor Electronics, Ltd., Canada, 14s, 56s
E O Electronics, Inc., N.J., 6s
Eastern Industries, Inc., Conn., 44c
Ebauches, S.A., Dept. Oscilloquartz, c/o Freeport Engineering Co., N.Y., 2c
Ebauches, S.A., Dept. Semiconducteurs, Switzerland, 52s
Eby Co., Hugh H., Pa., 38c
Edison Industries, Thomas A., Instrument Div., N.J., 44c
Ehrenpreis, David, Consulting Engineers, N.Y., 56c
Elcor, Inc., Va., 2c, 8c, 18c, 58c
Electrend Products Corp., Mich., 4c, 14c
Electric Eye Equipment Co., Ill., 2c, 20c, 34c
Electric Regulator Corp., Conn., 2s, 8s, 18sc, 26sc, 34sc, 36sc, 44sc
Electric Specialty Co., Conn., 8c, 34c, 36c, 52c
Electrical Service Co., Calif., 34sc
Electro-Chemical Engraving Co., Inc., N.Y., 38c
Electro Instruments, Inc., Calif., 2s, 4s, 6s, 8s, 36s, 38s, 40s, 44s, 46s, 52s, 56s, 58s
Electro Precision Corp., Ark., 2, 38, 44
Electro Tec Corp., N.J., 46c
Electron Enterprises, Inc., Ill., 4c, 14c
Electron-Radar Products, Ill., 24sc, 34sc
Electronic Applications, Inc., Conn., 4s, 24s, 32s
Electronic Assistance Corp., N.J., 54c
Electronic Associates, Inc., N.J., 2sc, 8sc, 38c, 44c, 46c
Electronic Cable Corp., Mass., 4c, 38c, 44c, 46c
Electronic Communications, Inc., Fla., 16c, 18c, 24c, 30c, 36c, 44c
Electronic Computer Co., Inc., Pa., 2s, 8s, 30s, 46s, 58s
**Electronic Instrument Co., Inc. (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 14s, Tel: STillwell 6-8700**
**See ad on page 283**
Electronic Measurements Corp., N.Y., 4s
Electronic Plastics Co., Calif., 38c, 52c





# Directory II. Components

## 38. Amplifiers.

Electronic Research Associates, Inc., N.J., 2c, 4c, 52s
Electronic Specialty Co., Calif., 4c, 8c, 16c, 18c, 20c, 34c, 36c, 40c, 42c, 44c, 52c, 58c
Electronic Systems Development Corp., Calif., 2sc, 8sc, 18sc, 38sc, 40sc, 44sc, 46sc, 56sc, 58sc
Electronic Systems Engineering Co., Okla., 4s, 10s, 30s
**Electronic Transformer Co., Inc., 70 Washington St., Brooklyn 1, N.Y., 20c, Tel: MAin 5-6123**
**See ad on page 567**
Electronic Transistors Corp., N.J., 52sc
Electronic Tube Corp., Pa., 2c, 8c
Electronica Industrial Ltda., Brazil, 4sc, 15s
Electronics, Inc. of Pa., Pa., 38c
Elk Electronic Labs., Inc., N.Y., 2c, 4c, 6c, 16c, 42c, 58c
Emerson Electric Mfg. Co., The, Mo., 8c, 10c, 16c, 24c, 36c, 38c, 42c, 44c, 52c
**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 24sc, 42sc, 58c, Tel: VIctor 2-8400**
**See ads on pages 307, 309, 313, 315, 379, 584**
Endevco Corp., Calif., 56sc
Enflo Corporation, N.J., 38c
Engineered Electronics Co., Calif., 18s, 38s, 40s, 52s
English Electric Valve Co., Ltd., England, 28s
Ensco, Inc., Utah, 2c, 44c, 46c
Entron, Inc., Md., 48s, 50s
Epsco Worcester, Mass., 2s, 8s, 46s, 52s
Erie Pacific Div., Erie Resistor Co., Calif., 6c, 8c
Erwood, Inc., Ill., 56c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 2c, 4c, 8c, 14c, 20c, 38c, 40c, 44c
Exactel Instrument Co., Calif., 44s
**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 22s, 24s, Tel: RAvenswood 1-9000**
**See ad on pages 125-128**
Fairchild Recording Equipment Corp., N.Y., 4s, 30s, 32s, 36s
Fairfield Engineering Corp., Conn., 20sc, 44c
Fanon Electronic Industries, Inc., N.J., 4s, 14s, 32s, 36s, 38s, 52s
Farmer Electric Products Co., Inc., Mass., 34s
Farwest Mfg. Div., Inc., Wash., 2c, 36c, 38c, 46c
Fecker Division, J. W., American Optical Co., Pa., 44sc
Federal Manufacturing & Engineering Corp., N.Y., 2s, 4s, 24c, 26c, 38sc, 42c, 48c, 52c, 56c
Federal Scientific Corp., N.Y., 16c, 18c, 58c
Feedback Controls, Inc., Mass., 20sc, 44sc, 52c
Fidelity Amplifier Co., Ill., 4sc, 14c, 20c, 34sc, 36c, 52c
Fidelity Instrument Corp., Pa., 20sc
Fisher Berkeley Corp., Calif., 4sc, 52sc
Fisher Radio Corp., N.Y., 4s, 14s, 36s
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 40c, 42c, 48sc, Computer c, Tel: CEnter 9-6100**
**See ad on page 480**
Franklin Electronics, Inc., Pa., 8s
Franklin Fibre-Lamitex Corp., N.Y., 38c
**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 20sc, Tel: EVergreen 6-1300**
**See ad on page 566**
Gables Engineering, Inc., Fla., 4c, 52c
Garrett Corp., The, Calif., 20c, 44c,
Gemco Electric Co., Mich., 8c, 20c, 34c, 36c, 44c, 46c, 52c
General Circuits, Inc., N.Y., 38c
**General Communication Co., 677 Beacon St., Boston 15, Mass., 24c, 42c, 52c, 58c, Tel: COpley 7-6030**
**See ad on page 331**
General Computers, Inc., Calif., 2sc, 8sc, Computer sc
General Devices, Inc., N.J., 2sc, 40c, 42c, 52sc, 58c
General Electric Co., Apparatus Sales Div., N.Y., 20c
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 28c, 52c, Tel: GRanite 6-4411**
**See ads on pages 263, 267, 435, 437, 501, 621**
General Electric Co., Specialty Transformer Dept., Ind., 20sc
General Electric Co., Ltd. of England, Telephone Works, England, 4s, 52s, 58s
General Electronic Controls, Inc., Minn., 2sc, 4sc, 44sc, 46sc, 52s, 56c
General Electronic Laboratories, Inc., Mass., 20c, 36sc, 42sc, 44sc, 58sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 24c, 54c
**General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N.J., 20c, Tel: PIIgrim 8-2400**
**See ads on pages 484, 485**
**General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 2c, 4c, 16c, 20c, 36c, 40c, 42c, 44c, 52c, Tel: WEst 9-8571**
**See ad on this page**
General Measurements Co., Inc., Mass., 4
**General Radio Co., 22 Baker Ave., West Concord, Mass., 2s, 4s, 16s, 26s, 36s, 40s, 42s, 54s, 56s, 58s, Tel: EMerson 9-4400**
**See ad on Cover 4**
Genisco, Incorporated, Calif., 4c, 36sc
Geotechnical Corporation, The, Tex., 2s, 26s, 34s, 46s, 56s
Geotronic Labs., Inc., Tex., 20c
Gertsch Products, Inc., Calif., 26s
Gibbs Mfg. & Research Corp., Wis., 26sc, 36c, 52sc
Gilfillan Bros., Inc., Calif., 16c, 28c, 38c, 40c, 42c, 44c
Godfrey Mfg. Co., Ill., 52c
Gonset Division, Young Spring & Wire Corp., Calif., 18s, 42s
Good Electronic Corp., Fla., 2c, 4c, 6c, 8c, 18c, 32c, 34c, 38c, 46c, 52c
Goodmans Industries, Ltd., Axiom Works, England, 4s, 36s, 56s
Goodyear Aircraft Corp., Ariz., 16c, 24c
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 24c
Gotham Audio Sales Co., Inc., N.Y., 4s, 30s
Granger Associates, Calif., 24sc, 36sc, 40sc, 42sc, 58sc
Granite State Machine Co., Inc., N.H., 20c, 44c
Green Rectifier Co., N.J., 36sc
Greene Electronics, Inc., R.I., 38c
Gregory Research Eng. Group, N.Y., 4sc
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 2c, Tel: CHesapeake 3-1100**
**See ad on page 512**
Gulton Industries, Inc., N.J., 6sc, 20sc, 44sc, 46sc, 52sc, 56sc
Gyra Electronics Corp., Ill., 18c
Gyrex Corp., The, Calif., 52sc
HRB-Singer, Inc., Pa., 16c, 38c, 40c, 42sc, 52c, 58c
Hallamore Electronics Co., Calif., 2s
Hallicrafters Co., The, Ill., 14c, 16c, 24c, 28c, 36c, 40c, 42c, 54c, 58c

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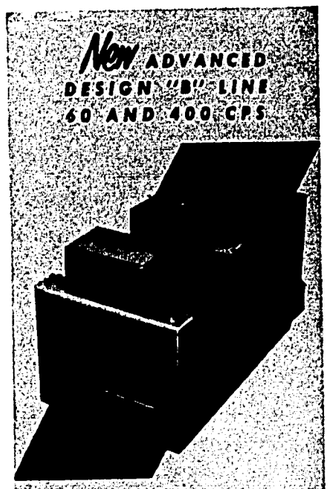
**PRODUCTION FACILITIES:** Controlled environment areas for stick, bobbin and toroid winding, hermetic sealing, and encapsulation.

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



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- Improved core design
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Hamilton Standard Div., United Aircraft Corp., Conn., 2c, 8c, 36c, 38c, 44c, 52c, 56c
Hamilton Watch Co., Precision Metals Div., Pa., 20c, 40c
Hammer Electronics Co., Inc., N.J., 18s, 40s, 58s
Hanson-Gorrill-Brian, Inc., N.Y., 36sc, 44sc
Harder Co., Donald C., Calif., 20c
Harman-Kardon, Inc., N.Y., 4sc, 14sc, 16sc, 32sc, 38c, 40sc, 42sc, 52sc
Harrel, Inc., N.Y., 2c, 8c, 20sc, 52c
Harris Transducer Corp., The, Conn., 54sc
Harrison Electrosonics, Inc., B. M., Mass., 54c, 56c
Hathaway Instruments, Inc., Colo., 46c
Hays Corp., The, Ind., 2c, 26c
Heath Company, Subsid. Daystrom, Inc., Mich., 4s, 14s, 36s, 38s
Henschel Corp., Mass., 44c, 52c
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 2c, 18c, 20c

**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 4s, 6s, 24s, 40s, 42s, 52s, 54s, 58s, Tel: DAvenport 6-7000**

**See ad on pages 3-18**

Highland Design, Inc., N.Y., 2c, 4c
Holt Instrument Laboratories, Wis., 4s, 18s, 36s
Hoover Electric Co., Calif., 44sc
Hoover Electronics Co., Md., 2c, 4c, 6c, 8c, 10c, 18c, 20c, 28c, 30c, 36c, 38c, 40c, 42c, 44c, 46c, 52c, 56c
Houston Instrument Corp., P.O. Box 22234, Houston 27, Texas, 2s, Tel: MOhawk 7-7405

**See ad on page 298**

Hydel, Inc., Mass., 2s, 34s, 38sc, 52s
Hydro-Aire Co., Calif., 20c, 44c
Image Instruments, Inc., Mass., 48sc, 58sc
Inductor Engineering, Inc., Del., 20c
Industrial Control Co., N.Y., 2sc, 6sc, 20sc, 26sc, 44sc, 46sc, 52sc

**Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 26sc, 36sc, 44c, Tel: GRamercy 3-4684**

**See ad on page 333**

Instrument Laboratories, Ill., 4s, 52s
Instruments For Industry, Inc., N.Y., 16s, 36s, 38s, 40s, 42s, 48c, 52s, 58s
Instruments of New England, Mass., 52c
Intercontinental Electronics Corp., N.Y., 2c, 16sc, 20c, 48s, 50s, 52c

**Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 2c, 4sc, 6sc, 8c, 14sc, 18c, 20c, 26c, 36sc, 44c, 52c, 54c, Tel: LUdlow 4-6200**

**See ads on pages 355, 487**

International Crystal Mfg. Co., Inc., Okla., 16s, 38s, 42s
International Electronic Research Corp., ELIN Div., Calif., 4s, 36s
International Electronics Mfg. Co., Md., 22c, 28c, 42sc, 58c
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 2c, 4c, 6c, 8c, 24c
International Telephone & Telegraph Corp., ITT Industrial Products Div., Calif., 48s
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 18c, 20c, 22c, 24c, 28c, 30c, 36c, 38c, 40c, 42c, 44c, 52c, 58c
Interstate Electronics Corp., Calif., 2s, 4s, 8s, 18c, 40c, 48s, 50s, 52c
Isotope Developments, Ltd., England, 18s, 58s

**J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 4, 32, Tel: STate 7-5825**

**See ads on pages 460, 546, 550**

J-V-M Microwave Co., Ill., 40sc, 42sc
Jordan Controls, Inc., Wis., 44s
Jordan Electronics, Div. Victoreen Instrument Co., Calif., 2c
K.V. Transformer Corp., Conn., 20c, 36c
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 48c

**Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 4s, 16s, 52s, Tel: CApital 6-4000**

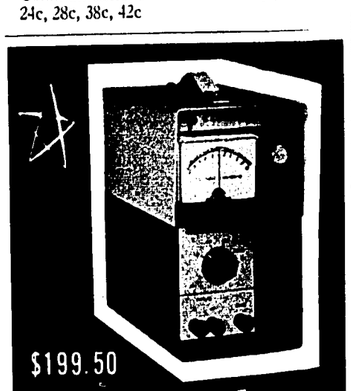
**See ad on page 330**

Kay-Townes Antenna Co., Ga., 52c

**Kearfott Div., General Precision, Inc., Little Falls, N.J., 2c, 20s, 44sc, 52sc, Tel: CLifford 6-4000**

**See ad on pages 120-121**

Kearfott Div., General Precision, Inc., Microwave Products, Calif., 24c, 28c
Keithley Instruments, Inc., Ohio, 2s, 4s, 6s, 8s, 26s, 46s
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 24c, 28c, 38c, 42c

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# Directory II. Components

## 38. Amplifiers.

Kent Corp., F. C., N.J., 24c
Keystone Products Co., N.J., 20c
Kidde & Co., Inc., Walter, N.J., 20c, 44c, 52c
Kidde Ultrasonic & Detection Alarms, Inc., N.J., 54s

**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., Box 623, San Diego 11, Calif., 2s, 6s, 8s, 26s, 46s, Tel: BRowning 7-6700**

**See ad on pages 110-111**

**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 4sc, Tel: STillwater 3-5000**

**See ad on page 415**

Knight Corp., Ewen, Mass., 22c, 24c, 28c, 42c, 58c
Knight Electronics Corp., Ill., 4s, 14s, 58s

**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 38sc, Tel: TWining 9-5600**

**See ad on page 268**

**Korfund Co., Inc., The, 22D Cantiague Rd., Westbury, L.I., N.Y., 46s, 56s, Tel: RAvenswood 9-7580**

**See ad on page 587**

Kraus Electronics, Inc., Calif., 2s, 8s, 18s, 40s
Krohn-Hite Corp., Mass., 2s, 4s, 36s, 58s


LEVINTHAL ELECTRONIC PRODUCTS
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SYRACUSE .....GRanite 4-7409
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Kurtston Electronics, N.Y., 4sc, 52c

**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 16sc, 24sc, 28sc, 30sc, 40sc, 42sc, 52sc, 58sc, Tel: AMityville 4-2200**

**See ad on this page**

Laboratory For Electronics, Inc., Mass., 16c, 20c, 22c
Lacey Engineering & Mfg. Co., Ill., 38c
Lake Manufacturing Co., Calif., 4sc
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 16sc, 42sc, 56c
Lansing Sound, Inc., James B., Calif., 4s
La Pointe Industries, Inc., Conn., 2c, 4c, 16c, 38c, 42c

**Leach Corporation, 18435 Susana Rd., Compton, Calif., 2sc, 8sc, 46sc, 52sc, 56sc, Tel: NEvada 6-1061**

**See ad on page 514**

Leak, N.Y., 4s, 32s, 36s
Lear, Inc., Calif., 2c, 20c, 38c, 44c, 46c
Lear, Inc., Mich., 2c, 36c, 38c
Lee Electric & Mfg. Co., Calif., 20c
Leeds & Northrup Co., Pa., 2s, 26s, 44s
Lessells & Associates, Inc., Mass., 46c, 56c
Levinthal Electronic Products, Inc., Calif., 24c, 36c, 40c
Librascope Div., General Precision, Inc., Calif., 44sc
Lignes Telegraphiques et Telephoniques, France, 16s

**Ling Electronics Div., Ling-Temco Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 56s, Tel: PRospect 4-2900**

**See ads on pages 247, 285**

Link Division, General Precision, Inc., N.Y., 2sc, 38sc, 44sc
Link Division, General Precision, Inc., Palo Alto Lab., Calif., 8sc, 38sc, 44sc, 52sc, 58sc
Liquidometer Corp., The, N.Y., 26c, 44c
Litton Industries, U. S. Engineering Co. Div., Calif., 38sc

**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 24c, Tel: REgent 9-4321**

**See ad on pages 112-113**

Loge Electronics, Inc., Calif., 4c

**Lumatron Electronics, Inc., Dept. IR, 116-120 County Courthouse Rd., New Hyde Park, L.I., N.Y., 24s, Tel: PIoneer 7-3200**

**See ad on page 323**

MB Electronics, Div. Textron Electronics, Inc., Conn., 4s, 44s

**M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 4sc, 52sc, Tel: GRamercy 3-5899**

**See ad on page 419**

M P Engineering Co., Conn., 4sc, 14sc, 32sc, 36sc
MacLaren & Co., Inc., F.B., N.Y., 2c, 8c, 26c, 38c, 44s, 46c, 52c
Madigan Electronic Corp., N.Y., 2c

**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 2sc, 20sc, 44sc, 52sc, Tel: CYpress 2-6610**

**See ads on pages 252, 364, 418**

Magnetic Circuit Elements, Inc., Calif., 2sc, 20sc, 36c
Magnetic Controls Co., Minn., 20sc, 44sc, 52sc

**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 2s, 6s, 8s, 20c, 26s, 44c, 46c, 52c, Tel: ROgers 9-5312**

**See ad on page 364**

**Magnetico, Inc., 6 Richter Ct., East Northport, L.I., N.Y., 20sc, 44sc, 46sc, 52sc, Tel: ANdrew 1-4502**

**See ad on page 366**

**Magnetics, Inc., Dept. P-80, P.O. Box 391, Butler, Pa., 20sc, 36sc, Tel: 7-3787**

**See ad on page 424**

Magnetics Research Co., Inc., N.Y., 20c
Maico Electronics, Inc., Minn., 12s
Manning, Maxwell & Moore, Inc., Conn., 46s
Marantz Co., N.Y., 4, 14, 18, 32
Marconi's Wireless Telegraph Co., Ltd., N.Y., 4s, 14s, 24s, 36s, 42s, 48s, 50s, 58s
Marine Electric Corp., N.Y., 4c, 14c
Marine View Electronics, Inc., N.Y., 14c, 42c
Marstan Electronics Corp., N.Y., 2sc, 4s, 34c, 52sc


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Andrew 1-4502

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Martin Co., The, Md., 2c, 4c, 14c, 16c, 18c, 20c, 24c, 28c, 36c, 38c, 40c, 42c, 44c, 46c, 52c, 54c, 56c, 58c
Massa Division, Cohu Electronics, Inc., Mass., 2s, 8s, 46s, 52s
Matthew Laboratories, N.Y., 36sc
Maurer, Inc., J. A., N.Y., 4s
Maxson Corp., The W. L., Instruments Div., N.Y., 16sc
Mayberry Electronics Co., Calif., 2sc, 4sc, 8sc, 36sc, 38sc, 40sc, 44sc, 52sc
McIntosh Laboratory, Inc., N.Y., 4s, 14s, 32s
McKenna Laboratories, Calif., 54sc
McKiernan-Terry Corp., N.J., 24c, 44c
Mechatrol, Div. Servomechanisms, Inc., N.Y., 44s
Medistor Instrument Co., Wash., 2s, 4s, 8s, 46s, 52s
Melabs, Inc., Calif., 22s, 24s, 26s, 28s, 30s, 38s, 40s, 58s
Melpar, Inc., Special Products Dept., Va., 38sc, 40sc, 44sc, 52sc
**Menlo Park Engineering, 711 Hamilton Ave., Menlo Park, Calif., 24s, Tel: DAvenport 6-9080**
**See ad on this page**
Mergenthaler Linotype Co., N.Y., 20c, 44c
Micro Gee Products, Inc., Calif., 2s, 8s, 26c, 44s, 52c
Micromega Corp., Calif., 24c, 28c
Microtech, Inc., Conn., 24sc
Microwave Associates, Inc., Mass., 28s
Microwave Development Labs., Inc., Mass., 24sc
Midwestern Instruments, Inc., Okla., 2sc, 4s, 44s, 46s, 52s
**Millen Manufacturing Co., Inc., James, 150 Exchange St., Malden 48, Mass., 16c, 36sc, 42sc, Tel: DAvenport 4-4108**
**See ad on page 402**
Millivac Instruments, Div. Cohu Electronics, Inc., N.Y., 2sc, 4c, 8c, 42s, 52sc, 58s
Milro Controls Co., Inc., N.J., 2sc, 20sc, 52c
Miltronics Co., Wis., 2c, 34c, 38c, 52c
Minneapolis-Honeywell Regulator Co., Boston Div., Mass., 2sc, 8sc, 20sc
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 2s, 8s, 44s, 46s
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 2sc, 8sc, 20sc, 44c, 52c
Minneapolis-Honeywell Regulator Co., Twin Cities, Minn., 8sc, 26s, 44sc, 52sc
Miratel, Inc., Minn., 2c, 4s, 42s, 48s, 58s
Missile Systems Corp., Calif., 24c
Missouri Research Laboratories, Inc., Mo., 2c, 8c, 44c, 46c, 52c, 56c
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 2c, 4c, 6c, 8c, 14c, 18c, 52c
**Moeller Instrument Co., Inc., Electronics Div., 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 2c, Tel: VIrginia 9-2100**
**See ad on page 588**
Montek Associates, Inc., Utah, 2c, 4c, 38c, 44c, 52sc
Moseley Co., F. L., Calif., 44s
Mosler Research Products, Inc., Conn., 4sc, 52sc
Motorola Aviation Electronics, Inc., Calif., 4s, 16s, 20s, 38s, 42s, 52s
Motorola, Inc., Military Electronics Div., Ariz., 2c, 4c, 16c, 18c, 24c, 28sc, 36c, 38c, 40c, 42c, 52c, 58c
Muirhead & Co., Ltd., England, 44s
Muirhead Instruments, Inc., N.Y., 44s, 56s
Multitone of Canada, Ltd., Canada, 12s
Munzig International, Inc., Calif., 28s
Mured Incorporated, Conn., 4sc, 14c, 32c
Mytron, Inc., Mass., 24c
Naniloa Corporation, Ohio, 34c, 44c, 52c
National Company, Inc., Mass., 24c, 28c, 36c, 42c
National Scientific Laboratories, Inc., D.C., 28c, 38c, 40c, 52c, 54c
National Ultrasonic Corp., N.J., 54sc
Neff Instrument Corp., Calif., 2s, 8s, 18s, 46s
Neptune Electronics Co., N.Y., 2c, 4c, 6c, 8c, 16c, 32c, 40c, 42c, 58c
Networks Electronic Corp., Calif., 2s, 8s, 58s
New London Instrument Co., Conn., 42s, 58s
Newcomb Audio Products Co., Calif., 4s, 14s, 36s
Nichols & Clark, Inc., Mass., 12s
Nichols, Ltd., R. H., Canada, 20c
**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 44s, 52s, Tel: OVerbrook 1-8600**
**See ad on page 286**
North Electric Co., Ohio, 2c, 36c, 52sc
Nortronics Co., Inc., Minn., 4s, 14s
Nuclear Electronics Corp., Pa., 2c, 4c, 6c, 8c, 14c, 16c, 30c, 38c, 40c, 42c, 52c, 58c
Offner Electronics, Inc., Ill., 2sc, 8sc, 46sc
Ohio Semiconductors, Inc., 18c, 20c, 36c, 44c
Oilgear Co., The, Servocontrol Div., Mass., 44sc, 52sc
**Ortho Filter Corp., 7 Paterson St., Paterson 1, N.J., 20c, Tel: MUlberry 4-5858**
**See ad on page 444**
Osborne Electronics Sales Corp., Ore., 20c
**Ostlund, E. M., P.O. Box 458, Andover, N.J., 2, Tel: PArkway 9-6635**
**See ad on page 629**
Otis Elevator Co., Defense & Industrial Div., N.Y., 2c, 4c, 6c, 8c, 16c, 20c, 36c, 38c, 40c, 42c, 44c, 52c, 58c
Ovitron Corp., N.Y., 36sc, 44sc
PIC Automation Controls, Div. General Controls Co., Ill., 34s
Pacific Automation Products, Inc., Calif., 2c, 4c, 6c, 8c, 38c, 52c
Pacific Magnetic Corp., Calif., 2sc, 8c, 20sc
Pacific Mercury Electronics, Thomas Organ Co., Calif., 4c, 14c, 16c, 32c, 36c, 42c, 48c, 52c
Packard Bell Computer Corp., Calif., 2s, 8s, 58s
Pam Associates, Inc., Md., 10sc, 56c
Paraplegics Mfg. Co., Inc., Ill., 2c, 4c, 6c, 14c, 16c, 20c, 32c, 34c, 36c, 38c, 40c, 42c, 44c, 48c, 52c
Pastoriza Associates, Inc., James, Mass., 2c, 8c





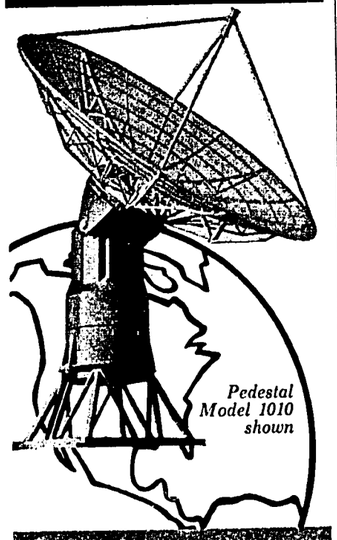
# Directory II. Components



Patterson, Inc., Wayne D., Calif., 4sc
Pegasus Laboratories, Inc., Mich., 2s, 44s, 46s, 52s
Penn-East Engineering Corp., Pa., 20c
Permoflux Products Co., Calif., 2c, 4c, 12s, 14s, 36s
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 2s, 6c, 8s, 18c, 26s, 30c, 38s, 46s, 52s, Tel: COmmonwealth 6-5375**
**See ad on page 270**
Philco Corporation, Pa., 2c, 4c, 6c, 8c, 12sc, 14c, 16c, 18c, 20c, 22c, 24sc, 28sc, 36c, 38c, 40c, 42c, 48c, 50c, 52c, 58c
Philco Corporation, Govt. & Industrial Group, Pa., 2c, 4c, 12sc, 24sc, 28c, 38c, 48sc, 50c, 52c
Philips Electronic Instruments, N.Y., 46s, 56s
Philips Electronics Industries, Ltd., Canada, 2s, 36s, 44s, 46s, 56s
Photobell Co., Inc., N.Y., 34sc
Photocon Research Products, Calif., 2s, 54s
Photomation, Inc., N.J., 34s
Photron Instr. Co., Ohio, 2s, 46s, 58s
Pitometer Log Corp., N.Y., 24c, 44c, 52sc
Plug-In Instruments, Inc., Tenn., 2s, 4s, 8s, 18s, 38s, 40s, 44s, 46s, 52s
Polyphase Instrument Co., Pa., 46c
**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 24c, Tel: WEstmore 9-4092**
**See ad on page 592**
Powertron Ultrasonics Corp., N.Y., 54s
Precise Electronics & Development Corp., N.Y., 2c, 4c, 6c, 8c, 14s, 20c, 32c, 38c, 42c
Precision Electronics, Inc., Ill., 4s, 14s, 32s, 36s
**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 24c, WEstmore 9-8900**
**See ad on page 383**
Pulse Techniques, Inc., N.J., 4s, 32s
Pye Telecommunications, Ltd., England, 4s
Quan-Tech Laboratories, Inc., N.J., 2s, 6s, 8s, 46s, 52s, 58s
Quantametric Devices, Inc., N.Y., 44c
RCA Victor Co., Ltd., Canada, 4sc, 10s, 12s, 14sc, 16s, 18s, 20s, 24s, 28s, 34s, 36s, 38s, 40s, 42s, 44s, 46s, 50s, 52s, 58s
RMS Associates, Inc., N.Y., 2c, 4c, 6c
**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 16s, 18s, 24s, 28c, 38s, 40s, 42s, 52s, 58s, Tel: DAvenport 1-1130**
**See ad on page 243**
Radar Design Corp., N.Y., 24sc
Radiation Electronics Co., Ill., 4s, 34s, 52s
Radiation Instrument Development Lab., Inc., Ill., 2s, 18s, 40s
Radio City Products Co., Inc., Pa., 58c
Radio Corp. of America, N.J., 4s, 14s, 16s, 18s, 32s, 36s, 38s, 40s, 42s, 48s, 52s, 58s
Radio Corp. of America, Defense Electronic Products, N.J., 2s, 4s, 14s, 16s, 24s, 32s, 36s, 38s, 42s, 48s, 50s, 52s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 24c, 28c, 34c, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Radio Development & Research Corp., Div. Bogue Electric Mfg. Co., N.J., 52c
Radio Engineering Laboratories, Inc., N.Y., 16sc, 24sc, 28sc, 36sc, 42sc, 48sc, 58sc
Radio Engineering Products, Canada, 4s
Radiometer, Denmark, 4s
**Radionics, Inc., 76 Cambridge St., Burlington, Mass., 4c, 16c, 36c, 42c, 44s, 54sc, 58c, Tel: BRowning 2-1233**
**See ads on pages 291, 343**
Railroad Electronic Labs. of Omaha, Inc., Neb., 2c, 4c, 20c
Ramage & Miller, Inc., Calif., 24sc, 58sc
Rank Cintel, Ltd., England, 2s, 4s, 14s, 32s, 34s, 36s, 38s, 48s, 50s, 52s
Rantec Corporation, Calif., 24sc
**Rapid Electric Co., Inc., 2881 Middletown Rd., New York 61, N.Y., 20sc, Tel: TAlmadge 8-2200**
**See ad on page 493**
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 20s
Raytheon Co., Special Microwave Devices Operations, Mass., 28c
Reeves Instrument Corp., N.Y., 2s, 8s, 44s
Rek-O-Kut, Inc., N.Y., 4s, 14s
Republic Electronic Industries Corp., N.Y., 2c, 4c, 6c, 8c
Resdel Engineering Corp., Calif., 16s, 24c, 42s, 52c, 58s
Rese Engineering, Inc., Pa., 40sc
Research, Inc., Minn., 44s
Research Industrial Laboratory of Electronics, Pa., 2s, 8s, 20c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 2sc, 4sc, 6c, 8c, 16c, 18c, 28c, 30c, 36c, 38sc, 40sc, 42c, 44c, 46c, 48c, 50sc, 52sc, 54c, 58c, Tel: LOckwood 5-4578**
**See ad on page 324**
Robinette Co., W. C., Calif., 44c
**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 26s, Tel: PRescott 3-8010**
**See ad on page 246**
Rytron Co., Inc., Calif., 20c
S & B Machine & Tool Co., N.J., 52c
Sage Laboratories, Inc., Mass., 28c
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 2s, 8s, 44s, 46s, Computer sc, Tel: TWinbrook 4-6300**
**See ad on pages 64-65**
Sangamo Electric Co., Ill., 20c, 52c
Sartron, Inc., Ore., 20c
Schaevitz Engineering, N.J., 2c, 4c, 6c, 8c, 44c
Schirmer National Alarm Co., N.J., 54c, 56s
Schoene Electronics Lab., Ind., 2c
Schulmerich Carillons, Inc., Pa., 4c, 12c, 14c, 32c, 36c, 38c, 52c
Scott, Inc., H. H., Mass., 4s, 6s, 10s, 14s, 26s, 32s, 36s, 54s, 56s, 58s
Secode Corp., Calif., 52c
**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 4sc, 38sc, 52s, Tel: HOpkins 7-3200**
**See ads on pages 385, 519**
Seg Electronics Co., Inc., N.Y., 18s, 42s, 48s, 50s, 58s
Seiscor, Div. Seismograph Service Corp., Okla., 4c
Servo Corp. of America, N.Y., 20s, 44s
Servo-Tek Products Co., N.J., 2s, 44s, 52s
Servodyne Corp., Mass., 44c
Servomechanisms, Inc., Calif., 2c, 18c, 20c, 44s
Setchell-Carlson, Inc., 14s
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 2c, Tel: WOodlawn 5-2341**
**See ad on page 258**
Sherwood Electronic Labs., Ill., 14sc
Sierra Electronic Corp., Div. Philco Corp., Calif., 24s, 36c, 40s, 42c
**Sierra Research Corp., P.O. Box 22T, Buffalo 25, N.Y., 2c, 4c, 38c, 40c, 42c, 44c, 52c, 56c, 58c, Tel: NF 2-8823**
**See ad on pages 271, 356, 662**
Sigma Electronics Research Corp., Wash., 24sc, 26c, 28c, 38sc, 42sc, 58c
Signal Equipment Co., Inc., Wash., 36s
Sillcocks-Miller Co., The, N.J., 38c
Simpson Mfg. Co., Inc., Mark, N.Y., 4s, 14s
Singer Mfg. Co., The, Conn., 58
Skiatron Electronics & Television Corp., N.Y., 8c, 38c, 48c, 52c
Smith-Florence, Inc., Wash., 18s, 46s
Solar Systems, Inc., Ill., 34c
Solartron Electronic Group, Ltd., England, 2s, 4s, 6s, 8s, 44s, 46s, 58s
Solartron, Inc., Calif., 2s, 4s, 36s, 38s
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 2c, 4c, 52c, Tel: EMpire 4-2271**
**See ad on page 420**
Sonotone Corp., N.Y., 12s
Southwestern Industrial Electronics Co., Tex., 2sc, 4sc, 8sc, 20c, 36c, 44c, 46c, 52c, 56c
Space Electronics Corp., Calif., 2c, 4c, 8c, 10c, 16c, 18c, 20c, 30c, 36c, 38c, 40c, 42c, 44c, 52c, 58c
Specialties, Inc., N.Y., 20c
Specialty Electronics Development Corp., N.Y., 24c, 40c, 42c
Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., N.Y., 8c, 16c, 18c, 30c, 34c, 40c, 52c, 58c
Spectralab Instruments, Calif., 28c, 42sc, 48sc
Spectrol Electronics Corp., Calif., 2c, 38c, 44c, 52c
Spencer-Kennedy Laboratories, Inc., Mass., 40s, 42s, 48s, 50s, 58s
Sperry Gyroscope Co. of Canada, Ltd., 20c, 38c, 44c, 52c
**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 24c, 28c, Tel: REdwood 6-4161**
**See ad on pages 100-101**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

ANTENNAS by Ainslie CORPORATION




NOW — available from Ainslie Corporation, a new remote control positioning pedestal capable of handling our antennas up to 18 feet in diameter in frequencies from 100 to 10,000 mc. Modifications available for a variety of tracking applications. Whatever your antenna or reflector requirements may be, contact us at our new facilities.

Ainslie CORPORATION

*531 Pond Street*
*South Braintree 85, Massachusetts*

For details, circle #284 on Reader Service Card

Spivey, Inc., James S., D.C., 4c
Sprague Electric Co., Mass., 38sc
Standard Electrical Products Co., Ohio, 20c
Standard Electronics, Div. Reeves Instrument Corp., N.J., 4c, 16c, 18c, 42c, 48c
Standard Telephones & Cables, Ltd., England, 4s, 24s, 34s, 36s
Stereatronics, Inc., Mass., 2c, 4sc, 6sc, 8c, 14sc, 18sc, 32sc, 34c, 36sc, 38sc, 42sc, 44sc, 46c, 52sc, 54sc, 58sc
Strand Engineering Co., Mich., 2c, 16sc, 58c
Strand Labs., Inc., Mass., 2c, 4c
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 2c, 4s, 14s, 22c, 28c, 40c, 42sc
Sturrup, Inc., Conn., 4c, 16c, 54c, 58c
Sunshine Scientific Instrument, Pa., 34sc, 54sc, 56sc
Sylvania Electric Products Inc., N.Y., 14s, 38c, 52s

**Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 24, Tel: YOrkshire 8-6211**
**See ad on pages 48-49**

TRG, Incorporated, 22c, 28c, 42c
Taber Instrument Corp., N.Y., 2c, 4s, 6s, 36c, 38s, 44c, 46c, 52s, 56s, 58s
Technology Instrument Corp., Mass., 6s, 36c
Tektronix, Inc., Ore., 2s, 8s, 40s, 58s
Tel-Instrument Electronics Corp., N.J., 16s, 36s, 48s, 58s
Telechrome Mfg. Corp., N.Y., 20sc, 24c, 36c, 38c, 52c, 54c
Telecomputing Corp., Calif., 20sc, 38sc
Telecomputing Corp., Electronic Components Div., Calif., 20c
Telecomtrol Corp., N.J., 36sc, 42sc

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 2sc, 4sc, 14sc, 20c, 28c, 38sc, 42c, Tel: YE 2-8600**
**See ad on page 338**

Telegraph Condenser Co., Ltd., The, England, 38sc
Telephonics Corp., N.Y., 2c, 4s, 16c, 36c, 38c, 42c, 52c

**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 2sc, 34s, 44sc, 50sc, 58s, Tel: TWining 8-1000**
**See ad on page 260**

**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 2c, 4c, 12c, 38c, 40c 52c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**

Telkor, Inc., Ohio, 2c, 4c, 36c

**Teltronics, Inc., 277 Main St., Nashua, N.H., 2c, 4s, 16c, 36c, 40c, 42c, 52c, 58sc, Tel: TUxedo 2-6264**
**See ad on page 337**

Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 2c, 16c
Ten Bosch Inc., M., N.Y., 44, 52
Tensor Electric Development Co., Inc., N.Y., 4c, 40c
Thermo Electric Co., Inc., N.J., 2s, 44s
Thompson Ramo Wooldridge Inc., Calif., 46s
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 2sc, 6c, 8sc, 20c, 44c, 52c
Thordarson-Meissner, Ill., 20c
Topping Electronics, Ltd., F. V., Canada, 4c, 36c, 42c, 52c

**Torotel, Inc., 5512 E. 110th St., Kansas City 34, Mo., 2sc, 8sc, 20sc, 44sc, Tel: SOuth 1-6314**
**See ad on page 405**

Torwico Electronics, Inc., N.J., 2c, 20c, 44c
Transformer Specialty Co., Pa., 20c
Transformers, Inc., N.Y., 20c

**Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 4c, 52c, Tel: WEst 9-6754**
**See ad on page 472**

**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 2, 8, 52, Tel: LOwell 7-3810**
**See ad on page 520**

Tri-Tronics Co., Ill., 34s

**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 2c, 4c, 26sc, 44c, 52sc, Tel: OVerbrook 1-0400**
**See ad on page 294**

**Trionics Corp., P.O. Box 548, Madison 1, Wis., 38c, Tel: CEdar 8-2616**
**See ad on page 663**

Trott Electronics, Inc., N.Y., 2c, 4c, 8c, 16c, 18c, 34c, 36c, 54c, 58c
Tullamore Electronics Corp., Ill., 18, 40

**Unholtz-Dickie Corp., 2994 Whitney Ave., Hamden 18, Conn., 56sc, Tel: AT 8-3358**
**See ad on page 295**

United Aircraft Corp., Norden Div., Conn., 2s, 8s
United Aircraft Corp., Norden Div., Ketay Dept., N.Y., 44sc, 52sc
United Control Corp., Wash., 2sc, 8c, 20c, 26c, 44sc, 52sc
United Electrodynamics, Inc., Calif., 2s, 8s, 16s, 38s, 42s, 46s, 52s, 56s
United Shoe Machinery Corp., Mass., 24c
U. S. Recording Co., D.C., 4c, 14c, 32c, 52c
U. S. Science Corp., Calif., 2c, 4c, 8c, 16c, 18c, 20c, 24c, 28c, 30c, 34c, 36c, 40c, 42c, 46c, 52c, 58c

**United Transformer Corp., 150 Varick St., New York 13, N.Y., 20sc, Tel: ALgonquin 5-3500**
**See ad on Cover 2**

Universal Match Corp., Armament Div., Mo., 2c, 44c, 52c

**Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 20c, Tel: ESsex 4-9804**
**See ad on page 407**

Univox Corp., N.Y., 44c

**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 2s, Tel: AN 1-2660**
**See ad on page 678**

Valco Mfg. Co., Ill., 4s
Van Norman Industries, Inc., Electronics Div., N.H., 18sc, 34sc, 36sc, 38sc, 40sc, 42sc, 52sc, 54sc, 58sc
Vap-Air Div., Vapor Heating Corp., Ill., 2c, 20c
Vari Corp., Minn., 12c

**Vari-L Company, Inc., 207 Greenwich Ave., Stamford, Conn., 20c, Tel: FIreside 8-0091**
**See ad on page 406**





# Directory II. Components

## 38. Amplifiers.

**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 24c, 28c, Tel: DAvenport 6-4000**
**See ad on pages 116-117**

Varo Mfg. Co., Inc., Tex., 2sc, 4sc, 20sc, 36sc, 40sc, 44sc, 52sc
VecTrol Engineering, Inc., Conn., 2c
Vickers, Inc., Electric Products Div., Mo., 2c, 8c, 20sc, 30c, 34c, 44c
Vicon Corp., Calif., 48s, 50s
Video Instruments Co., Inc., Calif., 2, 8, 38, 46, 52, 58
Viking Industries, Inc., Calif., 2c, 44c
Vinco Electronics Corp., Conn., 2c, 4sc, 14c, 32c, 36c, 38c, 40c, 52c
Virginia Electronics Co., Inc., D.C., 4c, 16c, 36c, 38c, 42c, 58c
Waber Electronics, Inc., Pa., 14s
Walkirt Co., Calif., 8s, 40s, 52s

**Wallson Associates, Inc., 917-914 Westfield Ave., Elizabeth, N.J., 2c, Tel: FLanders 1-0700**
**See ad on page 294**

Waltham Electronics Corp., Mass., 2sc, 4sc, 58sc
Warren Mfg. Co., Inc., The, Mass., 2c, 20c, 52c
Warwick Mfg. Corp., Ill., 4c, 14c, 32c, 38c, 42c

**Watkins-Johnson Co., 3333 Hillview Ave., Stanford Industrial Park, Palo Alto, Calif., 24c, 28c, Tel: DAvenport 6-8830**
**See ad on page 236**

Waugh Engineering Co., Calif., 44c
Wave/Particle Corp., Calif., 24
Waveguide, Inc., Calif., 24c
Webster Electric Co., Wis., 4s, 14s, 36s
Wells Electronics Co., Ind., 16c, 38c, 44c, 52c, 54c
Wells Industries Corp., Basic Electronic Controls Div., Calif., 38sc
Westinghouse Electric Corp., Air Arm Div., Md., 44c
Westlab, Inc., N.Y., 4s

**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 2c, 4c, 12sc, 14sc, 16c, 18sc, 28c, 56c, Tel: JUdson 2-3030**
**See ad on page 704**

Wheeler Electronic Corp., Conn., 2c, 4c, 16c, 18c, 20c, 38c, 40c, 42c
Wickes Engineering & Construction Co., N.J., 20c, 36c, 42c
Winslow Co., Inc., The, N.J., 2c, 4c, 6c
Wintronics, Calif., 4sc, 14sc, 32c, 36c, 44c, 52sc
Worner Electronic Devices, Ill., 34s
Yuba-Dalmotor Div., Yuba Consolidated Industries, Inc., Calif., 18 SSB sc

**Annunciator displays:**
**See class 62**

**Anodes:**
**See class 104**

## 39. Antennas & Accessories.

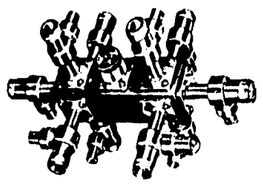
2. AM broadcast transmitting
4. Aircraft
6. All-wave receiving
8. Amateur types, accessories & rotators
10. Automobile
12. Dummy
14. FM broadcast transmitting
16. Ferrite rod
18. Fixed station system
20. Ground plane
22. Marine
24. Microwave
26. Mobile
28. Omni-range
30. Radar reflectors
32. Radio telescopes
34. Radomes
36. Rotators
38. Supporting towers
40. TV broadcast transmitting
42. TV multiple systems
44. TV receiver
46. Tower erection & maintenance service
48. Tower lighting equipment
50. UHF-VHF

A.L.A. Industries, Inc., N.Y., 16c
AMP Incorporated, Pa., 4c, 10c
APC Communication Products, Tex., 2s, 6s, 14c, 18s, 20s, 22s, 24c, 26s, 28s, 30c, 32s, 36s, 38s, 40c, 42s, 44s, 46s, 48s, 50s
Adams-Russell Co., Inc., Mass., 4sc, 24c, 28sc, 50sc
Admiral Corp., Ill., 4c, 50c
Advance Electronics Co., Mich., 6c, 20s, 44s, 50c

**Ainslie Corp., 531 Pond St., South Braintree 85, Mass., 24sc, 30sc, 36sc, Tel: VIctor 8-0850**
**See ad on page 368**

Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 24sc

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MEANS MICROWAVE



• SOLID STATE SWITCHES
• COAXIAL DETECTOR MOUNTS
• WAVEGUIDE DETECTOR MTS.
• LINEARLY & CIRCULARLY POLARIZED HORN ANTENNAS
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Microwave Circuitry, Antennas & Devices

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For details, circle #285 on Reader Service Card

Aircom, Inc., 48 Dearmington St., Boston 15, Mass., 12s, 24s, Tel: COpley 7-9115
**See ad on page 309**

Aircraft Armaments, Inc., Md., 4c, 24c
Aircraft Radio Corp., N.J., 4s, 20s, 50s

**Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 24sc, CHestnut 5-2990**
**See ad on page 589**

Airtron, Inc., Div. Litton Industries, Inc., N.J., 12c, 16c, 24c, 36c

**Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass., 24s, 28s, 40s, 50c, Tel: HAncock 6-2150**
**See ad on page 590**

All Channel Products Corp., N.Y., 22s, 44s, 50s
Allied Research & Engineering Div., Allied Record Mfg. Co., Calif., 24c
Alpar Manufacturing Corp., Calif., 2sc, 30c, 32c, 38sc
Amerac, Inc., Mass., 24sc
American Communications Corp., N.Y., 42sc
American Development Electronics Co., N.J., 12c, 20c, 26c

**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 24s, 38s, Tel: WAlnut 5-8780**
**See ad on this page**

AeS

Antenna Systems, Inc., is devoted exclusively to the design, fabrication and installation of antenna systems in the fields of scatter communications, missile tracking, space tracking, radar and surveillance, radio astronomy, and special antenna products.

We invite your inquiry, whatever your antenna problem may be. Write for our folder.

ANTENNA SYSTEMS INC.
HINGHAM, MASS.

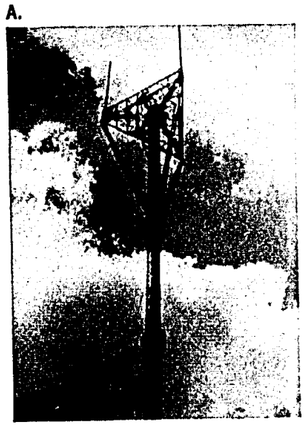
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## *Dresser-Ideco Designs, Fabricates, Erects A Wide Variety of Large Land-Based Antenna Structures*

Whatever the antenna tower or structural problem, Dresser-Ideco can handle the job. A large technical service staff, more than a quarter-million square feet of well-equipped production area, extensive research and development facilities, and many years experience designing and erecting steel and aluminum structures qualify Dresser-Ideco as a major contractor for any type of antenna tower . . . from 100 to 2000 feet. Below are some of the many types of Dresser-Ideco towers serving the nation's communications and military electronics facilities.

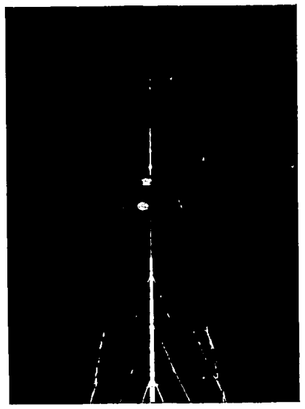
A.



B.



C.



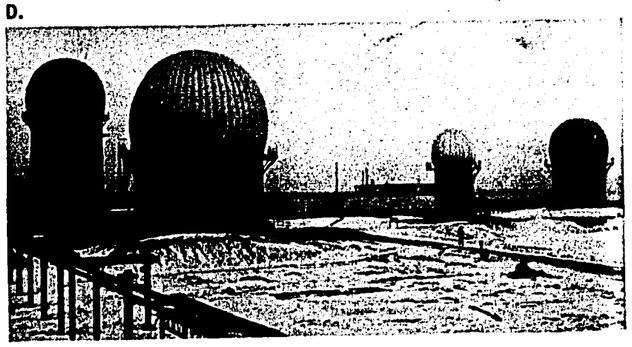
**A.** Multiple antenna tower. This big 729' tower in Baltimore supports three television antennas on a 105' wide platform at the top.

**B.** Antenna test range tower for height finding radar.

**C.** Microwave antenna tower typical of those used in systems built for the Ohio Turnpike and the Illinois Toll Road.

**D.** Surveillance radar towers on the DEW line. Designed for hurricane force winds and heavy ice and snow loads. These are some of more than 1,000 radar towers built by Dresser-Ideco for the nation's early warning systems.

D.



*Dresser-Ideco offers a complete tower and structural service—design, application, field installation. Call or write for consultation on your structural problems at no obligation. Send for booklet "Facilities For Defense Production". Dresser-Ideco Company, A Division of Dresser Industries, Inc., 875 Michigan Avenue, Columbus 15, Ohio. Branch: 8909 So. Vermont Avenue, Los Angeles 44, Calif.*

DRESSER-IDECO COMPANY

DRESSER IDECO® DRESSER INDUSTRIES INC.
ELECTRONIC • INDUSTRIAL
OIL • GAS • CHEMICAL



For details, circle #287 on Reader Service Card





# Directory II. Components

## 39. Antennas & Accessories.

American Electronics Co., N.Y., 8s
American Insulator Corp., Pa., 34c
American Machine & Foundry Co., D.C., 30c
American Tower Co., Ohio, 8c, 40c, 42c, 44c

**Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 4c, 6s, 8s, 24c, 28c, 44s, 50s, Tel: BIshop 2-1000**
**See ad on page 146**

Andrew Antenna Corp., Ltd., Canada, 14s, 18s, 20s, 24s, 26s, 32s, 34s, 40s, 50s

**Andrew Corp., 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 14s, 20s, 24s, 32sc, 34s, 36s, 38 Telescoping s, 50s, Tel: TRiangle 4-4400**
**See ad on this page**

**Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 4s, 16c, 24c, 30c, 34c, Tel: EDgewood 4-8770**
**See ad on page 379**

Antenna Specialists Co., The, Ohio, 4c, 6s, 8s, 10s, 18s, 20s, 22s, 24c, 26s

**Antenna Systems, Inc., Hingham Industrial Center, Hingham, Mass., 18c, 20c, 22c, 24c, 30c, 32c, 36c, 38c, 46c, Tel: RIverview 9-4700**
**See ad on page 369**

Antlab, Inc., Ohio, 36sc, 38sc
Armstrong Whitworth Equipment, England, 50s
Atkins & Merrill, Inc., Mass., 34c
Automation Dynamics Corp., N.J., 4c, 18c, 20c, 24c, 26c, 50c
Autotron, Inc., Calif., 4c
Babcock Radio Engineering, Inc., Calif., 20c
Bailey, Inc., P. A., Conn., 22sc
Barker & Williamson, Inc., Pa., 12sc
Bell Aircraft Corp., Avionics Div., N.Y., 50c
Bellaire Electronics, Inc., N.J., 24c

**Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 6s, 38c, Tel: ENfield 3322**
**See ad on page 411**

Belz Industries, Inc., N.Y., 24sc, 30sc
Bendix Corp., The, Bendix-Pacific Div., Calif., 4c, 22sc, 24c
Bendix Corp., The, Bendix Radio Div., Md., 4s, 16s, 20s, 24s, 26s, 28s

**Bendix Corp., The, Eclipse-Pioneeer Div., Teterboro, N.J., 4c, 38c, Tel: ATlas 8-2000**
**See ad on pages 103-106**

Bendix Corp., The, York Division, Pa., 24c

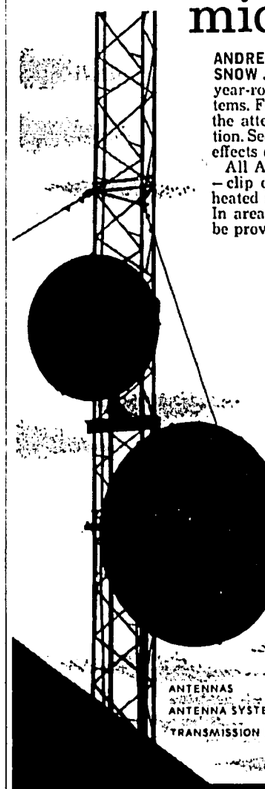
**Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 12sc, Tel: CHurchill 8-1200**
**See ad on page 306**

Birdair Structures, Inc., N.Y., 30c, 34c, 38c

**Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 6s, 8s, Tel: WOrth 6-5611**
**See ad on page 607**

Blaine Electronetics, Inc., Calif., 20c, 24c, 30c, 36c, 38 Test Antennas & Towers c
Blaw-Knox Co., Pa., 2c, 14c, 24c, 30c, 32c, 34c, 38c, 40c, 46c
Blaw-Knox Co., Blaw-Knox Equipment Div., Pa., 2c, 30c, 32c, 38c
Blonder-Tongue Laboratories, Inc., N.J., 42sc, 50s
Bogart Mfg. Co., N.Y., 4sc, 12sc, 24c, 36c, 50sc
Bone Engineering Corp., Calif., 24c, 36c
Brach Mfg. Corp., Div. General Bronze Corp., N.J., 10s, 26sc, 44sc
Brooks & Perkins, Inc., Mich., 30c
Budd-Stanley Co., Inc., N.Y., 12c, 24c
Burndy Corp., H. H. Buggie Div., Ohio, 26, 50
C.W.S. Waveguide Corp., N.Y., 12c, 24c
Caddell-Burns Mfg. Co., Inc., N.Y., 16c
California Technical Industries, Calif., Antenna testing range equipment
Camera Equipment Co., Inc., N.Y., 24sc
Canadian Marconi Co., Canada, 2s, 12s, 14s, 40sc

# weather conditioned microwave



**ANDREW RADOME EQUIPPED ANTENNAS DEFY ICE . . . SNOW . . . WIND.** Andrew radomes provide excellent 2-way year-round protection for Andrew microwave antenna systems. First, they protect feed and reflecting surface against the attenuating effects of snow, ice and debris accumulation. Secondly, for tower mounted antennas they reduce the effects of wind thrust by 35%.

All Andrew radomes are lightweight and easy to install — clip directly to the dish rim of existing antennas. Unheated radomes are suitable for all but exceptional cases. In areas where freezing rain occurs, heated radomes can be provided.

**SPECIFICATIONS**

**STANDARD RADOMES**

| Dia. Feet | Type No. | Attenuation @ 6 kmc. db | VSWR Contribution @ 6 kmc. | Thrust at* 30 psf (Flats), lbs. |
|---|---|---|---|---|
| 10 | R10 | 0.4 | 0.02 | 1,990 |
| 8 | R8 | 0.4 | 0.02 | 1,270 |
| 6 | R6 | 0.4 | 0.02 | 714 |
| 4 | R4 | 0.4 | 0.02 | 320 |
| 2 | R2 | 0.4 | 0.02 | 75 |

*Including antenna

**HEATED RADOMES**

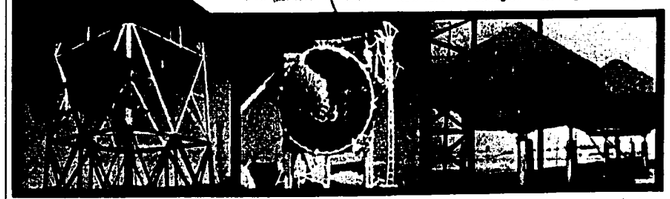
| Dia. Feet | Type No. | Atten. @ 6 kmc. db | VSWR Contr. @ 6 kmc. | Thrust at* 30 psf (Flats), lbs. | Power** Reqmts. |
|---|---|---|---|---|---|
| 10 | HR10 | 0.7 | 0.02 | 1,990 | 3,400 W. |
| 8 | HR8 | 0.7 | 0.02 | 1,270 | 2,400 W. |
| 6 | HR6 | 0.7 | 0.02 | 714 | 1,200 W. |
| 4 | HR4 | 0.7 | 0.02 | 320 | 550 W. |
| 2 | HR2 | 0.7 | 0.02 | 75 | 150 W. |

*Including antenna
**Power requirements for HR10 and HR8 are 3 wire single phase 60 cycle 220 volts. Power requirements for HR6, HR4 and HR2 are single phase 60 cycle 115 volts

*For further details on ANDREW Microwave Antennas, Radomes, Wave Guides write for new Andrew Catalog M.*

ANTENNAS
ANTENNA SYSTEMS
TRANSMISSION LINES

Andrew CORPORATION
P. O. Box 807, Chicago 42, Illinois
Boston • New York • Washington • Los Angeles • Toronto



"Very obvious that these radomes quite materially reduce the wind loading on the parabolas—due to their shape factor." *Washington State Patrol, Kennewick, Wash.*

"Up to 4 inches of ice on radome with practically no reduction of antenna effectiveness." *The KLIX Corporation, Twin Falls, Idaho.*

"Our field forces report that the radomes produce a signal loss of less than 1 db per antenna." *Natural Gas Pipeline Company of America.*

For details, circle #288 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

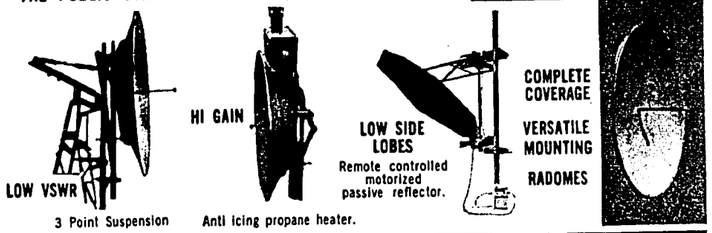
# Special Fields Of Interest

**PIONEERS IN ANTRONICS · · · ∫ · · · 30 TO 50,000 MC**

## POINT TO POINT COMMUNICATIONS

Gabriel's ruggedized PUBLIC UTILITY LINE and industrial COMMERCIAL LINE parabolic antennas offer plus values in Microwave systems requiring top performance and maximum versatility.

THE PUBLIC UTILITY LINE . . . 4, 7, and 11 KMC . . . THE NEW COMMERCIAL LINE




3 Point Suspension — Anti icing propane heater.

## ANTENNA SYSTEMS

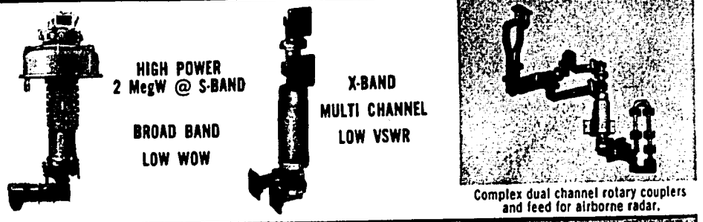
Gabriel has designed and produced hundreds of medium size radar antenna systems ranging between 10 and 45 feet in diameter — fan beam — cosecant squared — and true paraboloidal in shape for shipborne, and land based search and surveillance radar applications.




ASR-4 Radar — High powered shipborne long range search radar antenna — servo controlled. — High power land based 45 ft. search radar antenna.

## ROTARY JOINTS

Gabriel rotary couplers are designed for present and future sophisticated, ultra-long range search and detecting radar, and radio astronomy systems. Fifteen years of custom design and manufacture of all types and sizes give Gabriel leadership in this specialized field.




Complex dual channel rotary couplers and feed for airborne radar.

## HORNS AND FEEDS

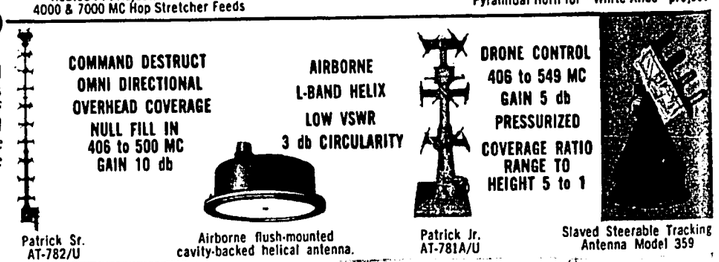
Gabriel's Horns and Feeds and other antenna components are in use extensively throughout the world — in tropo scatter — in dual polarized ultra long range radio-astronomy — in advanced slotted arrays and corporate structures — L to X-Band.




Heated . . . Adjustable — 360° 4000 & 7000 MC Hop Stretcher Feeds — Pyramidal Horn for "White Alice" project

## AERO SPACE ANTENNAS

Gabriel's line of Ground Support and Aero-Space circularly polarized antennas includes a series of ruggedized UHF omni's, a complete line of L, C, S and X Band aircraft, drone, and missile antennas, and UHF slaved steerable tracking antennas.




Patrick Sr. AT-782/U — Airborne flush-mounted cavity-backed helical antenna. — Patrick Jr. AT-781A/U — Slaved Steerable Tracking Antenna Model 359

## RESEARCH AND DEVELOPMENT

Gabriel's team of engineers and scientific staff places particular emphasis on research and development. In the past 5 years many "firsts" have been achieved in microwave art. Among these are re-entry, high velocity missile tracking, electronic scanning and an extension of the art in passive reflectors.



**COMPLETE TESTING FACILITIES** — on 80 acre site which houses a 73,000 sq. ft. ultra modern research, engineering, and manufacturing center. Microwave dark room — six centrally located pattern ranges 200, 400, 1000, 1200, 2200, and 3400 are in operation — three additional ranges are being established.

Gabriel electronics DIVISION OF THE GABRIEL CO., MILLIS, MASS. FR 6-2953

*Write for data sheets on our product line.*




For details, circle #289 on Reader Service Card





# Directory II. Components

## 39. Antennas & Accessories.

Canadian Westinghouse Co., Ltd., Canada, 22c, 30c
Canoga Division, Underwood Corp., Calif., 4s, 18c, 24s, 30s, 34c, 50s
Capehart Corp., Dynamic Electronics Div., N.Y., 4c, 6sc, 12c, 16c, 18c, 24c, 36c, 44sc, 50c
Carborundum Co., N.Y., 12c
Chance Vought Electronics Div., Texas, 4sc, 18c, 20c, 22c, 24c, 26c, 30c, 36c
Channel Master Corp., N.Y., 38s, 44s, 50s
Chicago Electronic Div., Land-Air, Inc., Ill., 4c, 50c
Chu Associates, Mass., 18sc, 24c, 28sc, 30c, 32c, 36c, 50sc
Clear Beam Antenna Co., Calif., 38s, 44s, 50s
Cleveland Metal Specialties Co., Ohio, 50c
Coil Winders, Inc., N.Y., 12c
Coilcraft, Inc., Ill., 16c
Collins Radio Co., Iowa, 2s, 4s, 24s, 30s
Collins Radio Co., Central Sales Office, Tex., 2sc, 4s, 8sc, 12sc, 14sc, 18sc, 20c, 24sc, 28s, 30c, 32c, 34c, 36c, 38c
Collins Radio Co., Texas Division, Tex., 24s, 50s
Columbia Products Co., S.C., 4c, 8s, 10s, 20s, 26sc
Communications Co., Inc., Fla., 4sc, 18sc, 26sc
Community Engineering Corp., Pa., 42c
Consolidated Wire & Associated Companies, Ill., 6s, 8s

**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 12c, Tel: HAmilton 7-7961**
**See ad on page 440**

Cook Electric Co., Ill., 24c, 26c, 50c
Cook Technological Center, Div. Cook Electric Co., 24c, 30c, 50c
Coors Porcelain Co., Colo., 34c

**Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 8s, 36s, Tel: PLainfield 6-9000**

**See ad on Cover 3**

Craig Systems, Inc., Mass., 34c, 38c
Crosley Division, Avco Corp., Ohio, 24s, 26s
Crowley Div., A. O. Smith Corp., N.J., 10c
Custom Components, Inc., N.J., 16sc
Dale Products, Inc., Neb., 4sc
Dalmo Victor Co., Div. Textron, Inc., Calif., 4c, 24c, 30c, 32c, 34c, 36c
Davis Electronics, Inc., Calif., 8s, 10s, 22s, 26s
Dayton Aircraft Products, Inc., Fla., 4sc, 8sc, 22sc, 26sc
Delta Coils, Inc., N.J., 16sc, 22c
Diamond Antenna & Microwave Corp., Mass., 4c, 6c, 12c, 20c, 22c, 24sc, 30sc, 34c, 50c
Dicon Corporation, N.Y., 12c, 22c
Dielectric Products Engineering Co., Inc., Me., 14c, 18sc, 26sc
Dimick Mfg. Co., Ore., 6c, 8c, 14c, 40c, 44s, 50s
Dorne & Margolin, Inc., N.Y., 4c, 24c, 26c, 28c, 36c, 50c

**Douglas Microwave Co., Inc., 252 E. Third St., Mount Vernon, N.Y., 12sc, 20c, 24sc, 30c, 36c, Tel: MOunt Vernon 8-6900**

**See ad on pages 90-91**

**Dresser-Ideco Co., Div. Dresser Industries, Inc., 875 Michigan Ave., Columbus 15, Ohio, 2c, 18c, 20c, 30c, 32c, 38c, 46c, 48c, Tel: AX 9-2123**

**See ad on page 370**

Dwyer Engineering Co., Inc., N.H., 24c, 30c, 34c
Dynair Electronics, Inc., Calif., 14sc, 40sc
Dynamics Corp. of America, N.Y., 2c, 14c, 40c

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 4c, 22c, 24c, 26c, 28c, 30c, 50c, Tel: HAlifax 6-7491**

**See ad on page 400**

E.M.I.-Cossor Electronics, Ltd., Canada, 18s
E.M.I. Electronics Ltd., England, 2s, 14s, 24s, 40s
E-Z Way Towers, Inc., Fla., 2c, 8s, 30c, 36s, 38sc, 46c, 48s
Ecco Electronic Components Corp., N.Y., 12c, 24c, 26c
Ehrenpreis, David, Consulting Engineers, N.Y., 34c, 38c, 46c

**Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., 12s, Tel: LYtell 1-1451**

**See ad on pages 80-81**

El-Rad Mfg. Co., Ill., 12c, 16sc
Electrend Products Corp., Mich., 8sc, 10s, 26s
Electric Specialty Co., Conn., 36c
Electron Corporation, Tex., 40c, 42c, 44sc, 50sc
Electronic Specialty Co., Calif., 4sc, 22sc, 24sc, 50sc
Elna Ferrite Laboratory, Inc., N.Y., 16s
Emerson & Cuming, Inc., Mass., 24s, 30s
Emerson Electric Mfg. Co., The, Mo., 24c

**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 24sc, 50sc, Tel: VIctor 2-8400**

**See ads on pages 307, 309, 313, 315, 379, 584**

Engineering Associates, Ohio, 20c, 24c
Erco Radio Laboratories, Inc., N.Y., 18sc, 50sc
Essex Electronics, Div. Nytronics, Inc., N.J., 16c
Eugene Engineering Co., Inc., Mass., 30c, 34c

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 24c, Tel: RAvenswood 1-9000**

**See ad on pages 125-128**

**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 16sc, Tel: CHerry 6-2811**

**See ads on pages 267, 354, 423, 457, 525, 620**

**Filmohm Corp., 48 W. 25th St., New York 10, N.Y., 12sc, Tel: WAtkins 4-6605**

**See ad on page 525**

Franklin Engineering, Calif., 36c, 38c
Freeman Co., The, S.D., 8s
G B Electronics, Subsid. General Bronze Corp., N.Y., 4sc, 6c, 18sc, 20sc, 22sc, 24c, 26c, 30sc, 32sc, 38sc

**G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 20s, 44s, 50s, Tel: WOodland 8-9661**

**See ad on page 640**

**Gabriel Electronics Div., Gabriel Co., Millis, Mass., 4, 18, 20, 22, 24, 26, 30, 36, Tel: FR 6-2953**

**See ad on page 372**

Gavitt Wire & Cable Co., Mass., 16c
General Coil Products Corp., N.Y., 6c, 12c, 16c

**General Communication Co., 677 Beacon St., Boston 15, Mass., 24c, 28c, Tel: COpley 7-6030**

**See ad on page 331**

General Crystal Co., Inc., Wis., 8s
General Devices, Inc., N.J., 36sc

**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 16c, 18c, Tel: GRanite 6-4411**

**See ads on pages 263, 267, 435, 437, 501, 621**

General Electric Co., Ordnance Dept., Mass., 24s, 30s, 32s
General Electric Co., Ltd., of England, Telephone Works, England, 24s, 38s
General Electronic Control, Inc., Minn., 8c, 10c
General Electronic Laboratories, Inc., Mass., 22sc, 24sc, 34sc, 36sc, 50sc
General Mills, Inc., Mechanical Div., Minn., 4c, 24c

**General Radio Co., 22 Baker Ave., West Concord, Mass., 12s, Tel: EMerson 9-4400**

**See ad on Cover 4**

Gilfillan Bros., Inc., Calif., 24c, 30c, 32c, 36c
Gombos Co., Inc., John, N.J., 24c
Gonset Division, Young Spring & Wire Corp., Calif., 8s, 18s, 20s
Goodyear Aircraft Corp., Ohio, 4c, 24c, 26c, 30c, 34c
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 4c, 12c, 24c
Granger Associates, Calif., 4c, 18c, 22c, 24c, 50c
Granite State Machine Co., Inc., N.H., 20c, 24c, 30c, 34c, 50c
Gulton Industries, Inc., N.J., 4sc, 20sc, 24sc, 26sc, 36sc
HRB-Singer, Inc., Pa., 24c, 50c

**Hackensack Cable Corp., 127 Orchard St., Hackensack, N.J., 4s, 18s, Tel: HUbbard 7-1100**

**See ad on page 611**

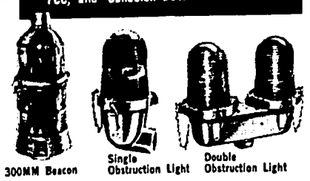
Hallett Mfg. Co., Calif., 10s, 22s, 26s
Hallicrafters Co., The, Ill., 4sc, 24sc, 34c, 50sc
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 30c, 50c
Hoover Electric Co., Calif., 36c, Tuning Units c
Houston Fearless Corp., Calif., 24s

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**HUGHEY and PHILLIPS, INC.**

*Specialists in Obstruction Lighting Equipment and Controls*

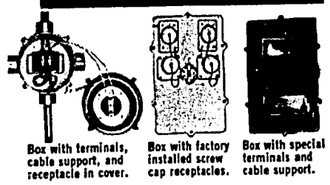
**BEACON and OBSTRUCTION LIGHTS, designed to meet specifications of CAA, FCC, and Canadian DOT.**



300MM Beacon — Single Obstruction Light — Double Obstruction Light

You'll find Hughey & Phillips have obstruction lights for every job. The engineering of each light offers maximum efficiency and simplified installation and maintenance. Whether you need bottom or side entrance conduit fitting types, there is a model to meet your requirements.

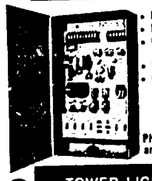
**SPECIAL CAST ALUMINUM WATERTIGHT JUNCTION BOXES, offering a wide choice in types of terminals, cable support, and factory installed screw cap receptacles.**



Box with terminals, cable support, and receptacle in cover. — Box with factory installed screw cap receptacles. — Box with special terminals and cable support.

Hughey & Phillips have pioneered in the use of adequate junction boxes with proper terminals, and built-in cable support to meet NEC requirements.

**SPECIAL CONTROL UNITS, designed for both indoor and outdoor installation.**



- Photo-Electric Control Units
- Beacon Flashers
- Combination Photo Control & Beacon Flashers
- Lamp Failure Indicator System
- Controls with Autotransformer system . . . pioneered by Hughey and Phillips for tall towers . . . increases lamp life

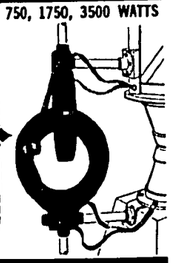
Photo control, flasher and Lamp Failure Alarm

**TOWER LIGHTING ISOLATION TRANSFORMER**

THREE SIZES . . . 750, 1750, 3500 WATTS

**FEATURING:**

- HIGHER EFFICIENCY
- IMPROVED REGULATION
- ADDITIONAL TAPS
- FIBER GLASS INSULATION
- EPOXY ENCASED
- VERSATILE MOUNTING



**HUGHEY & PHILLIPS, INC.**

MANUFACTURERS OF

300MM Beacons Obstruction Lights Photo Electric Controls Beacon Flashers Special Junction Boxes Microwave Tower Light Control and alarm Systems Tower Isolation Transformers and Complete Kits for Tower Lighting Sleetmelter Power and Control

3200 N. San Fernando Blvd. Burbank, Calif.

For details, circle #290 on Reader Service Card


**Hughey & Phillips, Inc.,** 3200 N. San Fernando Blvd., Burbank, Calif., 48s, Tel: VIctoria 9-1104
See ad on this page

Hycon Mfg. Co., Calif., 24c

I-T-E Circuit Breaker Co., Special Products Div., Pa., 4c, 6c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 34c, 36c, 38c, 50c

**Industrial Products-Danbury Knudsen, Div. of Amphenol-Borg Electronics Corp., 33 E. Franklin St., Danbury, Conn., 26s, Tel: PIoneer 3-9272**
See ad on page 160

International Telephone & Telegraph Corp., ITT Laboratories, Calif., 4c, 22c, 24c, 28c, 50c

International Telephone & Telegraph Corp., ITT Laboratories, N.J., 20c, 22c, 24c, 28c, 32c

Interstate Electronics Corp., Calif., 24c, 30c

**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 44s, 50s, Tel: DEwey 1-1000**
See ad on pages 76-77

J-V-M Microwave Co., Ill., 24c

Jampro Antenna Co., Calif., 14sc, 20s, 24s, 40sc, 50sc

Jansky & Bailey, Inc., D.C., 2c, 6c, 18c, 20c, 32c, 38c, 40c

Johnson Co., E. M., Minn., 8s

Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., Conn., 12sc

KTV Tower & Communication Equipment Co., Ill., 8c, 38sc

K-W Engineering Works, Wis., 26sc

Kaar Engineering Corp., Calif., 8s, 10s, 20s, 22s, 26s

Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 4c, 6c, 16c, 24c

Kay-Townes Antenna Co., Ga., 6c, 18s, 20s, 44sc

**Kearfott Div., General Precision, Inc., Little Falls, N.J., 16c, 24c, Tel: CLifford 6-4000**
See ad on pages 120-121

Kearfott Div., General Precision, Inc., Microwave Products, Calif., 24c

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 24c, 26c

Kemlite Laboratories, Inc., Ill., 48c

Kennedy & Co., D. S., Mass., 24c, 26c, 30c, 32c, 38c, 46c

King Radio Corp., Kan., 4s, 18s, 26s, 28s

**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 50c, Tel: STillwater 3-5000**
See ad on page 415

Koch & Sons, H., Calif., 34c

Kreckman Co., Herb, Pa., 8s, 20s, 24s, 50s

Laminair, Inc., Calif., 30c, 34c

Lance Antenna Corp., Calif., 2s, 6s, 14s, 28s, 38s, 40s, 44s, 50s

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 4sc, 50sc

LaPointe Industries, Inc., Conn., 4c, 8sc, 30c, 36c, 50sc

**Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 12c, Tel: LE Roy 385**
See ad on pages 62-63

Lehigh Structural Steel Co., N.Y., 38c

**Lieco, Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 12sc, 24c, Submarine s, Tel: WAlnut 1-6300**
See ad on page 553

Lignes Telegraphiques et Telephoniques, France, 24c

Litton Industries, Maryland Div., Md., 4, 18, 20, 22, 24, 26, 30, 36, 38

**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 24c, Tel: REgent 9-4321**
See ad on pages 112-113

Lockheed Electronics Co., Stavid Division, N.J., 4c, 22c, 24c, 30c, 50c

Madigan Electronic Corp., N.Y., 26c

Marconi's Wireless Telegraph Co., Ltd., N.Y., 2s, 4s, 10s, 12s, 14s, 18s, 20s, 22s, 24s, 26s, 28s, 30s, 34s, 38s, 40s, 46s, 48s, 50s

**Mark Products Co., 5439 Fargo Ave., Skokie, Ill., 4s, 8s, 10s, 14s, 18s, 20s, 22s, 24s, 26s, 32s, 34s, 50s, Tel: ORchard 5-1500**
See ad on page 375

Martin Co., The, Md., 4c, 30c

Materials for Electronics, Inc., N.Y., 10sc

Maury & Associates, Calif., 24c

McKiernan-Terry Corp., N.J., 24c, 30c, 32c, 36c, 38c

McMillan Electronics Industries, Mass., 34sc

Melabs, Inc., Calif., 24s, 30c, 32s, 34c

Melpar, Inc., Special Products Dept., Va., 4c, 6c, 24c, 30c, 32c, 50c

Meridian Metalcraft, Inc., Calif., 4c, 24c, 50c

Microtech, Inc., Conn., 24c

Microwave Chemicals Laboratory, Inc., N.Y., 16

Microwave Development Laboratories, Inc., Mass., 24sc

Microwave Electronic Tube Co., Inc., Mass., 24c

Miller Co., J. W., Calif., 16sc

Mitchell Industries, Inc., Tex., 4s

Mosley Electronics, Inc., Mo., 8s, 18sc, 20sc, 26sc, 50sc

Motorola Aviation Electronics, Inc., Calif., 4s, 16s, 26s, 28s, 50s

Motorola, Inc., Ill., 24s, 26s, 46s

Motorola, Inc., Military Electronics Div., Ariz., 4c, 16c, 24c, 50c

Munzig International, Inc., Calif., 16s

Mytron, Inc., Mass., 24c

N.R.K. Mfg. & Engineering Co., Ill., 12c

Narda Microwave Corp., The, N.Y., 24sc

National Aeronautical Corp., Pa., 4s, 18s, 28s

National Moldite Co., Inc., N.J., 16c

Neptune Electronics Co., N.Y., 4c, 12c

Nevada Air Products Co., Nevada, Tuning Units s

Nevada Antenna Co., Calif., 4, 18, 20, 42, 50

Nippon Electric Co., Ltd., Japan, 24c

Norrich Plastics Corp., N.Y., 36c

Ohmweve Co., Inc., The, Conn., 12c

**Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 12sc, Tel: ORchard 5-2600**
See ad on pages 78-79

Olsen Corp., Gunnar A., N.Y., 46sc

Oregon Electronic Mfg. Co., Ore., 8s, 10s





# Directory II. Components

## 39. Antennas & Accessories.

Pacific Automation Products, Inc., Calif., 6c, 50c

Parsons Company, The Ralph M., Electronics Div., Calif., 50c

Pearce-Simpson, Inc., Fla., 22sc

Pegasus Laboratories, Inc., Mich., 4s, 18s, 36s

Pennsylvania Testing Labs., Inc., Pa., 24s

Photo-Crystals, Inc., Ill., 24sc

Pickard & Burns, Inc., Mass., 6c, 24c, 30c, 50c

**Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 24sc, Tel: EXeter 2-4500**
See ad on pages 107-108

Polydoroff & Assoc., W. J., D.C., 4c, 10c, 16c

**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 24c, Tel: WEstmore 9-4092**
See ad on page 592

Premax Products Div., Chisholm-Ryder Co., Inc., N.Y., 8s, 10s, 20s, 22s, 26s, 50s

**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 24c, Tel: WEstmore 9-8900**
See ad on page 383

Prodelin, Inc., N.J., 20s, 24s, 26s, 28s

Pye Telecommunications, Ltd., England, 24s, 26s, 50s

Quartzite Processing, Inc., Mass., 16c

RCA Victor Co., Ltd., Canada, 2c, 12sc, 14sc, 22s, 30s, 40c

Racal Engineering, Ltd., England, 12c, 50c

Radar Design Corp., N.Y., 24c

**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 24, Tel: OVerbrook 1-5600**
See ad on page 314

Radio Corp. of America, N.J., 10s, 12s, 14s, 18s, 20s, 22s, 24s, 26s, 34s, 38s, 40s, 42s, 46s, 48s, 50s

Radio Corp. of America, Defense Electronic Products, N.J., 2s, 14s, 24s, 26s, 30s

Radio Industries, Inc., Kan., 26s, 36s, 50c

Rantec Corporation, Calif., 4c, 18c, 24c, 32c, 50c

Raytheon Co., Commercial Apparatus & Systems Div., Mass., 22s, 24s, 30s, 50s

Reeves Instrument Corp., N.Y., 36c, 38c

Rego Insulated Wire Co., N.J., 44, 50

Republic Aviation Corp., N.Y., 4c, 30c, 34c

Republic Electronic Industries Corp., N.Y., 12c, 18c, 30c, 32c

Riverside Plastics Corp., N.Y., 30, 34

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 12sc, 24c, 50c, Tel: LOckwood 5-4578**
See ad on page 324

**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 12s, 14s, Tel: PRescott 3-8010**
See ad on page 246

Rohn Manufacturing Co., Ill., 2s, 38s, 46s, 48s

Rollan Electric Co., Ill., 6c, 16c

Rostan Corporation, N.Y., 38sc

Rowe Industries, Ohio, 22s

Ruckelshaus Laboratories, Inc., John G., N.J., 36c

Rucker Co., The, Calif., 36sc

Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 24c, 30c

S & A Electronics, Inc., Ohio, 8s, 44s

Sage Laboratories, Inc., Mass., 24c

Sanders Associates, Inc., N.H., 4sc, 24sc

Satellite Corp. of America, Me., 24c, 30c, 32c, 34c, 38c, 46c

Savoy Electronics, Inc., Fla., 22c, 26c

**Saxton Products, Inc., 4320 Park Ave., New York 57, N.Y., 16s, Tel: WEllington 3-6400**
See ad on page 615

Scala Radio Co., Calif., 18c, 20c, 22c, 28c, 42c, 44c, 50c

Scientific-Atlanta, Inc., Ga., 24s, 30c, 34c, 36sc

Servo Corp. of America, N.Y., 28s

Sickles Div., F. W., General Instrument Corp., Mass., 16c

Sierra Electronic Corp., Div. Philco Corp., Calif., 12s

**Sierra Research Corp., P.O. Box 22T, Buffalo 25, N.Y., 24c, 30c, Tel: NF 2-8823**
See ads on pages 271, 356, 662

Sigma Electronics Research Corp., Wash., 4sc, 6c, 12c, 16c, 18c, 20c, 22c, 24sc, 26c, 28c, 30c, 50c

Sinclair Radio Labs., Inc., N.Y., 4sc, 10sc, 12sc, 14sc, 18sc, 20sc, 22sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36sc, 38sc, 40sc, 42sc, 44sc

Sioux Radio Products, S.D., 16c

Smith Electronics, Inc., Ohio, 2c, 6c, 14c, 20c, 34c

Smith Mfg. Co., J. & H., N.Y., 4c, 6c, 20c, 24c, 30c, 38c, 50c

Sorensen Industrial Electronic Co., N.J., 20sc, 22sc, 26sc

South River Metal Products Co., Inc., N.J., 38c

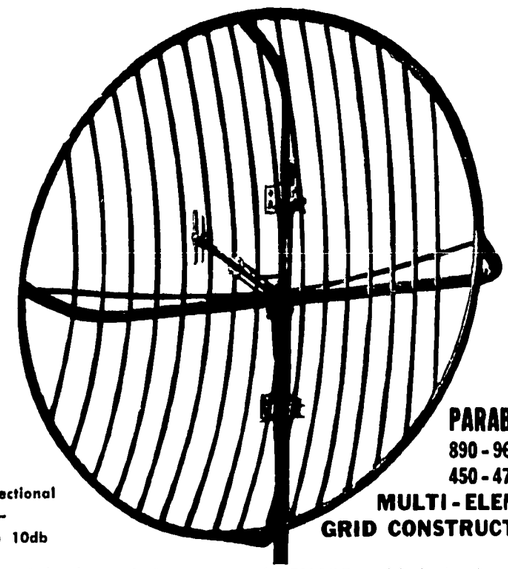
Space Electronics Corp., Calif., 18c, 20c, 24c, 26c

Spaulding Products Co., Ind., 38s, 48s

Specialty Electronics Development Corp., N.Y., 24c, 34c, 48c

**Specific Products, P.O. Box 425, 21051 Costanso, Woodland Hills, Calif., WWV sc, Tel: DI 0-3131**
See ad on page 259

Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., N.Y., 16c

also 150 & 450 MC Omnidirectional Arrays— gains to 10db

**PARABOLAS**
**890-960 MC**
**450-470 MC**
**MULTI-ELEMENT GRID CONSTRUCTION***

*light weight, low windage, rugged HELIARC welded aluminum open construction permits lighter, lower cost towers*
*Parabolas up to 15' diameter*
*retain electrical properties of solid spun dish up to 1000 MC*

* patent applied for

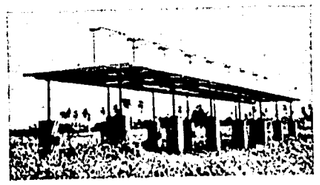
**MARK PRODUCTS**

5439 FARGO AVE. • SKOKIE, ILLINOIS • ORchard 5-1500

For details, circle #291 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

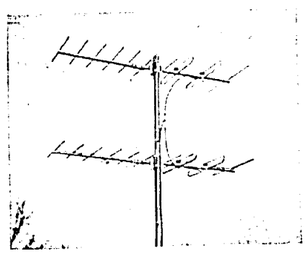
# Antennas



**MINITRACK ANTENNAS**

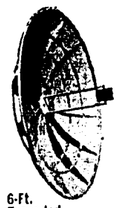
Horizontally or vertically mounted arrays similar to this MINITRACK antenna can be designed for individual beam requirements or you can select from a number of existing designs.

**TACO** offers unsurpassed facilities for the design, development and manufacture of military and commercial antenna systems. Mechanically, Taco is currently handling antenna arrays in the area of 2000' dimensions. Electrically, Taco is equipped and experienced in the design and manufacture of antennas from 30 MC to X-band. Modern laboratory and manufacturing facilities include long-range test sites, complete measuring and testing equipment, automatic constant potential welding equipment, and provision for competent field service and installation service anywhere.



**RUGGEDIZED YAGI**

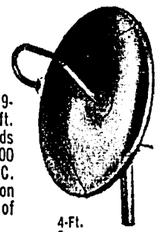
From 30 MC to 500 MC. Available as individual units or stacked systems.



6-Ft. Expanded Aluminum Mesh

**PARABOLIC ANTENNAS**

Mesh sizes from 4-ft. to 19-ft. and spun sizes from 4-ft. to 6-ft. Frequency bands from 806-960 MC, 1700-2400 MC and 5925-7450 MC. Other bands available on special order. Variety of mountings.



4-Ft. Spun Aluminum



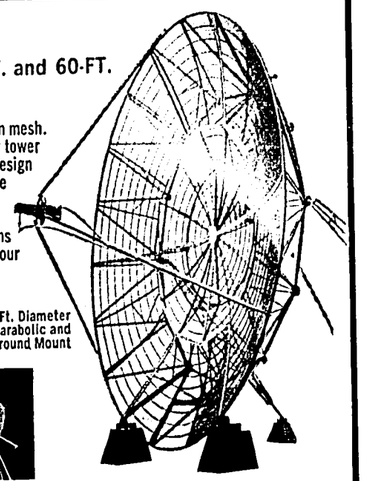
**WAVE GUIDE COMPONENTS**

Large Wave Guide Components for 10½" and 21" in the form of wave guide bends, feed horns, are available. Certified welders assure quality units fully tested to meet the most stringent electrical and mechanical requirements.

**28-FT., 32-FT. and 60-FT. PARABOLICS**

Expanded aluminum mesh. Ground mounted or tower mounted. Unique design allows rapid, simple erection.

Dual polarized horns supplied to meet your requirements at reasonable cost.



28-Ft. Diameter Parabolic and Ground Mount

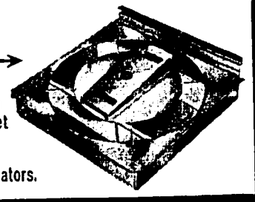


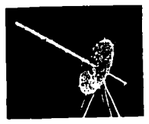
**AIRBORNE ANTENNAS**

←**Antenna AT-256-A/ARC** Type and Construction: Streamlined blade type antenna. Heat treated permanent mold aluminum castings with Teflon insulators.

**Antenna G-833**→

Type and Construction: Flush mounted annular slot antenna for communication band. Sheet aluminum, spot welded construction per Air Force specifications. Fibreglas insulators.





**HELICAL ANTENNAS and MOUNTS**

Mechanical mount for azimuth and elevation. Electromechanical remote mounts also available. Helicals available in 4, 6, or 8 turns from 215-265 MC. Other frequencies on special order. Mount illustrated is H-M-1.

and the best TV antennas in the world...

TACO ANTENNAS

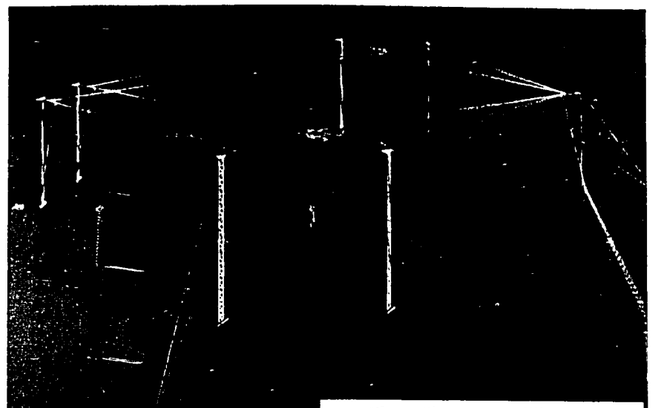
TACO

TECHNICAL APPLIANCE CORP.
SHERBURNE, N. Y.

In Canada: Horkbrush Electronics Ltd. Toronto 4, Ont.



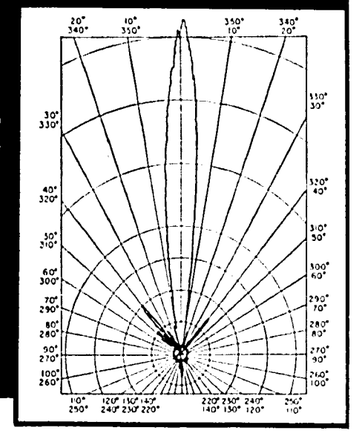




THE NEW

**Trylon / Laport Rhombic**

a low-interference antenna for long distance communications



# 60 MEGAWATT ERP PEP

**Built for U.S. Signal Corps.**

TRYLON®

ANTENNA DESIGN, FABRICATION, INSTALLATION

GALVANIZED STEEL TOWERS

TRANSMISSION LINES, SWITCHES & RELATED EQUIPMENT

**WIND TURBINE COMPANY,** West Chester, Pa.

*In Canada:* The Wind Turbine Company of Canada, Ltd., Waterloo, Ontario

For details, circle #293 on Reader Service Card




# Directory II. Components

## 39. Antennas & Accessories.

**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 12sc, 16c, 24sc, 30c, 34c, Tel: REdwood 6-4161**
See ad on pages 100-101

Spirling Products Co., Inc., N.Y., 44s

Stainless, Inc., Pa., 38, 46

Standard Electronics, Div. Reeves Instrument Corp., N.J., 2c, 14c, 40c

Standard Telephones & Cables, Ltd., England, 2s, 4s, 6s, 14sc, 18s, 24sc, 40sc, 50sc

Standard Winding Co., Inc., N.Y., 16c

Stanwyck Coil Co., E., N.Y., 16

States Company, The, Conn., 12sc

Strand Engineering Co., Mich., 24c, 30c

Superex Electronics Corp., N.Y., 16s

Swift Textile Metalizing & Laminating Corp., Conn., 30s

Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 4c, 20c, 24c, 30c, 32c, 50c

Systems, Inc., Fla., 24c

TMC (Canada), Ltd., Canada, 6c, 12s, 18sc, 22sc, 38sc

TRG, Incorporated, N.Y., 4sc, 16c, 20c, 24sc, 30c, 32c, 34c

Taffet Electronics, Inc., N.Y., 12c

Tamar Electronics, Inc., Calif., 4s, 24s

**Technical Appliance Corp., 1 Taco St., Sherburne, N.Y., 4sc, 8s, 18c, 20sc, 22sc, 24sc, 30sc, 32sc, 36sc, 38sc, 44sc, 50sc, Tel: ORchard 4-2211**
See ad on page 376

**Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 6s, 8s, 18s, Tel: OWens 8-4800**
See ads on pages 344, 345

Technical Research Group, Inc., Microwave & Antenna Dept., Mass., 4c, 24c, 30c, 32c, 34c

Technicraft Div., Electronic Specialty Co., Conn., 24c

Telecomputing Corp., Calif., 30sc

Telerad Mfg. Corp., N.Y., 24c

Telkor, Inc., Ohio, 6s, 42c, 44s, 50sc

Telrex Labs., N.J., 2c, 8sc, 14sc, 20sc, 26c, 36sc, 38c, 40c, 44s, 50sc

Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 4c, 20c, 26c, 28c, 30c, 34c

Tenatronics, Ltd., Ohio, 10s, 12s, 20s

Tennalab, Ill., 8s, 18c, 42c, 44s, 50c, Yagi Types c

Texas Instruments Incorporated, Apparatus Div., Tex., 4c, 24c, 30c

Thomas Mold & Die Co., 36c, 38sc

Thompson Fiber Glass Co., H. I., Calif., 34c

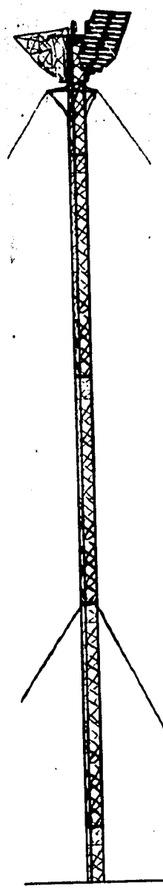
Thompson Ramo Wooldridge Inc., Calif., 24sc, 28sc

Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 4c, 24c, 34c

Topping Electronics, Ltd., F. V., Canada, 22s

Torngren Co., Inc., C. W., Mass., 24c, 30c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



**Towers**
**Reflectors**
**Buildings**

- FIXED
- PORTABLE

*Complete installations for all communications purposes*

TOWER
**CONSTRUCTION CO.**
**2725 Hawkeye Drive,**
**SIOUX CITY, IOWA**

*Tower Fabricators and Erectors the World Over!*

MAIL TODAY! FOR NEW CATALOG!
TOWER CONSTRUCTION CO.
2725 HAWKEYE DRIVE
SIOUX CITY, IOWA
NAME: _____
ADDRESS: _____
CITY: _____ ST: _____

For details, circle #294 on Reader Service Card


## 39. Antennas & Accessories.

**Tower Construction Co., 2725 Hawkeye Dr., Sioux City 2, Iowa, 2c, 14c, 24c, 38sc, 40c, 46sc, 48sc, Tel: 5-7653**
See ad on this page
Transco Products, Inc., Calif., 4sc, 24sc
**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 4sc, 22sc, 24sc, 30sc, Tel: ULysses 5-5131**
See ad on page 438
United Aircraft Corp., Norden Div., Conn., 4sc
United Shoe Machinery Corp., Mass., 22c, 24c, 30c, 34c, 50c
United States Chemical Milling Corp., Calif., 30c, 34c
U. S. Dielectric Products, Inc., Mass., 34c
U. S. Science Corp., Calif., 4c, 6c, 14c, 16c, 18c, 20c, 22c, 24c, 28c, 30c, 50c
Universal Products Engineering, Wis., 8s, 38s, 44s
Univox Corp., N.Y., 28c
Varo Mfg. Co., Inc., Tex., 20sc
Vicon Corp., Calif., 42c, 44s
Video Industries Co., N.Y., 8c, 20c, 44s
Virginia Electronics Co., Inc., D.C., 22c, 26c
Volta Mfg. Co., Ill., 16c
Waber Electronics, Inc., Pa., 44s
WacLine, Inc., Ohio, 12c
**Walsco Electronics Mfg. Co., Div. G-C Textron Electronics, Inc., 400 S. Wyman St., Rockford, Ill., 16s, 44s, 50s, Tel: WOodland 8-9661**
See ad on page 640
Washington Aluminum Co., Inc., Md., 18c, 20c, 22c, 26c, 30c, 32c, 34c, 36c, 38c
Waveline, Inc., N.J., 24c
Webster Manufacturing, Calif., 8s, 22s
Western Coil & Electrical Co., Wis., 8s, 38s
Westinghouse Electric Corp., Air Arm Div., Md., 4c, 30c
Westinghouse Electric Corp., Electronics Div., Md., 24c, 30c, 50c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 18sc, 20sc, Tel: JUdson 2-3030**
See ad on page 704
**Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 18c, 24c, 26c, 32c, 34c, 50c, Tel: HUnter 2-7876**
See ad on page 664
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 4s, 20s, 28s, 50s, Tel: BEnton 1-0700**
See ad on page 573
Wiley Electronics Co., Ariz., 24c
**Wind Turbine Co., 248 E. Market St., West Chester, Pa., 2s, 8c, 12c, 36c, 38c, 46c, Tel: OWen 6-3110**
See ad on page 377
Z & W Mfg. Corp., Electronics Div., Ohio, 4s
Zenith Plastics Co., Subsid. Minnesota Mining & Mfg. Co., Calif., 4c, 24c, 30c, 34c

**See the pink section preceding page 1 for complete instructions on how to get the most out of this Directory.**

## 40. Attenuators.

5. IF
10. RF
15. Decade
20. Impedance matching
25. Microwave
30. Fixed microwave step
35. Volume controlling

A C Electronics, Inc., Calif., 5c, 10c, 20c
Air-Maze Corp., Subsid. Rockwell-Standard Corp., Ohio, 10c
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 5s
**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 10s, 25s, Tel: COpley 7-9115**
See ad on page 309
**Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 25sc, 30sc, Tel: CHestnut 5-2990**
See ad on page 589
Airtron, Inc., Div. Litton Industries, Inc., N.J., 25c, 30c
**Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass., 25s, Tel: HAncock 6-2150**
See ad on page 590
Alfred Electronics, Calif., 25s
Allen-Bradley Co., Wis., 20sc
**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 25c, Tel: WAlnut 5-8780**
See ad on page 369
Ansco Division, General Aniline & Film Corp., N.Y., 25sc, 30sc
**Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 10s, 20s, 25s, 30s, Tel: EDgewood 4-8770**
See ad on page 379
**Applied Research, Inc., 76 S. Bayles Ave., Port Washington, L.I., N.Y., 5s, 10s, 20s, 25s, 30sc, Tel: POrt Washington 7-8707**
See ad on page 360
Applied Technology Corp., N.Y., 25c
**Arenberg Ultrasonic Laboratory Inc., 94 Green St., Jamaica Plain 30, Mass., 5s, Tel: JAmaica 2-8640**
See ad on page 435
**Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 5c, 10c, 25c, 30c, Tel: EVergreen 8-6057**
See ad on page 409
Aviel Electronics, Inc., Calif., 10c, 20c, 25c
BJ Electronics, Borg-Warner Controls, Calif., 10s
Bell Aircraft Corp., Avionics Div., N.Y., 25c
Bellaire Electronics, Inc., N.J., 25c
Belz Industries, Inc., N.Y., 25c
Blonder-Tongue Laboratories, Inc., N.J., 10s
Bogart Mfg. Co., N.Y., 10c, 25c
**Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 25c, Tel: WAlker 2-6000**
See ad on page 150
Bruno-New York Industries Corp., N.Y., 10c, 25c
Budd-Stanley Co., Inc., N.Y., 25c, 30c
C.E.S. Electronic Products, Inc., Calif., Logarithmic s
**CTS Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 35c, Tel: ELkhart 3-0310**
See ad on page 2
C.W.S. Waveguide Corp., N.Y., 25c
Cambridge Thermionic Corp., Mass., 5sc, 10sc



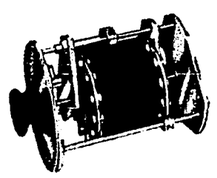


# Directory II. Components

## 40. Attenuators.

Canadian Marconi Co., Canada, 5c, 10c, 15s, 20s
Canoga Division, Underwood Corp., Calif., 25s
Capehart Corp., Dynamic Electronics Div., N.Y., 25c, 30c
Carborundum Co., N.Y., 25c
Caswell Electronics Corp., Calif., 25sc
Chemalloy Electronics Corp., Calif., 25sc
Clarostat Mfg. Co., Inc., N.H., 5sc, 20sc, 35sc
Collins Radio Co., Texas Division, Tex., 25s
**Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 25sc, Tel: HAmilton 7-7961**
See ad on page 440
**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 25s, Tel: FOrest 2-5571**
See ads on pages 390, 523
Crowley Div., A. O. Smith Corp., N.J., 25c
Daven Co., The, N.J., 5s, 10s, 15s, 20s, 30s, 35s
Delta Coils, Inc., N.J., 5c, 10c, 20c
Deltek, Calif., 10c
**DeMornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, Calif., 10s, 25s, Tel: SYcamore 2-4142**
See ad on pages 52-53
Diamond Antenna & Microwave Corp., Mass., 10sc, 25sc, 30c
Dielectric Products Engineering Co., Inc., Me., 10c
**Douglas Microwave Co., Inc., 252 E. Third St., Mount Vernon, N.Y., 25sc, 30sc, Tel: MOunt Vernon 8-6900**
See ad on pages 90-91
Dymec, Div. Hewlett-Packard Co., Calif., 25sc
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 10c, 30c, Tel: HAlifax 6-7491**
See ad on page 400
Ecco Electronic Components Corp., N.Y., 10c
Electrical & Physical Instrument Corp., N.Y., 10s, 20s, 25s, 30s
**Electro Impulse Laboratory, Inc., 208 River St., Red Bank, N.J., 25sc, Tel: SHadyside 1-0404**
See ad on page 310
Electron-Radar Products, Ill., 25sc, 30sc
Electronic Applications, Inc., Conn., 5s, 10s, 15s, 25s
Electronic Specialty Co., Calif., 25c
Elk Electr Labs., Inc., N.Y., 5c, 10c, 15c
**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, Tel: VIctor 2-8400**
See ads on pages 307, 309, 313, 315, 379, 584
Entron, Inc., Md., 10s, 20s
FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 25s, 30c, Tel: RAvenswood 1-9000
See ad on pages 125-128
Fairchild Recdg. Equip. Corp., N.Y., 35s
Faradyne Electronics Corp., Attl Mansol Ceramics, N.J., 25
Federal Manufacturing & Engineering Corp., N.Y., 5c, 10c, 25c
Ferris Instrument Co., N.J., 10c
**Ferrotec, Inc., 217 California St., Newton 58, Mass., 25c, Tel: DEcatur 2-7600**
See ad on page 591
**Filmohm Corp., 48 W. 25th St., New York 10, N.Y., 10sc, 20sc, 25sc, 30c, Tel: WAtkins 4-6605**
See ad on page 525
**Frequency Standards, Inc., P.O. Box 504, Asbury Park, N.J., 25c, Tel: PRospect 4-0500**
See ad on page 443


*When Reliability is a must...*
**specify EMPIRE**



**BROADBAND COAXIAL ATTENUATORS**
**DC to 10 KMC**
Pads, 6 and 12 position step attenuators (manually and motor operated), attenuator panels. 1 watt to 15 watts. Also 50 watt power attenuators. Large range of values. Low VSWR, high accuracy. Long term stability. Conservative power ratings.



**COAXIAL TERMINATION**
**Model TE-80 • DC to 10 KMC**
Low VSWR throughout. Many special versions available.

*Send for our Catalog No. 604*
edp **EMPIRE DEVICES**
**PRODUCTS CORPORATION**
**AMSTERDAM, N.Y. Victor 2-8400**
MANUFACTURERS OF FIELD INTENSITY METERS · DISTORTION ANALYZERS · IMPULSE GENERATORS · COAXIAL ATTENUATORS · CRYSTAL MIXERS

For details, circle #295 on Reader Service Card

ARRA TLINE
CONTINUOUSLY VARIABLE ATTENUATORS

New
**ULTRA BROADBAND**



*Exclusive Features:*

- Bandwidth: 1.0 to 9.0 KMC with a single unit
- Continuously variable for all values of attenuation
- VSWR: 1.5 max. at all frequencies for all values of attenuation
- Attenuation: 10 db min. at 1 KMC
- Insertion Loss: 0.5 db max.
- Power: 10 w. average
- Size: 5" diameter by 1" high
- Drive: micrometer or shaft
- Model 3-6414-10

PRICE **$150**

**In addition, other standard models available are**

| Model No. | Freq. KMC | Max. Atten. | Max. VSWR | Unit Price |
|---|---|---|---|---|
| 1414-10 | .25-.50 | 10 | 1.5 | $290. |
| 2414-20 | .50-1.0 | 20 | 1.5 | $290. |
| 2-3414-30 | .8-2.5 | 30 | 1.5 | $290. |
| 3414-30 | 1.0-2.0 | 30 | 1.4 | $270. |
| 4414-30 | 2.0-4.0 | 30 | 1.3 | $250. |
| 4-5414-30 | 2.0-6.0 | 30 | 1.3 | $260. |
| 5414-30 | 4.0-7.0 | 30 | 1.3 | $270. |
| 6414-30 | 7.0-11.0 | 30 | 1.3 | $280. |

arra — 27 Bond St., Westbury, N.Y.

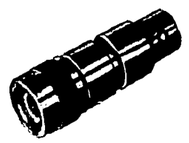
For details, circle #296 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

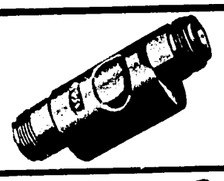
# THE MOST COMPLETE LINE OF STANDARD & *SPECIAL* COAXIAL COMPONENTS!

IMMEDIATE DELIVERY FROM STOCK!

**FIXED ATTENUATORS**
DC to 12,000 mc
0 to 80 db
1.2 max. VSWR
2 and 15 watts



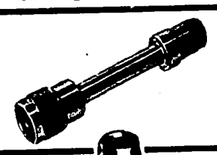
**TURRET ATTENUATORS**
DC to 2500 mc
0 to 30 db
1.25 max. VSWR
2¾" overall



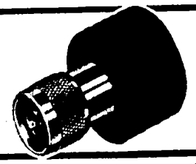
**LOW PASS FILTERS**
100 to 10,000 mc
1.2 max. VSWR
10 and 500 watts
Sharp cut-off



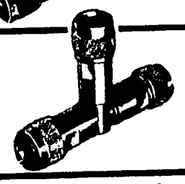
**HIGH PASS FILTERS**
200 to 6000 mc
1.6 max. VSWR
10 and 50 watts
Sharp cut-off



**COAXIAL TERMINATIONS**
DC to 13,000 mc
1.1 max. VSWR
2, 10, 150 watts
Fixed and sliding



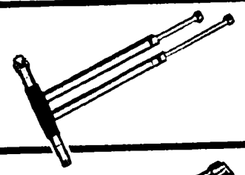
**POWER DIVIDERS**
DC to 13,000 mc
2 to 6 outputs
Resistive—wide band
Reactive—min. loss



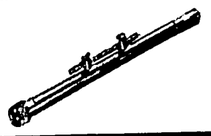
**CRYSTAL MOUNTS**
DC to 13,000 mc
Untuned, Fixed tuned;
Padded; Tripolar
High Sensitivity



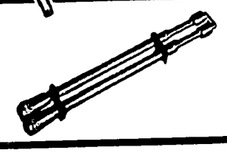
**STUB TUNERS**
250 to 10,000 mc
Single stub
Double stub
Triple stub



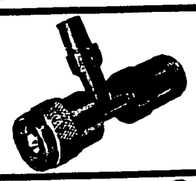
**DOUBLE SLUG TUNERS**
300 to 5000 mc
100 watts
Minimum size
Constant impedance



**LINE STRETCHERS**
DC to 5000 mc
1.2 max. VSWR
Constant impedance
Locking clamp



**MONITOR TEES**
Used to separate DC or video currents from an RF signal. Indispensable for monitoring helix intercept current in traveling wave tubes.



**SIGNAL SAMPLERS**
Used to monitor signals present in coaxial systems. Permits small signal to be taken from system without adding discontinuity. Coupling continuously adjustable.



**DC SHORTS**
Sections of constant impedance transmission line with built-in DC bypass, to ground low frequencies while allowing RF to pass unattenuated.



**DC BLOCKS**
Uniform lengths of constant impedance transmission line with DC blocking condenser in series with center conductor.



**COAXIAL CONNECTORS**
**Now Available!**
A Complete Line of UG and Special Coaxial Connectors.



**NEW CATALOGS AVAILABLE**
Coaxial Filters.
Catalog No. 9C.
Coaxial Terminations.
Catalog No. 9A.
Coaxial Attenuators.
Catalog No. 9B.



- All MICROLAB products are available FROM STOCK with Type N, C, HN, BNC or TNC male or female connectors.
- Special values, connector combinations and other special design features at same low cost and quick delivery.
- Prototype or production quantities at lowest cost.

MICROLAB
Livingston New Jersey • WYman 2 5700

For details, circle #297 on Reader Service Card



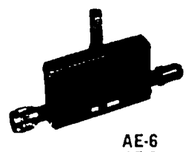


Merrimac

# COAXIAL DEVICES

**Zero Loss**
**Continuously Variable**
**Coaxial Attenuators**

Constant attenuation at any level over broad frequency bands... flat from 4 to 8 kmc and 8 to 12.4 kmc.



AE-6
AF-6

UHF, high power attenuator . . . 300 to 5000 mc bands . . . up to 60 db range for 10 watts average power rating.



AU-10

Low cost unit providing up to 60 db of attenuation range in the 1 to 7 kmc band.



A-7
A-10

**SUB-SYSTEM PACKAGING CAPABILITIES**



This special airborne assembly illustrates our capability in designing, developing, packaging and producing microwave subsystems.

**OTHER NOVEL MICROWAVE COMPONENTS**

For use over the 1 to 8 kmc band . . . provides smooth tuning over entire Smith Chart.



ST-10

**IN DEVELOPMENT**
Octave Wide Coaxial Magic Tee
D.C. To 4 kmc Flat Variable Attenuator
Low Capacity Octave Wide Crystal Mount

Merrimac
Research and Development, Inc.
517 Lyons Ave. • Irvington, N. J. • ESsex 1-1616

For details, circle #298 on Reader Service Card




# Directory II. Components

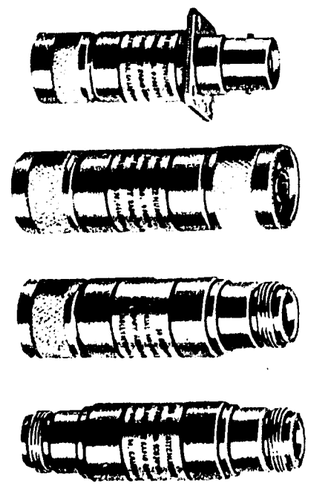
## 40. Attenuators.

General Communication Co., 677 Beacon St., Boston 15, Mass., 25c, Tel: COpley 7-6030
See ad on page 331
General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 5c, 10c, 20c, Tel: WEst 9-8571
See ad on page 363
General Measurements Co., Inc., Mass., 10
General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, 15s, Tel: EMerson 9-4400
See ad on Cover 4
Gertsch Products, Inc., Calif., 15s
Gilfillan Bros., Inc., Calif., 25c, 30c
Gombos Co., Inc., John, N.J., 25c
Goodman's Industries, Ltd., England, 35s
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 25c, 30c
Gotham Audio Sales Co., Inc., N.Y., 35s
Hathaway Instruments, Inc., Colo., 15s
Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 5s, 10s, 15s, 25s, 30s, Tel: DAvenport 6-7000
See ad on pages 3-18
Hoffman Electron Tube Corp., N.Y., 25s
Hycon Mfg. Co., Calif., 25c
Interference Testing & Research Lab., Inc., Mass., 5c
Interstate Electronics Corp., Calif., AF c
J-V-M Microwave Co., Ill., 25c
Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 10s, Tel: BAldwin 9-3456
See ad on pages 114-115
Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., Conn., 10sc
Julie Research Laboratories, Inc., N.Y., 15c, 20c
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 25c
Kay Electric Co., Dept. ID-10, 14 Maple Ave., Pine Brook, N.J., 5s, 10s, 35s, Tel: CApital 6-4000
See ad on page 330
Kearfott Div., General Precision, Inc., Little Falls, N.J., 25sc, 30c, Tel: CLifford 6-4000
See ad on pages 120-121
Kearfott Div., General Precision, Inc., Microwave Products, Calif., 10c, 25c
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 25c
Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 10sc, 20sc, 25c, Tel: STillwater 3-5000
See ad on page 415
Laboratory For Electronics, Inc., Mass., 25c
Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 25s, Tel: LOwell 6-2600
See ad on page 312
Lieco, Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 25sc, Tel: WAlnut 1-6300
See ad on page 553
Lignes Telegraphiques et Telephoniques, France, 25s
Lumatron Electronics, Inc., Dept. IR, 116-120 County Courthouse Rd., New Hyde Park, L.I., N.Y., 20s, Tel: PIoneer 7-3200
See ad on page 323
Mallory & Co., Inc., P. R., Ind., 35s
Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 5s, 10s, Tel: LOwell 7-0607
See ad on page 332
Martin Co., The, Md., 5c, 10c, 20c, 25c
Maury & Associates, Calif., 10s, 25s
Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 5s, 10s, 15s, 25s, 30s, Tel: DEerfield 4-2131
See ad on page 335
Mel-Rain Corp., Ind., 35sc
Melabs, Inc., Calif., 5c, 10c, 25s
Meridian Metalcraft, Inc., Calif., 25c, 30c
Merrimac Research & Development, Inc., 517 Lyons Ave., Irvington 11, N.J., 10sc, 25sc, Tel: ESsex 1-1616
See ad on this page
Metavac, Inc., N.Y., 20, 25, 30
Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 5s, 10s, 20s, 25s, 30s, Tel: WYman 2-5700
See ad on page 380
Micromega Corp., Calif., 25c
Microphase Corp., 1 Seneca Place, P.O. Box 1166R, Greenwich, Conn., 10c, 25c, Tel: NOrmandy 1-6200
See ad on page 204
Microtech, Inc., Conn., 25c, 30c
Microwave Associates, Inc., Mass., 25s
Microwave Development Laboratories, Inc., Mass., 25sc
Microwave Electronic Tube Co., Inc., Mass., 25c
Motorola, Inc., Military Electronics Div., Ariz., 25c
Muirhead & Co., Ltd., England, 5s, 10s, 15s, 35s
Muirhead Instruments, Inc., N.Y., 5s, 10s, 15s
Mytron, Inc., Mass., 25c
N'R'K Mfg. & Engineering Co., Ill., 25c
Narda Microwave Corp., The, N.Y., 25sc
Neptune Electronics Co., N.Y., 5c, 15c, 35c
New London Instrument Co., Conn., 10sc, 15sc
Ohio Semiconductors, Inc., Ohio, 20c, 35c
Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 35s, Tel: ORchard 5-2600
See ad on pages 78-79
Ortho Filter Corp., 7 Paterson Ave., Paterson 1, N.J., 10sc, Tel: MUlberry 4-5858
See ad on page 444
PRD Electronics, Inc., Subsidiary of Harris-Intertype Corp., 202 Tillary St., Brooklyn 1, N.Y., 25s, Tel: ULster 2-6800
See ad on pages 68-69

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# STODDART fixed UHF coaxial Attenuators and Terminations

## ATTENUATORS



**Description:** Available in any combination of Types "N" or "C" male or female connectors. Any female connector may be flanged for panel mounting. Values from 0.1 db thru 1.4 db are series resistive elements; from 1.5 db thru 60 db are T-section resistive networks.

**Specifications:**

**Frequency range:** dc thru 3000 mc on all values thru 60 db.

**Characteristic impedance:** 50 ohms.

**Maximum average power:** 1 watt

**Available insertion loss:** any value from 0 db thru 60 db.

**VSWR:** <1.2 on values of 10 db and above.

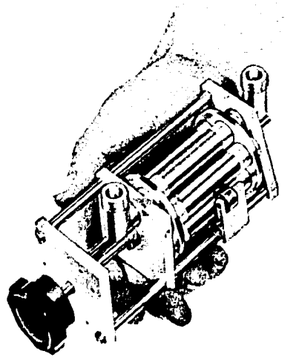
**Insertion loss tolerance:** ±0.5 db on values of 1.5 db thru 50 db.

**Temperature coefficient of insertion loss:** .005 db/°C at 25°C.

**Dimensions:** ¾" dia. x 3" max. length.

**Price: from $37.50 to $45.00**

## TURRET-TYPE STEP ATTENUATORS



**Description:** 2, 6 and 10-position turrets are compact assemblies composed of resistive networks each arranged in a tube 9/16" dia. x 3" long. One tube provides a straight-thru section for zero attenuation. Tubes are turret-mounted about a central shaft; assembly has radial and linear motion requiring a "Pull-turn-push" sequence, positively positioned by spring-loaded detent.

Any combination to 60 db is available, including fractional values of db.

**Specifications:**

**Frequency range:** dc thru 3000 mc on all values thru 60 db.

**Characteristic impedance:** 50 ohms.

**Maximum average power:** 1 watt.

**Available attenuation:** any value from 0 db thru 60 db.

**VSWR:** <1.2 on values of 10 db and above.

**Insertion loss tolerance:** ±0.5 db on values of 1.5 db thru 50 db.

**Temperature coefficient:** .005 db/°C at 25°C.

**Price:** 2-position, $175.00
6-position, $295.00
10-position, $435.00

## TERMINATIONS

**Types "N" or "C" connectors**

Available with male or female connectors, 50 or 70-ohm impedance



**Specifications:**

**Frequency range:** dc thru 7 kmc.

**Maximum average sine wave power:** 1.0 watt.

**Maximum peak power:** 200 watts.

**Termination accuracy at dc:** ±0.5 ohm.

**Temperature coefficient of resistance:** 70 ppm/°C at 25°C.

**Maximum VSWR (Type "N" Connectors, 50-ohm):** 1.15 (dc thru 1 kmc), 1.20 (1 kmc thru 7 kmc).

**Dimensions:** ¾" dia. x 1½" long (approx.).

**Price: from $30.00 to $35.00**



**Types "BNC" or "TNC" connectors**

Available with male or female connectors, 50-ohm impedance

**Specifications:**

**Frequency range:** dc thru 1000 mc.

**Characteristic impedance:** 50 ohms.

**VSWR:** <1.2

**Maximum average sine wave power:** 0.5 watt.

**Maximum peak power:** 1.25 kw.

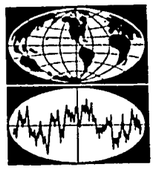
**Dimensions:** 9/16" dia. x 1 5/16" long (approx.).

**Price: $17.50**

***Immediate delivery on most items.***

Protected by issued and pending United States and foreign patents. Prices and specifications subject to change without notice.

OUR SALES ENGINEERING DEPARTMENT will give you individual consideration and information in the areas of your specific problems . . . provide engineering bulletins, Mil-Spec information, descriptions of new developments and applications, etc. For prompt service please call "Sales Engineering," HOllywood 4-9292.



Send for complete literature

**STODDART**
AIRCRAFT RADIO CO., INC.
6644 Santa Monica Blvd., Hollywood 38, Calif. HO 4-9292

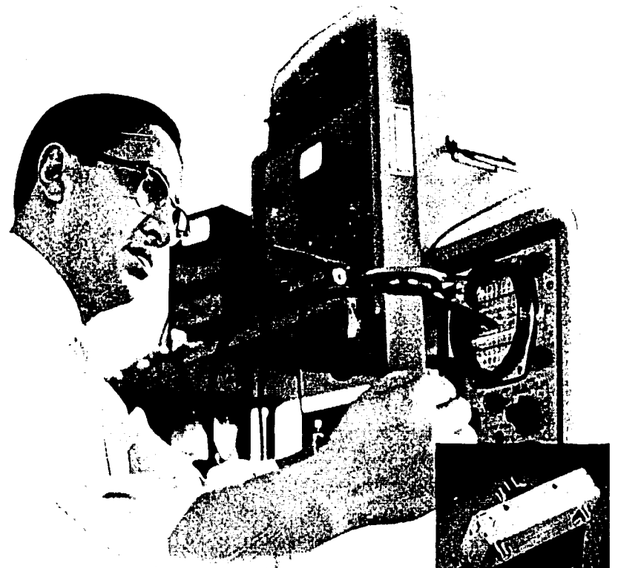
***serving 33 countries in radio interference control***

For details, circle #299 on Reader Service Card



*In advanced* **microwave** *development . . .*

# FACILITIES
## make the Difference



■ Creative microwave engineering talents work best when equipped with *extensive test and production facilities.* Here at PREMIER, our inventive, experienced engineers have at their disposal test and production equipment on a par with the most advanced in the entire microwave industry.

These integrated facilities enable PREMIER to exercise complete control over all steps of production from theory to finished component, thereby assuring complete uniformity . . . and over-all excellence.

Whatever your problem in advanced microwave development, you can expect to find your most efficient . . . and economical . . . solution at PREMIER. Some typical PREMIER products are depicted at the right.

*For detailed technical information, write to:*

**PREMIER INSTRUMENT CORP.**
**33 New Broad Street, Port Chester, N. Y.**
THE WAVEGUIDE HOUSE
For details, circle #300 on Reader Service Card



**COAXIAL VARIABLE ATTENUATOR**
Frequency Range-2670-2930 mc
Attenuation—25 db at 1.75 VSWR



**HIGH POWER VARIABLE ATTENUATOR**
Power Level—300 kw peak for 8.5-9.6 Kmc
Attenuation—.1-40 db at 1.15 VSWR



**WAVEGUIDE SWITCH**
VSWR-1.06 maximum
Isolation-100 db minimum



**COAXIAL DIRECTIONAL COUPLER**
Coupling Values—20 to 50 db
Directivity—greater than 30 db



# Directory II. Components

## 40. Attenuators.

Painton & Co., Ltd., England, 5c, 10c, 35c

Philips Electronic Instruments, N.Y., 25s, 30s

Photo-Crystals, Inc., Ill., 25s

Pitometer Log Corp., N.Y., 25s

**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 25c, 30c, Tel: WEstmore 9-4092**
See ad on page 592

Precise Electronics & Development Corp., N.Y., 5c, 10c, 15c, 20c, 35c

Precision Microwave Corp., Mass., 10c, 25c

**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 25c, 30c, Tel: WEstmore 9-8900**
See ad on this page

Radar Design Corp., N.Y., 10s, 25sc

**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 25, 30, Tel: OVerbrook 1-5600**
See ad on page 314

Rantec Corporation, Calif., 25c

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, 20c, 25c, 30c, Tel: LOckwood 5-4578**
See ad on page 324

**Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 10s, 15s, 20s, 25s, Tel: PRescott 3-8010**
See ad on page 246

Sage Laboratories, Inc., Mass., 25sc

Sanders Associates, Inc., N.H., 25sc

Schutter Microwave Corp., N.Y., 25

**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 5c, 10c, 35s, Tel: WOodlawn 5-2341**
See ad on page 258

Sigma Electronics Research Corp., Wash., 10sc, 25sc, 30c

Sinclair Radio Labs., Inc., N.Y., 5c, 10c, 15c, 20c, 25c, 30c

Sivers Lab., Sweden, 25s

Solartron Electronic Group, Ltd., England, 5s, 10s, 15s

Southwestern Industrial Electronics Co., Tex., 15c

Specialty Electronics Development Corp., N.Y., 5c, 10c, 15c, 25c, 30c

Spencer-Kennedy Laboratories, Inc., Mass., 10c

**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 25sc, 30sc, Tel: REdwood 6-4161**
See ad on pages 100-101

Standard Telephones & Cables, Ltd., England, 10s, 15s

**Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif., 10s, 20s, 25s, 30s, Tel: HOllywood 4-9292**
See ads on pages 336, 382

Sullivan, Ltd., H. W., N.Y., 15s

Sylvania Electric Products Inc., N.Y., 25c

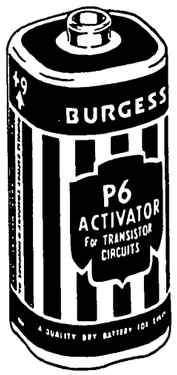
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# What's YOUR Portable Power Problem?

BURGESS has more than 5000 battery types to choose from

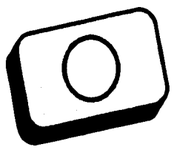
ZINC-CARBON NICKEL-CADMIUM
MERCURY
WATER-ACTIVATED

Each with the highest measure of uniform dependability! These are why 2 of 3 electronic engineers specify




## BURGESS BATTERIES

## BURGESS
IS THE MOST COMPLETE ONE-SOURCE LINE OF *Portable Power!*



**EXCLUSIVE WAFER CELL CONSTRUCTION**

. . . offers compactness, long shelf life, exceptional service life. A 30% increase in battery life at no increase in size.

**TRANSISTOR ACTIVATORS**



Burgess Activator Batteries for transistor circuits are smaller and more compact in size! Yet they deliver 30% more power because of the patented "Wafer-Cell" construction! Burgess Activators give you compact power, uniform performance, longer shelf life . . . all combined with modern packaging.

**RESERVE BATTERIES**



High energy output in a compact power source. Can be stored dry for years! Activated only when immersed in water. No handling of dangerous electrolyte, no spilling or leaking! Wide range of efficient operating temperatures. Designed for your specific applications.

**MERCURY ACTIVATORS**



Burgess constructional features provide uniform quality and dependable service! Burgess exclusive patents offer sealed-in-steel protection, wide temperature range efficiency, controlled venting, patented inner cell connector, and flat discharge curve.

**SEALED NICKEL-CADMIUM BATTERIES**



A secondary rechargeable battery system which delivers high energy output from a small package! Hermetically sealed-in-steel cells eliminate annoying maintenance and addition of liquids. Can be recharged many times, by trickle or quick charge, for long lasting economical power!

*Check with your Burgess Distributor for complete local stocks of fresh BURGESS BATTERIES! Or your distributor can order from Burgess the special battery needed for your specific application!*

## *FREE DESIGN SERVICE*

For special applications, skilled Burgess Engineers offer you a FREE battery design service. Burgess will manufacture the exact battery to fit your needs, regardless of quantity required.

**NEW ENGINEERING MANUAL**



New 100-page dry battery handbook now available! Engineers engaged in the design of battery-powered equipment are invited to write to Burgess Battery Company Dept. IRE Freeport, Ill., to secure a copy. Others may buy the manual for $1.00.

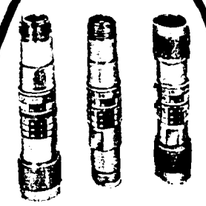
**BURGESS BATTERY COMPANY**
Division of Servel, Inc
FREEPORT, ILLINOIS NIAGARA FALLS, CANADA

For details, circle #301 on Reader Service Card



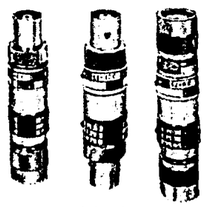
# WEINSCHEL
## FIXED COAXIAL ATTENUATORS
## Models 50, 51, 52
**DC to 1 KMC, Usable to 2 KMC**
**Attenuation: 1 to 50 db**
**High stability, low frequency sensitivity**
**Finish: Stainless Steel (Type N Connectors); Nickel Plated (Type C or SC Connectors)**

Type N Connectors



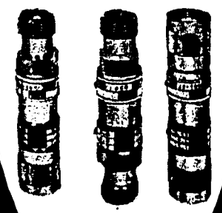
1 male 1 female | 2 female | 2 male

Type C Connectors



1 male 1 female | 2 female | 2 male

Type SC Connectors



1 male 1 female | 2 female | 2 male

Complete specifications upon request. Weinschel Fixed Coaxial Attenuators cover the frequency range of DC to 12.4 KMC. Write for complete catalog.

WE CO

*Weinschel Engineering*
KENSINGTON, MARYLAND

For details, circle #302 on Reader Service Card








# Directory II. Components

## 40. Attenuators.

Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 15, Tel: YOrkshire 8-6211
See ad on pages 48-49
Systems, Inc., Fla., 15c
Taffet Electronics, Inc., N.Y., 10c
Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N.J., 5c, 10c, 15c, 20c, Tel: WIndsor 4-2221
See ad on page 555
Technical Appliance Corp., 1 Taco St., Sherburne, N.Y., 10c, 20c, 25c, Tel: ORchard 4-2211
See ad on page 376
Technicraft Div., Electronic Specialty Co., Conn., 25c
Telerad Mfg. Corp., N.Y., 25c
Telonic Engineering Corp., 773 Broadway, Laguna Beach, Calif., 10c, Tel: HYatt 4-7581
See ad on page 71
Telonic Industries, Inc., 60 N. First Ave., Beech Grove, Ind., 10s, 15s, Tel: STate 7-7241
See ad on page 70
Tensor Electric Dev. Co., N.Y., 35c
Thompson Ramo Wooldridge Inc., Calif., 25c
Transco Products, Inc., Calif., 10sc, 25sc
Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 25sc, 30sc, Tel: ULysses 5-5131
See ad on page 438
Ultronix, Inc., Calif., 15c, 20c
Union Electric Products Co., N.J., 20s
United Shoe Machinery Corp., Mass., 25c, 30c
U. S. Dielectric Products, Inc., Mass., 30sc
U. S. Recording Co., D.C., 20c
Valor Instruments, Inc., Calif., 25s, 30s
Van Norman Industries, Inc., Electronics Div., N.H., 5sc, 10sc, 15sc, 25sc, 30sc
Waltham Electr. Corp., Mass., 10sc, 15sc
Wave/Particle Corp., Calif., 20, 30
Waveline, Inc., N.J., 25s, 30s
Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 5s, 10s, 15s, 25s, Tel: LOcust 8-6820
See ad on page 255
Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 5, 10, 25, 30, Tel: LOckwood 4-0121
See ads on pages 315, 384
Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 20sc, 35sc, Tel: JUdson 2-3030
See ad on page 704
Westronics of California, Calif., 25c, 30c

**Baffles:**
See class 56

**Ballasts:**
See class 78

**Battery chargers:**
See class 96

## 41. Batteries.

5. Dry
10. Mercury
15. Lead-acid
20. Nickel-cadmium
25. Nickel-alkali
30. Silver-cadmium
35. Silver-zinc
40. Solar
45. Zinc-carbon

Argonne Electronics Mfg. Corp., N.Y., 5s
Bright Star Industries, N.J., 5s
Burgess Battery Co., Dept. IRE, Foot of Exchange St., Freeport, Ill., 5s, 10s, 20s, Tel: ADams 2-2161
See ad on page 384
C & D Batteries, Div. The Electric Autolite Co., Pa., 15sc
Camera Equipment Co., Inc., N.Y., 20sc
Catalyst Research Corp., Md., 30c, 35c, Thermal c, Copper-Zinc c
Electric Autolite Co., The, Ohio, 15sc
Electronic Batteries, Inc., N.Y., 15sc
Gould-National Batteries, Inc., Nicad Division, Minn., 15sc, 20sc, 35sc
Gulton Industries, Inc., N.J., 20sc
Hoffman Electronics Corp., Calif., 40sc
Hoffman Electronics Corp., Semiconductor Div., Calif., 40sc
Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 20c, 35c, Tel: LUdlow 4-6200
See ads on pages 355, 487
International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 40s, Tel: OREgon 8-6281
See ad on pages 118-119
Itek Corp., Mass., 40c
Leesona Corp., P.O. Box 1605, Providence 1, R.I., Nuclear sc, Tel: WIlliams 1-5200
See ad on page 674
Mallory & Co., Inc., P. R., Ind., 5sc, 10sc, 45s
Munzig International, Inc., Calif., 5s
Nicad Division, Gould-National Batteries, Inc., Mass., 5sc, 20sc
Nippon Electric Co., Ltd., Japan, 40c
Philadelphia Scientific Glass Co., Pa., 10s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s
Radio Corp. of America, Electron Tube Div., Section 1-22-Q, 415 S. 5th St., Harrison, N.J., 5s, 10s, 45s, Tel: HUmboldt 5-3900
See ad on pages 54-55
Ray-O-Vac Co., Wis., 5c
Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 10s, Tel: HOpkins 7-3200
See ads on pages 385, 519

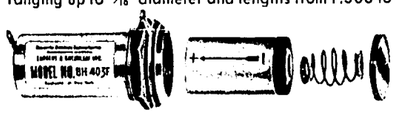

# BF SERIES

**BF Series Transistor Battery Holder accommodates batteries and cells with diameters up to 1⅜" and lengths from 1 19/64" to 7 3/16" making it possible to use different battery combinations to obtain a wide selection of DC voltages. Batteries can be exchanged simply by unscrewing the holder cap. Designed for mounting up to a 1¾" diameter hole and ⅜" thick panel.**

Inquiries for special battery holder length and diameters are invited.




300 SERIES: (B SERIES SHOWN) • Accommodates batteries ranging up to 7/16" diameter and lengths from 1.300 to 5.850.




400 SERIES: (F SERIES SHOWN) • Accommodates batteries ranging from 1" to 1⅛" diameter and lengths from 1 11/16" to 6 3/16".




500 SERIES: (B SERIES SHOWN) • Accommodates batteries ranging from 1 3/16" to 1 3/8" diameter and lengths from 2 3/16" to 7 3/16".

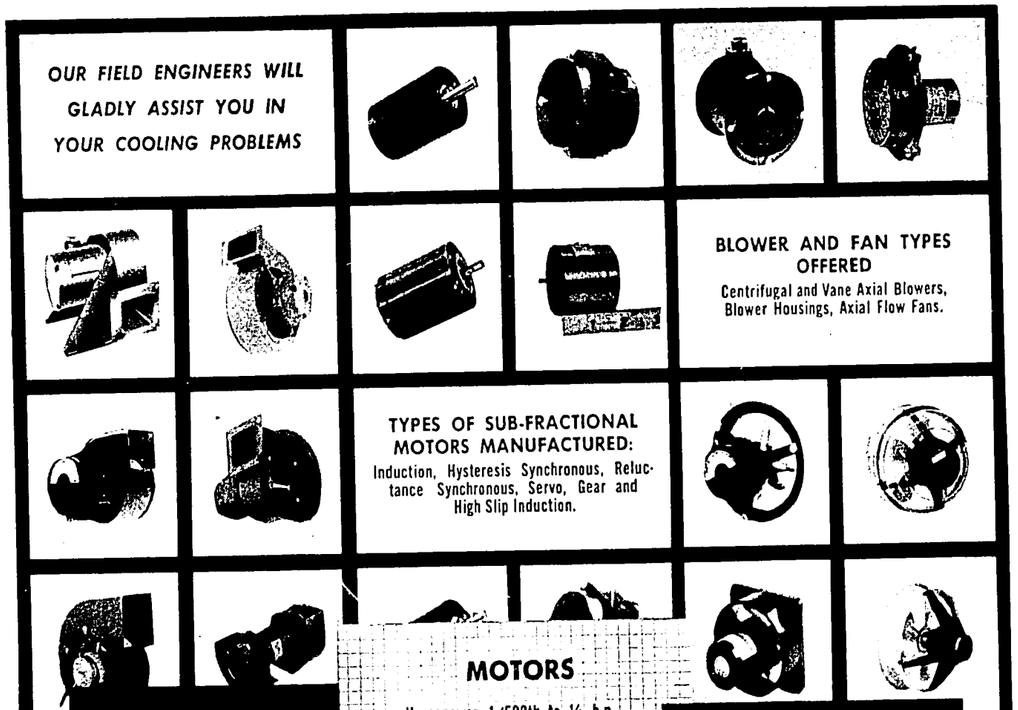
**SECURITY DEVICES LABORATORY**
ELECTRONICS DIVISION OF SARGENT & GREENLEAF, INC.
ROCHESTER 21, NEW YORK

For details, circle #303 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

OUR FIELD ENGINEERS WILL GLADLY ASSIST YOU IN YOUR COOLING PROBLEMS



BLOWER AND FAN TYPES OFFERED

Centrifugal and Vane Axial Blowers, Blower Housings, Axial Flow Fans.

TYPES OF SUB-FRACTIONAL MOTORS MANUFACTURED:

Induction, Hysteresis Synchronous, Reluctance Synchronous, Servo, Gear and High Slip Induction.

**BLOWERS**

| | |
|---|---|
| C F M | to 750 max |
| Types | Single, double, inverted |
| Housings | 2¼" to 11½", vertical, overall |
| Mountings | Flange, foot, cone |

**MOTORS**

| | |
|---|---|
| Horsepower | 1/500th to ½ h.p. |
| Speeds | 3600 rpm max. at 60 cps<br>24,000 rpm max. at 400 cps<br>Dual and Variable Speed Units |
| Frequency | Fixed . . . 50, 60 or 400 cps<br>Variable . . . 50 to 450 cps, and 320 to 1,000 cps<br>Special . . . as required |
| Voltage | Standard 115V and 230V<br>Special . . . as required |
| Phase | 1, 2 or 3 phase |
| Size | 1" O.D. to 4⅜" O.D. |

**FANS**

| | |
|---|---|
| C F M | to 1000 max |
| Types | Axial, vane axial, ALTIMATIC ® |
| Blades | 2" to 12" dia. |
| Mountings | Venturi, foot. |

Air-Marine motors and cooling units have been designed and tested to meet the specifications of both the military and industry.

**air•marine motors, inc.**

369 Bayview Ave.
Amityville, L. I., N. Y.
AM 4-3700

AIR-MARINE MOTORS, INC.

2221 Barry Ave.
Los Angeles, California
BR 2-6489

In Canada AAE Limited, Weston, Ontario

*WRITE TODAY FOR OUR NEW CATALOG*





SILVER CHLORIDE

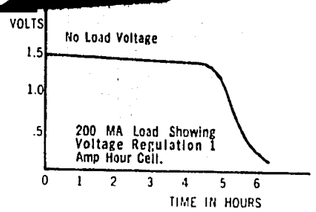
CALORO + + − − VOLT

BATTERIES

The newest development in batteries, these miniature units are capable of delivering large peak currents (10 amps/sq. in.) . . . May be recharged at 1 amp per sq. in. . . . Rapid depolarization. . . . Will withstand short circuits for sustained periods, recovering full potential in fraction of a second. Available in 5 sizes from ¼"D x ¼" to 2"D x ½" and from 300 to 6,000 MA hours.

Silver-Chloride, zinc, sea-water activated batteries also available . . . no gassing, no magnesium used.

We invite inquiries on special applications for unusual power source requirements.




DISCHARGE CURVE

*For detailed information and literature . . . write*

II 3 .14 16

THREE POINT ONE FOUR CORP.

24 Woodworth Ave., Yonkers, N. Y. • GReenleaf 6-4440

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IMMEDIATE DELIVERY!

*Motor Blower Assemblies!*

Compact, rugged construction. In stock from 4 to 150 CFM. Designed for applications where space and weight are prime factors. Blowers available without motors.

Write for literature.

Ripley's wide-range line of small motor-blowers offers a selection with a variety of models . . . one ideally suited for your specific job. Designed to meet your most exacting requirements and stocked for immediate delivery!

Why not let our engineers advise you?

Complete facilities for fabricating blower wheels, blowers, motor-blower assemblies for all industries. Estimates submitted promptly on receipt of blueprints or specifications.

Write for complete information today.

*Superior . . . through Research*

RIPLEY ESTABLISHED 1930

RIPLEY COMPANY INC.

MIDDLETOWN, CONNECTICUT

For details, circle #306 on Reader Service Card




# Directory II. Components

## 41. Batteries.

Semi-Elements, Inc., Pa., 4c
Solar Systems, Inc., Ill., 4c
Sonotone Corp., N.Y., 20s
Telecomputing Corp., Calif., 30s, 35s
Telecomputing Corp., Cook Batteries, Colo., 35c

Three Point One Four Corporation, 24 Woodworth Ave., Yonkers, N.Y., 30sc, 35sc, Tel: GReenleaf 6-4440
See ad on this page

Union Carbide Corp., Union Carbide Consumer Products Co., N.Y., 5s, 10s, 20s, 25s, 45s
Yardney Electric Corp., N.Y., 30s, 35s

Blower and fan motors:
See class 60

## 42. Blowers & Cooling Fans.

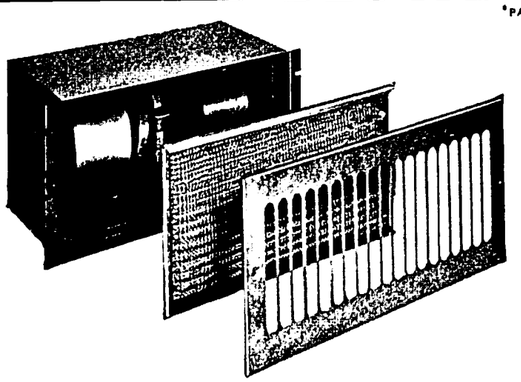
5. Air wheels & housings
10. Complete blower assemblies
15. Fan blades

Acro Products Corp., Ill., 10s
Air Control Installations, Ltd., England, 10sc
Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, L.I., N.Y., 10c, Tel: AMityville 4-3700
See ad on page 386
Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 10s, Tel: UNderhill 7-8500
See ad on page 623
American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 5sc, 10sc, Tel: DUnkirk 5-7401
See ad on page 164
Ashland Electric Products, Inc., N.Y., 10c
Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 10sc, 15s, Tel: WOodland 8-6833
See ad on page 465
Benson Mfg. Co., Mo., 5, 10, 15
Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 10s, Tel: HEnderson 1-7166
See ad on page 625
Budd Electronics, Inc., N.Y., 10c
Carroll Pressed Metal, Inc., Mass., 15c
Continental Electric Co., Inc., N.J., 10c
Dominion Electrohome Industries, Ltd., Canada, 5c, 10c
Eastern Air Devices, Inc., N.H., 10sc
Eastern Industries, Inc., Conn., 10c
Eicor Division, The Scranton Corp., Ill., 10c
Electric Indicator Co., Inc., Conn., 10c
Electric Specialty Co., Conn., 5c, 10c
Electro-Pack, Inc., Calif., 10s
Electronic Enclosures, Inc., Calif., 10c
Electronic Specialty Co., Calif., 10c
Emerson Apparatus Co., Mass., 10s

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# McLEAN
*Your Best Source For...*

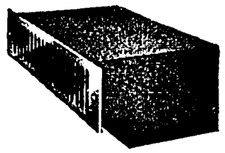
RACK MOUNTED
# FANS and BLOWERS*
*PATENTED



## STANDARD RACK MOUNTED FANS & BLOWERS

Over 15 models available in panel heights of 3½" to 12¼" in increments of 1¾". Range, 80 to 1200 cfm. All units feature quiet operation, no electrical noise and maximum air delivery. Blower units provide better air delivery against pressure and higher velocity for faster cooling. Highly reliable, rubber mounted, 115 volts, 60 cycle motors. Also Mil. Spec. and DC motors available. Permanent filters. Smart, heavy gauge, stainless steel grilles.

### RECESSED MODELS



Provide higher performance with minimum panel height. Filter and blower are recessed into the unused portion of the open base commercial type rack. Fit 3½", 5¼", 7", 8¾" and 10½" panel heights and deliver 150 cfm to 1200 cfm. Highly reliable, rubber mounted, 115 volts, 60 cycle motors. Mil. Spec. and DC motors available. Permanent filters.

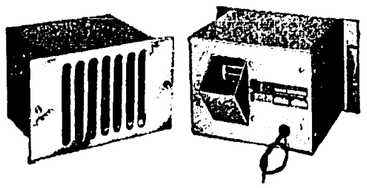
### REVERSIBLE FAN



Easy-to-install Filter Box Propeller Fan gives wide choice of cfm's and great mounting flexibility. Operates as blow or suck without rework. Compact, low-cost. Long, service-free life. Operates from various power sources.

### HALF PANEL WIDTHS

For narrow racks or where space is a problem. Fit half the width of standard 19" racks leaving balance of space for other components. Blower model (5¼" high) delivers 100 cfm. Fan model (7" high) delivers 225 cfm. Powered by highly reliable, rubber mounted, 115 volts, 60 cycle motors. Mil. Spec. and DC motors available. Permanent type filter.



HALF PANEL WIDTH FILTER-GRILLE ASSEMBLIES ALSO AVAILABLE



### MIL. SPEC. BLOWERS

Meet most rigid specifications. Mount in any position. Deliver 10 cfm. Fit 3¾" cube. Continuous duty, totally enclosed motor, 1/300 hp. 115 volts, 60 cycle, 3400 rpm.



### RING TYPE FANS

175 to 395 cfm. Fan diameters 6½" and 8". Motors totally enclosed, highly reliable, 115 volts, 60 cycle, 3000 rpm. Mil. Spec. and DC motors available. Other sizes available.

**FREE!** Engineering Booklet on Forced Air Cooling. Describes air convection methods. Includes design data, tables, charts, etc.

**FREE!** 31 page catalog loaded with helpful data. Shows complete line of fans, blowers.

**McLean Engineering Laboratories**
Princeton, New Jersey • Walnut 4-4440
TWX Princeton, New Jersey 636
mclean

For details, circle #307 on Reader Service Card



# HI VOLTAGE LOW INDUCTANCE CAPACITORS

Designed as high temperature gas discharge sources for Thermonuclear and similar type power research. Suitable for high peak energy within a short time constant and for blocking, bi pass service, power supply filters and similar applications.




### FEATURES

- Voltage Ratings up to 150KV.
- High energy content up to 4000 joules.
- Ringing frequency as high as 1.25 mcs.
- Hermetically sealed. Low cost per joule.

*Write for complete information and data sheets on Tub Type AE300B and Tubular Type AE301.*

*Axel*

*Manufacturers of*
High Voltage Capacitors
Low Inductance Capacitors
Pulse Forming Networks
Radio Noise Filters
Wire Wound Resistors

**AXEL ELECTRONICS**
*Div. of Axel Bros. Inc.*
134-20 Jamaica Ave., Jamaica, N.Y.
For details, circle #308 on Reader Service Card








# Directory II. Components

## 42. Blowers & Cooling Fans.

Eugene Engineering Co., Inc., Mass., 10c, 15c
Fasco Industries, Inc., N.Y., 10s
Flexaust Co., N.Y., Ducts, Flexible sc
Garrett Corp., The, Calif., 5c, 10sc
Giannini Controls Corp., Calif., 10c
Globe Industries, Inc., Ohio, 10c
Heinz Mueller Eng. Co., Inc., Ill., 5c, 10c, 15c
Heinze Electric Co., Mass., 10sc
Hoover Electric Co., Calif., 5c, 10c
**IMC Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 10sc, Tel: EDgewood 4-7070**
See ad on page 464
Industrial Plastic Fabricators, Inc., Mass., 5sc, 10sc, 15sc
Intelex Systems, Inc., N.Y., 10s
Joy Manufacturing Co., Pa., 10sc
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 10c, Tel: CLifford 6-4000**
See ad on pages 120-121
Kooltronic Fan Co., N.J., 10sc
Kroker Engineering & Development Co., Ill., 10c
Mamco Corp., Wis., 5s, 10c
Martindale Electric Co., Ohio, 10s
**McLean Engineering Laboratories, 70 Washington Rd., P.O. Box 228, Princeton, N.J., 5s, 10s, 15s, Tel: WAlnut 4-4440**
See ad on page 388
Nevada Air Products Co., Nev., 10c
Pesco Products Div., Borg-Warner Corp., Ohio, 10sc
Porter Co., Inc., H. K., Peerless Electric Div., Ohio, 5c, 10c, 15c
Radex Corp., Ill., 5c, 10sc, 15c
Redmond, Inc., Subsid. Controls Co. of America, Mich., 10sc
Revcor, Inc., Ill., 5c, 15c
Ripley Co., Inc., 1 Factory St., P.O. Box 31, Middletown, Conn., 5s, 10s, Tel: DIamond 6-6679
See ad on page 387
Rogers Mfg. Co., Dayton, Minn., 15c
Rotating Components, Inc., 267 Green St., Brooklyn 22, N.Y., 10c, 15c, Tel: EVergreen 9-3490
See ad on this page
Rotron Mfg. Co., Inc., N.Y., 10sc
Sanders Associates, Inc., N.H., 5s
Stokes Corp., F. J., Pa., 10sc
Torrington Mfg. Co., The, Specialty Blower Div., Conn., 5sc, 10c, 15c
Western Devices, Inc., 600 W. Florence Ave., Inglewood 1, Calif., 5sc, 10sc, Tel: ORegon 8-7827
See ad on page 624
Western Gear Corp., Electro-Products Div., Calif., 10c

Bobbins:
See class 91

Bolometers:
See class 21

Boosters:
See class 38

Boxes:
See class 84

Brakes:
See class 30

Breadboards:
See class 91

Bridges:
See class 5

Broadcast equipment:
See Directory I

Cabinets:
See class 84

Cable & wire:
See class 85

Calibrators, instrument:
See class 14

Calorimeters:
See class 21

Capacitor testers:
See class 14

## 43. Capacitors: Fixed.

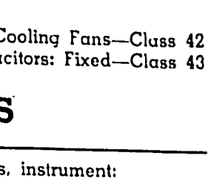
2. Ceramic
4. Decade
6. Electrolytic
8. Energy storage
10. Feed through
12. Fixed composition
14. Gas filled
16. Glass dielectric
18. High voltage
20. Metallized paper
22. Mica
24. Oil filled
26. Paper
28. Plastic insulated
30. Power factor
32. Precision air
34. Printed circuit
36. Pulse forming networks
38. Silvered mica
40. Tantalum
42. Vacuum

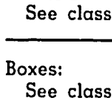
AMP Incorporated, Pa., 2c, 6c, 8c, 12c, 18c, 24c, 26c, 28c, 30c, 32c, 36c, 42c
Aerovox Corp., Mass., 2s, 4s, 6s, 8s, 10s, 12s, 18s, 20s, 22s, 24s, 26s, 28s, 30s, 34s, 36s, 38s, 40s
Airborne Accessories Corp., N.J., 10sc, 20sc, 22sc
Ajax Condenser Co., Inc., Ill., 6c, 8c, 18c, 24c, 26c, 28c, 34c

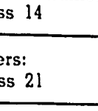
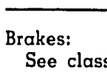

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ADAPTABLE TO THE WIDEST VARIETY OF APPLICATIONS TO FIT YOUR REQUIREMENTS

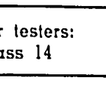
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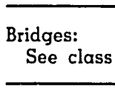
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**Fusion-sealed type:** Glass encapsulation with glass-to-metal leads to protect against severe environments, particularly moisture and vibration.

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Smallest, high-stability capacitors from any source. With tab or wire leads for printed circuits. 1 to 10,000 uuf.

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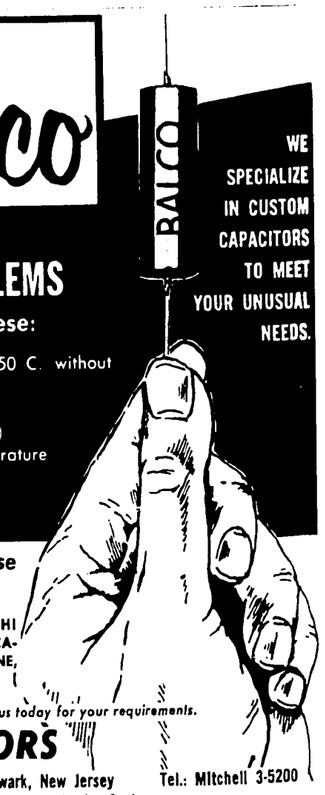

Allen-Bradley Co., Wis., 2sc, 10sc
Allis-Chalmers Mfg. Co., Wis., 8c, 18sc, 30sc
American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 2c, 10c. Tel: AMherst 5-3411
See ad on page 178
American Machine & Foundry Co., D.C., 2s
Amperex Electronics Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 42s, Tel: WEIls 1-6200
See ad on pages 42-45
Arco Electronics, Inc., N.Y., 4c, 6sc, 8c, 22sc, 28 Dielectric sc, 38sc
Arrow Radio Co., Canada, 24c, 26c
Astron Corp., N.J., 2s, 6s, 8s, 10s, 18s, 20s, 24s, 26s, 28s, 34s, 40s
Avnet Corp., Calif., 40s
Avnet Electronics Corp., N.Y., 2s, 6s, 8s, 12s, 16s, 18s, 20s, 22s, 24s, 26s, 28s, 38s, 40s
Axel Electronics, Inc., 134-20 Jamaica Ave., Jamaica 18, N.Y., 2c, 8c, 10c, 14c, 18c, 20c, 24c, 26c, 28c, 36c, Tel: AX 1-3900
See ad on page 388
Balco Capacitors, Inc., 50 Edison Pl., Newark 2, N.J., 8c, Plastic c, Metallized Plastic c, Tel: MItchell 3-5200
See ad on this page
Barco, Inc., Wis., 6s, 40s
Bel Fuse, Inc., N.J., 22c
Bellandi Co., Inc., M., Ill., 34c


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# Directory II. Components



Bendix Corp., The, Scintilla Div., Sidney, N.Y., 8c, 18c, 20sc, Tel: LOwell 3-9511
See ad on page 148
Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 36c, Tel: ORiole 8-3070
See ad on page 479
Cambridge Thermionic Corp., Mass., 2s
Capcon, Inc., N.Y., 4sc, 8sc, 10sc, 12sc, 18sc, 20sc, 24sc, 26sc, 28sc, 34sc
Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 2sc, 10sc, 18sc, 34sc, Tel: WOodruff 2-9200
See ad on page 152
Ceramic Specialties Co., Inc., Ohio, 2c
Chemtronic Corp., Tenn., 6c
Chicago Condenser Corp., 3255 W. Armitage Ave., Chicago 47, Ill., 10c, 12c, 18c, 20c, 24c, 26c, 30c, 34c, 36c, Tel: CApitol 7-7070
See ad on page 392
Columbus Electronics Corp., 1010 Saw Mill River Rd., Yonkers, N.Y., 14s, Tel: YOnkers 8-1221
See ad on page 505
Component Research Co., Inc., Calif., Plastic Film sc
Condenser Products Co., Conn., 12sc, 16sc, 18sc, 24sc, 28sc, 36sc
Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 2s, 4s, 6s, 8s, 10s, 12s, 18s, 20s, 22s, 24s, 26s, 28s, 30s, 34s, 36s, 38s, 40s, Tel: PLainfield 6-9000
See ad on Cover 3
Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 16s, 18s, 34s, Tel: FOrest 2-5571
See ads on pages 390, 523
Corning Glass Works, Electrical Products Div., N.Y., 10s
Corson Electric Mfg. Corp., 540 39th St., Union City, N.J., 8c, 18c, 24c, 26c, 28c, 36c, Tel: UNion 6-4227
See ad on page 390
Cosmic Condenser Co., 853 Whittier St., New York 59, N.Y., 6sc, 26s, 34sc, Tel: LUdlow 9-3360
See ad on this page
Dearborn Electronic Laboratories, Inc., Fla., 8c, 16c, 18s, 24sc, 26s, 28s, 30c
Dearborn Electronic Laboratories, Inc., Ill., 4c, 8c, 10c, 12sc, 16sc, 18c, 20sc, 24c, 26sc, 28c, 34sc
Diamond Electronics Corp., N.Y., 4c, 18c, 28c, RC Networks c
Dilectron Division, Bestran Corp., Calif., 2sc, 10sc, 18sc, 30sc, 34sc, 36sc
Dolinko & Wilkens, Inc., N.J., 18s, 42s
Du-Co Ceramics Co., Pa., 2c
EPIC, Inc., N.Y., 14s, 18s, 22s, 32s
Eclipse Electronics, Ltd., Canada, 10s, 24c, 26s, 28s
Efcon Incorporated, Patterson Place, Roosevelt Field, Garden City, L.I., N.Y., 8c, 12sc, 18s, 20c, 24c, 26c, 28sc, 34sc, 40sc, Tel: Pioneer 1-4200
See ad on pages 98-99
Electra Manufacturing Co., 4051 Broadway, Kansas City 11, Mo., 2sc, 34sc, Tel: WEstport 1-6864
See ad on page 526
Electralab Printed Electronics Corp., 179 "A" St., Industrial Ctr., Needham Heights 94, Mass., 34c, Tel: HIllcrest 4-3912
See ad on page 499
Electrical Utilities Co., Ill., 12c, 18c, 20c, 24c, 26c, 28c, 30c, 34c
Electro-Capacitors Co., Calif., 6sc, 8c
Electro-Chemical Engraving Co., Inc., N.Y., 34c
Electro Motive Mfg. Co., Inc., Willimantic, Conn., 2s, 10sc, 22sc, 26s, 38sc, Tel: HArrison 3-4551
See ad on page 168
Electro Scientific Industries, Ore., 4sc, 22sc
Electronic Applications, Inc., Conn., 4s





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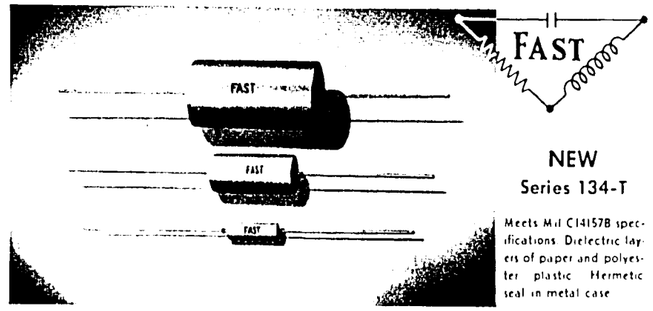
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# MUCON

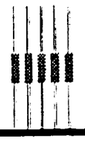
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are shaped to fit your

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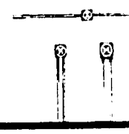
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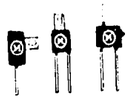
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CAM type capacitors. No derating to 65°C. 70% rated voltage at 85°C.

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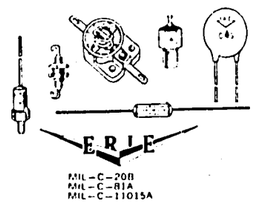
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For details, circle #770 on Reader Service Card

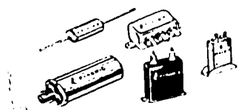


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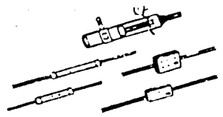

MIL-C-20B
MIL-C-81A
MIL-C-11015A

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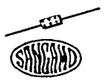

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JAN-C-62
MIL-C-18312





MIL-C-11272A

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MIL-C-5A

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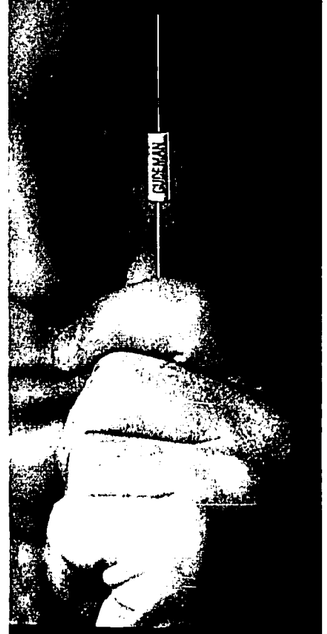
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And all progress* on high reliability capacitors means ever higher confidence levels, unprecedented reliability.

*Production under USAF-26244

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# Directory II. Components

## 43. Capacitors: Fixed.

Electronic Associates, Inc., N.J., 24c
Electronica Industrial Ltda., Brazil, 2sc
Elpac, Inc., Calif., 4c, 8c, 10c, 18c, 20c, 24c, 26c, 28c, 30c, 34c
Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 2s, 10s, 12s, 16s, 18s, 22s, 34s, 38s, Tel: GLendale 6-8592
See ad on pages 40-41
Espey Mfg. Co. Inc., Saratoga Industries Div., N.Y., 18c
FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 36s, Tel: RAvenswood 1-9000
See ad on pages 125-128
Fansteel Metallurgical Corp., North Chicago, Ill., 6s, 40s, Tel: DExter 6-4900
See ad on pages 130-131
Farnsworth Electronics Co., Pacific Div., Calif., 6sc, 18sc, 40sc
Fast & Co., John E., Subsid. Victoreen Instrument Co., 3594 N. Elston Ave., Chicago 18, Ill., 18s, 20s, 24s, 26s, 28s, 30s, 34s, 36s, Tel: JUniper 8-2715
See ad on page 391
Film Capacitors, Inc., 3400 Park Ave., New York 56, N.Y., 4c, 6s, 8sc, 18sc, 20sc, 28sc, Tel: CYpress 2-5181
See ad on page 479
Filtron Co., Inc., N.Y., 8c, 10sc, 18c, 20c, 24c, 26c, 28c, 30c, 36c
Flight Research, Inc., Va., 36sc
Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 4s, Tel: EVergreen 6-1300
See ad on page 566
General Circuits, Inc., N.Y., 34c
General Electric Co., Apparatus Sales Div., N.Y., 6sc, 8s, 10s, 12s, 18sc, 24sc, 28s, 30s, 36sc, 40s
General Electric Co., Capacitor Dept., N.Y., 6s, 8sc, 12s, 18s, 24s, 26s, 28s, 30s, 36sc, 40s
General Electric Co., Electronic Capacitor Product Section, S.C., 6sc, 8sc, 12sc, 18sc, 24sc, 26sc, 28sc, 30sc, 34sc, 36sc, 42sc
General Electric Co. Ltd. of England, Telephone Works, England, 26s
General Products Corp., N.Y., 26c
General Radio Co., 22 Baker Ave., West Concord, Mass., 4s, 22s, 28s, 32s, 38s, Tel: EMerson 9-4400
See ad on Cover 4
Geotronic Labs., Inc., Tex., 4c, 20c, 28sc
Girard-Hopkins, Calif., 24sc, 26sc, 30sc
Good-All Electric Mfg. Co., Neb., 2s, 6s, 18s, 24s, 26s, 28s, 34s
Gudeman Co. of California, Inc., The, Calif., 10sc, 26sc
Gudeman Co., The, 340 W. Huron St., Chicago 10, Ill., 6s, 8s, 10s, 12c, 18c, 20c, 24sc, 26sc, 30sc, Tel: DElaware 7-7400
See ad on this page
Gulton Industries, Inc., N.J., 2sc
Hallett Mfg. Co., Calif., 10s
Hamilton Standard Div., United Aircraft Corp., Conn., 34c
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Texas, 36c
Hopkins Engineering Co., Calif., 4c, 8c, 10sc, 12c, 20sc, 24sc, 26sc, 28sc, 30c, 34sc
Illinois Condenser Co., 1616 N. Throop St., Chicago 22, Ill., 6sc, 8sc, 26sc, 34sc, Tel: EVerglade 4-1300
See ad on page 158
Industrial Instruments, Inc., N.J., 4s
Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 8sc, 12sc, 18sc, 20sc, 28sc, 30c, Tel: LUdlow 4-6200
See ads on pages 355, 487
International Electronic Industries, Inc., Tenn., 2c, 6c, 10c, 28c, 34c, 40c
International Telephone & Telegraph Corp., ITT Components Div., N.J., 20sc, 40sc
Jeffers Electronics Div., Speer Carbon Co., Pa., 12c
Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 18s, 42s, Tel: CYpress 2-4025
See ad on page 550
Kemet Co., Div. Union Carbide Corp., Ohio, 40sc
Lacey Engineering & Mfg. Co., Ill., 34c
Lapp Insulator Co., Inc., Radio Specialities Div., 150 Sumner St., Le Roy, N.Y., 14c, 18c, Tel: LE Roy 385
See ad on pages 62-63
Leeds & Northrup Co., Pa., 22s, 32s, 38s
Leesona Corp., P.O. Box 1605, Providence 1, R.I., 8c, Tel: WIlliams 1-5200
See ad on page 674
Lignes Telegraphiques et Telephoniques, France, 28s, 40s
M.E.C., Inc., Tenn., 6c
Magnavox Co., Ind., 6c, 34c, 40sc
Mallory & Co., Inc., P. R., Ind., 6sc, 8s, 10s, 22s, 24sc, 26c, 34sc, 40sc
Materials for Electronics, Inc., N.Y., 2sc, 40sc
Metavac, Inc., N.Y., 22, 38
Mica Fabricating Co., N.J., 22c
Micamold Electronics Mfg. Corp., Div Gen. Instrument Corp., N.J., 5sc, 8c, 10sc, 18c, 20sc, 22sc, 24sc, 26sc, 28sc, 30c, 34c, 36c, 38sc, 40c
Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 2c, 16c, 34c, Tel: WAverly 6-2250
See ad on page 452
Mucon Corp., 9 St. Francis St., Newark 5, N.J., 2sc, Tel: MItchell 2-1476
See ad on page 392
Muirhead & Co. Ltd., England, 4s, 22s, 26s, 32s
Muirhead Instruments, Inc., N.Y., 4s, 22s, 26s
Mullenbach Div., Electro Machinery Mfg. Co., Electronic Dept., Calif., 2c
Munzig International, Inc., Calif., 2s, 4s, 22s, 38s
Murata Mfg. Co., Ltd., Japan, 2s, 10c, 12c, 18c
Muter Division, The Muter Co., Ill., 2sc, 10c, 18c, 34c, 36c
Neptune Electronics Co., N.Y., 24c, 26c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# tan-TI-cap CAPACITOR STABILITY ASSURED BY 250-HOUR PERFORMANCE LOAD TEST

## PREMIUM QUALITY AND STABILITY ASSURED BY 100% "BURN IN"

★ Each capacitor is stabilized for 250 hours at maximum rated temperature and voltage prior to shipment.

**TYPE SCM**
203 Standard Ratings
6 volts to 35 volts: 1μf to 330μf
±10% and ±20% tolerances

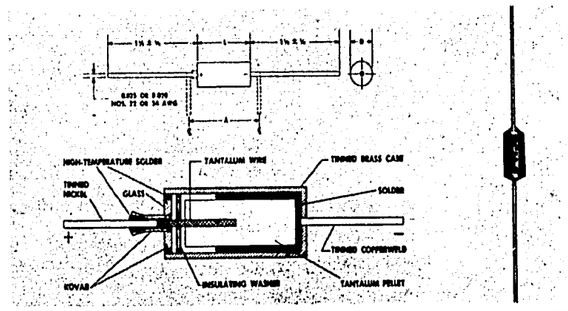
| Capacity Microfarads | | DC Working Voltage | | | | |
|---|---|---|---|---|---|---|
| | | 6 Volts | 10 Volts | 15 Volts | 20 Volts | 35 Volts |
| ±20% | ±10% | Case Size | Case Size | Case Size | Case Size | Case Size |
| 1.0 | 1.0 | F | F | F | F | F |
| | 1.2 | F | F | F | F | B |
| 1.5 | 1.5 | F | F | F | F | B |
| | 1.8 | F | F | F | F | B |
| 2.2 | 2.2 | F | F | F | F | B |
| | 2.7 | F | F | F | B | B |
| 3.3 | 3.3 | F | F | F | B | B |
| | 3.9 | F | F | B | B | B |
| 4.7 | 4.7 | F | F | B | B | B |
| | 5.6 | F | B | B | B | B |
| 6.8 | 6.8 | F | B | B | B | B |
| | 8.2 | B | B | B | B | G |
| 10 | 10 | B | B | B | B | G |
| | 12 | B | B | B | B | G |
| 15 | 15 | B | B | B | B | G |
| | 18 | B | B | B | G | G |
| 22 | 22 | B | B | B | G | G |
| | 27 | B | B | G | G | H |
| 33 | 33 | B | B | G | G | H |
| | 39 | B | B | G | G | H |
| 47 | 47 | B | G | G | G | H |
| | 56 | B | G | G | H | |
| 68 | 68 | G | G | G | H | |
| | 82 | G | G | H | H | |
| 100 | 100 | G | G | H | H | |
| | 120 | G | G | H | H | |
| 150 | 150 | G | H | H | | |
| | 180 | G | H | | | |
| 220 | 220 | H | H | | | |
| | 270 | H | | | | |
| 330 | 330 | H | | | | |

★ Type SCM units are lot sampled. Type SCM-E units are individually "burned in".

Military and Industry Standard Ratings and Case Sizes

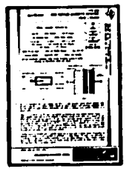
Operating Temperature Range: −80°C to +85°C at rated voltage, +125°C at 2/3 rated voltage.
DC Leakage Limits (Initial): 0.04μa/μfv @ 25°C
0.4μa/μfv @ 85°C
0.5μa/μfv @ 125°C
Dissipation Factor: 6% maximum @ 25°C
Surge Voltage Rating: 130% of rated
TI Stability Test Specification:
★ *Each capacitor shall be operated for 250 hours at rated temperature and voltage prior to final acceptance and shipment.*
Dynamic DC Leakage Test:
Capacitors are tested at rated voltage and temperature for intermittent leakage instability (noise, scintillation, arcing, etc.)
Life Test:
Lot tested for 2000 hours at rated temperature and voltage.
Units meet or exceed MIL-C-55057 (Sig C) and/or MIL-C-21720A (Navy).
Reverse Voltage Capability
Hermetically sealed, corrosion resistant case
Solid electrolyte eliminates leakage and dehydration
High stability with respect to time and temperature permits maximum circuit design use.
Performance proved in exacting commercial, industrial, and military applications.

Complete specifications available upon request.




| case size | D +0.010 −0.005 | L ±0.031 | *A ±0.031 | wire size AWG | avg. wt. gms. | with KEL-F insulating sleeve D +0.025 −0.010 | with KEL-F insulating sleeve L ±0.062 | with KEL-F insulating sleeve avg. wt. gms. | with Mylar insulating sleeve** D ±0.010 | with Mylar insulating sleeve** L ±0.031 | with Mylar insulating sleeve** avg. wt. gms. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | 0.125 | 0.250 | 0.482 | 24 | 0.4 | 0.162 | 0.337 | 0.5 | 0.135 | 0.322 | 0.4 |
| B | 0.175 | 0.438 | 0.688 | 24 | 1.1 | 0.210 | 0.525 | 1.3 | 0.185 | 0.510 | 1.2 |
| G | 0.279 | 0.650 | 0.888 | 22 | 2.7 | 0.315 | 0.735 | 3.1 | 0.289 | 0.722 | 2.8 |
| H | 0.341 | 0.750 | 0.988 | 22 | 3.3 | 0.377 | 0.835 | 3.9 | 0.351 | 0.822 | 3.4 |

* Dimension "A" determined by suspending a one-pound weight from one lead and rotating the case from the vertical position to the horizontal position, and then repeating the procedure for the other lead.
** Meets all requirements of MIL-C-55057 and MIL-C-21720A, including dimensions.



Write to your nearest TI sales office on your company letterhead for Bulletin DL-C 1173 which gives detailed specifications on the complete SCM series.

**TEXAS INSTRUMENTS**
INCORPORATED
SEMICONDUCTOR-COMPONENTS DIVISION
13500 N. CENTRAL EXPRESSWAY
POST OFFICE BOX 312 • DALLAS, TEXAS

For details, circle #318 on Reader Service Card

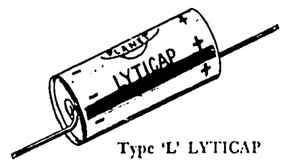




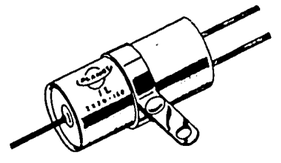
## PLANET CAPACITORS ARE

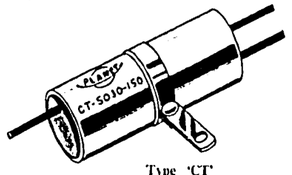
- *guaranteed for one year*
- *engineered for quality*

Whether you are a distributor, design engineer or industrial purchasing agent, you will find that our product is good, our service friendly and dependable, and our prices reasonable.

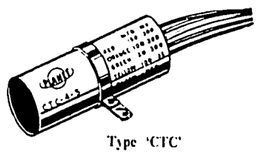


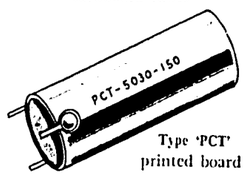
Type 'L' LYTICAP


Type 'IL' dual LYTICAP

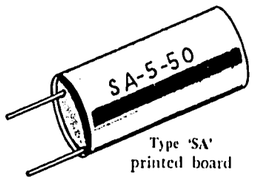


Type 'CT' cardboard tubes

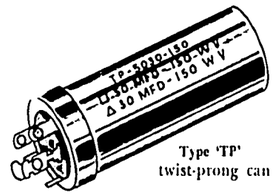

Type 'CTC'



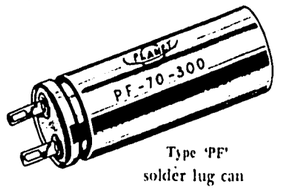
Type 'PCT' printed board



Type 'SA' printed board



Type 'TP' twist-prong can



Type 'PF' solder lug can

**PLANET MANUFACTURING CORP.**
BLOOMFIELD, NEW JERSEY
Pilgrim 3-2874

For details, circle #319 on Reader Service Card

## TANTALYTIC® CAPACITORS

We maintain a complete stock of all catalogued GE Tantalytic Capacitors. Expensive inventory, yes . . . but we are interested in all our customers, not just the users of the more popular types.

*Send for Special Guide to Selection of GE Tantalytic Capacitors*

Schweber ELECTRONICS
For Fast Delivery at Factory Prices—Call . . .
60 HERRICKS ROAD, MINEOLA, L.I., N.Y. PIONEER 6-6520. TWX G-CY-NY-580U

For details, circle #320 on Reader Service Card



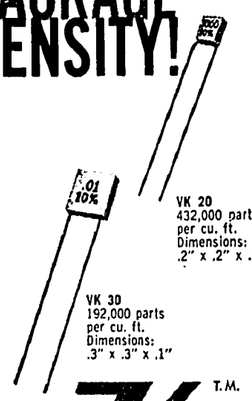
# Directory II. Components

## 43. Capacitors: Fixed.

New England Scientific Instruments Co., Mass., 14s
Nippon Electric Co., Ltd., Japan, 20s, 20os, 28s, 38s, 40s, 42c
Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 6sc, 40sc, Tel: ORchard 5-2600
See ad on pages 78-79
Packard Bell Electronics Corp., Calif., 2s
Paktron Division, Illinois Tool Works, Va., 24c, 28s, 34s
Patterson Moos Research, Div. Leesona Corp., N.Y., 8c
Philips Electronics Industries Ltd., Canada, 2s, 6s, 22s, 20s, 30s, 34s
Planet Mfg. Corp., 225 Belleville Ave., Bloomfield, N.J., 6sc, 34sc, Tel: PIlgrim 3-2874
See ad on this page
Plastic Capacitors, Inc., 2620 N. Clybourn Ave., Chicago 14, Ill., 4c, 8sc, 18sc, 20s, 24sc, 26sc, 28sc, 30sc, 36sc, Tel: DIversey 8-3735
See ad on page 396
Potter Co., The, Ill., 8c, 10c, 18s, 20c, 24s, 20s, 28s, 34c
Presin Co., 2014 Broadway, Santa Monica, Calif., 20s, 36s, Tel: EXbrook 3-9738
See ad on page 519
Prototype Transformer Corp., N.J., 30c, RC Networks c
Pyramid Electric Co., S.C., 6sc, 10c, 18c, 20sc, 24sc, 2osc, 28sc, 34sc, 40sc
Quality Components, Inc., Pa., 12s
Radio Corporation of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 2sc, 6sc, 16sc, 40sc, Tel: RAndolph 2-3200
See ad on pages 56-57
Radio Industries, Inc., Ill., 2c, 10c, 18c, 22c, 34c
Radio Materials Co., Ill., 2s
Resitron Laboratories, Inc., Calif., 18c
Rinco, Inc., Ore., 4s
Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 32c, Tel: LOckwood 5-4578
See ad on page 324
Rohde & Schwarz, 111 Lexington Ave., Passaic, N.J., 4s, Tel: PRescott 3-8010
See ad on page 246
San Fernando Electric Mfg. Co., Calif., 4c, 8c, 10sc, 12c, 20sc, 24c, 2osc, 28sc, 34sc, 36c
Sangamo Electric Co., Ill., 6s, 8s, 10s, 12s, 18s, 20s, 22s, 24s, 2os, 28s, 30s, 34s, 36s, 38s
Southern Electronics Corp., 150 W. Cypress Ave., Burbank, Calif., 4c, 8c, 10c, 16c, 18c, 24c, 28c, 34c, Tel: VIctoria 9-3193
See ad on page 208

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

HIGH PACKAGE DENSITY!




T.M.

micro-miniature

CERAMIC CAPACITORS

- Decimal dimensioned case
- Max. volumetric efficiency
- Contiguous flush-mount
- 47-10,000 mmf
- 200 vdc without derating
- −55°C to 150°C operation

"VK" capacitors are designed with square precision molded cases in only two sizes and a single standard 0.2" lead spacing for all values. Continuous life and environmental testing, plus 100% tests for Dissipation Factor, Insulation Resistance, and Capacitance guarantee that each "VK" capacitor in your circuit will perform as predicted.

ALSO UNCASED FOR COMPLETE ASSEMBLY ENCAPSULATION



Same electrical characteristics as standard "VK" series. Each unit coated with a resilient protective compound. Dimensions: 47-100 mmf, .100" square; 120-270 mmf, .130" square; 330-1000 mmf, .150" square; 1200-3300 mmf, .250" square; 3900-10,000 mmf, .265" square.

Vitramon® incorporated

BOX 544 • BRIDGEPORT 1 CONN

For details, circle #321 on Reader Service Card




Speer Carbon Co., Onondaga Electronics Div., N.Y., 2c, 34c
Sprague Electric Co., Mass., 2s, 4sc, 6s, 8s, 10s, 12s, 18s, 20s, 22s, 24s, 26s, 28s, 30s, 34s, 36s, 38s, 40s
Stackpole Carbon Co., Pa., 12s
Standard Condenser Corp., Ill., 18c, 24c, 26sc, 28sc, 30c, 34c
Standard Pressed Steel Co., Pa., 2s, 6s, 20s, 34s, 40s
Standard Telephones & Cables Ltd., England, 6s, 20s, 24s, 26s, 28s, 30sc, 42s
Steafix, France, 22s, 28s, 34s, 36c, 38s
Sullivan Ltd., H. W., N.Y., 22s, 32s, 38s
Tansitor Electronics, Inc., Vt., 40sc
Technical Ceramics & Lava Corp., N.J., 2
Telecomputing Corp., Calif., 2s, 10s, 28s, 40s
Telecomputing Corp., Electronic Components Div., Calif., 2s, 10s, 36c,
Telegraph Condenser Co. Ltd., The, England, 2s, 4s, 6s, 8s, 10s, 12s, 18s, 22s, 24s, 26s, 28s, 30s, 34s, 36sc, 38s, 40s
Texas Capacitor Co., Div. K-C-K Corp., Tex., 10c, 18c, 20c, 24c, 26c, 28s, 34c
**Texas Instruments Incorporated, Semiconductor-Components Div., 13500 N. Central Expressway, Dallas, Texas, 6s, 34s, 40s, Tel: ADams 5-3111**
**See ad on page 394**
Thompson Ramo Wooldridge, Inc., Calif., 2s
Topic Incorporated, Mass., 6sc, 8sc
**Trionics Corp., P.O. Box 548, Madison 1, Wis., 34c, Tel: CEdar 8-2616**
**See ad on page 663**
Underwood Electrical & Mfg. Co., Inc., Ill., 22c, 38sc
United Electronic Mfg. Corp., N.J., 6sc
**United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 2c, 38c, Tel: BEekman 3-8870**
**See ads on pages 533, 699**
U. S. Semiconductor Products, Div. United Industrial Corp., Ariz., 6c, 40s
Universal Can & Condenser Co., Ill., 8c, 10c, 18c, 20c, 24c, 26c, 28c, 30c, 34c
**Vitramon, Inc., P.O. Box 544, Bridgeport 1, Conn., 2sc, 10s, 12s, 16s, 30s, 34s, 36s, Tel: AMherst 8-1656**
**See ad on this page**
**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 14s, 32s, Tel: LOcust 8-6820**
**See ad on page 255**
Wells Co., Inc., Gary, N.Y., 6sc
Wells Electronics Co., Ind., 4c, 22s, 38s
Wesco Electrical Co., Inc., Mass., 18sc, 20sc, 24sc, 26sc, 28sc, 34sc
**White Instrument Laboratories, P.O. Box 9006, Austin 17, Tex., 36c, Tel: GLendale 3-8447**
**See ad on page 447**
Winslow Co., Inc., The, N.J., 4sc


One Reliable Source for:

- High voltage capacitors to 120KV cataloged. Higher voltages available.
- Highly accurate polystyrene capacitors in 4 case styles.
- Small, compact, medium voltage capacitors 2KV to 50KV.
- Metallized Mylar* Capacitors, the smallest and most reliable in the low voltage range.
- Pulse forming networks . . . power and high REP rate type . . . 600 volts to 40KV.
- Miniature paper dielectric capacitors.
- High voltage power supplies: output: 500 to 75 KVDC. inputs: any voltage 60, 400, 1000 and more cps as well as 5 to 50 volts DC.
- Oil-filled, air-operated and the compact potted types are available.

Write for Literature

Plastic Capacitors, INC.

2620 N. Clybourn Chicago 14, Illinois DI 8-3735

For details, circle #322 on Reader Service Card






# Directory II. Components

## 44. Capacitors: Variable.

5. Neutralizing
10. Precision variable
15. Temperature compensating
20. Trimmers, air
25. Trimmers, ceramic
30. Trimmers, glass
35. Trimmers, vacuum
40. Tuning

A.R.F. Products, Inc., Ill., 10c
**American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 25c, Tel: AMherst 5-3411**
**See ad on page 178**
American Machine & Foundry Co., D.C., 15s
Atlee Corporation, Mass., 10sc, 20sc, 25sc, 30sc
Barker & Williamson, Inc., Pa., 5sc, 40sc, Phase Split Networks sc
Bright Radio Labs., Inc., N.Y., 20c, 40c
**Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 5s, 10s, 20s, 40s, Tel: HEnderson 1-7166**
**See ad on page 625**
Cardwell Condenser Corp., N.Y., 5sc, 10sc, 15sc, 20sc, 40sc
**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 25sc, Tel: WOodruff 2-9200**
**See ad on page 152**
Component Research Co., Inc., Calif., 10sc, 20sc, 30sc
**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 5sc, Tel: YOnkers 3-5900**
**See ad on page 523**
Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 10s, 30s, Tel: FOrest 2-5571
**See ads on pages 390, 523**
Corning Glass Works, Electrical Products Div., N.Y., 30s
Diamond Electronics Corp., N.Y., 15c
Dolinko & Wilkens, Inc., N.J., 35s
Du-Co Ceramics Co., Pa., 25c
Electro Motive Mfg. Co., Inc., Willimantic, Conn., 35 Mica s, Tel: HArrison 3-4551
**See ad on page 168**
Elveco Etablissements, France, 10sc, 20sc, 25sc, 40sc
English Electric Valve Co., Ltd., England, High Vacuum s
Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 15s, 25s, 40s, Trimmers Plastic s, Tel: GLendale 6-8592
**See ad on pages 40-41**
Fastex Div., Illinois Tool Works, Ill., 25c
General Instrument Corp., Semiconductor Div., N.J., 10sc
**General Radio Co., 22 Baker Ave., West Concord, Mass., 10s, Tel: EMerson 9-4400**
**See ad on Cover 4**
Gombos Co., Inc., John, N.J., 10c
Gulton Industries, Inc., N.J., 15sc
Hammarlund Mfg. Co., Inc., N.Y., 5sc, 10sc, 20sc, 40sc
**Hughes Aircraft Co., Hughes Semiconductor Div., P. O. Box 278, Newport Beach, Calif., Silicon s, Tel: LIberty 8-0671**
**See ads on pages 188, 538**
**International Rectifier Corp., 233 Kansas St., El Segundo, Calif., Silicon Voltage s, Tel: ORegon 8-6281**
**See ad on pages 118-119**
**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 10sc, 15c, 25s, 30sc, 40c, Tel: DEwey 1-1000**
**See ad on pages 76-77**
**Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 35s, Tel: CYpress 2-4025**
**See ad on page 550**
Johanson Mfg. Corp., N.J., 10c, 20sc, 30sc, 40c
Johnson Co., E. F., Minn., 5s, 20sc, 40sc
La Pointe Industries, Inc., Conn., 5c, 10sc, 15sc, 20sc, 35sc, 40sc
**Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 40c, Gas-Filled c, Tel: LE Roy 385**
**See ad on pages 62-63**
Marstan Electronics Corp., N.Y., 5s, 10s, 15s
Microwave Associates, Inc., Mass., Diode-Types s
Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5sc, 10c, 20sc, 40sc, Tel: DAvenport 4-4108
**See ad on page 402**
Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 25c, 30c, Tel: WAverly 6-2250
**See ad on page 452**
Muirhead Instruments, Inc., N.Y., 10s
Munzig International, Inc., Calif., 20s, 25s, 40s
Murata Mfg. Co., Ltd., Japan, 10c, 15c, 25c, 30c
Muter Division, Ill., 15c, 25c
**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 10, 20, Tel: NOrmandie 5-4800**
**See ad on page 614**
Nilsen Mfg. Co., Ill., Phase Shifting sc
**Oak Manufacturing Co., Dept. R, 1260 N. Clybourn, Chicago 10, Ill., 10c, 40c, Tel: MOhawk 4-2222**
**See ad on pages 86-87**
Pacific Semiconductors, Inc., Calif., Voltage sc
Philips Electronics Industries, Ltd., Canada, 20s, 25s
Radio Condenser Co., N.J., 10c, 20c, 40c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 10c, 15c, Tel: LOckwood 5-4578**
**See ad on page 324**
Sickles Div., F. W., General Instrument Corp., Mass., 10c, 20c
**Southern Electronics Corp., 150 W. Cypress Ave., Burbank, Calif., 10s, Tel: VIctoria 9-3193**
**See ad on page 208**
Stocker & Yale, Inc., Mass., 40sc
Sullivan, Ltd., H. W., N.Y., 10s
Technical Ceramics & Lava Corp., N.J., 25
Telecomputing Corp., Calif., 15s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 10sc, Tel: YE 2-8600**
**See ad on page 338**
Telegraph Condenser Co., Ltd., England, 25s
Transitron Electronic Corp., Mass., Silicon sc
Vacap Corp., N.J., 35s
Van Norman Industries, Inc., Electronics Div., N.H., 10sc, 40sc
Wells Co., Inc., Gary, N.Y., 40s
Wells Industries Corp., Basic Electronic Controls Div., Calif., 10sc, 20s
Wesco Electrical Co., Inc., Mass., 30sc

**Carbon resistors:**
**See class 69**

**Caps, vacuum tube:**
**See class 104**

**Castings, waveguide:**
**See class 83**

**Cathode ray tubes:**
**See class 77**

**Cavities, waveguide:**
**See class 83**

**Changers, record:**
**See class 61**

**Chassis slides:**
**See class 87**

**Chokes:**
**See class 45**

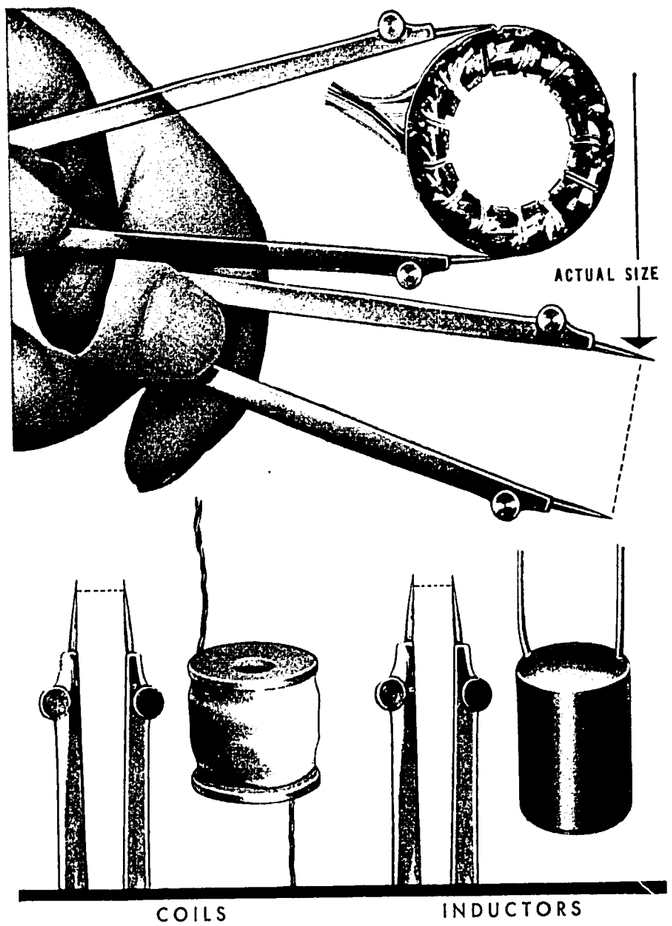
**Choppers:**
**See class 47**

**Circuit breakers:**
**See class 72**

**Circuit testers:**
**See class 14**

**Circuits, printed & packaged:**
**See class 64**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.




COILS INDUCTORS

**MINIATURE COILS, EXACTLY AS YOU SPECIFY**

. . .manufactured on a production basis

We have the facilities to produce consistent quality miniature coils, components, and Luxolene molded fine wire coils on a production basis, and engineered to fit your exact specifications.

The Miniature Products Division was founded to furnish electrical and electronic manufacturers with bobbin wound miniature coils—molded fine wire coils—self supported coil assemblies—completed assemblies (plain or encapsulated)—molded inductors—printed circuit board assemblies, etc.

The facilities of the Miniature Products Division are especially designed and equipped to produce up to and including 56 gauge ultra-fine wire coils and other custom built components.

Luxolene encapsulated fine wire coils resist moisture, acids and abrasive conditions.




MINIATURE PRODUCTS DIVISION

**Deluxe COILS, INC.** WABASH, INDIANA

For details, circle #323 on Reader Service Card





Circulators, ferrite:
See class 83

Clamps, tube:
See class 104

Clips, cable:
See class 91

Clips, test:
See class 55

Clocks, digital:
See class 9

Clutches, magnetic:
See class 30

Coaxial cable:
See class 85

Coil dope:
See class 95

Coil forms, ceramic:
See class 86

Coil winding machines:
See class 96


## 45. Coils.

5. Audio frequency chokes
10. Deflection yokes
15. Filter
20. Flyback
25. Focusing coils
30. IF chokes
35. Magnet
40. Power chokes
45. RF chokes
50. Relay
55. Solenoid
60. Toroids
65. Tuning

A C Electronics, Inc., Calif., 5sc, 15sc, 30sc, 35sc, 40sc, 45sc, 60sc

**ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 5c, 10c, 15c, 30c, 40c, 45sc, 60c, Tel: VIctoria 9-2414**

See ad on page 474

**ADC Incorporated, 2863 13th Ave. S., Minneapolis 7, Minn., 5sc, 15sc, 40sc, 45c, 60sc, Tel: PArkway 1-5551**

See ad on page 564

A.P.W. Co., N.J., 15c, 25c, 35c, 55c, 60c
Ace Coil & Electronics Co., N.J., 30c, 35c, 45c, 50c, 55c
Acme Wire Company, The, Conn., 35c, 50c, 55c
Acromag, Incorporated, Mich., 60c
Advance Ross Electronics Corp., Ill., 10c, 20c
Advanced Electronics, Inc., Conn., 55c
Advanced Research Associates, Inc., Md., 60sc
Aerolite Electronics Corp., N.J., 30c, 45c
Aetna Electronics Corp., Readington Rd., North Branch, N.J., 65c, Tel: RAndolph 5-1000

See ad on page 277

Airpax Electronics, Inc., Cambridge Div., Jacktown Rd., Cambridge, Md., 5sc, 60sc, Tel: AC 8-4600

See ad on pages 82-83





# Directory II. Components

## 45. Coils.

**Airpax Electronics, Inc., Seminole Div., Fort Lauderdale, Fla., 15c, 60s, Tel: LUdlow 3-6160**

See ad on pages 82-83

Aladdin Electronics, Div. Aladdin Industries, Inc., Tenn., 30c, 45c
Alcon Metal Products, Inc., Ill., 65c

**All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 15c, 45c, 55c, Tel: EDgewood 3-3090**

See ad on page 439

**Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., 35c, 50c, 55c, Tel: BUtterfield 8-7403**

See ad on page 508

Altec Lansing Corp., Calif., 5s, 15s

**American Measurement & Control, Inc., Mass., 55c**

**American Molded Products Co., 2723 W. Chicago Ave., Chicago 22, Ill., 10c, ARmitage 6-3235**

See ad on page 639

American Research & Mfg. Corp., Md., 60s
Applied Electro Mechanics, Inc., Va., 65c
Ardente Acoustic Labs., Ltd., England, 5sc
Arnold Magnetics Corp., Calif., 5c, 40c, 60c
Artisan Electronics Corp., N.J., 50sc, 55sc
Associated Spring Corp., Conn., 65c
Atlantis Electronics Corp., Tex., 60c
Atlas Engineering Co., Inc., Mass., 5c, 15c, 35c, 40c, 60c

**Automatic Coil Co., Inc., 195 Sackett St., Brooklyn 31, N.Y., 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c, 60c, 65c, Tel: ULster 2-5454**

See ad on this page

Automation Industries, Inc., Magnetic Div., Calif., 15c, 25c, 30c, 35c, 40c, 45c, 55c
Autotron, Inc., Calif., 55c
Barker & Williamson, Inc., Pa., 5c, 15c, 30c, 45c, 60c, 65c, Rotary c, Transmitting c
Barwood Electronics, Inc., Calif., 40c
Bellaire Electronics, Inc., N.J., 45c
Bendix Corp., The, Bendix-Pacific Div., Calif., 55c
Bendix Corp., The, Montrose Div., Pa., 10c, 35c
Berkshire Transformer Corp., Conn., 15c, 40c
Bittermann Electric Co., Inc., Conn., 5c, 15c, 25c, 35c, 40c, 45c, 55c, 60c
Black & Webster, Inc., Mass., 55s

**Branson Corp., 41 S. Jefferson Rd., Whippany, N.J., 50sc, Tel: TUcker 7-1100**

See ad on page 511

**Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 45s, Tel: HEnderson 1-7166**

See ad on page 625

Bundy Electronics Corp., N.J., 40sc

**Burnell & Co., Inc., 10 Pelham Pkwy., Pelham Manor, N.Y., 60c, Tel: PElham 8-5000**

See ad on pages 88-89

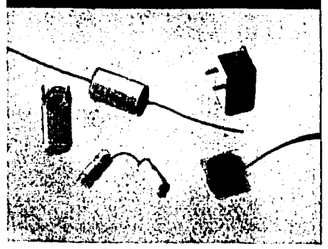
CGS Laboratories, Inc., Conn., 60c, 65s
Caddell-Burns Mfg. Co., Inc., N.Y., 30sc, 45sc, 55sc, 65sc
Caledonia Electronics & Transformer Corp., N.Y., 5c, 15c, 40c, 60c
Cambridge Thermionic Corp., Mass., 5sc, 30sc, 45sc, 60c, 65sc
Campbell Co., Inc., Colin, Conn., 60c
Canadian Marconi Co., Canada, 5c, 15c, 35c, 40c, 45c, 50c, 55c
Carad Corp., Calif., 5sc, 15sc, 30c, 35c, 40c, 45sc, 50c, 55sc, 60sc, 65sc
Carmody Corp., N.Y., 35c
Cedar Engineering Div., Control Data Corp., Minn., 60c

**Celco—Constantine Eng. Labs. Co., 70 Island Ave., Mahwah, N.J., 5c, 10sc, 15c, 20c, 25sc, 60sc, Tel: DAvis 7-1123**

See ads on pages 60-61, 84-85

Central Transformer Co., Ill., 5c, 15c, 35c, 40c
Chet Engineering Co., Calif., 35c, 55c

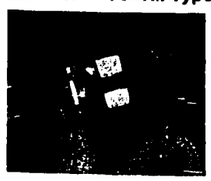

**COILS**



**Designed and Produced by Forbes and Wagner**

The F&W specially designed coils shown above have solved specific problems. We will be glad to put our coil experience to work for you.

**Typical F & W Coils: Relay IF RF Saturable Reactor Antenna Choke Solenoid Color Purity Toroidal Magnet Inductor TV—All Types Variable**



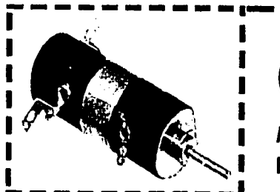
The F&W subminiature coils in this sub-miniature relay were designed and built in cooperation with a large electrical manufacturer. Write for illustrated brochure.

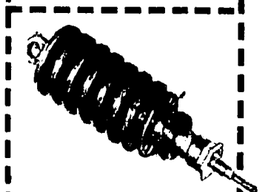
*forbes and wagner, inc.*

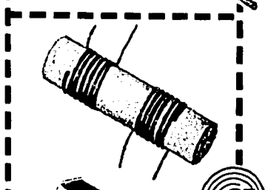
**350 Central Avenue**

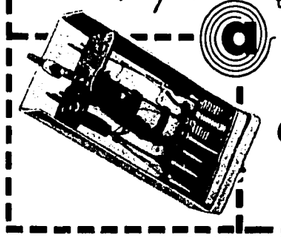
**Silver Creek, N. Y. • Phone YE 4-2691**

For details, circle #324 on Reader Service Card









**COILS**

**MANUFACTURED TO MEET AND EXCEED MIL-C-15305A SPECS**

**OSCILLATOR • RF and IF TRANSFORMERS • BOBBIN WOUND • VARIABLE PITCH • FERRITE ANTENNA • RF CHOKES • PRINTED CIRCUIT • ENCAPSULATED • CUP CORE ASSEMBLIES •**

**DELAY LINES • FILTERS TOROIDALS PULSE TRANSFORMERS**

AUTOMATIC COIL COMPANY specializes in the custom manufacture of coils and electronic assemblies of any design to meet MIL-C-15305A and commercial specifications.

*SEND YOUR REQUIREMENTS FOR PROMPT, COMPETITIVE QUOTATIONS*

**AUTOMATIC COIL COMPANY, INC.**

195 Sackett St., Brooklyn 31, N.Y.
ULster 2-5454

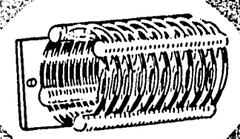
For details, circle #325 on Reader Service Card


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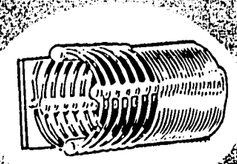
air dux

AIR WOUND COILS

**Special Designs?**
That's our business! We now supply a majority of the air wound coils used by leading equipment manufacturers.



**High Q!**
Q's of over 500 are possible with the unique air-core construction. Send for free Catalog.



**Standard Air Dux!**
A wide selection is available from Jobbers nationally.



illumitronic
sunnyvale, i california
engineering

For details, circle #326 on Reader Service Card


**Chicago Magnetic Control**, 1616 N. Damen Ave., Chicago 47, Ill., Saturable Reactors c, Tel: ARmitage 6-7400
See ad on page 565

**Chicago Standard Transformer Corp.**, 3504 W. Addison St., Chicago 18, Ill., 10sc, 15s, 20sc, 25s, 30s, 45s, 60s, Tel: INdependence 3-7400
See ad on page 565

Chicago Telephone of California, Inc., Calif., 5c, 15c, 45c, 50c, 55c

Cinaudagraph, Inc., Ill., 5c

Clippard Instrument Laboratories, Inc., Ohio, 30c, 45c, 65c

Coast Coil Co., Calif., 60c

Coil Co. of America, Inc., N.J., 15c, 35c, 40c, 50c, 55c, 60c

Coil Engineering & Mfg. Co., Inc., Ind., 5c, 15c, 25c, 35c, 40c, 50c, 55c

Coil Winders, Inc., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c

Coilcraft, Inc., Ill., 30c, 35c, 45c, 50c, 55c, 60c, 65c

Coils-Electronics Co., Pa., 5c, 15c, 30c, 45c

**Comar Electric Co.**, 3349 Addison St., Chicago 18, Ill., 35c, 50c, 55c, Tel: JUniper 8-2410
See ad on page 166


ELECTRONICS EMI-COSSOR LIMITED

Designers of
**Military & Civilian Electronics**

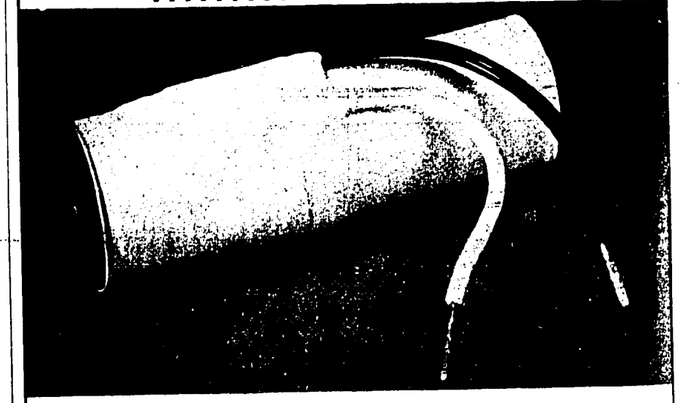
SONAR — COMMUNICATIONS
PRECISION DEFLECTION YOKES & SYSTEMS
SOUND EQUIPMENT
INDUSTRIAL TELEVISION

HALIFAX • MONTREAL • TORONTO • OTTAWA

For details, circle #327 on Reader Service Card



**Electrical Coil Windings**
.....WIRE SIZES #6 TO #56



For 43 years . . . specializing in all types of coils to customers' specifications. Design or engineering assistance available on request.

**COTO-COIL CO., INC.**
SINCE 1917
74 Pavilion Avenue Providence 5, Rhode Island

For details, circle #328 on Reader Service Card






# Directory II. Components

## 45. Coils.

**Communication Accessories Co.**, 50 Highway & 71 By-Pass, Lee's Summit, Mo., 5sc, 15sc, 40sc, 60sc, Tel: BRoadway 1-1700 (Kansas City)
See ad on page 182

Components Corp., Ill., 15c, 60c

Continental Electronics Corp., N.Y., 55c

Control Data Corp., Minn., 60c

**Control Electronics Co., Inc.**, 10 Stepar Place, Huntington Station, L.I., N.Y., 60sc, Tel: HAmilton 7-7961
See ad on page 440

**Corning Glass Works, Corning Electronic Components**, 550 High St., Bradford, Pa., 65s, Tel: FOrest 2-5571
See ads on pages 390, 523

Corning Glass Works, Electrical Products Div., N.Y., 5s

Cornwell Electronics Corp., Conn., 15c, 40c, 50c, 60c, Saturable Reactors c

Corona Engineering Service, N.Y., 60c

**Coto-Coil Co., Inc.**, 74 Pavilion Ave., Providence 5, R.I., 15c, 25c, 30c, 35c, 45c, 50c, 55c, Tel: WIlliams 1-3355
See ad on page 400

Crowley Div., A. O. Smith Corp., N.J., 10c

Crown Engineering, N.M., 20c

Cycle Transformer Corp., N.J., 5c, 15c, 35c, 40c, 50c, 55c

D & R, Ltd., Calif., 15s, 60sc

Dano Electric Co., Conn., 10c, 20c, 35c, 50c, 55c

**Del Electronics Corp.**, Dept. RE, 521 Homestead Ave., Mt. Vernon, N.Y., 35c, 40sc, Tel: OWens 9-2000
See ads on pages 282, 481, 567

Delevan Electronics Corp., N.Y., 30c, 45sc, 50c, 55sc, 65sc

Delta Coils, Inc., N.J., 5c, 15c, 30sc, 45sc, 55c, 60c, 65sc

Delta Radio Co., N.Y., 30c, 45c, 65c

**Deluxe Coils, Inc.**, P.O. Box 454, Wabash, Ind., 35c, 50c, 55c, Potted c, Miniature c, Tel: 1720
See ad on page 398

Direct T/V Replacements, Ltd., England, 5s, 10s, 15s, 20s, 25s, 30sc, 40c, 45s

Djordjevic Engineering Co., Djeco Div., Ill., 15c

Dwyer Engineering Co., Inc., N.H., 45c, 65c

Dynamics Corp. of America, N.Y., 30c, 45c, 60c

**E.M.I.-Cossor Electronics, Ltd.**, P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10sc, 15c, 20c, 25c, 30c, 45c, 65c, Tel: HAlifax 6-7491
See ad on page 400

E.M.I.-Cossor Electronics, Ltd., Canada, 10sc

**ESC Electronics Corporation**, 534 Bergen Blvd., Palisades Park, N.J., 60c, Tel: WIndsor 7-0400
See ad on page 436

Eagle Signal Co., Ill., 50s, 55s

Edko Electronics Engineering Co., N.Y., 5c, 15c, 35c, 40c, 50c, 55c

El-Rad Mfg. Co., Ill., 5c, 20c, 30sc, 45sc, 50c, 60c, 65c

Electrend Products Corp., Mich., Antenna sc

Electric Autolite Co., The, Ohio, 55s

Electric Specialty Co., Conn., 40c, 60c

Electrical Windings, Inc., Ill., 5c, 15c, 35c, 50c, 55c

Electro Assemblies, Inc., Ill., 45c, 55c

Electro Engineering Works, Calif., 25c, 35c, 40c

Electro Networks, Inc., N.Y., 15c, 60c

**Electron Arc Division, Ionics Incorporated**, 244 Broad St., Lynn, Mass., 40c, Tel: LY 8-2100
See ad on page 485

Electronic Assembly Co., Inc., Mass., 40c

Electronic Cable Corp., Mass., 5c, 30c, 45c

Electronic Coils, Inc., Mass., 15c, 30c, 35c, 40c, 45c, 50c, 55c, 60c

**Electronic Transformer Co., Inc.**, 70 Washington St., Brooklyn 1, N.Y., 35c, 40c, 60c, Tel: MAin 5-6123
See ad on page 567

**Endicott Coil Co., Inc.**, 24 Charlotte St., Binghamton, N.Y., 35c, 50c, 55c, 60c, Tel: SWarthmore 7-1263
See ad on this page

Ensign Coil Co., Ill., 5c, 15c, 40c, 50c, 55c, 60c

Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 15c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c

Essex Electronics, Div. Nytronics, Inc., N.J., 5c, 15c, 20c, 25c, 30sc, 35c, 40c, 45sc, 55c, 60c, 65c

Essex Wire Corp., Magnetic Windings Div., Pa., 35c, 40c, 50c, 55c

Farwest Mfg. Div., Inc., Wash., 50c, 55c

Fasco Industries, Inc., N.Y., 55c

**Fast & Co., John E., Subsid. Victoreen Instrument Co.**, 3594 N. Elston Ave., Chicago 18, Ill., 45s, Tel: JUniper 8-2715
See ad on page 391

Ferranti Electric, Inc., N.Y., 5sc, 15sc, 40sc

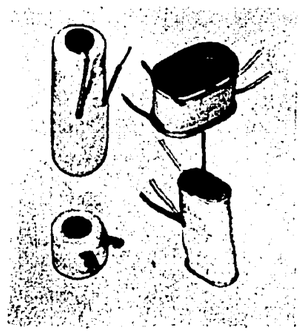
Five Star Co., Inc., Conn., 35c, 50c, 55c

**Forbes & Wagner, Inc.**, 350 Central Ave., Silver Creek, N.Y., 20c, 30c, 35c, 45c, 55c, Tel: YEllowstone 4-2691
See ads on pages 341, 399, 403, 437, 563, 569

Foster Transformer Co., Ohio, 40c

**Freed Transformer Co., Inc.**, 1713 Weirfield St., Brooklyn 27, N.Y., 5sc, 60sc, Tel: EVergreen 6-1300
See ad on page 566

Fugle-Miller Labs., Inc., N.J., 15c, 20c, 25s, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c

**COILS**
for

RELAYS SOLENOIDS
TIMERS FILTERS
CONTROLS CLUTCHES

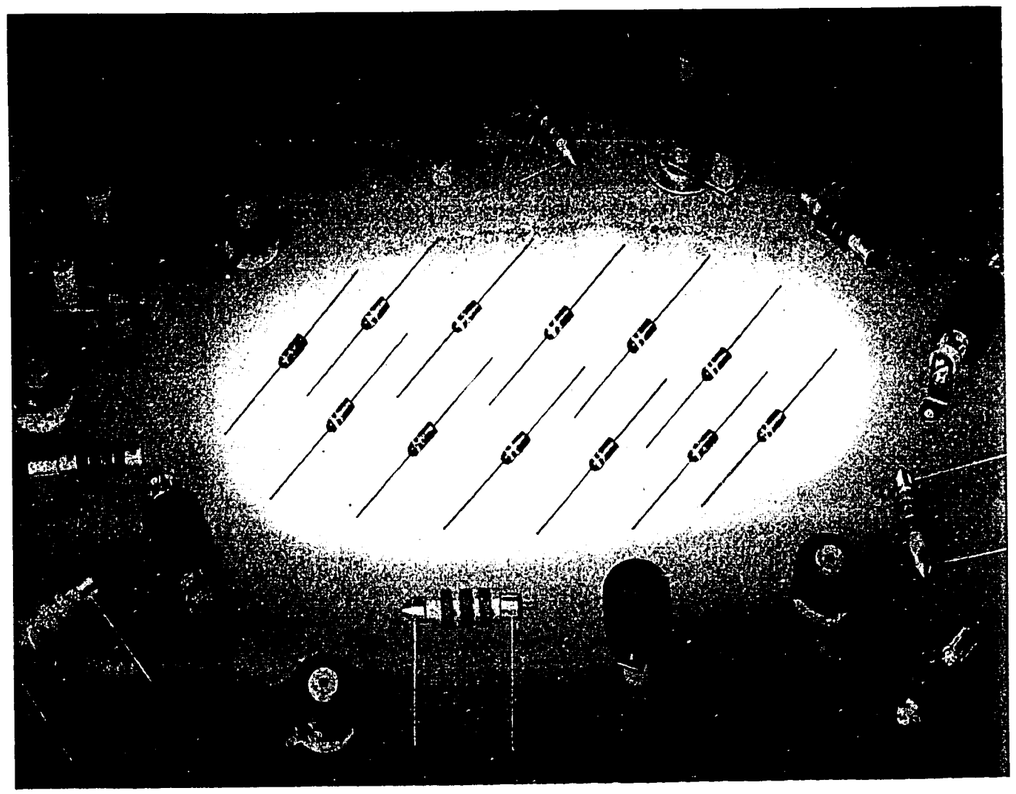
COMPLETE ENGINEERING SERVICE to assist you in the development of exactly the right coil for your particular application, starting at the design stage.

Endicott Coil has successfully supplied top quality coils to some of America's major industries for a decade . . . Made to exacting specifications . . . Continuously inspected in every stage of production . . . Competitively priced . . . Delivered on time in high production quantities and sample lots.

**Endicott Coil Co., Inc.**
24 Charlotte St., Binghamton, N. Y. SWarthmore 7-1263

For details, circle #329 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



# Encapsulated Inductances

Millen DESIGNED for APPLICATION encapsulated coils provide another advance in the r-f inductor field. Modern application requires miniature, heat and cold resistant, hermetically sealed, and abrasion resistant r-f inductor assemblies. The James Millen Manufacturing Company has pioneered many advances in the r-f inductor field, including the now standard 4-pi r-f choke, the axial lead r-f choke, and the miniature r-f choke. Developments have now made possible another advance, the No. 34301 and No. J301 encapsulated inductors—hermetically sealed—miniature size. Ambient temperature minus 55 degrees to plus 100 degrees C.

## NO. J301 MINIATURE ENCAPSULATED INDUCTANCES

DESIGNED for APPLICATION miniature inductances are: extremely small (see table at right)—hermetically sealed—wound on axial lead Carbonyl cores—color coded. Coils are available in EIA standard values plus 25, 50, 150, 250, 350, 500, and 2500 microhenries. Current rating 100 to 1450 milliamperes depending on coil size.

## NO. 34301 STANDARD ENCAPSULATED INDUCTANCES

Encapsulated DESIGNED for APPLICATION axial lead phenolic form r-f inductances. Hermetically sealed—heat resistant—abrasion proof—color coded. 0.15 to 2500 microhenries available in EIA standard values plus 25, 50, 150, 250, and 350 microhenries. Inductance ± 5%. Values available in same progression as J301 coils listed in the table at the right. Current rating 250 to 2800 milliamperes, depending on coil size. Ambient temperature range—minus 55 degrees to plus 100 degrees Centigrade. Size 3/16 inches diameter × 9/16 inches long to 3/8" × 3/8".

| COIL NUMBER | INDUCTANCE MICROHENRIES | DIAMETER INCHES | LENGTH INCHES |
|---|---|---|---|
| J301-25 | 25 | 3/16 | 9/16 |
| J301-33 | 33 | 3/16 | 9/16 |
| J301-47 | 47 | 3/16 | 9/16 |
| J301-50 | 50 | 3/16 | 9/16 |
| J301-82 | 82 | 3/16 | 9/16 |
| J301-100 | 100 | 3/16 | 9/16 |
| J301-120 | 120 | 3/16 | 9/16 |
| J301-150 | 150 | 3/16 | 9/16 |
| J301-200 | 200 | 3/16 | 9/16 |
| J301-220 | 220 | 3/16 | 9/16 |
| J301-250 | 250 | 3/16 | 9/16 |
| J301-300 | 300 | 3/16 | 9/16 |
| J301-330 | 330 | 3/16 | 9/16 |
| J301-350 | 350 | 3/16 | 9/16 |
| J301-360 | 360 | 7/32 | 5/8 |
| J301-390 | 390 | 7/32 | 5/8 |
| J301-430 | 430 | 7/32 | 5/8 |
| J301-470 | 470 | 1/4 | 11/16 |
| J301-500 | 500 | 1/4 | 11/16 |
| J301-510 | 510 | 1/4 | 11/16 |
| J301-560 | 560 | 1/4 | 11/16 |
| J301-620 | 620 | 1/4 | 3/4 |
| J301-680 | 680 | 9/32 | 3/4 |
| J301-750 | 750 | 9/32 | 3/4 |
| J301-820 | 820 | 9/32 | 3/4 |
| J301-910 | 910 | 9/32 | 3/4 |
| J301-1000 | 1000 | 9/32 | 13/16 |
| J301-1200 | 1200 | 5/16 | 13/16 |
| J301-1300 | 1300 | 5/16 | 13/16 |
| J301-1500 | 1500 | 5/16 | 13/16 |
| J301-1800 | 1800 | 5/16 | 7/8 |
| J301-2000 | 2000 | 3/8 | 7/8 |
| J301-2200 | 2200 | 3/8 | 7/8 |
| J301-2400 | 2400 | 3/8 | 7/8 |
| J301-2500 | 2500 | 3/8 | 7/8 |

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN, MASSACHUSETTS, U.S.A.



For details, circle #330 on Reader Service Card





# Directory II. Components

## 45. Coils.

**Gates Electronic Co.**, 1705-I Taylor Ave., New York 60, N.Y., 40s, Tel: TYrone 2-6490
See ad on page 484

Genco Electric Co., Mich., 60c

General Coil Products Corp., N.Y., 15c, 30sc, 35c, 45sc, 55c, 65c

General Electric Co., Apparatus Sales Div., N.Y., 55s

**General Magnetics, Inc.**, 2641 Louisiana Ave., Minneapolis 26, Minn., 5c, 30c, 35c, 40c, 45c, 55c, 60c, Tel: WEst 9-8571
See ad on page 363

General Winding Company, Inc., N.Y., 15c, 25sc, 60sc

Gerstrom, Inc., Calif., 15sc, 45sc, 60sc

Geotronic Labs., Inc., Tex., 5c, 15sc, 30sc, 60sc

Gilfillan Bros., Inc., Calif., 10c, 15c, 20c, 25c, 45c, 60c

Globe Electronics, Iowa, 5c, 30c, 40c, 45c, 50c, 55c

Good All Electric Mfg. Co., Neb., 55s

**Gorman Machine Co.**, 480 S. Main St., Randolph, Mass., 60c, Tel: WOodlawn 3-7333
See ad on page 670

Granger Hallbotson Transformer Corp., Ill., 5s, 10s, 15s, 20s, 25s, 30s, 40s, 45s, 60s

Grand Transformers, Inc., Mich., 5c, 25c, 35c, 55c

Green Rectifier Co., N.J., 40sc

**Guardian Electric Mfg. Co.**, 1672 W. Carroll Ave., Chicago 7, Ill., 50sc, 55sc, Tel: CHesapeake 3-1100
See ad on page 512

Gudeman Co. of California, Inc., Elec., Calif., 60c

**Guidance Controls Corp.**, 110 Duffy Ave., Hicksville, L.I., N.Y., 60c, Tel: WEIls 8-9500
See ad on page 342

Gurton Industries, Inc., N.J., 60sc

Hafstatters Co., Elec., Ill., 65sc

Harder Co. Donald C., Calif., 5c, 10c, 15c, 25c, 35c, 40c, 60c

Hartel, Inc., N.Y., 60c

Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 5sc, 15c, 40sc, 60sc

Hi-G, Inc., Conn., 15s, 35s, 50s, 55s, 60s, 65s

Highland Design, Inc., N.Y., 5c, 15c, 35c, 40c, 55c

**Hillburn Electronics Corp.**, 55 Nassau Ave., Brooklyn 22, N.Y., 50c, 55c, Tel: STagg 2-3875
See ad on page 514

Hindle Transformer Co., Inc., N.J., 15c, 35c, 40c

Hisonic, Inc., Kan., 60s

**Illumitronic Engineering**, 680 E. Taylor St., Sunnyvale, Calif., 45sc, Tel: REgent 9-2395
See ads on pages 400, 692

Inductor Engineering, Inc., Del., 15c, 60c

**Industrial Winding Machinery Corp.**, 120 Wall St., Suite 3410, P.O. Box 62, New York 5, N.Y., 35c, 50c, 55c, 60c, Tel: WHitehall 3-1754
See ad on page 673

Intercontinental Electronics Corp., N.Y., 60c

**Interelectronics Corp.**, 2432 Grand Concourse, New York 58, N.Y., 60c, Tel: LUdlow 4-6200
See ads on pages 355, 487

James Electronics, Inc., Ill., 5s, 15s, 35s, 50c, 55c

Jeffers Electronics Div., Speer Carbon Co., Pa., 45c

Jobbins Electronics, Calif., 15, 25, 30, 35, 40, 45, 50, 55

Johnson Co., E. F., Minn., 45s, 65sc

K-V Transformer Corp., Conn., 5c, 15c, 35c, 40c, 60c

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 50c

Kendrick Mfg. Co., Ind., 60c

Keystone Products Co., N.J., 5c, 15c, 30c, 60c

Knopp, Inc., Calif., 60c

Kwikset Powdered Metal Products, Calif., 60s

Laboratory For Electronics, Inc., Mass., 5s, 15s, 30s, 40s, 45s, 60s, 65s

Land Air, Inc., Stepper Motors Div., Calif., 55c

Lee Electric, Inc., N.J., 35c

Life Instrument Co., Inc., Mass., 50sc, 55sc

Light Electric Corp., N.J., 30c

Line Electric Co., N.J., 35c, 50c

Linell Engineering Corp., Ill., 45sc, 55sc

Litton Industries, Electron Tube Div., Calif., 25c

Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Div., Calif., 15s, 60s

Magnetic Circuit Elements, Inc., Calif., 5sc, 15sc, 40sc

**Magnetico, Inc.**, 6 Richter Ct., East Northport, L.I., N.Y., 15sc, 60sc, Tel: ANdrew 1-4502
See ad on page 366

Magnetics Research Co., Inc., N.Y., 60sc

Mallory & Co., Inc., P. R., Ind., 65c

Marine Electric Corp., N.Y., 5c, 15c, 35c, 40c, 50c, 55c

Marine View Electronics, Inc., N.Y., 50c, 55c, 65c

Marstan Electronics Corp., N.Y., 60sc

Materials For Electronics, Inc., N.Y., 30sc

Maurer, Inc., J. A., N.Y., 55s

**Menlo Park Engineering**, 711 Hamilton Ave., Menlo Park, Calif., 25s, Tel: DAvenport 6-9080
See ad on page 366

Mercury Transformer Corp., Calif., 5c, 15c, 40c, 60c

Merit Coil & Transformer Corp., Fla., 5sc, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s, 60s, 65s

**Mico Instrument Co.**, 70 Trowbridge St., Cambridge 38, Mass., 60s, Tel: KIrkland 7-8660
See ad on page 674

**Millen Manufacturing Co., Inc.**, James, 150 Exchange St., Malden 48, Mass., 30sc, 45sc, 65c, Tel: DAvenport 4-4108
See ad on page 402

Miller Co., J. W., Calif., 15sc, 30sc, 45sc, 65sc

Miller Company, Sanford, N.Y., 5s, 15s, 40s

Milso Controls Co., Inc., N.Y., 15s, 30s, 60c

Missouri Research Laboratories, Inc., Mo., 10c, 60c

Mitchell Electronics Corp., N.Y., 5s, 15c, 35s, 30c, 50c, 55s

Modelectric Products Corp., N.Y., 15c, 30c, 35c, 40c, 50c, 55c

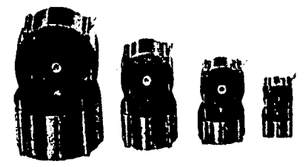
Muter Division, The Muter Co., Ill., 45s

National Coil Co., Wyo., 5c, 15c, 30c, 40c, 45sc, 65s

**National Radio Company, Inc.**, 37 Washington St., Melrose 76, Mass., 5, 15, 30, 45, 60, Tel: NOrmandie 5-4800
See ad on page 614

Network Industries, Inc., N.Y., 15c, 45c, 60c

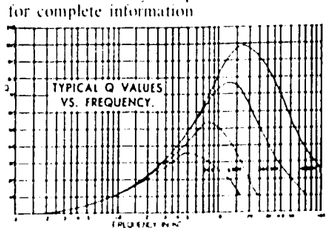

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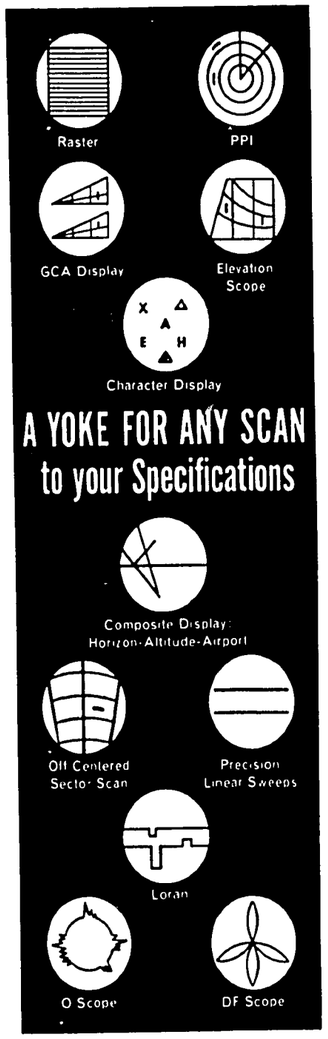

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**Washington-Baltimore Area:** Massey Associates
Phone: GRanite 4-2071

**Indianapolis:** Joe Murphy
Phone: Victor 6-0359

**Los Angeles:** Ash M. Wood Co.
Phone: CUmberland 3-1201

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New York Coil Co., Pa., 5c, 15c, 30c, 35c, 40c, 45c, 50c, 55c
New York Transformer Co., Inc., N.J., 5c, 15c, 40c, 60c
North Electric Co., Ohio, 50sc, 60sc
**North Hills Electronics, Inc., Alexander Pl., Glen Cove, L.I., N.Y., 30s, 40s, 45s, 50s, 55s, 60s, 65s, Tel: ORiole 1-5700**
See ads on pages 405, 445, 588
Nothelfer Winding Labs, Inc., N.J., 15c, 35c, 40c, 60c
**Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 45s, 55c, Tel: ORchard 5-2600**
See ad on pages 78-79
Omega Mfg., Inc., N.Y., 40c, 45c, 55c
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 40sc, Tel: WOrth 6-0380**
See ad on page 483
**Ortho Filter Corp., 7 Paterson St., Paterson 1, N.J., 5c, 15c, 40c, 60sc, Tel: MUlberry 4-5858**
See ad on page 444
Osborne Electronics Sales Corp., Ore., 15c, 40c, 50c
Osborne Transformer Corp., Mich., 35c, 40c, 60c
Ovitron Corp., N.Y., 60sc
Oxford Electric Corp., Ill., 5c, 15c
Pacific Instrument Co., Calif., 5c, 15c, 40c, 60c
Pacific Magnetic Corp., Calif., 5c, 40c, 60c
Painton & Co., Limited, England, 45sc
Partridge Transformers, Ltd., England, 5sc, 15sc, 40sc
Peerless Electrical Products Div., Altec Lansing Corp., Calif., 15c, 40c
Penn-Transformer Corp., Pa., 10sc, 20s
Perkin Engineering Corp., Calif., 15c, 40c, 60c
Philco Corporation, Pa., 60c
Philco Corporation, Govt. & Industrial Group, Pa., 60c
Philips Electronics Industries, Ltd., Canada, 15c
Philmore Mfg. Co., Inc., N.Y., 30s, 45s
Pickering & Co., Inc., N.Y., 35c, 50c, 55c
Polyphase Instrument Co., Pa., 5sc, 15sc, 45sc, 60sc
Precise Electronics & Development Corp., N.Y., 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c, 60c, 65c
Precision Electronics, Inc., N.Y., 5c 10c, 15c, 25c, 30c, 35c, 40c, 45c, 50c 55c, 65c
Precision, Inc., Minn., 35c, 50c, 55c, 60c
**Profile Electronics, Inc., 6 Bridge St. Concord, N.H., 5c, 15c, 30c, 35c, 45s, 50c, 55c, 65c, Tel: CApitol 4-1232**
See ad on this page
Prototype Transformer Corp., N.J., 5c, 40c, 55c
Pulse Engineering, Inc., Calif., 15c, 60c
Quam-Nichols Co., Ill., 35sc
RCA Victor Co., Ltd., Canada, 5c, 10c, 15c, 20c, 40c
**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 30c, 45c, 60c, Tel: DAvenport 1-1130**
See ad on page 243
Radio Corp. of America, N.J., 25s
Radio Development & Research Corp. Div. Bogue Electric Mfg. Co., N.J., 60c
Radio Industries, Inc., Ill., 30c
Railroad Electronic Labs. of Omaha, Inc., Neb., 15c, 60c
Railway Communications, Inc., Mo., 60c
Ramage & Miller, Inc., Calif., 55sc
Randall, Inc., Douglas, R.I., 35c, 50c, 55c, 60c
Rank Cintel, Ltd., England, 10s, 25s
Raypar, Inc., Ill., 5c, 15c, 20c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 5s, 15s, 30s, 40s, 60s
Redman Electronics Corp., Conn., 45c, 60c
Redmond, Inc., Subsid. Controls Co. of America, Mich., 10c
Resitron Laboratories, Inc., Calif., 50s
Richmond Engineering Co., Inc., Conn., 5c, 25c, 40c, 50c, 55c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 15sc, 35c, 60c, 65c, Tel: LOckwood 5-4578**
See ad on page 324
Rogers Electronic Corp., N.Y., 5sc, 10sc, 15c, 20sc, 25c, 30sc, 45sc, 50c, 55c
Rola Co., The, Ohio, 10c, 20c, 25c
Rowe Industries, Ohio, 35c, 55c
Rytron Co., Inc., Calif., 5c, 15sc, 40sc, 60sc
SNC Mfg. Co., Inc., Wis., 15c, 40c, 55c, 60c
Sag Harbor Industries, N.Y., 5c, 35c, 40c, 50c, 55c, 60c, 65c


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## 45. Coils.

Sarzamo Electric Co., Ill., 5c, 15c, 35c, 40c, 45c, 60c
Sattron, Inc., Ore., 5c, 15c, 35c, 40c, 50c, 60c, 65c
Schavitz Engineering, N.J., 5c, 15c
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 15c, 55c, 60c, 65c, Tel: WOodlawn 5-2341**
See ad on page 258
Sickles Div., F. W., Mass., 5c, 10sc, 15c, 20sc, 25c, 30sc, 35sc, 55c, 60c, 65c
Sigma Electronics Research Corp., Wash., 45c
Signal Transformer Co., Inc., N.Y., 5c, 35c, 40c
Sirtex Radio Products, S.D., 15c, 25c, 30c, 45c, 50c, 55c, 60c
Skyweepet, Inc., Ill., 5c, 15c, 30c, 35c, 40c, 45c, 50c, 55c
Speedliwood, Ltd., S. Ont., Canada, 10c, 20c, 30c, 45c, 55c
Somerset Radiation Laboratory, Inc., N.J., 30s, 45s, 65s
Sorensen Industrial Electronic Co., N.J., 30c, 45c
Southwestern Industrial Electronics Co., Tex., 5c, 15c, 40c, 45c, 60c
Sperry Gyroscope Co. of Canada, Ltd., Canada, 60c
Standard Electrical Products Co., Ohio, 5c, 15c, 35c, 50c, 55c, 60c
Standard Electronics, Div. Reeves Instrument Corp., N.J., 30c, 45c, 60c
Standard Telephones & Cables, Ltd., England, 5s
Standard Winding Co., Inc., N.Y., 15c, 20c, 30c, 35c, 45c, 55c
Stanavyck Coil Co., E., N.Y., 15, 30, 45, 60, 65
Sterling Transformer Corp., N.Y., 5sc, 15sc, 40sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 50s
Sturrup, Inc., Conn., 55c
Summit Coil Co., N.J., 30c, 45c, 65c
Supertex Electronics Corp., N.Y., 5s, 30c, 40c, 45c, 55s, 65s
Sylvania Electric Products Inc., N.Y., 10s, 20s
Sylvania Electric Products Inc., Special Products Div., N.Y., 5c, 25sc, 35c, 40c, 55c, 60c
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c
**Syntronic Instruments, Inc., 100 Industrial Rd., Addison, Ill., 10s, 25s, Tel: KIngswood 3-6444**
See ad on page 404
TRAK Electronics, Div. CGS Laboratories, Conn., 55c, 65s
T.I. Electronics, Inc., Calif., 5c, 15c, 60s
Technical Engineering Co., Inc., Pa., 45c
Tele Coil Co., N.J., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c
Telechrome Mfg. Corp., N.Y., 60c
Telecomputing Corp., Electronic Components Div., Calif., 5c, 15c, 40c, 45c, 55c, 60c
**Telex, Inc., 1633 Eustis Ave., St. Paul 1, Minn., 5c, 15c, 35c, 50c, 60c, Tel: MIdway 6-7211**
See ads on pages 456, 556
Tenor Electric Development Co., Inc., N.Y., 5c, 15c, 30c, 40c, 45c, 60c
Theodarson Measures, Pa., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc, 60sc
Todd Electric Co., Inc., N.Y., 35c, 40c, 55c
Topper Mfg. Co., Inc., N.Y., 30sc, 45sc, 60sc, 65sc
Topping Electronic Dev., L.I., Canada, 15c
Toroid Company, Ill., 60sc
Toroidal Components Co., Calif., 60c
Toroids Unlimited, Inc., Pa., 60sc
**Torotel, Inc., 5512 E. 110th St., Kansas City 34, Mo., 55sc, 15c, 40c, 50c, 55c, 60sc, 65c, Tel: SOuth 1-6311**
See ad on this page


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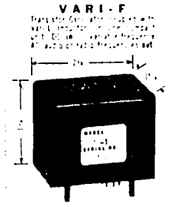

INDUCTOR STYLE A


INDUCTOR STYLE B


INDUCTOR STYLE C


INDUCTOR STYLE D


INDUCTOR STYLE E



OSCILLATOR STYLE F

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|---|---|---|---|---|---|---|---|---|---|---|
| EL 215 | 130 Henries | 58 Henries | 200 Cycles | 4000 Cycles | 50 MA | 2.5 Henries | 20 Ohms | D | $52.50 | EL 215 |
| PA 28 | 4 Henries | 63 MH | 1000 Cycles | 8000 Cycles | 50 MA | 72 Henries | 450 Ohms | A | 52.50 | PA 28 |
| TF 2X10 | 1 Henry | 10 MH | 5000 Cycles | 50 KC | 50 MA | 5 Henries | 450 Ohms | D | 47.50 | TF 2X10 |
| PA 3Y6 | 500 MH | 14 MH | 2500 Cycles | 45 KC | 50 MA | 4.3 Henries | 450 Ohms | A | 39.50 | PA 3Y6 |
| PA 4U6 | 100 MH | 3 MH | 15 KC | 90 KC | 50 MA | 4.3 Henries | 450 Ohms | A | 39.50 | PA 4U6 |
| TF 49 | 50 MH | 6 MH | 25 KC | 225 KC | 50 MA | 5 Henries | 450 Ohms | D | 45.00 | TF 49 |
| PA 47 | 5 MH | 1 MH | 50 KC | 450 KC | 40 MA | 7 Henries | 450 Ohms | A | 47.50 | PA 47 |
| TF 59 | 5 MH | 06 MH | 100 KC | 900 KC | 50 MA | 5 Henries | 450 Ohms | D | 45.00 | TF 59 |
| PA 56 | 8 MH | 02 MH | 400 KC | 2.4 MC | 40 MA | 5 Henries | 450 Ohms | A | 47.50 | PA 56 |
| PA 6Y3 | 820 μh | 3.5 μh | 750 KC | 2.25 MC | 50 MA | 3 Henries | 450 Ohms | A | 45.00 | PA 6Y3 |
| PA 63 | 45 μh | 5 μh | 2 MC | 6 MC | 50 MA | 1 Henries | 450 Ohms | A | 45.00 | PA 63 |
| PA 6T3 | 16 μh | 2.05 μh | 4 MC | 11.2 MC | 50 MA | 1 Henries | 450 Ohms | A | 45.00 | PA 6T3 |
| PA 7X2 | 4.5 μh | 1.1 μh | 8 MC | 16 MC | 40 MA | 1.25 Henries | 775 Ohms | A | 45.00 | PA 7X2 |
| MF 58 | 820 μh | 5 μh | 750 KC | 6 MC | 25 MA | 1.3 Henries | 400 Ohms | B | 32.50 | MF 58 |
| MF 68 | 50 μh | 25 μh | 1.5 MC | 12 MC | 25 MA | 1.3 Henries | 400 Ohms | B | 32.50 | MF 68 |
| MF 62 | 7 μh | 1 μh | 8 MC | 20 MC | 50 MA | 1.6 Henries | 400 Ohms | B | 32.50 | MF 62 |
| MF 7R2 | 1.6 μh | 4 μh | 20 MC | 40 MC | 50 MA | 1.3 Henries | 400 Ohms | B | 32.50 | MF 7R2 |
| MF 7W2 | 5 μh | 15 μh | 60 MC | 108 MC | 50 MA | 1.3 Henries | 400 Ohms | B | 32.50 | MF 7W2 |
| MF 82 | 2 μh | 09 | 100 MC | 150 MC | 50 MA | 1.3 Henries | 400 Ohms | B | 32.50 | MF 82 |
| MF 811C | 1 μh | 065 μh | 165 MC | 206 MC | 50 MA | 1.3 Henries | 400 Ohms | B | 32.50 | MF 811C |
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| OM 101 | 1.6 μh | 4 μh | 20 MC | Oversized MF 7R2. Heater specs. to order | | | | C | 60.00 | OM 101 |
| OM 102 | 5 μh | 15 μh | 60 MC | Oversized MF 7W2. Heater specs. to order | | | | C | 60.00 | OM 102 |
| OM 103 | 2 μh | 09 μh | 100 MC | Oversized MF 82. Heater specs. to order | | | | C | 60.00 | OM 103 |
| MF 52 | 25 MH | 05 MH | 500 KC | Low temp. drift, low hysteresis. Ideal for FM | | | | B | 38.00 | MF 52 |
| E 4Y8 | 40 MH | 65 | 25 KC | Delayed response for max. usable range | | | | A | 47.50 | E 4Y8 |
| TF 4X1 | 7 MH | 3.1 MH | 50 KC | Very low drift, low hysteresis — for telemetering | | | | A | 47.50 | TF 4X1 |
| WF 4R7 | 25 MH | 5 MH | 50 KC | To sweep 100 KC region without dimensional resonances | | | | E | 45.00 | WF 4R7 |
| MF 7K2 | 6 μh | 2 μh | 60 MC | Temperature stabilized. Similar to MF 7W2 but less range | | | | B | 32.50 | MF 7K2 |

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Transformer Design, Inc. of Milwaukee, Wis., 5c, 15c, 35c, 40c, 60c

Transformer Technicians, Inc., Ill., 5c, 15c, 35c, 40c, 60c

Transformers, Inc., N.Y., 5c, 15c, 40c, 60c

Transistor Applications, Inc., Mass., 50c, 55c

**Transistor Electronics Corp.**, 3358 Republic Ave., Minneapolis 26, Minn., 30c, 45c, Tel: WEst 9-6754
See ad on page 472

Trenton Transformer Corp., N.J., 15sc, 40sc

Tri Dex Co., Calif., 35c, 55c

Triad Transformer Corp., Div. Litton Industries, Calif., 10s, 15s, 20s, 40sc, 60sc

Tur-Bo Jet Products Co., Inc., Calif., 35c, 50c, 55c

Union Electric Products Co., N.J., 5c, 10c, 15c, 30c, 35c, 40c, 45c, 50c, 55c, 65c

United States Electronics Corp., N.J., 5c, 15c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 65c

United States Instrument Corp., Va., 50c

U. S. Relay-Electronics, Calif., 15c, 50c, 55c, 65c

**United Transformer Corp.**, 150 Varick St., New York 13, N.Y., 5sc, 15sc, 40sc, 60sc, Tel: ALgonquin 5-3500
See ad on Cover 2

**Universal Toroid Coil Winding, Inc.**, 171 Coit St., Irvington 11, N.J., 5sc, 10c, 15c, 30sc, 40c, 45sc, 60sc, Tel: ESSex 4-9804
See ad on this page

Vabr Instruments, Inc., Calif., 15s, 20s, 30s, 45s, 60s

Vanguard Electronics Co., Calif., 15c, 30c, 45sc, 65c

**Vari-L Company, Inc.**, 207 Greenwich Ave., Stamford, Conn., 60c, Variable, Tel: FIreside 8-0091
See ad on page 406

Varo Mfg. Co., Inc., Tex., 5sc, 15sc, 35sc, 40sc, 50sc, 55sc, 60sc

Virginia Electronics Co., Inc., D.C., 5c, 15c, 30c, 40c, 45c, 60c, 65c

Volta Mfg. Co., Ill., 45c

Warsaw Coil Co., Ind., 10c, 25c, 30c, 35c, 45c, 50c, 55c, 60c, 65c

Welch Mfg. Co., Inc., N. W., Ind., 30c, 45c, 60c, 65c

Wells Electronics Co., Ind., 15c, 30sc, 45sc, 55c, 60c, 65sc

Wheeler Electronic Corp., Conn., 5c, 15c, 30c, 35c, 40c, 45c, 60c, 65c

Whitewater Electronics, Inc., Wis., 15sc, 30c, 45c, 55c, 65c

Wilco Corp., Ind., 45sc

**Wilcox Electric Co., Inc.**, Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5c, 15c, 30c, 45c, 55c, 60sc, Tel: BEnton 1-0700
See ad on page 573

Winatic Corp., The, N.Y., 35c, 50c, 55c

Wirco Electronics, Inc., Calif., 15c, 30c, 35c, 40c, 45c, 50c, 55c, 65c

Wright-Zimmerman, Inc., Minn., 20sc, 30sc, 45sc

Z & W Mfg. Corp., Electronics Div., Ohio, 50c

**Coil Winding Machines:**
See class 96

**Commutator switches:**
See class 72

**Commutators, telemetering:**
See class 36

**Computer accessories & components:** See class 9

**Condensers:**
See class 43

**Cones, loudspeaker:**
See class 56

## 46. Connectors.

| | |
|---|---|
| 5. AN & MIL standard types | 35. Multiple circuit |
| 10. Anode | 40. Phono |
| 15. Coaxial | 45. Power |
| 20. Hermetically sealed | 50. Printed circuit |
| 25. Interlock | 55. RF type |
| 30. Microphone | 60. Slip ring |
| | 65. Sub-miniature |
| | 70. Waterproof |

AMP Incorporated, Pa., 5s, 15s, 20s, 25s, 35s, 40s, 45s, 50s, 65s, 70s

**A.P.M. Corp.**, 252 Hawthorne Ave., Yonkers 5, N.Y., 5s, 45s, Tel: YOnkers 8-2010
See ads on pages 451, 638

A-I Precision Products, Calif., 60s

Accurate Electronics Corp., Ohio, 25sc, 35sc, 40sc

Aerolite Electronics Corp., N.J., 20sc, 40sc

**Aircom, Inc.**, 48 Cummington St., Boston 15, Mass., 55s, Tel: COpley 7-9115
See ad on page 309

Aircraft Radio Corp., N.J., 55c

**Airtlyte Electronics Co.**, 537 Avenue A, Bayonne, N.J., 60sc, Tel: HEmlock 6-2230
See ad on page 408

**Airtec, Inc.**, 139 E. 1st Ave., Roselle, N.J., 55c, Tel: CHestnut 5-2990
See ad on page 589

Arttron, Inc., Div. Litton Industries, Inc., N.J., 55c


**DIRECT FACTORY SOURCE FOR**

AMPHENOL | CANNON

SAME-DAY SHIPMENT ASSURED
Schweber ELECTRONICS
60 HERRICKS ROAD, MINEOLA, L.I., N.Y. PIONEER 6-6520 TWX G-CY-NY-5800

For details, circle #337 on Reader Service Card

*High Quality*
**TOROIDAL COILS and COMPONENTS**



Universal Toroidal Coil Winding Service comprises *custom design* and of production of inductors, transformers, magnetic amplifiers, oscillator coils, filters, potentiometer windings, etc. We specialize also in high frequency toroidal inductors and transformers, featuring extremely low distributed capacity and high coupling coefficient. Universal components are produced in open, encased, encapsulated, MIL-T-27A, or commercial construction.



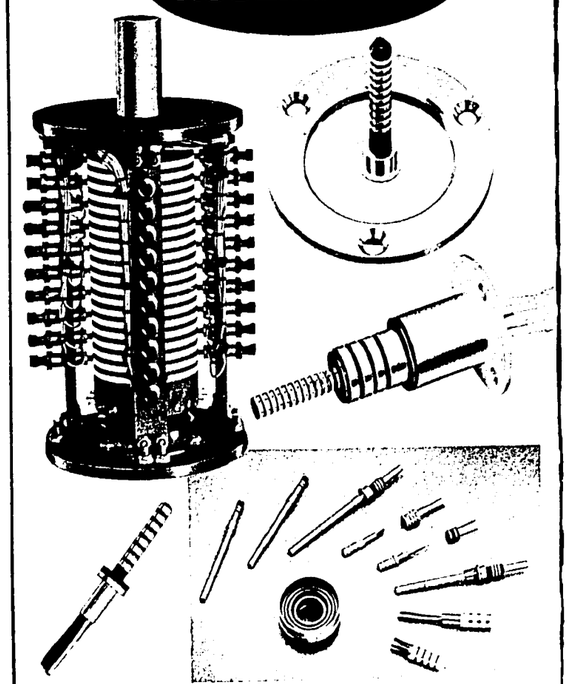
171 Coit St., Irvington 11, N.J.
ESsex 4-9804

For details, circle #338 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Airflyte ELECTRONICS CO.

## SLIP RING ASSEMBLIES



## BRUSH BLOCK ASSEMBLIES

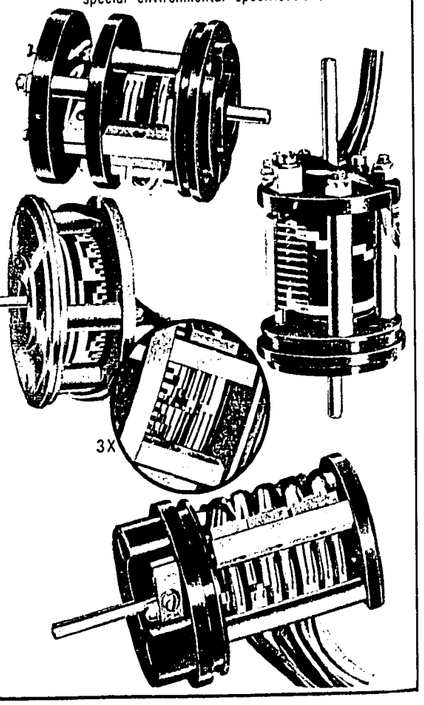


Shown here are just a few examples of our products. We invite your inquiry on the development and production to your specifications. Avail yourself of our engineering facilities to carry-through from design . . . to prototype . . . to mass production. Hundreds of stock molds eliminate tooling in most cases.

## COMMUTATING SWITCHES

**HIGH SPEED ROTARY SWITCHES FOR TELEMETERING, SAMPLING, PROGRAMING AND ANALOG-DIGITAL CONVERSION.**

Airflyte's production facilities are geared to produce standard and non-standard commutators at "off-the-shelf" prices. Featuring noise-free performance through the use of solid gold alloy commutating surfaces . . . and exclusive drum construction for maximum life, uniform wear and close angular tolerance. We will supply packaged units (as illustrated) or component commutators and/or brush blocks. All products designed to meet MIL-E 5272 and MIL-E 5400 and other special environmental specifications.




Airflyte ELECTRONICS CO.

537 AVENUE A
BAYONNE
NEW JERSEY

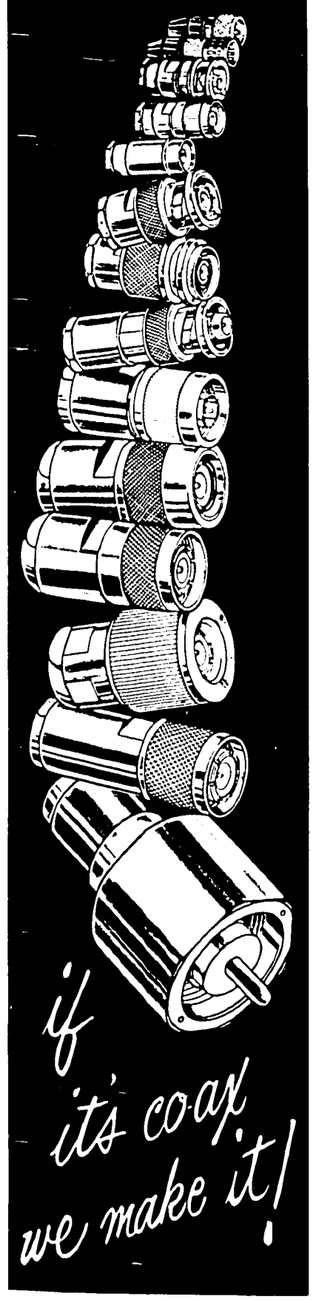
Write for literature and prices.




For details, circle #339 on Reader Service Card




# Connectors



*if it's coax we make it!*

*Technical Brochures are available upon request*

Automatic METAL PRODUCTS CORP.
323 BERRY ST., B'KLYN 11, N.Y.
Telephone: EVergreen 8-6057

For details, circle #340 on Reader Service Card




# Directory II. Components

## 46. Connectors.

Alcon Metal Products, Inc., Ill., 5c, 40c, 50c, 65c

**Alden Products Co.**, 140 N. Main St., Brockton 64, Mass., 10s, 35s, 40s, 45s, 65s, Tel: JUniper 3-0160
See ad on page 406

Amatom Electronic Hardware Co., Inc., N.Y., 40c

American Communications Corp., N.Y., 15s

American Development Electronics Co., N.J., 5c, 20c, 35c, 70c

American Electronics Co., N.Y., 15s, 30s, 40s, 55s

**Amphenol-Borg Electronics Corp., Amphenol Connector Div.**, 1830 S. 54th Ave., Chicago 50, Ill., 5s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s, 65s, 70s, Tel: BIshop 2-1000
See ad on page 146

Amphenol-Borg Electronics Corp., Amphenol Western Div., Calif., 5s, 15c, 20c, 35c, 45c, 50c, 55c, 65c, 70c

Anderson Electric Corp., Ala., 5c, 20c, 45c, 65c, 70c

Andrew Antenna Corp., Ltd., Canada, 5s, 15s, 55s

**Andrew Corp.**, 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 15s, Tel: TRiangle 4-4400
See ad on page 371

**Antenna & Radome Research Associates (ARRA)**, 27 Bond St., Westbury, L.I., N.Y., 15c, 55c, Tel: EDgewood 4-8770
See ad on page 379

**Anton Electronic Laboratories, Inc.**, 1226 Flushing Ave., Brooklyn 37, N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 35sc, 45sc, 50sc, 55sc, 60sc, 65sc, 70sc, Tel: EVergreen 6-5715
See ads on pages 319, 409, 581

Ardente Acoustic Labs., England, 65s

Argonne Electronics Mfg. Corp., N.Y., 30s, 40s

Arnal Electronics, Inc., N.Y., 5sc, 35sc, 45sc, 50sc, 65s

Arnoux Corp., Calif., 5s, 15s, 25s, 30s, 55s, 65s, 70s

**Automatic Metal Products Corp.**, 323 Berry St., Brooklyn 11, N.Y., 15c, Cable e, Tel: EVergreen 8-6057
See ad on this page

Automation Electronics, Inc., Calif., 20c, 25c, 45c, 50sc, 60c, 65c, 70c

Autotron, Inc., Calif., 45c

Axel Electronics, Inc., Calif., 15s, 20s, 55s, 65s, 70s

Axnet Corp., Calif., 5s, 15s, 35s, 70s

Axnet Electronics Corp., N.Y., 5s, 15s, 20s, 55s, 65s, 70s

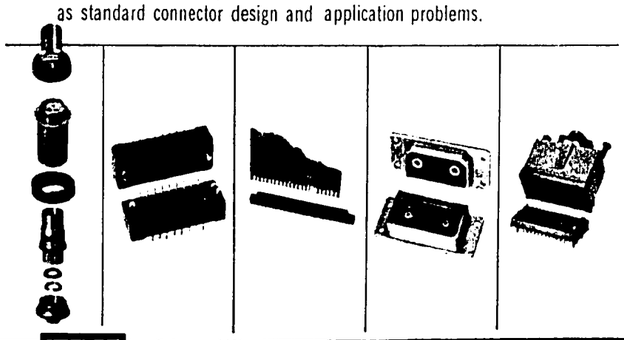
Barker & Williamson, Inc., Pa., 15c

Bellandi Co., Inc., M., Ill., 50s


## RELIABLE COMPONENTS
ARE YOUR NEED AND OUR SPECIALTY

### ANTON PRECISION-BUILT CONNECTORS

incorporate new techniques in hermetic sealing, high-altitude operation, molding and waterproofing. Our facilities include complete design and model making shops as well as the full range of shock, vibration and environmental test equipment. We welcome your "difficult" as well as standard connector design and application problems.



ANTON ELECTRONIC LABORATORIES, INC.
1226 FLUSHING AVE., BROOKLYN 37, N. Y.

For details, circle #341 on Reader Service Card

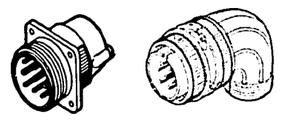



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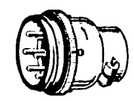
*27,000 CANNON PLUG DESIGNS*

# FOR EVERY CONCEIVABLE APPLICATION

**AIRCRAFT AND ELECTRONIC INSTRUMENTATIONS—MS, MS-A, MS-B, MS-E, MS-R SERIES,** conforming to Specification MIL-C-5015D. Vibration-proof—Lightweight—Plugs are available with from 1 to 100 contacts. 15 different insert diameters and 260 contact layouts. 6 shell styles, MS 3100 to MS 3108 with all accessories. Environmental-Resisting MS-E and MS-R Series have interfacial sealing at mating faces and integral grommet seal at wire entry plus—grounding lugs and integral cable clamp.



**GENERAL CIRCUITRY AND QUICK DISCONNECT—K, RK SERIES,** with special acme thread. The all-purpose series with eight insert diameters available. Conduit and cable clamp entry types. 1 to 110 contacts. 10, 15, 30, 40, 60, 80, 115 and 200 amp. silver plated contacts. High quality phenolic, melamine, and formica insulators. Cadmium-plated aluminum alloy shells.



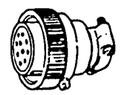
**UNIT-PLUG-IN RACK/PANEL-DP, DPB, DPD, DPD2, DPD2R, DPJ, DPS SERIES,** available with from 2 to 180 contacts in rectangular inserts. With and without shells; coaxial and high voltage contacts. Permit quick disconnect, interchange, replacement, testing, and inspection of assemblies and sub-assemblies.



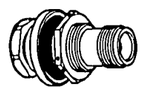
**AUDIO AND LOW-LEVEL CIRCUITS—P, XLR, XK, O, UA, BRS SERIES,** in many shell styles and insert layouts. Straight and 90° angles. Latch-lock types. Wall-mounting, panel, locknut mounting, and adapter receptacles, single and two-gang. 10 and 30 amp. contacts, coaxials.



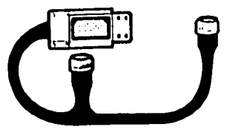
**MINIATURE AND SUB-MINIATURE—D, US, DPA, DPX, AND K-MINIATURE SERIES,** designed for amplifiers, miniature indicators, computer circuits, telemetering equipment, and general instrumentation of limited space requirements. Variety of shell styles, junction shells, and insert arrangements. Available with from 2 to 50 contacts, plus coaxials.



**COAXIAL RF SERIES**—available in a wide range of Series and types from sub-miniature to large cable applications. New Cannon adapters available for use with latest cable developments. Cannon's latest RF Plugs include aluminum versions designed for use where weight-saving is a critical design criteria.



**GM AND PLUG HARNESS SYSTEMS**—Cannon produces a wide range of GM Plugs to fit specific missile applications, ranging from straight umbilical dis-connects to stage-separation dis-connects. Cannon also produces Plug Harness Systems featuring MS or other specified plugs and cables as one unit, available with various contact types and sizes. From 8 to 140 contacts. Highest quality and proven reliability. Varied remote disconnect methods actuated by hydraulic, pneumatic, explosive, or manual means.



**The Cannon Electric Company** also has available a wide variety of plugs for Battery-Power, Fire-wall, Watertight, Printed Circuit, and other applications, as well as "Kwik-Term" Terminals and DC Solenoids.
FOR ADDITIONAL INFORMATION on the typical designs illustrated . . . other configurations for your specific applications . . . or the design, engineering and manufacture to your special needs . . . write to Cannon Electric Company—3208 Humboldt Street, Los Angeles 31, California. Please refer to Dept. 425.

**CANNON PLUGS**

*LARGEST FACILITY IN THE WORLD FOR PLUG RESEARCH-DEVELOPMENT-MANUFACTURE*

Factories in Los Angeles, Santa Ana, Salem, Toronto, London, Paris, Melbourne, and Toyko. Distributors and Representatives in the Principal Cities of the World.



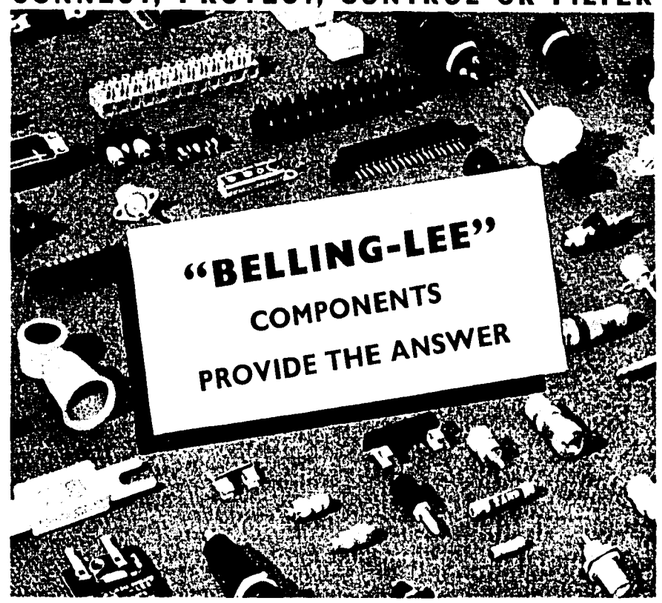



# Directory II. Components

## 46. Connectors.

Belling & Lee Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 15s, 25s, 35s, 40s, 50s, 55s, 65s, 70s, Tel: ENfield 3322
See ad on this page
Belz Industries, Inc., N.Y., 15c, 55sc
Bendix Corp., The, Scintilla Div., Sidney, N.Y., 5s, 20s, 35s, 65s, 70s, Tel: LOwell 3-9511
See ad on page 148
Berg Mfg. Corp., Pa., 50sc, 65c
Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 15sc, 55c, Tel: CHurchill 8-1200
See ad on page 306
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 10s, 30s, 40s, Tel: WOrth 6-5611
See ad on page 607
Blonder-Tongue Labs., Inc., N.J., 15s
Breeze Corporations, Inc., N.J., 60c
Buchanan Electrical Products Corp., 607 U.S. Highway 22, Hillside, N.J., 45s, Tel: WAverly 3-7474
See ad on page 557
Buckbee Mears Co., Minn., 50c
Burndy Corp., H. H. Buggie Div., Ohio, 5, 15, 20, 35, 45, 50, 55, 60, 65, 70 triaxial
Burndy Corp., Omaton Div., Richards Ave., Norwalk, Conn., 5s, 15s, 35s, 45s, 50sc, 55s, Tel: TEmple 8-4444
See ad on this page
C.W.S. Waveguide Corp., N.Y., 15c
Cambridge Thermionic Corp., Mass., 50sc, 65sc
Cannon Electric Co., Dept. 425, 3208 Humboldt St., Los Angeles 31, Calif., 5s, 15s, 20s, 30s, 45s, 50s, 55s, 65s, 70s, Tel: CApitol 5-1251
See ad on page 410
Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 20c, 55c, Tel: WEst Lebanon 3-5851
See ad on page 452
Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, 15s, 30s, 35s, 40s, 45s, 50s, 65s, Tel: NEvada 2-2000
See ad on pages 46-47
Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 35s, 45s, 50s, 65s, Tel: WOodland 7-1113
See ad on page 471
Cleveland Metal Specits. Co., Ohio, 50sc
Co-operative Industries, Inc., N.J., 20c
Cole Electric Co., Calif., 15c, 20c, 25c, 35c, 45sc, 50c, 55c
Collectron Corp., 304 E. 45th St., New York 17, N.Y., 60c, Tel: MUrray Hill 9-7120
See ad on page 547
Collins Radio Co., Central Sales Office, Tex., 15s, 20s, 25s, 30s, 35s, 45s, 50s, 55s, 65s, 70s
Component Mfg. Service, Inc., Mass., 15, 30, 40, 70
Components for Research, Inc., 979 Commercial St., Palo Alto 2, Calif., 15sc, 45sc, Tel: DAvenport 1-5252
See ad on page 688
Connector Corp. of America, Calif., 15sc
Connector Seals Corp., 300 North Lake Ave., Pasadena, Calif., 20sc, 65sc, 70sc, Tel: CUmberland 3-7224
See ad on page 450
Consolidated Electrodynamics Corp., Calif., 5s
Constantin & Co., L. I., N.J., 5c, 20c
Continental Connector Corp., N.Y., 5c, 15c, 20c, 35sc, 45c, 50sc, 65sc, 70c
Coors Porcelain Co., Colo., 15c, 20c, 50c
Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 5sc, 15sc, 20sc, 35sc, 45sc, 55sc, 65sc, Tel: SWarthmore 1-0100
See ad on page 510
Dage Electric Co., Inc., 67 N. Second St., Beech Grove, Ind., 15s, 20s, 55s, Tel: STate 6-0458
See ad on pages 132-133


**CONNECT, PROTECT, CONTROL OR FILTER**



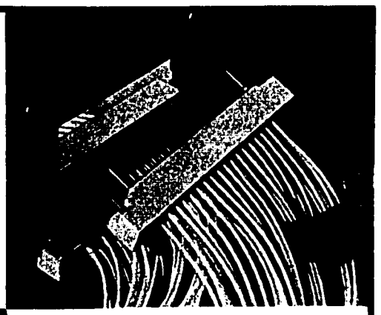

TERMINALS • PLUGS & SOCKETS • THERMAL DEVICES
FUSES • INTERFERENCE FILTERS • GLASS SEALS

**ERCONA CORPORATION**
*(Electronic Division)*
Dept. P-8, 16 West 46th Street, New York 36, New York

For details, circle #343 on Reader Service Card

crimp-type, snap-locked contacts
Modular
**HYFEN®**
**connector**
feed-thru, multiple insert

Makes possible the design of lighter and more compact equipment. Each insert holds 35 contacts. Frames available for 5 or 8 inserts.

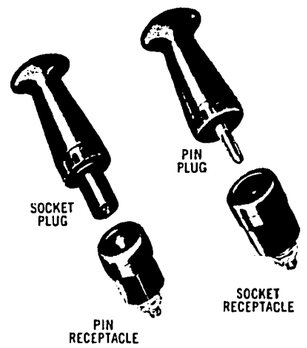


**BURNDY**
For complete information, write: OMATON DIVISION, BURNDY—Norwalk, Connect.
59-1

For details, circle #344 on Reader Service Card


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## SUPERCON®
*Electrical Connectors*



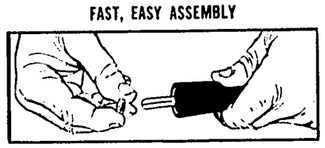

**25, 50, 100 AND 250 AMPERE TYPES**

**GOLD-PLATED BRASS PARTS**

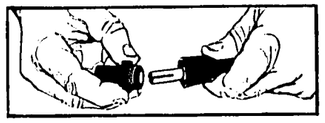
**NEW, POSITIVE-GRIP PLUG DESIGN**

**RED, WHITE, BLUE, YELLOW, BLACK AND GREEN CORROSION-RESISTANT NYLON**

**FAST, EASY ASSEMBLY**



After attaching the cable to the pin plug with the two fastening screws or by soldering, 50 and 100 ampere pin plugs are assembled by slipping the grip over the pin plug and tightening in place with the assembly nut.

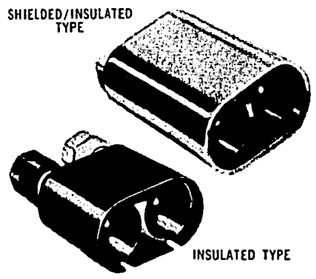


On 25 and 250 ampere pin plugs and all socket plugs, the grip is slipped over the cable and the cable is attached to the socket or pin plug with the screws or by soldering. The shield and grip are then easily screwed together securely.



After the panel hole is opened, the color-matched nylon receptacle cap and base are screwed together securely. Wiring is attached by lug, clip-lead, wrap-around or by soldering depending upon the load or individual requirements.

## DUB-L-PLUG
*Dual Electrical Connectors*




**SHIELDED/INSULATED AND INSULATED TYPES AVAILABLE**

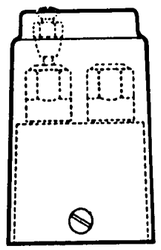
**ALL CONDUCTING METAL PARTS GOLD-PLATED**

**NYLON BODIES ON INSULATED TYPES AVAILABLE IN 6 COLORS**

DUB-L-PLUG Dual Electrical Connectors are valuable accessories for making quick connections to SUPERIOR 5-WAY and similar binding posts mounted on 3/4" centers. Completely recessed integral banana plugs prevent accidental shorting. Captive black and white thumbnuts permit ready circuit and polarity identification. Wiring connections to insulated DUB-L-PLUGS can be made by center hole clamping, spade lug, cliplead, banana plug or looping and clamping.

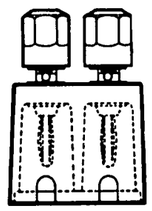
### SHIELDED/INSULATED DUB-L-PLUG

Used where protection from stray fields is desired as in high impedance testing. Supplied with sturdy die-cast chrome-plated case that can be removed if only insulated plug is needed. Has grounding banana plug that can be removed when used with 2-wire ungrounded circuits. Nylon body supplied in black only.

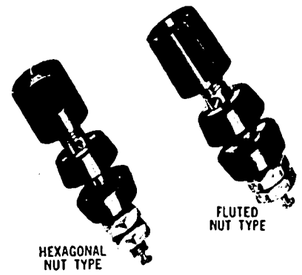


### INSULATED DUB-L-PLUG

Ideal for making rapid connections in power circuits and electronic and electrical applications where shielding is not required. All metal parts are recessed for maximum safety of user and equipment. Design permits stacking of several DUB-L-PLUGS if desired. Nylon bodies supplied in red, white, blue, yellow, green or black.



## SUPERIOR 5-WAY®
*Binding Posts*

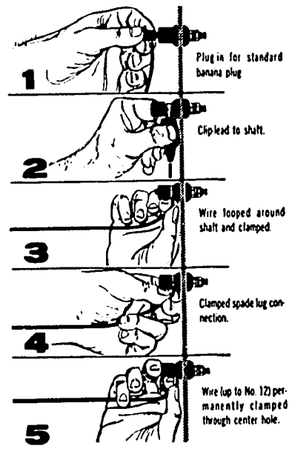



**FIVE WAYS TO CONNECT**

**GOLD-PLATED BRASS PARTS**

**SIX COLORS AVAILABLE**

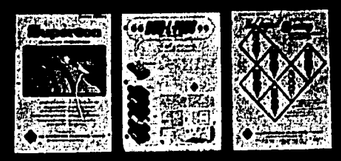
**FAST, EASY INSTALLATION**




These are the original SUPERIOR 5-WAY® Binding Posts and are the first choice of electrical and electronic equipment manufacturers. Their 30 amperes current capacity and 1000 volt working voltage satisfy a wide range of user requirements. Finely machined brass parts are gold-plated for long life, resistance to corrosion, stable electrical contact and faster soldering. Metal parts are recessed for protection of user and equipment. Offered with either hexagonal or fluted type thumbnut. Available in six colors for more attractive panels and easier circuit identification. Nylon plastic is compounded to meet military specification MIL-P-17091B. SUPERIOR 5-WAY Binding Posts with nickel-plated metal parts are available on special order. Can be mounted and securely locked in any panel from 1/6" to 1/4" thick. Adapter spacers are available for thinner panels. Complete insulation from the panel is provided.

THE SUPERIOR ELECTRIC COMPANY

600 Ames Avenue, Bristol, Connecticut



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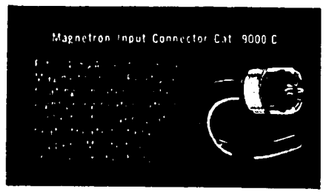



For details, circle #345 on Reader Service Card




# MAGNETRON CONNECTORS
by jettron®

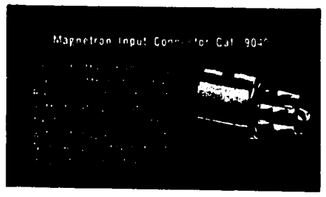
**Specify JETTRON for all types of magnetron connectors for vital military or commercial equipment. Complete facilities for the design and production of "specials" and other precision components including sockets and cable assemblies.**




**Magnetron Input Connector Cat. 9005-C**



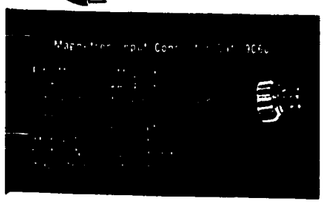
**Fits 4J52A and similar Magnetrons. Features identical to Cat. 9000-C. In addition has 75 mil thick silicone insulated cables for higher potential applications. Made with 4700 $\mu\mu f$ built-in capacitor.**



**Magnetron Input Connector Cat. 9050**



**Fits Miniature Magnetrons such as L-3028B. Beryllium copper heater and cathode contacts assure dependable contact. Silicone cup fits snugly over magnetron input end. Leads insulated with silicone.**



**Call or write for bulletins on special sockets, magnetron and other connectors**

## JETTRON PRODUCTS • INC

**56 Route 10, Hanover, New Jersey**
**Telephones: TUcker 7-0571-0572**

**Sales Engineers in Principal Cities**

For details, circle #346 on Reader Service Card




# Directory II. Components

## 46. Connectors.

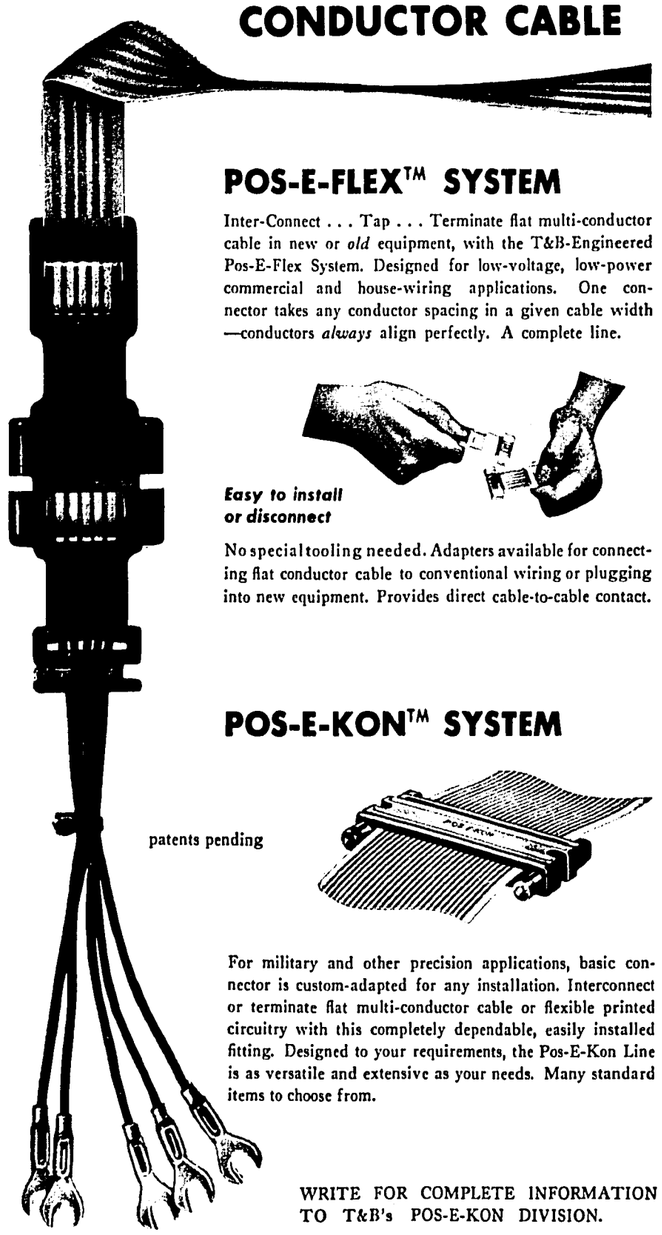
Dante Electric Mfg. Co., Conn., 45s
DeJur-Amsco Corp., Electronics Div., N.Y., 5c, 15c, 20c, 35sc, 45c, 50sc, 65sc, 70c
Deutsch Co., Calif., 5s, 15s, 20s, 35s, 45s, 55s, 65sc, 70s
**Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 5s, Tel: HYacinth 7-7600**
See ad on page 472
Dielectric Products Engineering Co., Inc., Me., 15sc, 55sc
Dow-Key Co., Inc., Minn., 15s
Dyna Magnetic Devices, Inc., N.Y., 65s
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 60c, 70c, Tel: HAlifax 6-7491**
See ad on page 400
Eby Co., Hugh H., Pa., 40c, 50c, 65c
Ecco Electronic Components Corp., N.Y., 15s, 20s, 30s, 40s, 50c, 55s, 65c, 70c
Elco Corporation, Pa., 5s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 65s, 70s
Electric Terminal Corp., R.I., 20s, 25s
**Electrical Industries, Div. Philips Electronics & Pharmaceutical Industries Corp., 691 Central Ave., Murray Hill, N.J., 20sc, 65sc, Tel: CRestview 7-4300**
See ad on page 180
Electro-Chemical Engraving Co., Inc., N.Y., 50c
**Electro Contacts, Inc., Div. Electro Switch Corp., Osterville, Mass., 60c, Tel: (Hyannis) GArden 8-6986**
See ad on page 548
Electro Development Co., Calif., 60sc
Electro-Miniatures Corp., N.J., 5sc, 20sc, 60sc, 65sc
Electro-Physics Labs., Calif., 15s, 50s, 55s, 65s
Electro-Seal Corp., Ill., 20sc
Electro Tec Corp., N.J., 60c
Electrocraft Component Div., G-C Electronics Co., Ill., 30s, 40s
Enflo Corporation, N.J., 65c
Entron, Inc., Md., 15s, 35s, 55s
Escon, Inc., Sub. Glass-Tite Inds., Inc., R.I., 5
Franklin Fibre-Lamitex Corp., N.Y., 50c, 60c
**Fusite Corp., The, Dept. H-1, 6000 Fernview Ave., Cincinnati 13, Ohio, 20sc, Tel: REdwood 1-2020**
See ad on page 194
**G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 30sc, 40sc, Tel: WOodland 8-9661**
See ad on page 640
Garlock Electronic Products, Garlock, Inc., N.J., 5s, 35sc, 65s
Garrett Corp., The, Calif., 5c
General Circuits, Inc., N.Y., 50c
General RF Fittings, Inc., Mass., 15sc, 20sc, 55sc
**General Radio Co., 22 Baker Ave., West Concord, Mass., 15s, Tel: EMerson 9-4400**
See ad on Cover 4
Gibson Electric Co., Pa., 60c
Glass-Tite Industries, Inc., R.I., 5sc, 20sc, 65sc
Glasseal Products Co., Inc., N.J., 5sc, 20sc, 65sc
Good-All Electric Mfg. Co., Neb., 15s, 55s
Gorn Electric Co., Inc., Conn., 5
**Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 60sc, Tel: YOnkers 8-8400**
See ad on page 416
Gremar Mfg. Co., Inc., Mass., 15sc, 20sc, 55sc, 65sc, 70sc
**Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 65c, Tel: NEw Rochelle 3-8600**
See ad on page 643
Gulton Industries, Inc., N.J., 65s
Hall-Barkan Instruments, Inc., N.Y., 5c, 15c, 20c, 65c
Hallett Mfg. Co., Calif., 15s, 70s
Hallicrafters Co., The, Ill., 15sc, 55sc
Hercon Electronics Corp., N.J., 5s, 20sc, 65c, 70c
**Hermetic-Pacific Corp., 4232 Temple City Blvd., Rosemead, Calif., 20sc, Tel: GIbert 3-1757**
See ad on page 450
**Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 5sc, 20sc, 35c, 45c, 65c, 70c, Tel: WYman 8-8080**
See ad on page 450
Hobson Bros., Inc., Ill., 10c
Hollingsworth Company, Pa., 5s
Hughes Aircraft Co., Industrial Systems Div., Calif., 50s
Industrial Electronic Hardware Corp., N.Y., 10sc, 25sc, 40sc, 50sc
**Industrial Products-Danbury Knudsen Div., Amphenol-Borg Electronics Corp., 33 E. Franklin St., Danbury, Conn., 15s, 20s, 35s, 55s, 65s, 70s, Tel: PIoneer 3-9272**
See ad on page 160
International Electric Industries, Inc., N.Y., 45sc, 70c
**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 5s, Tel: DEwey 1-1000**
See ad on pages 76-77
**Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 15s, Tel: BAldwin 6-3456**
See ad on pages 114-115
**Jettron Products, Inc., 56 Route 10, Hanover, N.J., 10s, 20sc, 65c, Input s, Heater c, Tel: TUcker 7-0571**
See ads on pages 413, 544
Joclin Mfg. Co., Conn., 5
Johnson Co., E. F., Minn., 50s, 55s
**Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, 15s, 30s, 35s, 40s, 45s, 50s, 65s, Tel: NEvada 2-2000**
See ad on pages 46-47
Joy Mfg. Co., Electrical Products Div., Mo., 5sc, 10sc, 20sc, 25sc, 35sc, 45sc, 70sc
Ken-Tron Corp., Mass., 15sc, 30sc, 55sc, 65sc
Kennedy Industries, Calif., 50s
Keystone Electronics Corp., N.Y., 40s



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# CONNECTOR SYSTEMS FOR FLAT CONDUCTOR CABLE

T&B ENGINEERED



## POS-E-FLEX™ SYSTEM

Inter-Connect . . . Tap . . . Terminate flat multi-conductor cable in new or *old* equipment, with the T&B-Engineered Pos-E-Flex System. Designed for low-voltage, low-power commercial and house-wiring applications. One connector takes any conductor spacing in a given cable width —conductors *always* align perfectly. A complete line.



***Easy to install or disconnect***

No special tooling needed. Adapters available for connecting flat conductor cable to conventional wiring or plugging into new equipment. Provides direct cable-to-cable contact.

## POS-E-KON™ SYSTEM

patents pending



For military and other precision applications, basic connector is custom-adapted for any installation. Interconnect or terminate flat multi-conductor cable or flexible printed circuitry with this completely dependable, easily installed fitting. Designed to your requirements, the Pos-E-Kon Line is as versatile and extensive as your needs. Many standard items to choose from.

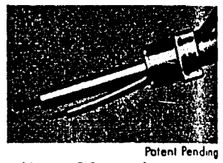
WRITE FOR COMPLETE INFORMATION TO T&B's POS-E-KON DIVISION.

## THE THOMAS & BETTS CO.
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ELIZABETH, NEW JERSEY — IN CANADA, THOMAS & BETTS, LTD. MONTREAL

SOLD COAST TO COAST EXCLUSIVELY BY YOUR LOCAL T&B DISTRIBUTOR

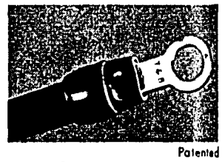
# electronic product news



Patent Pending

## Grounding Sheath Connectors

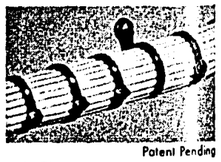
For simply and effectively grounding braid of shielded or coaxial cable, this reliable T&B connector is now available with new duPont TEFLON Insulation for high temperature applications, as well as in standard materials. A complete line of connectors is available for standard and special applications.



Patented

## STA-KON® Terminals

For small wire terminating, T&B presents a full selection of terminal styles, sizes and tongue shapes — including the popular new quick-disconnect . . . and many aircraft type joints and splices. The exclusive T&B type of staking — by hand tool or high-speed machine — insures a dependable, sound installation.



Patent Pending

## TY-RAP™ Cable Ties and Straps

This new modern method for tying wire bundles and harnesses — or mounting electronic components — obsoletes the use of string, cord or tape by virtue of its extreme ease of application (tool or hand applied) and the resulting economies in time and dollars.

WRITE FOR COMPLETE INFORMATION The Thomas & Betts Co., Pos-E-Kon Division, 36 Butler Street, Elizabeth, New Jersey.



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# IT'S A BREEZE




**Time Required to Attach Connector to the Cable Greatly Reduced with K-GRIP®**

***Plus all these other advantages***

1 Superior strength of connection. Both cable braid and dielectric are firmly held by K-Grip.
2 Uniformity of performance from unit to unit.
3 Ease of inspection or replacement in the field.
4 No highly skilled assembly personnel required.
5 Present inventories of connectors do not become obsolete.

KINGS Electronics CO., INC.
49 MARBLEDALE ROAD — TUCKAHOE, N. Y. — SWIFTWATER 3 5000

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# "RELI-ACON"
CONNECTORS
for Immediate Delivery!




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# Directory II. Components

## 46. Connectors.

Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 15sc, 20sc, 30sc, 35c, 40sc, 45sc, 55sc, 65sc, 70sc, Tel: STillwater 3-5000
See ad on this page

Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 25s, 35s, 45s, 50s, 65s, Tel: MOunt Vernon 4-4024
See ads on pages 551, 558

Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 15s, 30s, 40s, 45s, 70s, Tel: GRaceland 7-7900
See ad on page 454

Lacey Engineering & Mfg. Co., Ill., 50c
La Pointe Industries, Inc., Conn., 50sc
Lerco Electronics, Inc., Calif., 50sc
Liquidometer Corp., The, N.Y., 15sc, 20c, 65sc, 70sc

Makepeace Div., D. E., Engelhard Industries, Inc., Attleboro, Mass., 60, Tel: ATtleboro 1-0089
See ad on page 170

Malco Manufacturing Co., Ill., 5s, 25s, 40s, 50s
Marconi's Wireless Telegraph Co., Ltd., N.Y., 15s

Methode Manufacturing Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 5s, 20s, 35s, 50s, 65s, Tel: UNderhill 7-9600
See ad on this page

Microdot, Inc., Calif., 15sc, 20sc, 35sc, 50s, 55sc, 65sc, 70sc

Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 5s, 15s, 55s, Tel: WYman 2-5700
See ad on page 380

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 10s, 45sc, Tel: DAvenport 4-4108
See ad on page 402

Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 20c, 65c, Tel: WAverly 6-2250
See ad on page 452

Molding Corporation of America, R.I., 5c, 20c, 50c, 60c, 65s, 70c
Monadnock Mills, Calif., 10c
Mosley Electronics, Inc., Mo., 35s, 55s
Motorola, Inc., Military Electronics Div., Ariz., 50c

National Tel-Tronics Corp., 53 St. Casimir Ave., Yonkers, N.Y., 10c, 50c, Tel: YOnkers 8-6400
See ad on page 559

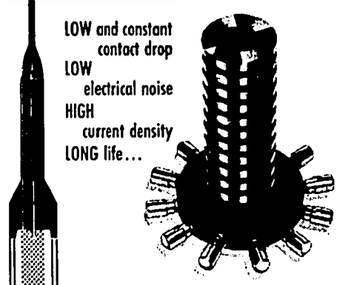
Networks Electronic Corp., Calif., 5c, 20sc, 25c, 35c, 45c, 70c

Ney Company, J. M., Maplewood Ave., Bloomfield, Conn., 60c, Tel: CHapel 2-2281 (Hartford)
See ad on page 687

Norrich Plastics Corp., N.Y., 5c, 10c, 20c, 40c, 50c, 55c, 60c, 65c, 70c
North Electric Co., Ohio, 70sc
Nugent Electronics Co., Inc., Ind., 15sc, 20c, 50s, 65s

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

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LOW and constant contact drop
LOW electrical noise
HIGH current density
LONG life...

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Wide range of grades available for standard and special applications. Call on our 40 years of design experience to help solve your problems.

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Packard Bell Electronics Corp., Calif., 5sc, 15sc, 20sc, 35sc, 45sc, 65sc, 70sc
Painton & Co., Limited, England, 15c, 35c, 50sc
Penn Keystone Corp., Conn., 5c, 20c
Permonite Mfg. Co., Ill., 10s, 25sc, 40sc
Phelps Dodge Copper Products Corp., N.Y., 15s, 55s
Poly-Scientific Corp., Va., 60sc
Prodelin, Inc., N.J., 15s
Pyle-National Co., The, Ill., 5s, 15sc, 25s, 35sc, 45sc, 65sc, 70sc
Radio Engineering Products, Canada, 5s, 20s, 35s, 70s
Raypar, Inc., Ill., 10sc, 25sc
Revcor, Inc., Ill., 60c
Rho Engineering Co., Calif., 10s
Robertson Electric Co., Inc., N.Y., 5c, 20c, 65c, 70c, Cable c
Rodale Mfg. Co., Inc., Pa., 25s, 70s
Rotary Devices Corp., N.J., 60sc
Royal Electric Corp., Div. ITT, R.I., 25s
Schaevitz Engineering, N.J., 60s
Scientific Components, Inc., Calif., 50s, 60s
Scientific Electronic Labs., N.J., 20c, 35c
Sealectro Corp., N.Y., 15s, 50s, 55s
Sealtron Corp., Ohio, 5c, 65c
**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 20s, Tel: HOpkins 7-3200**
**See ads on pages 385, 519**
Sherman Mfg. Co., H. B., Mich., 5sc
Signal Indicator Corp., N.Y., 30s, 65s
Silicone Seals, Inc., Ill., 20sc
Slip Ring Co. of America, Calif., 60c
Smith, Inc., Herman H., N.Y., 15s, 30s
Specialty Electronics Development Corp., N.Y., 20sc, 35sc, 45sc, 70sc
Spencer-Kennedy Laboratories, Inc., Mass., 15s
Sphere Co., Inc., The, N.J., 20sc, 65sc
Standard Electrical Products Co., Ohio, 45c
Stanwyck Coil Co., E., N.Y., 50, 65
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 25s
**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 45s, Tel: LUdlow 2-9561**
**See ads on pages 412, 468, 494, 572, 586**
**Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 30sc, 40sc, 65s, Tel: SPring 4-1515**
**See ad on page 554**
Tamar Electronics, Inc., Calif., 5s, 15s, 55s
**Technical Appliance Corp., 1 Taco St., Sherburne, N.Y., 55c, Tel: ORchard 4-2211**
**See ad on page 376**
Technical Industries Corp., Calif., 5sc, 15sc, 20sc, 45sc, 65sc, 70sc
**Telcon, Inc., Dept. E 611, P.O. Box 216, Pacific Palisades, Calif., 15s, 55s, Tel: GLadstone 4-4043**
**See ad on page 617**
Telechrome Mfg. Corp., N.Y., 25s, 35s
Texas Instruments Incorporated, Metals & Controls Div., Mass., 60c
**Thermal Controls, Inc., 41 River Rd., North Arlington, N.J., 5sc, 20sc, Tel: NOrth 1-1000**
**See ad on page 450**
**Thomas & Betts Co., Inc., The, 36 Butler St., Elizabeth 1, N.J., 5s, Tel: ELizabeth 4-4321**
**See ad on page 414**
Thor Ceramics, Inc., N.J., 20c
Topper Mfg. Co., Inc., N.Y., 60c
**Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 15sc, 30sc, Tel: EMpire 2-3700**
**See ad on page 454**
Tru-Connector Corp., Mass., 15sc, 20c, 25c, 55sc, 65c, 70sc, Cable sc
Ucinite Co., The, Div. United-Carr Fastener Corp., Mass., 10, 15, 50
United International Dynamics Corp., Mass., 50c
United Shoe Machinery Corp., Mass., 15c
**U.S. Components, Inc., 454 East 148th St., New York 55, N.Y., 5, 20, 25, 35, 45, 50, 65, Tel: CYpress 2-6525**
**See ad on page 134**
U. S. Dielectric Products, Inc., Mass., 5c
U. S. Stoneware Co., Alite Div., Ohio, 20s
Viking Industries, Inc., Calif., 20s, 35s, 45s, 50s, 65s, 70s
Virginia Electronics Co., Inc., D.C., 35sc
Waldom Electronics, Inc., Ill., 10s, 25s, 40s
Warren Components Div., El-Tronics, Inc., Pa., 10c, 20c
Whitney Blake Co., Conn., 5s, 45s, 50s, 70s
Wiggins Oil Tool Co., Inc., E. B., Calif., 5sc, 15sc, 20sc, 25sc, 65c, 70sc
Winchester Electronics, Inc., Conn., 5sc, 10sc, 15sc, 20sc, 25sc, 35sc, 45sc, 50sc, 65sc, 70sc
Wiremold Co., Conn., 45
Wood Electric Co., Inc., Mass., 15sc, 20sc, 55sc, 65sc, 70sc

**Consoles & cabinets:**
**See class 84**

**Consoles, studio:**
**See class 34**

**Contacts:**
**See class 72**

**Controls, remote:**
**See class 4**

**Converters, analog to digital, digital to analog, card to tape, tape to card: See class 9**

**Converters, frequency shift:**
**See class 35**





# Directory II. Components

## 47. Converters.

5. AC to DC
10. DC to AC
15. Choppers
20. Inverters
25. Rotary
30. Vibrators
35. Vibrators, crystal
40. Vibrators, semiconductor
45. Voltage

A C Electronics, Inc., Calif., 5sc, 10sc, 20sc
Accurate Instrument Co., Tex., 10sc, 40sc
**Acme Electric Corp., 44 Water St., Cuba, N.Y., 45c, Tel: CUba 4**
**See ad on page 476**
**Acton Labs., Inc., 500-B Main St., Acton, Mass., 20c, Tel: COlonial 3-7756**
**See ad on page 346**
Adage, Inc., Mass., 5sc, 10sc, 45sc
Advanced Research Associates, Inc., Md., 5sc, 10sc
Aeroflex Corp., The Aeroflex Laboratories Div., N.Y., 15s, 20c
Aerolab Development Co., Calif., 5c, 10c, 20sc
Airborne Accessories Corp., N.J., 20c
Airdesign Corp., Pa., 5c, 10c
**Airpax Electronics, Inc., Cambridge Div., Jacktown Rd., Cambridge, Md., 5sc, 10sc, 15sc, 20sc, 30sc, Tel: AC 8-4600**
**See ad on pages 82-83**
**Airpax Electronics, Inc., Seminole Div., Fort Lauderdale, Fla., 5c, 10s, 15s, 30s, Tel: LUdlow 3-6160**
**See ad on pages 82-83**
Allis-Chalmers Mfg. Co., Wis., 5c
Alto Scientific Co., Inc., Calif., 5c
**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 5s, Tel: WAlnut 5-8780**
**See ad on page 369**
**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 5c, 10c, 15c, 20sc, 25sc, Tel: DUnkirk 5-7401**
**See ad on page 164**
American Research & Mfg. Corp., Md., 5s, 10s, 20s, 45c
**American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 5sc, 10sc, 20sc, 30sc, 45sc, Tel: CApital 2-3791**
**See ad on page 472**
**Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 15c, Tel: BUckingham 1-2727**
**See ads on pages 463, 577**
Anders Electric Products, Inc., Mass., 5sc, 10sc, 20c, 45sc
Arnold Magnetics Corp., Calif., 10c
Arnoux Corp., Calif., 5s, 10s, 20s, 45s
Associated Electrical Industries, Ltd., Instrumentation Div., England, 15s
Atlas Engineering Co., Inc., Mass., 5c, 10c, 20c, 45c
**Ballantine Laboratories, Inc., Boonton, N.J., 5s, 20s, Tel: DEerfield 4-1432**
**See ad on page 144**
Barker & Williamson, Inc., Pa., 5sc, 10sc, 20sc
Barnes & Reinecke, Ill., 5c, 10c
**Behlman Engineering Co., 2911 Winona Ave., Burbank, Calif., 10c, Tel: VIctoria 9-5733**
**See ad on page 477**
Bell Aircraft Corp., Avionics Div., N.Y., 5c, 10c
Bergen Laboratories, Inc., N.J., 5c, 10c, 20c
Block Associates, Inc., Mass., 10c, 20c
Bone Engineering Corp., Calif., 5c, 10c, 20c
Bristol Co., Conn., 5sc, 10sc, 15sc, 20sc, 30sc
Britton Electronics Corp., N.Y., 5c
Brocker Laboratories, Calif., 10c
Bruel & Kjaer, A/S, Denmark, 10s, 15s
Brunswick Instruments, N.J., 20c
Bucknell Engineering Co., Inc., Calif., 5c, 10c, 20c, 25c
**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 5c, 10c, 20c, Tel: CLoverdale 3-8931**
**See ad on page 321**
Cadre Industries Corp., N.Y., 5c, 10c, 20c
Camera Equipment Co., Inc., N.Y., 5sc, 10sc
Capehart Corp., Dynamic Electronics Div., 5c, 10c, 40c, 45c
Carter Motor Co., Ill., 10s, 20s, 25s
Chicago Electronic Div., Land-Air, Inc., Ill., 10c
Christie Electric Corp., Calif., 5sc
Co Engineering Co., N.J., 10c, 15c
Coil Winders, Inc., N.Y., 5c, 10c, 20c, 45c
Collins Electronics, Inc., Md., 10c, 15c, 20c, 30c
Collins Radio Co., Central Sales Office, Tex., 5sc, 10sc
**Communication Measurements Laboratory, Inc., 348 Leland Ave., Plainfield, N.J., 10s, 20s, Tel: PLainfield 4-5502**
**See ad on page 479**
Components Corp., Ill., 5c, 10c
Computer Engineering Associates, Inc., Calif., 5s, 10c, 45s
Consolidated Avionics Corp., N.Y., 5sc, 10sc, 20sc
Consolidated Diesel Electric Corp., Conn., 5c, 10c, 20c
Continental Electric Co., Inc., N.J., 5c, 10sc, 20sc, 25sc
**Control Electronics Co., Inc., 10 Stepar Pl., Huntington Station, L.I., N.Y., 5c, 10c, 20c, Tel: HAmilton 7-7961**
**See ad on page 440**
Cook Electric Co., Ill., 5c, 10c, 45c
**Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 5s, 10s, 20s, 30s, 45s, Tel: PLainfield 6-9000**
**See ad on Cover 3**
Crown Engineering, N.M., 10c
D & R, Ltd., Calif., 5sc, 10sc, 20sc, 25sc, Frequency sc
Datascan, Inc., N.J., 5s, 10s, 20s, 45s
Daven Co., The, N.J., 5c, 10c, 20c, 45c
Davenport Mfg. Co., Ill., 5c, 10c, 20c, 45c
Daystrom, Inc., Weston Instrument Div., N.J., 5sc, 10sc
Dayton Electronic Products Co., Ohio, 5sc, 15sc
Deltek, Calif., 5c, 10c, 20c
Deltron, Inc., Pa., 10s, 20s, 40s
Designers for Industry, Inc., Ohio, 5c, 10c, 20c
Dicon Corporation, N.Y., 5c, 10c, 20c, 45c
Djordjevic Engineering Co., Djeco Div., Ill., 5sc, 10sc, 20sc, 45sc
Dresser Electric Co., Mich., 5c
Dymec, Div. Hewlett-Packard Co., Calif., 5sc
E.M.I.-Cossor Electronics, Ltd., Canada, 30sc
Eicor Division, The Scranton Corp., Ill., 5c, 10c, 20c, 25c, 45c
Electric Specialty Co., Conn., 5c, 10c, 25c, 45c
Electro Development Corp., Wash., 5c, 10c, 20c
Electro Instruments, Inc., Calif., 5s
**Electron Arc Div., Ionics, Inc., 244 Broad St., Lynn, Mass., 5c, 10c, Tel: LY 8-2100**
**See ad on page 485**
Electronet Div., Rue Products, Calif., 5c, 10c


ESCO ELECTRIC SPECIALTY COMPANY
Pioneers in Power

*Multi-output airborne MG set for gun turret drive.*



Conversions: AC-DC, DC to low or high voltage DC, AC or DC to specified frequency or special wave shapes, plus special combinations of all these on the same shaft. Precise Power Sets minimize cost, size, and maintenance—optimize performance and reliability.

FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL
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WASHINGTON .....OLiver 4-6400
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For details, circle #351 on Reader Service Card

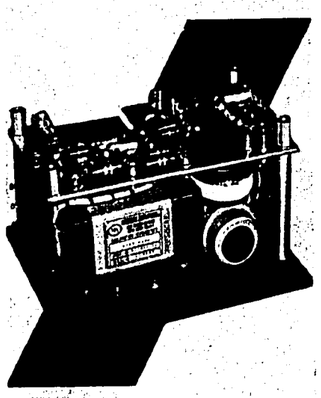

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

*New* PRECISION FREQUENCY

**STATIC INVERTER SUPPLY**

INPUT 28V D.C. ± 10%
OUTPUT *Nom.* 115V ± 2%
400 CPS ± 0.01%
1 Ø (2- or 3-phase output available)
RATINGS: 30VA 50VA 100VA
*Higher-ratings available.*

**APPLICATION:**
***For gyro wheel supplies and where precise 400 cycle voltages are required in aircraft, radar and missile computers.***



**FEATURES:**
*PRECISION OUTPUT FREQUENCY*
*RUGGED*
*EXCELLENT WAVEFORM*
*SIMPLICITY OF CIRCUITRY*
*FAST STARTING TIME*
*GOOD VOLTAGE REGULATION*
*throughout an adjustable range*
*ISOLATED CASE DESIGN*
*HIGH RELIABILITY*
*VIBRATION ISOLATED*
*COMPACT*
*LIGHTWEIGHT*
*MILITARY SPECIFICATIONS*
(Send for Bulletin S-864)

THE MAGNETIC AMPLIFIER CORPORATION

**MAGNETIC AMPLIFIERS DIVISION**
632 TINTON AVE., NEW YORK 55, N. Y.
CYPRESS 2-6610

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Electronic Associates, Inc., N.J., 5s
Electronic Computer Co., Inc., Pa., 5sc
Electronic Plastics Co., Calif., 5c, 10c
Electronic Research Associates, Inc., N.J., 5sc, 10sc, 20sc, 45sc
Electronic Specialty Co., Calif., 5c, 10c, 20c, 40c, 45c
Elk Electronic Labs., Inc., N.Y., 5c, 10c
Engineering Associates, Ohio, 25c
Era Electric Corp., N.J., 5, 10
Erie Pacific Div., Erie Resistor Co., Calif., 5c, 10c, 20c, 35c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 10c, 20c, 40c, 45c
Fairfield Engineering Corp., Conn., 10c, 20c

**Freed Transformer Co., Inc., 1713 Wierfield St., Brooklyn 27, N.Y., 10sc, Tel: EVergreen 6-1300**
See ad on page 566

Garrett Corp., The, Calif., 5c, 10c, 20c

**Gates Electronic Co., 1705-I Taylor Ave., New York 60, N.Y., 5s, Tel: TYrone 2-6490**
See ad on page 484

General Devices, Inc., N.J., 5c, 10c, 15sc, 20c, 25sc, 30c, 35c, 40c, 45c
General Electric Co., Pa., 5sc 10c, 20c, 45c
General Electric Co., Apparatus Sales Div., N.Y., 5sc, 10sc, 20sc, 25sc
General Electric Co., Ltd., of England, The, Telephone Works, England, 5s, 10s, 15s, 20s, 40s, 45s

**General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N.J., 10s, Tel: PIlgrim 8-2400**
See ads on pages 484, 485

Geotechnical Corporation, The, Tex., 10s, 20s
Geotronic Labs., Inc., Tex., 5sc, 10c, 15sc
Gibbs Mfg. & Research Corp., Wis., 10c
Glentronics, Inc., Calif., 5c, 45sc
Globe Industries, Inc., Ohio, 30s
Great Lakes Electric Mfg. Co., Ill., 10s, 25s
Green Rectifier Co., N.J., 5sc, 45sc


**You find facts faster with the IRE DIRECTORY**

**Because the product listings in the IRE DIRECTORY are logically arranged the way an engineer thinks, under three great major classifications that cover the entire radio-engineering field, you can find the product you want, and the names of the firms who make it, faster and more easily than in "terminology-index" types of listings. Advertisements are logically positioned near the product listings which describe them, to give you more information on the companies you'll want to deal with, and the easy-to-use Reader Service Card brings you quick additional data.**


**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 5sc, 10sc, 30c, 45c, Tel: CHesapeake 3-1100**
See ad on page 512

Gyro Electronics Co., N.Y., 30s
Hallicrafters Co., The, Ill., 5c, 10c, 40c
Hamilton Standard Div., United Aircraft Corp., Conn., 5c, 10c, 20c, 45c
Harrel, Inc., N.Y., 10c, 20c
Hathaway Instruments, Inc., Colo., 5s, 10s, 20s, 45s
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 20c
Heath Company, Subsid. Daystrom, Inc., Mich., 5s, 10s
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 5c, 10c, 15c, 20c, 45c
Holt Instrument Laboratories, Wis., 5s
Hoover Co., Ltd., The, Canada, 20c
Hoover Electric Co., Calif., 25c
Hoover Electronics Co., Md., 15c, 45c
Horlick Co., Inc., William L., Mass., 5s, 10s, 20s, 25s
Hydro-Aire Co., Calif., 5c, 10c, 20c, 35c, 45c
Ideal Electric & Mfg. Co., The, Ohio, 5c, 10c, 25c

**Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 20s, Tel: GRamercy 3-4684**
See ad on page 333

Intercontinental Electronics Corp., N.Y., 5c

**Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5sc, 10sc, 15c, 20sc, 40c, 45c, Tel: LUdlow 4-6200**
See ads on pages 355, 487

International Telephone & Telegraph Corp., ITT Industrial Prods. Div., Calif., 5c, 10c, 20c, 45c
Invar Electronics Corp., Calif., 5sc
James Electronics, Inc., Ill., 15s, 20s, 30s
Jordan Electronics, Div. Victoreen Instrument Co., Calif., 5sc, 10sc, 20sc, 45sc
Kaiser Aircraft & Electronics, Kaiser Industries Corp., Calif., 15c
Kaiser Electronics, Inc., N.J., 5sc, 10sc, 20sc

**Kato Engineering Co., 1420 First Ave., Mankato, Minn., 5c, 10c, 25c, 45c, Tel: 8-2941**
See ad on page 467

**Kearfott Div., General Precision, Inc., Little Falls, N.J., 15sc, Tel: CLifford 6-4000**
See ad on pages 120-121

**Kepco, Inc., 131-42 Sanford Ave., Flushing 52, N.Y., 5s, Tel: INdependence 1-7000**
See ad on page 484

Kidde & Co., Inc., Walter, N.J., 5c, 10c, 20c, 40c
Kidde Ultrasonic & Detection Alarms, Inc., N.J., 10s
Kinetics Corp., Calif., 10sc, 20sc

**Kupfrian Manufacturing Corp., 157 Prospect Ave., Binghamton, N.Y., 5sc, 10sc, 20sc, 45sc, Tel: RAymond 3-6426**
See ad on page 489

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 10c







# Directory II. Components

## 47. Converters.

**Leach Corporation, 18435 Susana Rd., Compton, Calif., 5sc, 10sc, 20sc, 25sc, Tel: NEvada 6-1061**
See ad on page 514

Lear, Inc., Calif., 5sc, 10sc
Lear, Inc., Mich., 5c, 10c, 20c
Leland Airborne Products Div., A.M.F., Ohio, 20sc
Lenkurt Electric Co., Inc., Calif., 10s
Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Div., Calif., 5s, 10s, 20s, 45s

**M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 10c, Tel: GRamercy 3-5899**
See ad on this page

Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 20, Static Inverter Supply, Tel: CYpress 2-6610**
See ads on pages 252, 364, 418

Magnetic Circuit Elements, Inc., Calif., Demodulators c
Magnetic Controls Co., Minn., 5c, 10c, 20c

**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 5c, 10c, Tel: ROgers 9-5312**
See ad on page 364

**Magnetico, Inc., 6 Richter Ct., East Northport, N.Y., 10sc, Tel: ANdrew 1-4502**
See ad on page 366

Mallory & Co., Inc., P. R., Ind., 5c, 10c
Marathon Electric Mfg. Corp., Wis., 5c, 10c, 20c, 45c
Marquardt Corp., The, Pomona Div., Calif., 5c, 10c
Marstan Electronics Corp., N.Y., 5s, 10s, 45s
Martin Co., The, Md., 10c, 15c
Mayberry Electronics Co., Calif., 5sc, 10sc, 15s, 20s
Millivac Instruments, Div. Cohu Electronics, Inc., N.Y., 15s
Milro Controls Co., Inc., N.J., 5c, 10c, 20c, 25c, 40c, 45c
Minneapolis-Honeywell Regulator Co., Boston Div., Mass., 10s
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 5s, 15s
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 10sc
Model Rectifier Corp., N.Y., 5sc, 45sc
Moseley Co., F. L., Calif., 5s
Munzig International, Inc., Calif., 5s
Nacimco Products, Calif., 5s, 45s
Networks Electronic Corp., Calif., 5c, 10c, 20c, 45c
Non-Linear Systems, Inc., Calif., 5s

**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 5s, Tel: OVerbrook 1-8600**
See ad on page 286

**Oak Manufacturing Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 15c, 30c, Tel: MOhawk 4-2222**
See ads on pages 86-87

Ohio Semiconductors, Inc., Ohio, 5sc, 10sc, 15sc

**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 5c, 10c, 20c, Tel: WOrth 6-0380**
See ad on page 483

Osborne Electronics Sales Corp., Ore., 45c
Pacific Automation Products, Inc., Calif., 5c, 10c
Paraplegics Mfg. Co., Inc., Ill., 5c, 10c
Penn Keystone Corp., Conn., 15c, 45c
Perkin Engineering Corp., Calif., 5s, 10s, 20c
Permoflux Products Co., Calif., 5c, 10c, 20c

**Peschel Electronics, Inc., Towners, R.F.D. #1, Patterson, N.Y., 5c, 45c, Tel: TRinity 8-3251**
See ad on page 289

Pesco Products Div., Borg-Warner Corp., Ohio, 5c, 10c, 20c, 25c


**MF TRANSISTORIZED ASSEMBLIES**

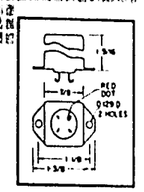
**FIXED FREQUENCY AUDIO TONE OSCILLATORS**

**RC Pretuned Sine Wave—Reliable and hermetically sealed.**

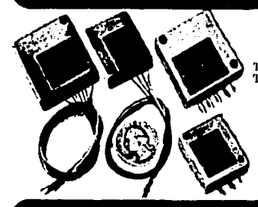
**Series 101, 102**—Standard frequencies from 100 cy. to 20 kc with any intermediate frequency available. Weight .35 grams; operating temperature, 25 to +55°C. Dimensions ⅝" sq. x 1-9/16". Volume 1½ cubic inches.

Uses: Include aircraft, space vehicle, portable equipment; in telemetry, tims circuits, bridge circuits and test equipment.
May be supplied with noval plug if desired.

0.5% TOLERANCE AVAILABLE ON SPECIAL ORDER




| Electrical Specifications: | Series 101 | Series 101A | Series 102 | Series 102A |
|---|---|---|---|---|
| Input Volts, nominal | 12 | 28 | 12 | 28 |
| Input Current, ma. | 7 | 7 | 7 | 7 |
| Output Frequency | as specified | | | |
| Initial Freq. Accuracy at 25°C (percent) | ±2½ | ±2½ | ± ½ | ± ½ |
| Freq. Drift, max., over combined conditions of voltage and temperature variations (percent) | ±2½ | ±2½ | ±1½ | ±1½ |
| Maximum Load to meet Drift spec. (kilohms) | 10 | 20 | 10 | 20 |
| Maximum Load (kilohms) | 1 | 2 | 1 | 2 |
| Output Impedance, Nom. (ohms) | 100 | 200 | 100 | 200 |
| Total Harmonic Signal Distortion, Typical (percent) | 1 | 1 | 1 | 1 |
| Output voltage, minimum, RMS | 1.0 | 2.0 | 1.0 | 2.0 |



**TRANSISTORIZED FLIP FLOPS & BINARY DIVIDERS**
Operating Temperature: −25 to +60° C.

**Group 1**—Microminiature Units, commercial, 1/5 cubic inch
Type 11—20 kc, 6 v. or 12 v. Type 11B—Binary Divider, 20 kc.
Type 11A—300 kc., 6 v. or 12 v. Type 11C—Binary Divider, 300 kc.

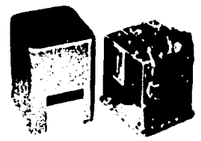
**Group 2**—Non-Military Units, in can, 1-1/16 x 1-1/4 x 1/2"
Type 21—30 kc, with two steering diodes and one reset diode. Both collector and base leads brought out.
Type 23—Same as Type 21 but 300 kc.
Type 24—130 kc., 12 v., using 2N78*s.
Type 26—Frequency Divider.
Type 27—Monostable Multivibrator.

**Group 3**—Military Units, designed to meet the specification of MIL-164000 Class 4.

**TRANSISTORIZED DC to AC INVERTERS**

These are Precision AC Power Supplies operating from battery voltages of 12 to 28 volts. All are controlled by isolated oscillators similar to Series 101/102, or by other internal frequency sources. Output is separated from oscillator by a power amplifier; power factor correction included where necessary.

USES—Power Source for Synchronous Motors in Servo Systems
Power Source for Precision Recorders
Packaged for original equipment or for field and laboratory use.



**TRANSISTORIZED MICROMINIATURE MODULES**



Precision modules made up with whole components and printed wiring board. Units are encapsulated for protection against shock and humidity.

Size: 1/5 cubic inch
Weight: 9 grams

Typical stock types are Amplifiers, Multivibrators, Saw-tooth Generators, Flip-Flops, Binary Dividers, Oscillators.

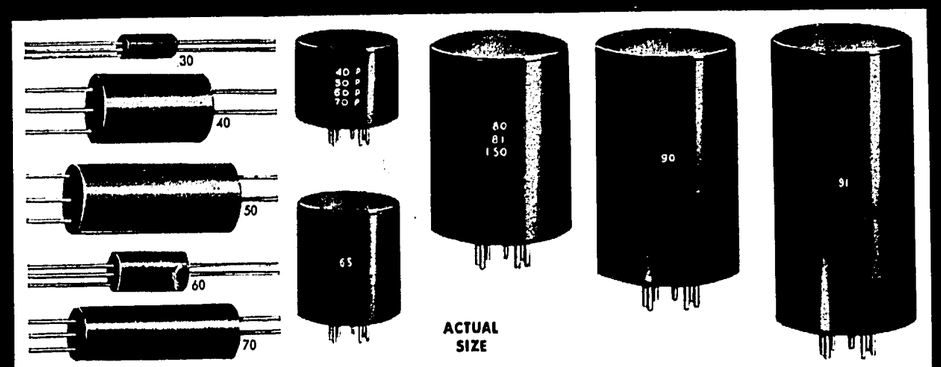
Modifications or special units to your specifications.

MF Electronics Co. 122 East 25 St. New York 10, N. Y. GRamercy 3-5899

For details, circle #353 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# THE MOST COMPREHENSIVE LINE OF SOLID STATE ELECTRONIC CHOPPERS




| | | | | | |
|---|---|---|---|---|---|
| microminiature | lightweight | low power | high speed | rugged | indefinitely long life |
| non-mechanical | inertialess | low level | high efficiency | linear | temperature stable |

The transistor chopper (or modulator) is a solidly encapsulated unit designed to alternately connect and disconnect a load from a signal source. It may also be used as a demodulator to convert an a.c. signal to d.c. It is capable of linearly switching or chopping voltages over a wide dynamic range which extends down to a fraction of a millivolt and up to 150 volts or more. Unlike mechanical choppers which can only be designated to operate over a narrow and comparatively low frequency range due to mechanical limitations, this transistorized chopper is an inertialess device that can be driven from d.c. to hundreds of kilocycles.

The switching circuitry used operates the transistors in a manner which provides stability and freedom from drift over a wide temperature range. Only carefully selected and matched transistors are utilized.

The Models 30, 40, 40P, 50, 50P, 60, 60P, 70 and 70P are direct-coupled so as to provide the circuit designer with the most basic chopper from which to synthesize solutions to special circuit problems. The Models 65 and 150 are transformer-coupled for isolation purposes. The Model 65 is for low-level voltages and the Model 150 for high-level signals. The Models 80, 81, 90 and 91 VIBRACHOPPERS are unique in the chopper field in that they require DC rather than AC drive.

These units are practically immune to the effects of shock and vibration making them ideal for military, space vehicle and portable applications; or where power conservation, miniaturization and elimination of maintenance are a necessity. The transistor chopper has an inherently long life and is not subject to contact bounce, wear, pitting or burning.

## CHOPPER MODEL SPECIFICATIONS

| Model | Type | Max. Signal Voltage (Volts) | Max. Signal Current (MA) | Drive Frequency Range | Max. Drive Voltage (600Ω Source) (Volts) | Drive Input Impedance (Ohms) | Ambient Temp. Range (°C) | Size (Inches) | Weight (Grams) | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | Ge | ±10 | 10 | DC to 100 kcps | 25 pk-pk | 200 | −55 to +90 | .38 X .16 Dia. | ½ | Micro-Min Hi-Freq |
| 40 | Si | ±20 | 40 | DC to 50 kcps | 40 pk-pk | 2K | −55 to +150 | .7 X .44 Dia. | 2 | Sub-Min Hi-Temp |
| 40P | Si | ±20 | 40 | DC to 50 kcps | 40 pk-pk | 2K | −55 to +150 | ½ X ¾ Dia. | 8 | Plug-In Hi-Temp |
| 50 | Ge | ±10 | 10 | DC to 100 kcps | 25 pk-pk | 200 | −55 to +90 | 1¼ X .44 Dia. | 3 | Sub-Min Hi-Freq |
| 50P | Ge | ±10 | 10 | DC to 100 kcps | 25 pk-pk | 200 | −55 to +90 | ½ X ¾ Dia. | 8 | Plug-In Hi-Freq |
| 60 | Ge | ±10 | 50 | DC to 100 kcps | 50 pk-pk | 600 | −55 to +90 | ½ X ¼ Dia. | 1 | Micro-Min Hi-Freq |
| 60P | Ge | ±10 | 50 | DC to 100 kcps | 50 pk-pk | 600 | −55 to +90 | ½ X ¾ Dia. | 8 | Plug-In Hi-Freq |
| 65 | Ge | ± 3 | 50 | 0.27 to 30 kcps | 50 pk-pk | 200 | −55 to +90 | ¾ X ¾ Dia. | 12 | Xfmr-In Plug-In |
| 70 | Si | ± 3 | 40 | DC to 100 kcps | 4 pk-pk | 600 | −55 to +150 | 1⅛ X 5/16 Dia. | 2 | Sub-Min Hi-Freq Hi-Temp |
| 70P | Si | ± 3 | 40 | DC to 100 kcps | 4 pk-pk | 600 | −55 to +150 | ½ X ¾ Dia. | 8 | Plug-In Hi-Freq Hi-Temp |
| 80 | Ge | ±15 | 50 | 1.5 to 6.5 kcps | 6 to 32 DC | 2K | −55 to +90 | 1¼ X 1 Dia. | 32 | DC-Drive Plug-In |
| 81 | Ge | ±15 | 50 | 1.5 to 6.5 kcps | 6 to 32 DC | 2K | −55 to +90 | 1¼ X 1 Dia. | 32 | DC-Drive Plug-In DPDT |
| 90 | Si | ± 6 | 50 | 1.2 to 3.0 kcps | 12 to 32 DC | 2K | −55 to +150 | 1½ X 1 Dia. | 40 | DC-Drive Plug-In |
| 91 | Si | ± 6 | 50 | 1.2 to 3.0 kcps | 12 to 32 DC | 2K | −55 to +150 | 1¾ X 1 Dia. | 40 | DC-Drive Plug-In Hi-Temp DPDT |
| 150 | Si | ±150 | 40 | 0.27 to 30 kcps | 100 pk-pk | 300 | −55 to +150 | 1¼ X 1 Dia. | 30 | Hi-Volt Hi-Temp Xfmr-In |

WRITE OR PHONE FOR BULLETINS DESCRIBING ABOVE UNITS

**SOLID STATE ELECTRONICS CO.**

DEPT. I • 15321 RAYEN ST. • SEPULVEDA, CALIF.

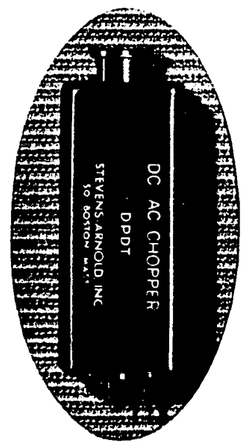
EMPIRE 4-2271

research, development, engineering specialists in solid state electronic devices, instruments, systems



For details, circle #354 on Reader Service Card






## DC-AC CHOPPERS

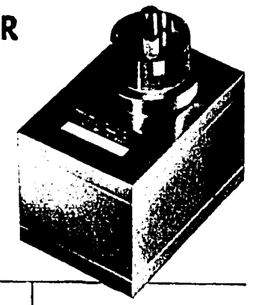
**For 50/60/94/120 Cycle Use**

There are twenty-two miniature types, both single and double pole, built to rigid commercial specifications with the emphasis on long life, low noise level, and extreme reliability. Please write for Catalog 515.

## MICROVOLT MODULATORS

### VIBRATING CAPACITOR

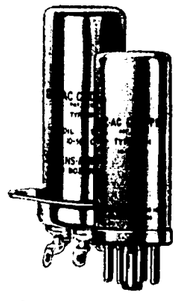
A vibrating-reed type capacitance modulator used to measure currents as low as $10^{-16}$ amperes. Drift never exceeds ±0.2 millivolts per day, noncumulative. Thus it is ideal where stable performance without recalibration is required for periods of a month or more. Write for Catalog 523.





### ULTRA HIGH SPEED RELAYS

Operating time 200 microseconds. Mount in any position. Will cover the range of −65°C to +85°C factory sealed. Please write for Catalog 337.



### 0-500 CYCLE DC-AC CHOPPERS

Liberal factors of safety. Before any Chopper is shipped, it is tested twice over the range of −65°C to +85°C to give double proof of stamina. Please write for Catalog 280.



### RESONANT RELAYS

Permit remote control by radio or carrier through frequency discrimination. Relays operate only when energized at rated frequencies and reject all others. Please write for Catalog 335.

## STEVENS-ARNOLD

**INCORPORATED**

7 ELKINS STREET, SOUTH BOSTON 27, MASS.

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# Directory II. Components

## 47. Converters.

Philips Electronics Industries, Ltd., Canada, 15s

Plug-In Instruments, Inc., Tenn., 5s, 10s

Potter Aeronautical Corp., N.J., 5c

**Power Designs, Inc., 1700 Shames Dr., Westbury, L.I., N.Y., 5c, 10c, 20c, Tel: EDgewood 3-6200**

See ad on page 486

Power Sources, Inc., Mass., 5sc, 10sc, 20sc, 45sc

**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 5s, 10c, 20c, Tel: DAvenport 1-1130**

See ad on page 243

Racal Engineering, Ltd., England, 5s, 40c

Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 5sc, 10sc, 15sc, 20sc, 25sc, 45sc

Research, Inc., Minn., 5c

Richardson-Allen Corp., N.Y., 5c

Riverbank Laboratories, Dept. of Engineering, Ill., 10c

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 20c, 45c, Tel: LOckwood 5-4578**

See ad on page 324

Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 5c, 10c

Sangamo Electric Co., Ill., 5s, 10s, 20s, 25s

Schauer Mfg. Corp., Ohio, 5sc

Sel-Rex Corp., N.J., 5c

Servomechanisms, Inc., Calif., 5c, 10c, 15c, 20c, 45c

Smith-Florence, Inc., Wash., 45s

Solartron Electronic Group, Ltd., The, England, 5s

**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 5c, 10c, 15s, 40s, Tel: EMpire 4-2271**

See ad on page 420

**Sorensen & Co., Inc., Subsid. Raytheon Co., Richards Ave., South Norwalk, Conn., 5sc, 10sc, 20sc, Frequency sc, Tel: TEmple 8-6571**

See ad on page 490

Southwestern Industrial Electronics Co., Tex., 5sc, 10sc, 20sc, 45sc

Spec-Tronics, Calif., 5sc, 10sc, 15sc

Spectrol Electronics Corp., Calif., 5c, 10c, 20c

Stancil-Hoffman Corp., Calif., 10s

Standard Electric Time Co., The, Mass., 10c

Standard Telephones & Cables, Ltd., England, 5sc

**Stevens-Arnold, Inc., 7 Elkins St., South Boston 27, Mass., 15s, Tel: ANdrew 8-1170**

See ad on this page

Strand Engineering Co., Mich., 10c

Sylvania Electric Products Inc., Special Products Div., N.Y., 10c

**Syntron Co., Semiconductor Div., 83 Lexington Ave., Homer City, Pa., 5c, Tel: GRidley 9-8011**

See ad on page 506

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Directory II. Components

## 47. Converters.

Systron-Donner Corp., Calif., 5s, 45c
Taber Instrument Corp., N.Y., 5sc
Tapetone, Inc., Mass., Frequency sc
Technology Instrument Corp., Mass., 20c
Telechrome Mfg. Corp., N.Y., 5sc, 10sc, 15sc, 20sc, 40sc, 45sc
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 10c, Tel: YE 2-8600**
See ad on page 338
Telkor, Inc., Ohio, 5s, 10s, 20s, 30s
**Teltronics, Inc., 277 Main St., Nashua, N.H., 20c, 40c, Tel: TUxedo 2-6264**
See ad on page 337
Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 20c, DC to DC c
Terado Company, Minn., 10sc
Texas Instruments Incorporated, Apparatus Div., Tex., 5c, 10c, 15c, 20c, 40c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 10c, 20c, 25c
Topping Electronics, Ltd., F. V., Canada, 5c, 10c, 20c, 40c, 45c
**Torotel, Inc., 5512 E. 110th St., Kansas City 34, Mo., 5c, 10c, Tel: SOuth 1-6314**
See ad on page 405
Torwico Electronics, Inc., N.J., 5c, 10c, 20c
Trans Electronics, Inc., Calif., 5c, 10c, 20c
Trans-Sil Corp., N.J., 5c
Transistor Specialties, Inc., N.Y., 5s, 10s, 15s
Transval Electronics Corp., Calif., 5c, 10c, 15c, 20c, 30c, 40c, 45c
Trott Electronics, Inc., N.Y., 5s
**Tung-Sol Electric Inc., 1 Summer Ave., Newark 4, N.J., 5, 10, 20, Tel: HUmboldt 2-4200**
See ad on pages 74-75
Union Electric Products Co., N.J., 5c, 10c, 45c
United Control Corp., Wash., 5c, 10c, 20c
United Electrodynamics, Inc., Calif., 45s
U. S. Science Corp., Calif., 5c, 10c
**Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 10c, Tel: ESsex 4-9804**
See ad on page 407
Uniwave, Inc., N.Y., 10c
Valor Instruments, Inc., Calif., 5sc, 45sc
Varo Mfg. Co., Inc., Tex., 5sc, 10sc, 20sc, 25sc, 45sc
**Victory Engineering Corp., P.O. Box 373, 114 Springfield Rd., Union, N.J., 15s, Tel: MUrdock 8-7150**
See ad on page 535
Waugh Engineering Co., Calif., 5sc
Webster Electric Co., Wis., 10s
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5sc, 10sc, 20sc, Tel: BEnton 1-0700**
See ad on page 573
Wincharger Corp., Iowa, 10c, 20c, 25c
Yuba-Dalmotor Div., Yuba Consolidated Industries, Inc., Calif., 10s, 20s

**Cord, lacing:**
**See class 91**

## 48. Cores and Core Materials.

5. Ceramic
10. Ferrite
15. Laminations
20. Magnetic
25. Metallic powders
30. Powdered metal
35. Tape wound
40. Toroid

AMP Incorporated, Pa., 5s
Alcon Metal Products, Inc., Ill., 35c
**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 35s, 40s, Tel: JUniper 3-0160**
See ad on page 496
Allegheny Ludlum Steel Corp., Pa., 15sc
Allen-Bradley Co., Wis., 10sc
**American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 5c, Tel: AMherst 5-3411**
See ad on page 178
**American Silver Company, Inc., 36-06 Prince St., Flushing 54, N.Y., 15c, 20c, Tel: FLushing 3-8012**
See ad on page 685
Antara Chemicals Div., General Aniline & Film Corp., N.Y., 25s, 30s
Anthony & Co., J. L., R.I., 15c
**Arnold Engineering Co., P.O. Box G, Marengo, Ill., 20sc, 25sc, 30sc, 35sc, 40sc, Tel: (Chicago) ANdover 3-6300**
See ad on pages 72-73
Burroughs Corp., Electronic Instruments Div., Pa., 20sc, 35sc, 40sc
Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 5c, Tel: WOodruff 2-9200
See ad on page 152
Ceramic Specialties Co., Inc., Ohio, 5c
Composite Industrial Metals, R.I., 15c
Connolly & Co., Calif., 20sc, 30sc, 40sc
Control, Div. Magnetics, Inc., Pa., 20 Assemblies sc
Crowley Div., A. O. Smith Corp., N.J., 10c, 20c, 25c, 30c, 40c
Custom Components, Inc., N.J., 10sc, 30sc
Delta Coils, Inc., N.J., 10c, 25c
Division Lead Co., Ill., 25s, 30s
Du-Co Ceramics Co., Pa., 5c
Dynacor, Inc., Md., 20sc, 35sc, 40sc, Bobbin Cores sc
Dynamics Corp. of America, N.Y., 20c, 40c
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 30c, Tel: HAlifax 6-7491**
See ad on page 400
Electric Specialty Co., Conn., 10c, 15c, 20c, 40c
Electrical Refractories Co., The, Ohio, 5c
Elna Ferrite Lab., N.Y., 10s, 20s, 40s
Fair-Rite Products Corp., N.Y., 10sc
Faradyne Electronics Corp., Affil. Mansol Ceramics, N.J., 10
Ferritronics Limited, Canada, 10sc
Ferro Corp., Louthan Plant-Refractories Div., Ohio, 5sc
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 10sc, 40sc, Tel: CHerry 6-2811**
See ads on pages 267, 354, 423, 457, 525, 620
Franklin Fibre-Lamitex Corp., N.Y., 15c
Frenchtown Porcelain Co., N.J., 5c
G-L Electronics Co., Inc., N.J., 15sc, 20sc, 35sc, 40sc
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 10c, Tel: GRanite 6-4411**
See ads on pages 263, 267, 435, 437, 501, 621
Hamilton Watch Co., Pa., 20c, 35c
International Electronics Corp., Mullard Products, N.Y., 40s
International Powder Metallurgy Co., Pa., 30c
**Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 5sc, Tel: MIllington 7-0385**
See ad on page 620
Kearfott Div., General Precision, Inc., Little Falls, N.J., 10c, Tel: CLifford 6-4000
See ad on pages 120-121
Kirchberger & Co., Inc., M., N.J., 5c
**Krystinel Corp., Fox Island Rd., Port Chester, N.Y., 10sc, 20sc, 40sc, Tel: WEstmore 7-5252**
See ad on this page
**Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 5c, Tel: LE Roy 385**
See ad on pages 62-63
Lignes Telegraphiques et Telephoniques, France, 10s
Lockheed Aircraft Corp., Electronics, Avionics & Industrial Products Div., Calif., 5s, 10s, 15s, 20s, 35s, 40s
Mackay, Inc., A. D., N.Y., 25s, 30s
**Magnetic Core Corp., John & Lawrence Sts., Newburgh, N.Y., 5c, 20c, 30c, 40sc, Tel: JOhn 1-5116**
See ad on page 422
**Magnetic Metals Co., 2200 River Rd., Camden 1, N.J., 10sc, 20sc, 30sc, 35sc, Tel: WOodlawn 4-7842**
See ads on pages 422, 423, 425, 427


ELECTRONIC
**Powder Metal Parts**

TOROIDS
Sizes—.200" O.D. to 4" O.D.
Permeability—6 to 75
High Temperature Stability

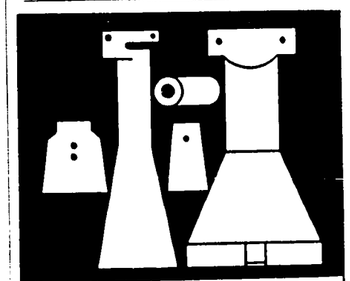
IRON POWDER CORES
Cup, Sleeve, Threaded, Insert Types

MICRO-WAVE COMPONENTS
R. F. Gaskets, Terminations, Dummy Loads

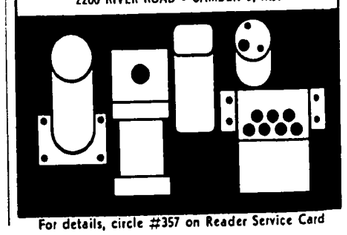
RAD-A-COR TEL-A-COR
FILT-A-COR TOR-A-COR

**MAGNETIC CORE CORP.**
*Manufacturers of Electronic Powder Metallurgy*
John & Lawrence Streets, Newburgh, N.Y.
*Telephone: JOhn 1-5116*

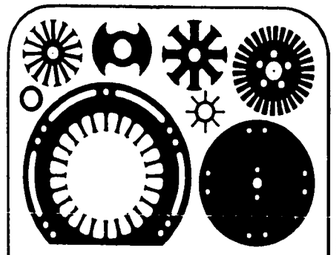
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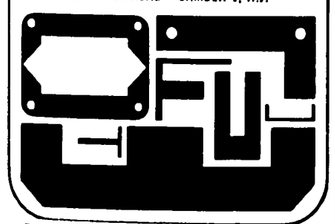
Drawn or Formed MAGNETIC SHIELDS
Provide efficient protection of sensitive electrical equipment against stray magnetic fields, and effect a high ratio of field strength reduction. A wide range of single and multiple shield structures is available from existing tools.
MAGNETIC METALS
Phone WOodlawn 4-7842
ELECTROMAGNETIC CORES AND SHIELDS
2200 RIVER ROAD • CAMDEN 1, N.J.



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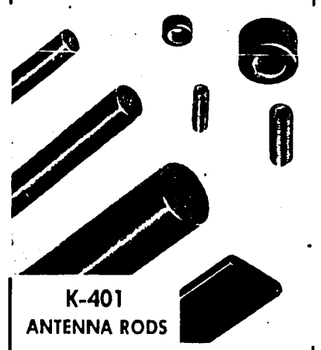


Magnetic Core LAMINATIONS
Motor laminations are produced to close specifications from both universal type and customer-owned dies of all types. Call for discussion of your requirements. Transformer laminations are available from stock in a wide variety of sizes and materials—including Supermu laminations with uniform magnetic characteristics and substantially higher permeability rejection levels.
MAGNETIC METALS
Phone WOodlawn 4-7842
ELECTROMAGNETIC CORES AND SHIELDS
2200 RIVER ROAD • CAMDEN 1, N.J.



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**KRYSTINEL FERRITES**



K-401
ANTENNA RODS
Now in production quantities, high "Q" ferrite material designed especially for use as antenna rods in the broadcast band.
- excellent magnetic properties
- stable shock and aging characteristics
- low "Q" and permeability drift with respect to temperature, consistently uniform

*Krystinel offers a comprehensive line of ferrite materials covering a wide range of electronic applications and frequencies. Write for Technical Bulletin Series 101.*
KRYSTINEL CORP.
WEstmore 7-5252
FOX ISLAND RD., PORT CHESTER, N.Y.

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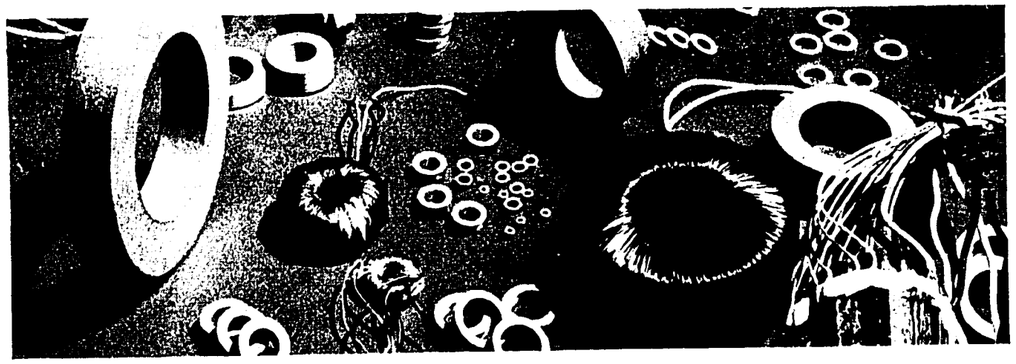


Investigate FXC *for a complete line of ferrite cores*
Complete details, including sample kit information, furnished on request.
Say ferroxcube when you need ferrite.
**FERROXCUBE**
CORPORATION OF AMERICA
50 East Bridge Street, Saugerties, N. Y.

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MAGNETICS inc.®

# PERFORMANCE-GUARANTEED PRODUCTS



## TAPE WOUND CORES

Magnetics, Inc. offers high permeability tape wound cores with guaranteed maximum and minimum performance limits. Made from Orthonol*, Hy Mu-80* (square loop and high initial permeability), or 48 Alloy, cores are dry hydrogen annealed to meet a wide range of performance specifications. These cores are available immediately from stock.

*For complete details:* **Write for Catalog TWC-200**

**TAPE WOUND SILICON (Magnesil) CORES** are available in 2, 4 or 12 mil gauges for use in current transformers, magnetic amplifiers, saturable reactors and other applications. Available cased or uncased.

*Write for complete details.*

**TAPE WOUND BOBBIN CORES,** capped with tough glass polyester (Poly Cap), offer permanent seal, do not distort with temperature, yet allow normal potting techniques. Available in stainless steel or ceramic bobbins, in all catalog sizes.

*For complete details:* **Write for Bulletin BC-203**

**Hy Mu-80, reg. trademark of The Carpenter Steel Co.*

## MOLYBDENUM PERMALLOY POWDER CORES

Magnetics, Inc. guarantees practical inductance limits for both stabilized and non-stabilized powder cores. Available with standard baked enamel and wax-tight finishes; cores can be numerically coded within the guaranteed inductance limits at slight extra cost. Furnished in eight standard sizes, with outside diameters from .500-in. to 1.570-in.; and inside diameters from .300-in. to .950-in.

*For complete details:* **Write for Bulletin PC-203**

**160 MU MOLY-PERMALLOY POWDER CORES,** for audio filter low frequency applications, gives circuit designers advantages of higher inductance, higher Q, and miniaturization.

*For complete details:* **Write for Bulletin 160-mu**

**LINEAR PERMALLOY POWDER CORES** offer low-cost frequency stability over wide temperature range. Used with polystyrene capacitor, core produces frequency stability on order of 0.5% for temperature swings between −55°C and +85°C at half the cost of previous techniques.

*For complete details:* **Write for Bulletin LPC**

## MAGNETIC LAMINATIONS

Available in Orthonol*, Hy Mu-80 and 48 Alloy in 29 standard shapes for every application. Standard gauges are 0.014-in. and 0.006-in. Laminations are dry hydrogen annealed to meet specifications. Special shapes can be produced to fit specific needs including rotor, stator, and recording head laminations using customer-owned dies.

*For complete details:* **Write Applications Engr. Dept.**

## MAGNETIC SHIELDS

Made from Mu Metal, 48 Alloy, or from other commercially available magnetic and non-magnetic materials, dependent on your application.

*For complete details:* **Write Applications Engr. Dept.**

## THESE MAGNETICS, INC. REPRESENTATIVES ARE AT YOUR SERVICE:

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Carl Hower & Co.
Box 1627
340 N. Marshall Ave.
WHitney 5-2471

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G. B. Mulvin
3841 E. Colorado Blvd.
MUrray 1-7487

**CALIF.—Redwood City**
Magnetics, Inc.
W. C. Maes
1743 Maryland Ave.
EMerson 6-1210

**COLO.—Lakewood**
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GArden 2-7342

**ILL.—Chicago 44**
H. G. Pretat, Inc.
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COlumbus 1-3146

**IND.—Ft. Wayne**
James W. Green
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2511 W. Drexel
KEnmore 1251

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C. L. Omer (Inland Assoc.)
6047 Howe Drive
ENdicott 2-2366

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R. C. Warner, P. O. Box 338
South Whitley, Ind.
350

**MASS.—Marshfield**
Magnetics, Inc.
R. C. Woodward
Tupelo Road,
Holly Ridges
P. O. Box 313
(Plymouth, Mass.)
PIlgrim 6-2460

**MINN.—Minneapolis**
Fred Peterson
2431 Hennepin Avenue
FRanklin 7-3025

**MO.—Clayton 5**
James N. O'Brien
25 S. Bemiston Ave.
PArk 1-4435 (St. Louis)

**N. J.—North Plainfield**
(Includes Philadelphia)
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W. J. Irvine
172 Dahlia Terrace
PLainfield 7-0182

**N. Y.—Rochester 18**
(Excludes New York City)
Fowler-Beach Corp.
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Room 3
LUdlow 6-0468

**N. C.—Winston Salem**
The Hilker Co.
A. H. Hilker
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**OHIO—Cleveland 7**
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ACademy 1-1313

**TEXAS—Dallas 20**
Lawrence Sales Co.
J. H. Lawrence
P. O. Box 13026
FLeetwood 2-7484

**CANADA—Toronto 7**
George M. Fraser Ltd.
1554 Yonge Street
WAlnut 4-9492

**EXPORT**
B. Freudenberg, Inc.
240 West 98th Street
New York 25, N. Y.
UNiversity 5-8075

MAGNETICS inc.®

**DEPT. P-80, BUTLER, PENNSYLVANIA**

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# Directory II. Components

## 48. Cores and Core Materials.

Magnetic Powders, Inc., Subsid. Crane Co., Pa., 30s

**Magnetics, Inc., Dept. P-80, P.O. Box 391, Butler, Pa., 15s, 20sc, 30s, 35sc, 40sc, Tel: 7-3787**
**See ad on page 424**

Maryland Lava Co., Md., 5c

Microwave Chemicals Laboratory, Inc., N.Y., 10

Minnesota Mining & Mfg. Co., Magnetic Products Div. & Electrical Prods. Div., Minn., 5sc

**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5c, Tel: WAverly 6-2250**
**See ad on page 452**

Moloney Electric Co., Mo., 35sc, 40c

Motorola, Inc., Military Electronics Div., Ariz., 5c, 10sc, 40c

Munzig International, Inc., Calif., 5s, 10s, 30s

National Cash Register Co., The, Ohio, 10c

National Ceramic Co., Inc., N.J., 5c

National Moldite Co., Inc., N.J., 10sc 20c, 30c, 40c

**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 5, 40, Tel: NOrmandie 5-4800**
**See ad on page 614**

Norton Company, Mass., 5sc

Nothelfer Winding Labs., Inc., N.J., 15c, 20c

Packard Bell Electronics Corp., Calif., 5c

Philips Laboratories, Div. North American Philips Co., Inc., N.Y., 10c, 20c

Philips Electronics Industries, Ltd., Canada, 10s, 20s, 40s

Polydoroff & Assoc., W. J., D.C., 30c

Polymer Corp. of Pa., The, Pa., 20c, 30c

Porcelain Products Co., Ohio, 5c

Pyroferric Co., Inc., N.Y., 20sc, 25sc, 30sc, 40sc

Q.O.S. Corp., N.Y., 20sc, 30sc, 40c

Quality Components, Inc., Pa., 30c

Quartzite Processing, Inc., Mass., 10c

**Radio Cores, Inc., 9540 S. Tulley Ave., Oak Lawn, Ill., 20sc, 25sc, 30sc, 40sc, Tel: GArden 2-3353**
**See ad on this page**


**STOCKS AVAILABLE FROM:**
**INDIANAPOLIS, IND.**
Phone WAlnut 3-2501
TWX: IP 130
**DALLAS, TEXAS**
Phone
FLeetwood 1-9947
TWX: DL 1182
**PASADENA, CALIF.**
Phone MUrray 2-3331
TWX: PASA CAL 7276

## ORTHO-SIL® WOUND CORES

● "C" CORES ● THREE PHASE CORES
● TOROIDAL CORES

**THOMAS & SKINNER OFFER A FULL RANGE OF STANDARD AND SPECIAL DESIGNS**

Ortho-Sil® Wound Cores are available in gauges 1, 2, 4, and 12 mil oriented silicon steel. We invite your inquiry on special designs. ORTHO-SIL®—T&S registered name for oriented silicon steel.

**WRITE:** Send for complete information on our special insulation coating "EPON-CLAD"—plus Ortho-Sil® Wound Core catalog and prices.

*Thomas & Skinner, Inc.*
1120 EAST 23RD STREET • INDIANAPOLIS • INDIANA
SPECIALISTS IN MAGNETIC MATERIALS

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# POWDERED PERMALLOY ·FILTOROID· CORES

Magnetic Metals Company is now supplying powdered alloy cores in popular standard sizes and in five permeability ranges: 150, 125, 60, 26 and 14. Filtoroid cores are stabilized for applications involving wide temperature ranges.

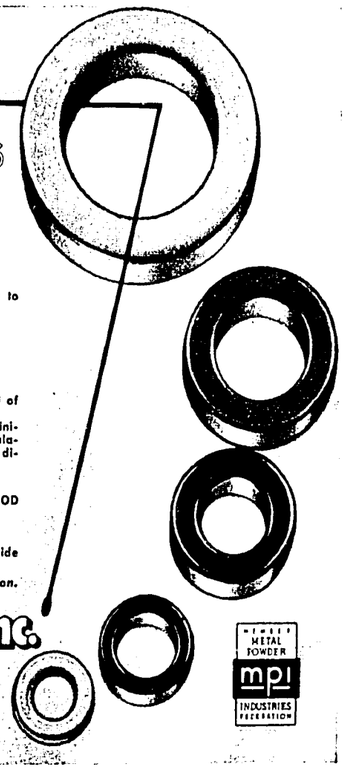
MAGNETIC METALS®

Phone WOodlawn 4-7842

ELECTROMAGNETIC CORES AND SHIELDS
2200 RIVER ROAD • CAMDEN 1, N.J.

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## Powdered Iron Toroids



**APPLICATIONS**

**High Q circuits for**
a Transformers — I.F., etc.
b Precision filters
c Delay lines
d Linear Networks

**TOROIDAL FEATURES**

1 Reduces stray fields and proximity effects to obtain better stability.
2 Permits small coil construction
3 Higher effective permeability
4 Coupling not affected by tuning circuit
5 High stability with temperature and time
6 Low harmonic distortion
7 Improved insulation results in high Q
8 Manufacturing methods permit close control of permeability and Q
9 Finishes of tough thermosetting resins minimizes moisture absorption and provides insulation suitable for winding enameled wire directly on the core.

**CORE SIZES**

Cores are available in diameters from 9/32 OD to 2" OD.
Permeability: From 8 to 45
Recommended frequencies:
Materials are available which will provide good Q from 0.1 to 25 MC

*Write for samples and further information.*

**Radio Cores, Inc.**
9540 South Tulley Avenue
Oak Lawn, Illinois
Phone:
GArden 2-3353

MPI METAL POWDER INDUSTRIES FEDERATION

For details, circle #364 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

BULOVA

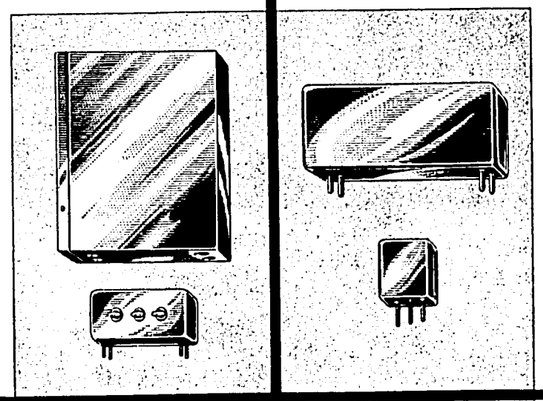
## SYNONYM FOR QUALITY, RELIABILITY AND STABILITY!

### Frequency control SYSTEMS AND OSCILLATORS .3 cps to 100 mc

Bulova frequency control systems and oscillators are custom-engineered for the most exacting military and industrial applications.

Bulova systems and oscillators span the frequency range from .3 cps to 100 mc and in stability ± 15 pp million without oven to ± 1 pp $10^9$ with proportional oven control ...are available in either tube type or transistor construction.

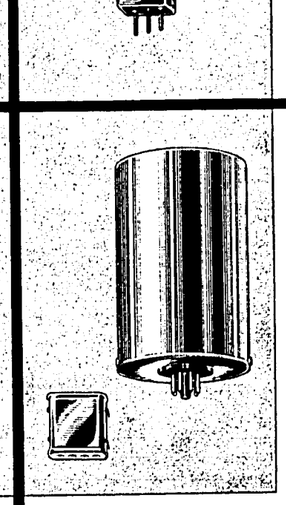
They graduate in size from the MB-100 (1" x 1" x 2") to complete systems. The MB-100 compensated crystal oscillator assures single frequency output with a stability of ± 15 pp million from −50° C. to +90° C. without oven control. Complete systems may include power supply, oscillator, gated and resetting circuitry, binary stage, voltage regulator and pulse or power amplifiers



### Crystal FILTERS 7 kc to 20 mc

Bulova crystal filters are designed to solve filtering problems at center frequencies with bandwidths of 0.01% to 8% and slope factors of 60/6 db as steep as 1.4 to 1.

Bulova filters shave the frequency range from 7 kc to 20 mc, inclusive ...are available as bandpass, reject and single side band. They graduate in size from the 2E2 SM (1 7/16" x 1 1/16" x 1⅛") for frequencies of 175 kc through 20 mc to the OE6 (5½" x 3¼" x 3¾₄"), a single side band for frequencies of 7 kc through 500 kc.



### CRYSTALS 2 kc to 100 mc

Bulova crystals are designed and produced for use wherever reliable, close-frequency control is essential.

Bulova crystals assure exacting control from 2 kc through 100 mc with 100 g shock resistance and 30 g to 2000 cps vibration resistance in most frequencies. They graduate in size from the HC-13/U (1 1/32" x 2 3/32" x 3") for 2 kc to the HC-18/U (.50" x .400" x .510") for 100 mc. The HC-18/U is now available to cover 450 kc through 1100 kc and 2 mc through 100 mc.

The majority of Bulova MIL Type crystals may be obtained in miniature holders.



### OVENS

Bulova ovens are engineered to maintain ±.1° C. of operating temperatures so as to assure superior results in electrical stability of crystals, components and circuitry.

Bulova ovens graduate from the AM-100ED (external measurements: 3" diameter with a 7" maximum height; internal: 1.96" diameter with a 6" height) to the BHC-18-1 (external: 1 3/32" x 1 3/32" x 1¼"; internal 1 3/32" x ½" x 7/32"). The AM-100 maintains a temperature stability of ± .1° C. and is used for Bulova Type 74 glass crystal holders (Military Type HC-15/U), or complete systems. The BHC-18-1 holds temperature to ± 2° C. (−55° to +90° C. ambient) and has a capacity for a single HC-18/U plug-in type crystal holder or four crystal diodes, such as the IN658.

Complete information on all Bulova components and systems is available from your nearest Sales Representative, or by writing – *Department A-1376, Electronics Division, Bulova, 61-10 Woodside Ave., Woodside 77, New York.*

For details, circle #365 on Reader Service Card





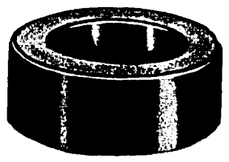

# Directory II. Components

## 48. Cores and Core Materials.

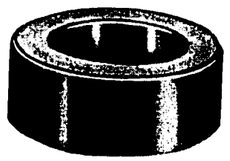
Radio Corp. of America, Defense Electronic Products, N.J., 10s

Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 10s, Tel: HUmbolt 5-3900
See ad on pages 54-55


THE ULTIMATE IN



TAPE WOUND CORES



CENTRICORES

Precision manufacturing methods are used to obtain closely matched magnetic characteristics, including high thermal stability. Centricores matched at room temperature will remain matched over wide temperature ranges.

MAGNETIC METALS

Phone WOodlawn 4-7842
ELECTROMAGNETIC CORES AND SHIELDS
2200 RIVER ROAD • CAMDEN 1, N.J.
For details, circle #366 on Reader Service Card


Radio Corporation of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 10sc, 20sc, 40sc, Tel: RAndolph 2-3200
See ad on pages 56-57

Raytheon Co., Microwave & Power Tube Div., Mass., 5sc, 10sc

Raytheon Co., Special Microwave Devices Operations, Mass., 10s

Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 40c, Tel: LOckwood 5-4578
See ad on page 324

Ronson Metals Corp., Cerium Metals & Alloys Div., N.J., 30s

Schaevitz Engineering, N.J., 5c

Semi-Elements, Inc., Pa., 10s, 20s, 25s

Sillcocks-Miller Co., The, N.J., 15c

Stackpole Carbon Co., Pa., 10sc, 20sc, 40c

Standard Electrical Products Co., Ohio, 35c, 40c

Standard Electronics Div., Reeves Instrument Corp., N.J., 20c, 40c

Standard Telephones & Cables, Ltd., England, 10s, 15s, 25s, 35s, 40s

Star Porcelain Co., The, N.J., 5c

Steward Mfg. Co., D. M., Tenn., 5c, 10c, 40c

Superex Electronics Corp., N.Y., 10sc

Superior Steatite & Ceramic Corp., 89 W. Forest Ave., Englewood, N.J., 5c, Tel: LOwell 8-4555
See ad on page 621

Technical Ceramics & Lava Corp., N.J., 5

Telcon, Inc., Dept. E 611, P.O. Box 216, Pacific Palisades, Calif., 15c, 20c, 40c, Tel: GLadstone 4-4043
See ad on page 617

Telegraph Condenser Co., Ltd., The, England, 5s

Telemeter Magnetics, Inc., Calif., 10s, 20s

Thomas & Skinner, Inc., 1120 E. 23rd St., Indianapolis 7, Ind., 15sc, 35sc, 40sc, Tel: WAlnut 3-2501
See ads on pages 425, 427, 458

Thor Ceramics, Inc., N.J., 5c

Torrington Co., The, Conn., 10c

Trans-Tech, Inc., Md., 5sc, 10sc

Trionics Corp., P.O. Box 548, Madison 1, Wis., 5c, 10c, Tel: CEdar 8-2616
See ad on page 663

United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 5sc, 30c, Tel: BEekman 3-8870
See ads on pages 533, 699

U. S. Sonics Corp., Mass., 5c

U. S. Stoneware Co., Alite Div., Ohio, 5c

Var-Lac-Oid Chemical Co., N.Y., 25, 30

Westinghouse Electric Corp., Specialty Transformers, Pa., 20sc, 35sc, 40sc

Williams & Co., C. K., Pa., 20s, 25s

Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 25sc, Tel: UNiversity 7204
See ad on page 688

Counters: See class 10

Couplings, mechanical: See class 91

Couplings, servo: See class 30

Couplings, waveguide: See class 83

Crystal detectors: See class 83

Crystal filters: See class 52

Crystal furnaces: See class 96

Crystal mixers and mounts: See class 83

Crystal sockets: See class 71

Crystal testers: See class 14


STOCKS AVAILABLE FROM:
INDIANAPOLIS, IND.
Phone WAlnut 3-2501
TWX: IP 130
DALLAS, TEXAS
Phone FLeetwood 1-9947
TWX: DL 1182
PASADENA, CALIF.
Phone MUrray 2-3331
TWX: PASA CAL 7276

ORTHO-SIL® ELECTRICAL LAMINATIONS

• SINGLE PHASE • THREE PHASE • THIN LAMINATIONS
• LARGE LAMINATIONS • MOTOR LAMINATIONS

Available in Ortho-Sil® and Radio grades (1 to 6) silicon steels.

HI-FREQUENCY THIN LAMINATIONS
.004 (4 mil) and .006 (6 mil) Ortho-Sil® laminations 400 to 2000 cycle range.

MIL "T"—Single phase is available to MIL "T" specs.

ORTHO-SIL®—T&S registered name for oriented silicon steel.

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Thomas & Skinner, Inc.
1120 EAST 23RD STREET • INDIANAPOLIS 7, INDIANA
SPECIALISTS IN MAGNETIC MATERIALS

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## 49. Crystals & Accessories.

5. Crystal holders
10. Crystal ovens
15. Germanium
20. Iron garnet
25. Quartz
30. Raw quartz
35. Sapphire
40. Silicon

American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 5s, 10s, Tel: WAlnut 5-8780
See ad on page 369

American Quartz Laboratories, Inc., N.Y., 25c

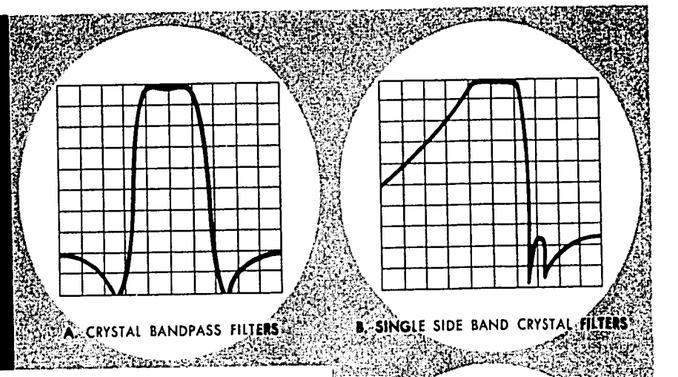
Amersil Quartz Div., Engelhard Industries, Inc., 685 Ramsey Ave., Hillside, N.J., 25, 40, Tel: MUrdock 8-4500
See ad on page 170

Atlee Corporation, Mass., 5sc

Augat Brothers, Inc., 31 Perry Ave., Attleboro, Mass., 5s, Tel: CAstle 2-2202
See ad on page 543

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# FROM CRYSTALS TO "BLACK BOXES" HEEMCO OFFERS 3-SIGMA RELIABILITY




The 3-sigma reliability for which Heemco products have long been recognized is available not only in crystals, but in filters and frequency sources as well as all types of associated circuitry and "black boxes".

## CRYSTALS

Heemco crystal units, both standard and high vibration types, are available from 400 cps up, to fill a wide variety of commercial and military requirements.

## FREQUENCY SOURCES

From standard designs, Hill Electronics custom designs and manufactures frequency sources to your particular requirements. Frequencies range from less than 1 cps to above 100 mc. Sizes range from ¾"x¾"x1½".

Specifications for a typical standard unit are:

FREQUENCY: from 150 cps up
OPERATING TEMPERATURE: −65 to +125°C
FREQUENCY ACCURACY: ±.001%
VIBRATION: 5 to 2000 cps at 20g
SHOCK: 100g
SIZE: 2"x2"x4"

ONE OF HILL ELECTRONIC'S RECENT DEVELOPMENTS IS A 3-PHASE FREQUENCY SOURCE, SPECIFICATIONS FOR WHICH ARE AVAILABLE UPON REQUEST.

## FILTERS

**A. CRYSTAL BANDPASS FILTERS**

Center frequency: 400 cps to 30 mc
Band Width: .01% to 13% of center frequency
Selectivity: Ratio of 60db to 6db band widths as steep as 1.4:1
Insertion loss: Usually less than 6db for wide band filters and less than 3db for narrow band filters
Wide Impedance Range
Attenuation: As much as 80db
Passband Variation: ± ½db

**B. SINGLE SIDE BAND CRYSTAL FILTERS**

Center frequency: 400 cps to 30 mc
Band Width: .6% to 10% of center frequency
Steep Side Slope: As steep as 1.0026:1
Wide Impedance Range
Attenuation on steep side: As much as 60db
Passband Variation: ±1db

**C. CRYSTAL NOTCH FILTERS**

Center frequency: 400 cps to 30 mc
Band Width at 6db: .01% to .8% of center frequency
Insertion loss: Usually less than 3db
Attenuation in the notch: As high as 60db
Passband Variation: Less ±1db

**D. CRYSTAL DISCRIMINATORS**

Center frequency: 400 cps to 30 mc
Band Width (peak to peak): .01% to 10% of center frequency
Wide Impedance Range
Output Voltage: Up to 20 volts peak to peak

**E. "COMB" SETS**

Because of rigid quality controls and long experience in the design and manufacture of our own crystals, we have been particularly successful in production of "comb" sets.

*Hill Electronics specializes in the design and manufacture of "black boxes" which utilize frequency sources and/or filters.*

# HILL ELECTRONICS, INC.

*300 north chestnut street • mechanicsburg • pennsylvania*

For details, circle #368 on Reader Service Card






# Directory II. Components

## 49. Crystals & Accessories.

**Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 5c, Tel: EVergreen 8-6057**
See ad on page 409

**Bliley Electric Co., 200 Union Station Bldg., Erie, Pa., 10sc, 25sc, Tel: GLendale 6-7561**
See ad on pages 92-93

Bogart Mfg. Co., N.Y., 5s
Bram Metallurgical-Chemical Co., Pa., 15sc, 40sc

**Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 5c, Tel: HAwthorne 7-1773**
See ads on pages 449, 537, 547

Breon Laboratories, Pa., 5sc, 25sc, 30sc

**Bulova Watch Co., Inc., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 5sc, 10sc, 25sc, 30s, Tel: NEwtown 9-5700**
See ad on page 426

Burnett Radio Lab., W. W. L., Calif., 5sc, 10sc, 25c

**Clark Crystal Co., Inc., 2 Farm Rd., Marlboro, Mass., 10sc, 25c, Tel: HUntley 5-1411**
See ad on this page

Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 25s
Component Mfg. Service, Inc., Mass., 5
Connecticut Instrument Corp., Conn., 5c, 15c, 25c, 35c, 40c
Connolly & Co., Wallace E., Calif., 35sc
Corning Glass Works, Electrical Products Div., N.Y., 5s
Cox & Co., Inc., N.Y., 10c
Dallons Semiconductors, Div. Dallons Laboratories, Inc., Calif., 25sc
Delta-F, Inc., Ill., 10c
Designers For Industry, Inc., Ohio, 10c
Diamond Antenna & Microwave Corp., Mass., 5sc
Diamond Drill Carbon Co., The, N.Y., 25s, 30s
Dynamics Corp. of America, N.Y., 5c, 10c, 25c
Ebauches S. A., Dept. Oscilloquartz, c/o Freeport Engineering Co., N.Y., 15c
Eidson Electronic Co., Tex., 25sc
Electro Radiation, Inc., Calif., 15c, 20c, 40c

**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 25s, 30s, 40s, Tel: BIgelow 2-2700**
See ad on page 170

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 5s, Tel: RAvenswood 1-9000**
See ad on pages 125-128

General Crystal Co., Inc., Wis., 10s, 25s
General Electric Co. Ltd. of England, N.Y., 15s, 40s
Greenfield Hermetic Components Corp., Mass., 5sc

**Hermetic-Pacific Corp., 4232 Temple City Blvd., Rosemead, Calif., 5s, Tel: GIlbert 3-1757**
See ad on page 450

**Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 5sc, Tel: WYman 8-8080**
See ad on page 450

**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 5s, Tel: DAvenport 6-7000**
See ad on pages 3-18

**Hill Electronics, Inc., 300 N. Chestnut St., Mechanicsburg, Pa., 25s, Tel: POplar 6-7611**
See ad on page 428

**Hoffman Co., P.R., 321 Cherry St., Carlisle, Pa., 25sc, Tel: CHapel 3-2011**
See ad on this page

Hoffman Electron Tube Corp., N.Y., 5s

**Hunt Corp., The, 453 Lincoln St., Carlisle, Pa., 10c, 25c, 30c, Tel: CHapel 9-2232**
See ad on this page

Intelex Systems, Inc., N.Y., 25s
International Crystal Mfg. Co., Inc., Okla., 25sc
Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., Conn., 5s


# CLARK CRYSTALS

*THE COMPLETE LINE*

**STABILITY**
**DEPENDABILITY**
**ECONOMY**

*SPECIAL APPLICATIONS*
Delay Lines Discriminators
Filters Oscillators Ultrasonics

*PREFERRED JAN TYPES*
16 kc to 100 mc Mil-C-3098 ( )

*Replacements for all Equipments*
Commercial or Military Specifications

*CRYSTAL OVENS*
For housing all types of crystals and small components

**CLARK CRYSTAL COMPANY**
INCORPORATED
Marlboro, Mass. U. S. A.
Phone—HUntley 5-1411
Cable—Crystal

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# CUTTING AND LAPPING YOUR PROBLEM?

We have the answers on cutting and lapping of

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Manufacturers of Quartz Crystals and Processing Machinery since 1938. Our wide experience on semiconductor materials available.

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THE Hunt CORPORATION
*Pacemaker in Stability*

QUARTZ CRYSTALS

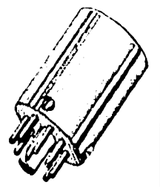
High Stability-Close Tolerance

Wherever Exacting Frequency Control Is Necessary



Temperature Controlled OVENS

Flexible In Design Superior Stability

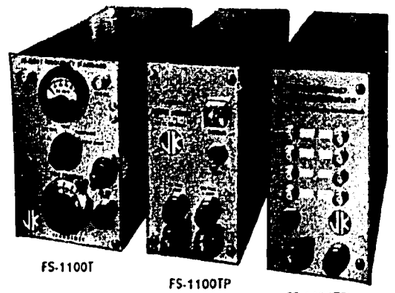


THE Hunt CORPORATION
PRECISION CRYSTALS
CARLISLE, PA.

For details, circle #371 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.




## J K SULZER FREQUENCY STANDARDS

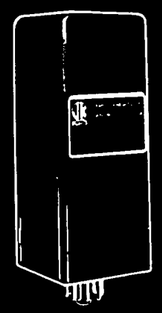
**Fully-transistorized FS-1100T Frequency Standard:** Normal output is 1.0 mc. and 100 kc. simultaneously with 1 volt available to 50 ohm loads. Provides minimum stability of $5 \times 10^{-10}$ per day after initial aging. Features double proportional control oven.

**Companion FS-1100TP Power Supply:** Operates on 115 V. AC. Features internal nickel-cadmium battery for stand-by power up to 12 hours. Permits transport of operating unit.

**Supplemental FS-1100TD Frequency Divider:** All sub-harmonics commonly used — 1000 cycles, 400 cycles, 60 cycles — have same order of stability, $5 \times 10^{-10}$ per day or better. Frequencies as low as 1 pulse per second available.

**Time-proven FS-1000 Frequency Standard: (not shown):** 1 mc. tube type precision frequency standard for 100 volt AC operation. Stability of $1 \times 10^{-9}$ per day or better. Optional divider and multiplier outputs available. Ideal for laboratory uses.

## J K OSCILLATORS



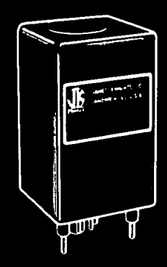
**Compact, precision plug-in signal sources. 60 cps through 75 mc. Sine and square wave outputs. Stabilities $1 \times 10^{-7}$/Day to $1 \times 10^{-4}$/Day. Silicon transistors.**

**JKTO-PIP:** For frequency stability of 1 part in 100 million per day under normal conditions. Transistorized proportional control oven hermetically-sealed, shock and vibration resistant. Other frequencies available on special order.

**JKTO-PIA:** Meets applicable aircraft equipment specifications with maximum frequency deviation of $4 \times 10^{-7}$. Long-life oven. Hermetically-sealed.

**JKTO-9:** Popular, compact, general-use, wide-range oscillator.

## J K THERMYSTALS



**Precision-matched crystal and oven combination:** Maximum stability, accurate calibration and high "Q". Type JKO23T: Frequency range 50 kc to 400 kc with stability of 1 PPM. Frequency range 950 kc to 1200 kc with stability of $1 \times 10^{-7}$. Other models available.

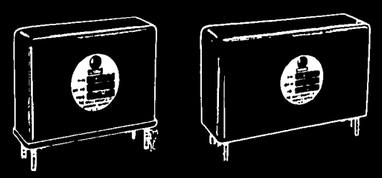
## J K OVENS



**Versatile, precise, compact:** Available with snap-action or glass-sealed thermostats, or proportional control, depending on application. Wide range of sizes and shapes for virtually any requirement.

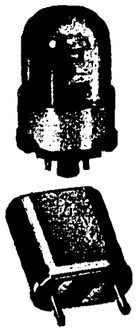
## FREQUENCY MANAGEMENT

## CERTIFIED PERFORMANCE



## J K CRYSTAL FILTERS

**Compact, rugged, hermetically-sealed and stable:** Frequency Range 1 kc to 40 mc available to 150 mc. Band widths as narrow as .01% up to as high as 10% for certain frequencies.



## J K CRYSTALS

**Precision Glasline Crystals:** From 1 kc. to 150 mc. Designs for frequency standards available at 1 mc. to 5 mc. (with stabilities of $1 \times 10^{9}$) and at 100 kc. (with stability of $1 \times 10^{8}$).

**Military Crystals:** Meet all requirements outlined in specifications — MIL-C-3098B, MIL-C-16C, MIL-C-17167, etc.

**Standard Crystals:** Manufactured to a variety of specifications. Used as replacement crystals and as original equipment components.

**Amateur and Citizens' Band Crystals:** For transmitters, receivers, calibrators, etc.

*Write for detailed information*

**THE JAMES KNIGHTS COMPANY — Sandwich, Illinois**



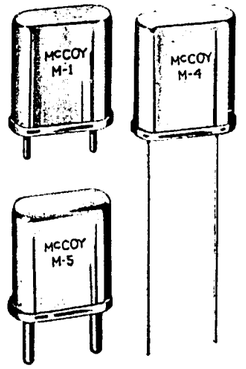
For details, circle #372 on Reader Service Card



# McCoy

*a synonym for quality, stability, and dependability in*

## CRYSTALS and CRYSTAL FILTERS



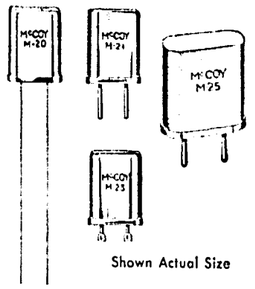

## STANDARD SIZE CRYSTAL UNITS

The crystals that made the name of McCoy a synonym for quality. Metal encased, the M-1, M-4, and M-5 are available in frequencies from 500.0 kc to 200.000 mc.

Shown Actual Size

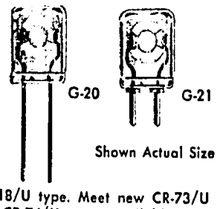
## SUB-MINIATURE CRYSTAL UNITS

Fill the need for miniature crystals from 1.0 mc to 200.0 mc. Meet specs MIL-C-3098B and ARINC No. 401




Shown Actual Size

## ALL-GLASS CRYSTAL UNITS

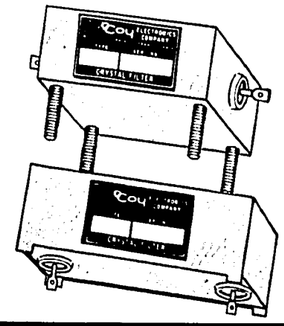



Shown Actual Size

HC-18/U type. Meet new CR-73/U and CR-74/U specs. Available 5000 kc to 200.0 mc.

## CRYSTAL FILTERS

Band pass types from 1.0 mc to 30.0 mc center frequency with 6 db band widths of 0.01% to 4.0% of center frequency. Single side band types from 1.0 mc to 20.0 mc frequency with 3 db bandwidths from 1.0 kc to 10.0 kc.



Write for free illustrated catalog



*Regardless of size, weight or shape McCoy crystals and filters will deliver the utmost in stability under extreme conditions of shock and vibration. Our research section will be pleased to assist you.*

McCoy ELECTRONICS CO.
Dept. P-10
MT. HOLLY SPRINGS, PA.
Phone: HUnter 6-3411

For details, circle #373 on Reader Service Card



# Directory II. Components

## 49. Crystals & Accessories.

Kahle Engineering Co., 3319 Hudson Ave., Union City, N.J., 10c, Tel: UNion 7-6500
See ad on page 672

Keller, Jr., Hugo P., N.Y., 35sc

Kemtron Electron Products, Inc., Mass., 15sc, 40sc

Keystone Electronics Co., N.J., 10sc, 25sc

Keystone Electronics Corp., N.Y., 5c

Knapic Electro-Physics, Inc., Calif., 15sc, 40sc

Knights Co., The James, 101 E. Church St., Sandwich, Ill., 10sc, 25sc, Tel: 2141
See ad on page 430

Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 10sc, Tel: LOwell 6-2600
See ad on page 312

Lignes Telegraphiques et Telephoniques, France, 5s

Lindberg Engineering Co., Ill., 10

Lockheed Aircraft Corp., Electronics, Avionics & Industrial Products Div., Calif., 20s

Mackay, Inc., A. D., N.Y., 15s, 20s, 30s, 35s, 40s

Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 10s, Tel: DAvis 5-1391
See ad on pages 96-97

Marconi's Wireless Telegraph Co., Ltd., N.Y., 10s, 25s

McCoy Electronics Co., Dept. P-10, Watts & Chestnut St., Mt. Holly Springs, Pa., 10sc, 25sc, Tel: HUnter 6-3411
See ad on this page

Meller Co., Adolf, R. I., 25c, 35sc

Meridian Metalcraft, Inc., Calif., 5c

Micro-Lectric Div., Micro Machine Works, Inc., 19 Debevoise Ave., Roosevelt, L.I., N.Y., 5c, Tel: FReeport 8-3222
See ad on page 529

Micromech Mfg. Co., Div. Sanford Mfg. Corp., N.J., 5

Microtech, Inc., Conn., 5c

Microwave Associates, Inc., Mass., 5s, 40s

Midland Manufacturing Co., Kansas, 10s, 25s

Miller Labs., August E., N.J., 25sc, 30sc

Monitor Products Co., Calif., 10sc, 25sc

Mosley Electronics, Inc., Mo., 5sc

Motorola, Inc., Military Electronics Div., Ariz., 20c

Mytron, Inc., Mass., 5c

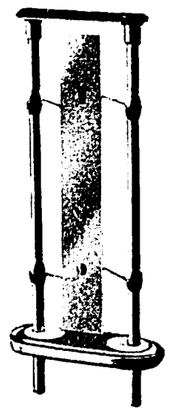
New London Instrument Co., Conn., 10sc

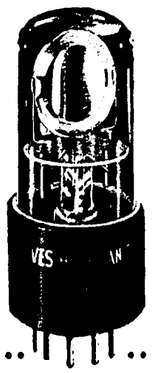
Northern Engineering Laboratories, Inc., 372 Wilmot Ave., Burlington, Wis., 5sc, 10sc, 25sc, Tel: ROckwell 3-3591
See ad on page 433

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

REEVES-HOFFMAN

# CRYSTALS, FREQUENCY SOURCES, FILTERS, OVENS

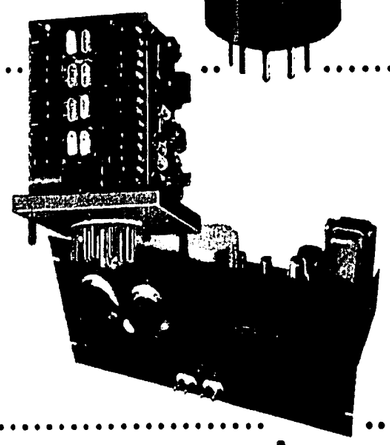




## CRYSTALS

STANDARD TYPES of Reeves-Hoffman crystals, for all commercial and military applications, are available in a frequency range from 1 kc to 100 mc. Hermetically sealed in metal holders.

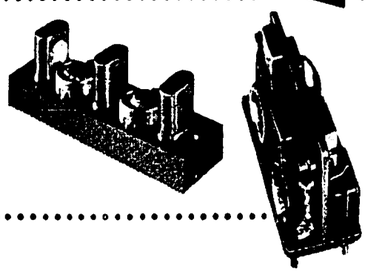
PRECISION TYPES of Reeves-Hoffman crystals, for use in high precision oscillators and secondary frequency standards, are available in a frequency range from 1 kc to 5 mc. Hermetically sealed in glass holders with standard radio tube bases.



## FREQUENCY SOURCES

TRANSISTORIZED AND HARD TUBE TYPES of Reeves-Hoffman frequency sources are available in a frequency range from 100 cps to 100 mc. Stability is up to 1 part in $10^7$. Packaged to your specifications.

PRECISION FREQUENCY STANDARDS have a basic frequency of 5 mc and are available with auxiliary circuitry for division to 100 kc, 1 mc and 10 mc. Stability is up to 1 part in $10^9$ per day. Packaged to your specifications.



## FILTERS

CRYSTAL OR LC TYPES of Reeves-Hoffman filters are available in a frequency range from audio to 30 mc.

## OVENS

OVENS for precise temperature control are available in three types:

PROPORTIONAL CONTROLLED, for precise frequency standards, hold within 1/100th of 1° C at any fixed ambient.

THERMOSTATICALLY CONTROLLED, for high reliability requirements, hold within 1/10 of 1° C at any fixed ambient.

SNAP-ACTION CONTROLLED, for rugged military requirements, hold within 1° C at any fixed ambient.

**Compact, rugged and highly reliable Reeves-Hoffman components are available in standard types or will be designed and manufactured to your specifications. Most units can be designed to withstand up to 10 g at 5 to 2000 cps. Write for complete details.**

REEVES-HOFFMAN

DIVISION OF DYNAMICS CORPORATION OF AMERICA
CARLISLE, PENNSYLVANIA

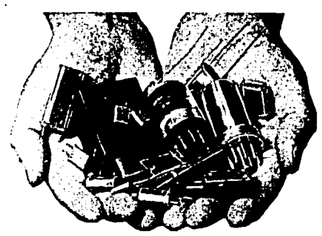





# Directory II. Components

## 49. Crystals & Accessories.

Pan American Trade Development Corp., N.Y., 30s
Permonite Mfg. Co., Ill., 5c
Petersen Radio Co., Inc., Iowa, 25sc
Philips Electronics Industries, Ltd., Canada, 25s
Piezo Crystal Co., Pa., 10c, 25c
Pilot Chemicals, Inc., Mass., Scintillators sc

LET **SHEROLD** SOLVE YOUR CRYSTAL PROBLEMS

**Complete, advanced engineering laboratory is at your disposal.**

**Whether your need is for one special frequency crystal—or thousands, you can be assured of quality manufacture and unexcelled performance when you specify Sherold . . . now one of the country's largest, exclusive producers of crystals for military and commercial requirements.**

***Write for complete data on your requirements.***

**Sherold Crystals inc.**

**Phone Victor 2-9792**
**Truman Road & McGee Trafficway**
**Kansas City, Mo.**

For details, circle #375 on Reader Service Card


Precision Crystal Laboratory, Calif., 10c, 25c
Premier Research Laboratories, Inc., N.Y., 5s, 10sc, 25sc
Radio Corp. of America, N.J., 5s, 10s, 25s, 40s
**Reeves-Hoffman, Div. of Dynamics Corp. of America, 145 Cherry St., Carlisle, Pa., 5c, 10c, 25c, Tel: CHapel 3-5929**
See ad on page 432
Republic Lens Co., Inc., N.Y., 15c, 25c
Robertshaw-Fulton Controls Co., A & I Div., Calif., 10s
Sage Laboratories, Inc., Mass., 5sc
Savoy Electronics, Inc., Fla., 10c, 25c
Savoy Electronics, Inc., Ga., 5s, 10c, 25sc, 30s
Scientific Radio Products, Inc., Colo., 25c
Scientific Radio Service, Md., 25c
Semi-Elements, Inc., Pa., 15s, 20s, 35s, 40s, Cadmium s, Scintillators s
**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 40sc, Tel: CRestview 4-8542**
See ad on page 507
**Sherold Crystals, Inc., Truman Rd. & McGee Trafficway, Kansas City 8, Mo., 5, 10, 25, 30, Tel: VIctor 2-9792**
See ad on this page
Sigma Electronics Research Corp., Wash., 5sc
Standard Telephones & Cables, Ltd., England, 15s, 25s, 40s
Stokes Corp., F. J., Pa., 10c
Swiss Jewel Co., Pa., 35c
Sylvania Electric Products Inc., Chemical & Metallurgical Div., Pa., 15c, 40c
TRG, Incorporated, N.Y., 5sc
Texas Crystals, Fla., 5s, 25sc
Trans-Sil Corp., N.J., 40c
**Trionics Corp., P.O. Box 548, Madison 1, Wis., 20c, Tel: CEdar 8-2616**
See ad on page 663
Union Carbide Corp., Linde Co., N.Y., 35sc
U. S. Semiconductor Products, Div. United Industrial Corp., Ariz., 40s
Valpey Crystal Corp., Mass., 10sc, 25sc
Var-Lac-Oid Chemical Co., N.Y., 15, 40
Waldom Electronics, Inc., Ill., 5s
Waltham Electronics Corp., Mass., 10sc
Warren Components Div., El-Tronics, Inc., Pa., 5c
Waveguide, Inc., Calif., 5c
Waveline, Inc., N.J., 5s
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 10s, Tel: BEnton 1-0700**
See ad on page 573

Custom built items:
See class 94

Cutting heads & styli:
See class 65

D'Arsonval relays:
See class 68

Data recorders and storage mechanisms:
See class 36

Decade counter tubes:
See class 78

Decades:
See class 11

Deflection yokes:
See class 45

## 50. Delay Lines.

5. Decade
10. Distributed constant fixed
15. Distributed constant variable
20. Electrically variable
25. Lumped constant fixed
30. Lumped constant variable
35. Ultrasonic

ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 10c, 25c, Tel: VIctoria 9-2414
See ad on page 474
AMP Incorporated, Pa., 5c, 10c, 20c, 25c
**Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 5sc, 10sc, 15sc, 25sc, 30sc, Tel: GRegory 2-5622**
See ad on page 329
Admiral Corp., Ill., 25c, 30c
Advanced Research Associates, Inc., Md., 20c
Airtronics International Corp., Fla., 10c, 25c
Andersen Labs., Inc., Conn., 5c, 10c, 15c, 20c, 25c, 30c, 35c





For details, circle #376 on Reader Service Card


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# FOREMOST IN DELAY LINES

## Columbia Technical CORPORATION

Faster rise time, lower attenuation, smaller volume, greater stability, rugged construction, reliable performance . . . these are some of the characteristics distinguishing COLUMBIA Delay Lines from conventional delay elements.

COLUMBIA offers you two products: Delay Lines of the **highest quality** and **service. And we mean SERVICE:** assistance in determining your exact delay requirements; engineering advice on the delay line kind best suited to meet your needs most economically; custom design of delay elements; manufacture of prototypes — usually in a matter of a few days, reliable and fast delivery on production runs.

Through the years COLUMBIA has designed and manufactured thousands of different delay lines. Some of our more important delay line types are listed here. Please write for additional literature which is available for many types.

**Write for Bulletin No. 18 — "How to Use Delay Lines Efficiently."**

## Q-LINES *

Lumped-constant delay lines with high Q factor. Q represents the ratio of total delay to rise time, and denotes the quality of the delay line. COLUMBIA Q-Lines with delay-to-rise time ratios of up to 100:1 are in regular production.

Depending on specific requirements COLUMBIA lumped-constant delay lines are engineered for maximum Q, lowest attenuation or smallest volume. Many Q-Line types represent an optimum combination of electrical characteristics, small volume and outstanding environmental properties. Several hundred designs are available — the chart lists a few typical examples.

Write for Bulletin D40 — "Q-Lines".

*T.M. Reg. Applied For

| Type | Imped. Ohms | Delay μsec | Q | Atten. db | Size Inch , | Remarks |
|---|---|---|---|---|---|---|
| L773C | 75 | 6.0 | 34 | 1.5 | 2⅛x2¼x2¾ | Med. Q-factor. Low atten. |
| L734C | 100 | 1.0 | 10 | 0.2 | 1⁹/₁₆x1⁹/₁₆x2½ | Small volume. Low atten. |
| L655C | 150 | 0.3 | 15 | 0.5 | 1⁹/₁₆x1⁹/₁₆x3 | Small volume |
| L748C | 470 | 6.5 | 50 | 1.5 | 3x6x2¹⁵/₁₆ | Med. Q-factor. Mult. taps. Low atten. |
| L759C | 470 | 20.25 | 100 | 1.5 | 5¼x5½x3⅞ | High Q-factor. Low atten. |
| L694C | 1000 | 1.0 | 13 | 0.75 | 1x1x3 | Extremely small volume. Low atten. |
| L673C | 1000 | 9.0 | 16 | 0.6 | 1⁹/₁₆x1⁹/₁₆x3 | Small volume. Low atten. |
| L691C | 2000 | 50.0 | 27 | 2.0 | 1⅝x1⅞x3¾ | Med. Q-factor. Small vol. Low atten. |
| L784C | 2000 | 19.85 | 40 | 2.0 | 3⅜x4½x2¼ | Med. Q-factor. Low atten. |
| L771C | 2200 | 4.0 | 33.4 | 1.0 | 1⅝x1⅞x3¾ | Med. Q-factor. Low atten. Small vol. |

## MINILINES *

These miniaturized delay elements are completely resin-encapsulated and combine in a minimum volume excellent electrical characteristics with extreme mechanical strength.

MiniLines are designed for operation within a temperature range from —55°C to +125°C and are characterized by unusual electrical stability. Because of their small volume and constancy of properties MiniLines are widely used in computer applications.

Write for Bulletin No. 78 "MiniLines—Miniaturized Delay Lines". Typical examples of MiniLine types are listed in the charts below.

**Type A — 0.250 inch O.D.**

| Model No. | Imped. (ohms) | Delay (μsec) | Length (in.) | Rise Time (μsec) | Pulse att. (db) | Bandwidth (mc) |
|---|---|---|---|---|---|---|
| 550 | 560 | 0.20 | 3¼ | 0.04 | 0.5 | 12 |
| | | 0.10 | 2 | | | |
| 551 | 1000 | 0.30 | 3¼ | 0.04 | 1.0 | 12 |
| | | 0.20 | 2½ | | | |
| | | 0.10 | 1⅝ | | | |
| 552 | 1500 | 0.20 | 3¼ | 0.04 | 0.5 | 12 |
| | | 0.10 | 2 | | | |
| 553 | 2000 | 0.20 | 3¼ | 0.04 | 0.5 | 12 |
| | | 0.10 | 2 | | | |

**Type B — 0.300 inch O.D.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 554 | 560 | 0.50 | 5½ | 0.08 | 1.3 | 10 |
| | | 0.40 | 4¾ | | | |
| | | 0.30 | 3¾ | | | |
| 555 | 1000 | 1.00 | 5½ | 0.10 | 1.2 | 5 |
| | | 0.80 | 4¾ | | | |
| | | 0.60 | 3¾ | | | |
| | | 0.40 | 2¾ | | | |
| 556 | 1500 | 0.80 | 5½ | 0.09 | 0.8 | 5 |
| | | 0.60 | 4½ | | | |
| | | 0.40 | 3½ | | | |
| 557 | 2000 | 0.80 | 5½ | 0.09 | 0.7 | 5 |
| | | 0.60 | 4½ | | | |
| | | 0.40 | 3½ | | | |

## MAGNETIC-CORE DELAY CABLE

—a proven COLUMBIA standby! Here is economical delay by-the-foot and off-the-shelf! Ideal for breadboard and prototype work. Five high-impedance delay cable types are available, ranging from fast rise time Type HH-1500A to compact type HH-4000. Delay-to-rise time ratios of up to 100 : 1 can be achieved with HH-1500A and HH-2000 delay cables.

Ready-to-mount calibrated sections of Magnetic-Core Delay Cable are available with molded end-caps and tinned leads. Phenolic endcaps can be furnished for terminating the cable in the laboratory.

Delay cables are available from stock in 100 ft. coils. Custom made calibrated sections can be promptly furnished.

Write for Bulletin No. 17 — "High-Impedance Delay Lines with Magnetic Core".

| Type | Imped. ohms | Delay μsec/ft. | B-width (3 db down) mc † | DC-resist. ohms/μsec | Insert. loss db/μsec | Max. Oper. V DC | O.D. Inch | Wt. Lbs./Ft. | Min. Bend. Rad. |
|---|---|---|---|---|---|---|---|---|---|
| HH-1500A RG-266/U | 1500 | 0.08 | 15 | 30 | 0.20 | 5000 | 0.40 | 0.12 | 2" |
| HH-1600 | 1700 | 1.0 | 6 | 80 | 0.40 | 300 | 0.28 | 0.07 | 3" |
| HH-2000 RG-176/U | 2200 | 0.11 | 15 | 70 | 0.25 | 5000 | 0.40 | 0.12 | 2" |
| HH-2500 | 3000 | 0.60 | 8 | 125 | 0.30 | 500 | 0.28 | 0.07 | 3" |
| HH-4000 | 3900 | 1.0 | 6 | 85 | 0.20 | 1000 | 0.32 | 0.09 | 4" |

**NOTE**—Temperature range of all types — 40°C to +85°C.
†Bandwidth measured for a delay of 1 usec with resistive terminations.

## DELAY-LINE FLATS *

. . . Another Columbia development! Through the choice of an elliptical core a combination of unusual electrical and mechanical properties can be achieved. The "Flat" design makes it possible to produce with one standardized 5" long core delay lines with delays up to 1.0 microsecond per inch, and to cover a wide impedance range from 100 to 10,000 ohms.

Write for Bulletin No. 29 "Delay-Line Flats". Many hundreds of "Flat" designs are available. The chart below summarizes the characteristics of some typical units.

| Design No. | Imped. (ohms) | Delay (μsec) | Rise Time (μsec) | Atten. (db) |
|---|---|---|---|---|
| 169 | 120 | 0.1 | 0.02 | 0.1 |
| 486 | 2000 | 1.5 | 0.15 | 1.2 |
| 618 | 2500 | 5.0 | 0.80 | 3.0 |
| 560 | 3300 | 2.0 | 0.20 | 1.0 |
| 413 | 7500 | 2.0 | 0.25 | 0.6 |

## AUDIO DELAY LINES

Precision engineered and custom-manufactured lumped-constant delay elements designed for use in the audio frequency range, characterized by long delays (often in the 5,000 to 10,000 microsecond range), low attenuation (e.g., 3 db at mid-frequency point), and excellent phase linearity (±1% over entire useful frequency range). Housed in standard EIA (RETMA) cabinets suitable for rack mounting.

Write for Bulletin D10.

## HUMISEAL * Protective Coatings for Electronic Applications

HumiSeal coatings protect electronic components and assemblies from temperature extremes, humidity, fungus attack, dust, saline atmosphere and other environmental stresses. The table below lists our standard types.

| TEMP. CLASS. | TYPE | SYSTEM DESCRIPTION |
|---|---|---|
| Class O 95°C | 1A14 | Single comp., air drying, solderable acrylic base. |
| | 1A11 | Single comp, fast air drying, flux type, solderable. |
| Class A 105°C | 2A51 | Solvent-free, two-comp., modified epoxy base. |
| | 1A27 | Single comp., fast air drying, solderable, polyurethane base, |
| Class B 130°C | 1B12 | Single comp., fast air drying, solderable, all-purpose. |
| | 2B13 | Two-comp. coating of superior mech., chem. and elect. properties, |
| | 2B52 | Solvent-free, two-comp., modified epoxy base. |
| Class F 155°C | 1F18 | Single comp., fast air drying, all-purpose acrylic base. |
| Class H 180°C | 2H55 | Solvent-free, two-comp., high temp. resistant. |
| | 1H34 | Single comp., fast air drying, high temp. resistant. |

**Bulletins C99 — "HumiSeal Protective Coatings" and #79 — "How to Use Protective Coatings" are available on request.**

## Columbia Technical CORPORATION

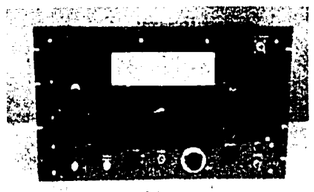
61-02 Thirty-first Ave — Woodside 77, N. Y. — AStoria 8-7401



For details, circle #377 on Reader Service Card



## New High Power Pulsed Oscillator PG-650-C



The successful introduction of the PG-650 pulsed oscillator to many test applications has led to an improved model of interest to workers in utrasonics, r.f. transient analysis, nuclear magnetic resonance, Kerr Cells, etc. The following characteristics and features are available only with the PG-650-C.

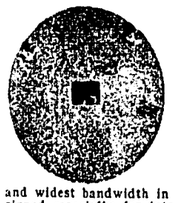
R.F. output Voltage (Min.)
into 93 ohms .....0—300 p to p
into 27 K .....2000v p to p
Pulse length
continuously variable ..... .....1½—15 usec
Rise and Fall times (Max.) .....0.5 usec
Pulse Droop .....5% Max.
Noise Output between
Pulses .....Thermal Noise from Termination
Harmonic Content (Max.) mostly 3rd .....10%
R.F. Leakage ..... ....Negligible
Trigger to Pulse Jitter .....005 usec

SPECIAL FEATURES

Pulse Lengths Available from ½ to 50 usec.
Internal Delay Ranges available from calibrated Helipot .....200, 1100, 11,000 usec
Gate Pulse output available for intensifying and blanking purposes.
External modulation of r.f. oscillator using varying pulse length and p.r.f.'s for Carr-Purcell Method.
Fine controls of P.R.F., Pulse length, and delay times.

*Usable as C.W. Oscillator or Pulsed Amplifier.*
*Range can be extended from 100 KC to 150 MC.*

## ULTRASONIC DELAY LINES



Advanced designs in solid delay lines has been the feature of ARULAB products. This organization has always been the leader in a highly competitive field in improving the performance in all respects. The model shown has the lowest secondary level and widest bandwidth in history and was designed especially for integration applications.

SPECIFICATIONS:

Delay time .....900 usec
Average Max. Secondary level .....70 db
Triple Travel level .....60 db
Bandwidth for Operation .....10 MC
Center Frequency .....40 MC
3 db Bandwidth .....20 MC
Size .....14½" diam. x 1"

## Model "C" Miniaturized Line

The Model "C" series delay lines were developed to reduce the weight and cost of the longer delays needed for radar applications. These units represent a 20% reduction in diameter and 40% in weight over older models. Typical Specifications:

Delay time .....1500 usec
Center Frequency .....32 MC
Bandwidth 3 db .....20 MC
Insertion Loss (50 ohms) .....60 db
Capacity .....100 uufd
Max. Secondary level—5 MC-BW .....43 db
Max. Secondary level—20 MC-BW .....40 db
Aluminum Case .....8¼" diam. x 7⅞"
Weight .....2 lbs.-14 oz.

Please write for our bulletins on other test equipment: Wide Band Amplifiers, Preamplifiers, and Precision Attenuators.

**ARENBERG ULTRASONIC LABORATORY, INC.**

94 Green Street, Jamaica Plain 30, Mass.

*Phone—JAmaica 2-8640*

For details, circle #378 on Reader Service Card



# Directory II. Components

## 50. Delay Lines.

Arenberg Ultrasonic Laboratory, Inc., 94 Green St., Jamaica Plain 30, Mass., 35sc, Tel: JAmaica 2-8640
See ad on this page

Artronic Instrument Co., The, Md., 5c, 10c, 15c, 20c, 25s, 30c

Barker & Williamson, Inc., Pa., 10c, 25c

Beckman Instruments, Inc., Helipot Div., Calif., 15sc

Bel Fuse, Inc., N.J., 10s

Bliley Electric Co., 200 Union Station Bldg., Erie, Pa., 35c, Tel: GLendale 6-7561
See ad on pages 92-93

Brew & Co., R. D., N.H., 5c, 10s, 15c, 20c, 25c, 30c, 35sc

Canadian Marconi Co., Canada, 25c

Canadian Westinghouse Co., Ltd., Canada, 20c

Carad Corp., Calif., 25c

Coileraft, Inc., Ill., 25c

Columbia Technical Corp., 61-02 31st Ave., Woodside 77, N.Y., 10c, 25c, High Impedance c, Miniature c, Tel: AStoria 8-7401
See ads on pages 434, 664

Communication Accessories Co., 50 Highway & 71 By-Pass, Lee's Summit, Mo., 25c, Tel: BRoadway 1-1700
See ad on page 182

Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 5sc, 10sc, 20sc, 25sc, 30sc, 35sc, Tel: HAmilton 7-7961
See ad on page 440

Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 10c, 15c, 20c, 25c, Tel: PLainfield 6-9000
See ad on Cover 3

Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 35sc, Tel: FOrest 2-5571
See ads on pages 390, 523

Corning Glass Works, Electrical Products Div., N.Y., 35s

Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 10c, 15c, 20c, 25c, 30c, 35c, Tel: SWarthmore 1-0100
See ad on page 510

Delta Coils, Inc., N.J., 25c

Deltime, Inc., N.Y., 20sc, 35sc

Developmental Electronics Corp., Calif., 10sc, 15sc, 25sc, 30sc

E.M.I.-Cossor Electronics, Ltd., Canada, 5s, 10s, 15s

ESC Electronics Corporation, 534 Bergen Blvd., Palisades Park, N.J., 5sc, 10sc, 15sc, 20c, 25sc, 30sc, Tel: WIndsor 7-0400
See ad on page 436

El-Rad Mfg. Co., Ill., 10sc, 25sc, 30c

Electrical & Physical Instrument Corp., N.Y., 15s

Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 35sc, Tel: BIgelow 2-2700
See ad on page 170

Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 25c

Essex Electronics, Div. Nytronics, Inc., N.J., 5c, 10sc, 15c, 20c, 25c, 30c

Fairchild Engine & Airplane Corp., Fairchild Astronics Div., N.Y., 15c, 20c

Ferranti Electric, Inc., N.Y., 35sc

Ferritronics Ltd., Canada, 20c, 25c, 30c, 35c

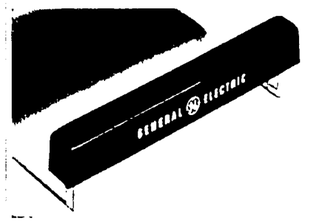
Filtron Co., Inc., N.Y., 10c, 15c, 25c, 30c

Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 10c, 25c, Tel: YEllowstone 4-2691
See ads on pages 341, 399, 403, 437, 563, 569

General Automatics, Inc., Calif., 25c, 30c

General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 10c, 15c, 20c, 35c, Non-Linear c, Tel: GRanite 6-4411
See ads on pages 263, 267, 435, 437, 501, 621

General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 10c, 25c, Tel: WEst 9-8571
See ad on page 363




## ELECTRICALLY VARIABLE DELAY LINES

A unique General Electric product, *Electrically Variable Delay Lines* are suitable for general signal processing applications and as modulating devices for FM communications equipment. Highly adaptable to transistorized circuitry, EVDL's can be produced within a wide range of operating characteristics to give delays up to 12 microseconds. Tailored to defense electronics equipment, the EVDL will withstand extreme humidity, shock and vibration. 227-24

**GENERAL ELECTRIC**

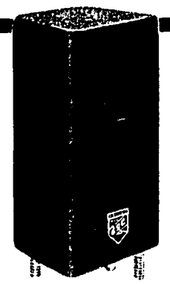
DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK

For details, circle #379 on Reader Service Card

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# ESC World Leader in Custom-Built Delay Lines

- **First** in sales
- **First** company devoted exclusively to the manufacture of custom-built and stock delay lines
- **First** in research, design and development of custom-built delay lines, variable delay lines and continuously variable delay lines.



## LUMPED CONSTANT Delay Lines

**Standard LC Series**

This series has delay time/rise time ratios from 10 to 30 for delays of .25 usec. to 50 usec.

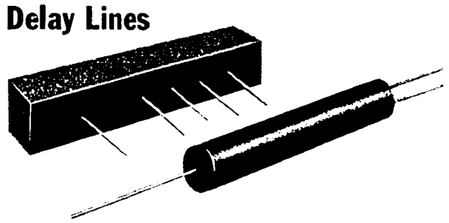
**Millisecond Series**

Long delay, low attenuation characteristics with delay time/rise time ratios from 20 to 50 for delays of 10 usec. to 5 msec.

**Custom-Built**

Custom-built Lumped Constant Delay Lines are available with delay time/rise time ratios as high as 170/1.

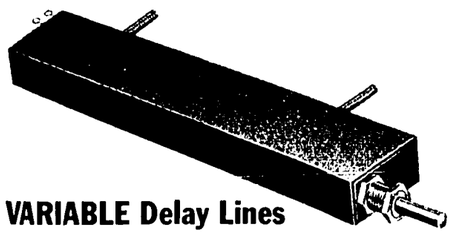
## DISTRIBUTED CONSTANT Delay Lines



Cylindrical or rectangular (for printed board mounting) shapes.

Delays varying from .02 to 1.2 usec. covering impedance ranges from 100 ohms to 1,800 ohms, exhibiting excellent pulse characteristics—at low cost.

Custom-built, distributed lines are also available.



## VARIABLE Delay Lines

**Continuously Variable Delay Lines: 400 Series**

Delays from .1 to .7 usec. with resolution better than .001 usec. Adjustable by 10 turns of the shaft. Dimensions: $6^{17}/_{32}$" x $^5/_8$" x $1^1/_4$".

**Step Variable Delay Lines: 200 Series**

Step variable pushbutton-type units for rack mounting or in instrument cabinet, with delays available from 5 to 50 usec., with extremely low resolution and fast pulse rise time.

**Continuously Variable Delay Lines: 500 Series**

Delays from .9 to 15.0 usec. with resolution of 1/1,000 of maximum delay or less. Adjustable by 10 turns of the shaft. Dimensions: $7^1/_4$" x 1" x $1^5/_8$".

**Custom-Built**

Custom-built Variable Delay Lines of all types and configurations are available.

## COMPLETE LABORATORY REPORTS

With every delay line prototype, ESC gives you a complete laboratory report that includes submitted electrical requirements, photo-oscillograms (which indicate input and output pulse shape and output rise time), the test equipment used and an evaluation of the electrical characteristics of the unit.

**For literature and technical data on any of these products, write to**

**ESC ELECTRONICS CORP.** 534 Bergen Boulevard, Palisades Park, New Jersey

Distributed constant delay lines • Lumped constant delay lines • Variable delay networks • Continuously variable delay lines • Step variable delay lines • Shift registers • Video transformers • Filters of all types • Pulse-forming networks • Miniature plug-in encapsulated circuit assemblies

For details, circle #380 on Reader Service Card

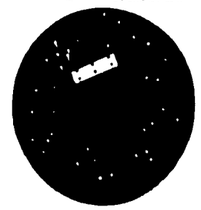





# Directory II. Components

## 50. Delay Lines.

General Radio Co., 22 Baker Ave., West Concord, Mass., 15s, Tel: EMerson 9-4400
See ad on Cover 4
Geotronic Labs., Inc., Tex., 5c, 25c, 30sc
Gray & Kuhn, Inc., Div. IMC Magnetics Corp., N.Y., 10, 15, 25, 30
Gudeman Co., The, 340 West Huron St., Chicago 10, Ill., 10c, 25c, Tel: DElaware 7-7400
See ad on page 393
Gudeman Co. of California, Inc., The, Calif., 5c, 10sc, 25c
Hallicrafters Co., The, Ill., 10c, 25c
Hathaway Instruments, Inc., Colo., 10c
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 10c
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 25c
Hycon Mfg. Co., Calif., 10c
IMC Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 10sc, 15sc, 25sc, 30sc, Tel: EDgewood 4-7070
See ad on page 464
Intercontinental Electronics Corp., N.Y., 10c, 25c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 20c, 25c, 30c
JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 10sc, 15sc, 25sc, 30sc, Tel: DEwey 1-1000
See ad on pages 76-77
Johbins Electronics, Calif., 5, 10, 15, 25, 30
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 10c, Microwave c
Knights Co., The James, 101 E. Church St., Sandwich, Ill., 35c, Tel: 2141
See ad on page 430
Laboratory For Electronics, Inc., Mass., 35s
Litton Industries, U. S. Engineering Co. Div., Calif., 10s, 25s
Lumatron Electronics, Inc., Dept. IR, 116-120 County Courthouse Rd., New Hyde Park, L.I., N.Y., 10s, Tel: PIoneer 7-3200
See ad on page 323
Magnetics Research Co., Inc., N.Y., 20c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 35s
Marquardt Corp., The, Pomona Div. Calif., 35sc
Martin Co., The, Md., 30c
Meridian Metalcraft, Inc., Calif., 10c, 15c
Micamold Electronics Mfg. Corp., Div. Gen. Instrument Corp., N.J., 25c
Microphase Corp., 1 Seneca Pl., P.O. Box 1166R, Greenwich, Conn., 10c, Tel: NOrmandy 1-6200
See ad on page 204
Microsonics, Inc., Mass., 35c
Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 10sc, 25c, Tel: DAvenport 4-4108
See ad on page 402
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 20c
Nilsen Mfg. Co., Ill., 20c
PCA Electronics, Inc., 16799 Schoenborn St., Sepulveda, Calif., 10sc, 15sc, 25sc, Tel: EMpire 2-0761
See ad on page 570
Packard Bell Electronics Corp., Calif., 10c, 25c
Paraplegics Mfg. Co., Inc., Ill., 5c
Parsons Company, The Ralph M., Electronics Div., Calif., 25sc, 30sc
Pastoriza Associates, Inc., James, Mass., 30c
Phelps Dodge Copper Products Corp., N.Y., 10s
Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 20c, 25c, 30c, Tel: COmmonwealth 6-5375
See ad on page 270
Philco Corporation, Pa., 20c, 25c, 30c
Philco Corporation, Govt. & Industrial Group, Pa., 25c, 30c
Polydoroff & Assoc., W. J., D.C., 10c
Polyphase Instrument Co., Pa., 25sc
Precise Electronics & Development Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c
Raychem Corp., Calif., 10c
Redman Electronics Corp., Conn., 25c
Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 15c, 20c, 25c, 30sc, Tel: LOckwood 5-4578
See ad on page 324
Rytron Co., Inc., Calif., 25c
Sangamo Electric Co., Ill., 10c, 25c, 35c
Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 5c, 10c, 25c, 30c, Tel: WOodlawn 5-2341
See ad on page 258
Sickles Div., F. W., General Instrument Corp., Mass., 5c, 10c, 15c, 25c, 30c
Southwestern Industrial Electronics Co., Tex., 15c, 20c
Steafix, France, 5s
Sturrup, Inc., Conn., 35sc
Sylvania Electric Products Inc., Data Systems Operations, Mass., Digital s
Technitrol Engineering Co., Inc., Pa., 10sc, 25sc
Tele Coil Co., N.J., 10c, 15c, 20c, 25c, 30c, 35c
Telecomputing Corp., Calif., 5c, 10c, 15c, 20c, 25c, 30c
Telecomputing Corp., Electronic Components Div., Calif., 5s, 25c, 30c
Teltronics, Inc., 277 Main St., Nashua, N.H., 10c, 25c, 35c, Tel: TUxedo 2-6264
See ad on page 337

## WIRE SONIC DELAY LINES

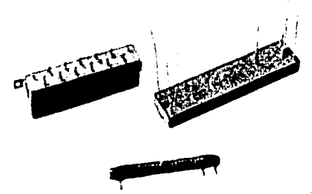
New in the field of delay devices, *Wire Sonic Delay Lines* employ a special alloy wire as the delay medium. WSDL provides long delay per unit volume (up to 10,000 μsec) and adjustable or fixed delay. *Plus* values such as shock and vibration resistance, stability over wide temperature ranges and the availabilty of output taps give this advanced type of delay device unlimited applications at relatively low cost. 127-23

**GENERAL ELECTRIC**

DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK

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## DELAY LINES



**Designed and Built *by* Forbes and Wagner**
**Color T.V., Distributed; Constant, Fixed. Lumped; Constant, Fixed. Pulse Forming, Networks**

Nearly all of our production is on special units, designed and built to meet customers specific requirements. Our facilities also include a precision metal working plant for the tooling and fabrication of cases and stampings for electronic assemblies.

We serve America's leading manufacturers. Write for illustrated brochure.

*forbes and wagner, inc.*
**350 Central Avenue**
**Silver Creek, N. Y. • Phone YE 4-2691**
For details, circle #382 on Reader Service Card


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## 50. Delay Lines.

Tensor Electric Development Co., Inc., N.Y., 10c
Thompson Ramo Wooldridge Inc., Calif., 10c, 25c
Topper Mfg. Co., Inc., N.Y., 10c, 15c, 25c, 30c
**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 10sc, 15sc, 20sc, Tel: ULysses 5-5131**
See ad on this page
U. S. Science Corp., Calif., 10c, 15c, 20c, 25c, 30c
Valor Instruments, Inc., Calif., 5sc, 10sc, 15sc, 25sc, 30sc
Vanguard Electronics Co., Calif., 10c, 25c, 30c
Wells Electronics Co., Ind., 5c, 25c
Wheaton Engineering Corp., Ill., 10c, 15c, 20c, 25c, 30c
Wheeler Electronic Corp., Conn., 25c
Whitewater Electronics, Inc., Wis., 10c, 25c, 30c
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 10c, 25c, Tel: BEnton 1-0700**
See ad on page 573

**Demagnetizers:**
See class 65

**Dials & dial assemblies:**
See class 91

**Digital clocks:**
See class 9

**Diode testers:**
See class 14

**Diodes, germanium & silicon, tunnel diodes & Zener diodes:**
See class 70

**Diodes, selenium:**
See class 66

**Directional couplers:**
See class 83

**Disks, recording:**
See class 65

**Displays, numerical:**
See class 62

**Drums, memory:**
See class 9

**Duplexers:**
See class 83

**Dynamometers:**
See class 14

**Dynamotors:**
See class 60

**Electro-magnets:**
See class 57

**Electrometer tubes:**
See class 78

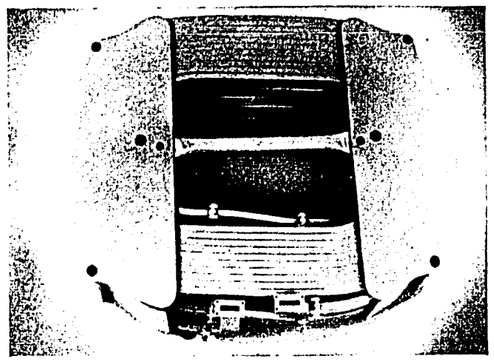
**Electrometers:**
See class 14

**Envelopes, vacuum tube:**
See class 104

## 51. Equalizers.

5. Dialogue
10. Line
15. Magnetic recording
20. Recording diameter
25. Sound effect

Airtronics International Corp., Fla., 10sc
Altec Lansing Corp., Calif., 10s, 25s
Blonder-Tongue Laboratories, Inc., N.J., 10s
Canadian Marconi Co., Canada, 10s
Coil Winders, Inc., N.Y., 5c, 10c, 15c, 20c, 25c
Components Corp., Ill., 10c
Cornwell Electronics Corp., Conn., 5c
Crown Engineering, N.M., 10c
Daven Co., The, N.J., 10c, 25c
Fairchild Recording Equipment Corp., N.Y., 5s
Ferritronics, Ltd., Ontario, 25c
**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 5c, 10c, 15c, 20c, 25c, Tel: EVergreen 6-1300**
See ad on page 566
General Electric Co., Ltd. of England, The, Telephone Works, England, 10s
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 10c
Hoover Electronics Co., Md., 10c
M P Engineering Co., Conn., 25sc
Magnasync Corp., Calif., 5s
Peerless Electrical Products Div., Altec Lansing Corp., Calif., 10c
Precision Instrument Co., Calif., 15sc
Pulse Techniques, Inc., N.J., 5s, 25s
Radio Corp. of America, N.J., 10s
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 10c, Tel: LOckwood 5-4578**
See ad on page 324
Seg Electronics Co., Inc., N.Y., 10s
Technisonic Studios, Inc., Mo., 5c, 25c
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 15sc, 20sc, 25c, Tel: YE 2-8600**
See ad on page 338
**United Transformer Corp., 150 Varick St., New York 13, N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, Tel: ALgonquin 5-3500**
See ad on Cover 2
Western Union Telegraph Co., The, N.Y., 10c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 10sc, 15sc, Tel: JUdson 2-3030**
See ad on page 704
**Wilcox Electric Co., Inc., Wilcox Magnetics Div. 14th and Chestnut, Kansas City 27, Mo., 10c, Tel: BEnton 1-0700**
See ad on page 573

**PACKAGED X-BAND DELAY LINES**

SINGLE COILS UP TO 78 FEET IN LENGTH
MULTIPLE INTERCONNECTED SYSTEMS ANY LENGTH

Turbo "packaged" delay lines are readily contained in standard test racks. Typical 1000 ft. assembly is 2 ft. dia. x 15" high. Complete test assemblies, and slotted waveguide antenna assemblies, built to specification. Bulletin on request.

**TURBO** DELAY LINES

TURBO MACHINE COMPANY, LANSDALE, PA.

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# Directory II. Components

**Fan motors:**
See class 60

**Fans and fan blades:**
See class 42

**Fasteners:**
See class 91

**Ferrimagnetic materials:**
See class 90

**Ferrite circulators:**
See class 83

**Ferrite cores:**
See class 48

**Ferrites:**
See class 86

**Film processors:**
See class 65

**Filters, air:**
See class 84

**Filters, optical:**
See class 17

## 52. Filters.

5. Antenna
10. Band pass & band rejection
15. Crystal
20. Equalizer
25. High pass
30. Loudspeaker dividing networks
35. Low pass
40. Mechanical
45. Microwave
50. Noise reduction
55. SSB
60. UHF & VHF

A C Electronics, Inc., Calif., 5c, 10sc, 20c, 25sc, 35sc
**ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 10c, 25c, 30c, 35c, Tel: VIctoria 9-2414**
See ad on page 474
ACF Electronics Div., ACF Industries, Inc., Md., 45sc
**ADC Incorporated, 2863 13th Ave. S., Minneapolis 7, Minn., 10c, 20c, 25c, 35c, 55c, Tel: PArkway 1-5551**
See ad on page 564
Adams-Russell Co., Inc., Mass., 5sc, 10sc, 35sc, 45c, 50sc, 60sc
Advance Electronics Co., Mich., 10c
Advanced Electronics Corp., N.Y., 10sc, 25sc
Airborne Accessories Corp., N.J., 50sc
**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 45c, Tel: COpley 7-9115**
See ad on page 309
Aircraft Radio Corp., N.J., 60c
Airdesign Corp., Pa., 10c, 25c, 35c
Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 45sc, Tel: CHestnut 5-2990
See ad on page 589
Airtron, Inc., N.J., 45c
Aladdin Electronics, Tenn., 35c
**Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 35s, Tel: HAncock 6-2150**
See ad on page 590


**ALLISON LABORATORIES**

Audio Frequency Test Instrumentation



*Series 2 Filters: Usable as low-cutoff, high-cutoff or band-pass units. Continuously adjustable bandwidth, 1 cycle to 672 KC.*

Unique, continuously-variable passive filters of every type. Noise generators, Octave Band analyzers and equalizers, Band-Elimination Filter Sets. Extremely high rejection, smooth, flat-topped characteristics.

**FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL**

**BURLINGAME ASSOCIATES**

MOUNT VERNON, N.Y. • MOunt Vernon 4-7530

WALTHAM .....TWinbrook 4-1955
SYRACUSE .....GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400

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## 52. Filters.

**All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 50sc, Tel: EDgewood 3-3090**
See ad on this page
Allen-Bradley Co., Wis., 35sc, 60sc
Allison Labs., Inc., Calif., 10s, 25s, 35s, Variable s, Passive Network s
Altec Lansing Corp., Calif., 30s
Alto Scientific Co., Inc., Calif., 10c
Amerac, Inc., Mass., 45sc
American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 10s, 45s, Tel: WAlnut 5-8780
See ad on page 369
American Electronics Co., N.Y., 5s, 10s, 25s, 35s
Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 25s, Tel: BIshop 2-1000
See ad on page 146
Amtron Corp., 17 Felton St., Waltham 54, Mass., 60c, Tel: TWinbrook 4-5020
See ad on page 591
Andrew Antenna Corp., Ltd., Canada, 10s, 60c
Andrew Corp., 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 10c, Tel: TRiangle 4-4400
See ad on page 371
Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 45c, Tel: EDgewood 4-8770
See ad on page 379
Antenna Systems, Inc., Hingham Industrial Center, Hingham, Mass., 45c, Tel: RIverview 9-4700
See ad on page 369
Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 5sc, 10sc, 45sc, 60sc, Tel: POrt Washington 7-8707
See ad on page 360
Applied Technology, Inc., Calif., 10c, 60c
Argonne Electronics Mfg. Corp., N.Y., 5s, 25s, 30s, 35s
Ark Electronics Corp., Pa., 5c, 25c, 35c, 50c, 60c


**ENGINEERING FACILITIES FOR**

- Radio Frequency Interference Testing
- Suppression of Radio Frequency Interference
- RF Field Engineering Service
- Attenuation Measurements
- Design of RF Filters

**FREE**
TO DESIGN ENGINEERS
Comprehensive stock catalog listing of over 22,000 RF Filters ready for off-the-shelf delivery.

**RF FILTER SPECIALISTS**

**PRODUCTS**

- Radio Frequency Interference Filters
- Screen Booth Filters
- Coils—RF Chokes
- Line Stabilization Networks

For immediate engineering consultation, call Mr. Harold P. Westman, Jr.

**ALL-TRONICS, Inc.**
**45 Bond St., Westbury, N. Y., ED 3-3090**

For details, circle #385 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# CONTROL ELECTRONICS' BUYERS' GUIDE

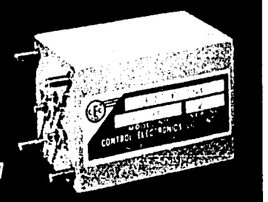
*C.E.C. has for years been engaged in the design and production of quality components and systems for both military and industry. A member of our engineering group will be happy to meet with you on any problems you now face.*

## FILTERS & TOROIDS



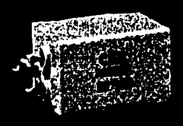
**BF-139**

45 mc band pass filter—3 db bandwidth @ 2.5% center freq—40 db rejection at $2F_0$ and $0.5F_0$—Input and output impedance 1500Ω—Hermetically sealed in accordance with applicable MIL specifications—Dimensions: 4½" x 2" x 2½"



**LF-197**

3000 cps low pass filter—3 db @ 3000 cps—40 db @ 4000 cps—Attenuation at other frequencies specified—Input and output impedance 10,000Ω—Dimensions: 1⅛" x 1⅛" x 2⅛"



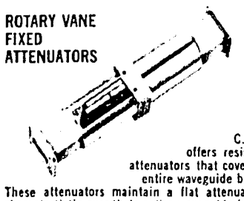
**BF-128**

45 kc resonant circuit—Max 3 db bandwidth: 4500 cps—Entire package requires only 0.4 cubic inches—Units available from 20 kc to 100 kc—Source impedance 3000Ω—Dimensions: ⅝" x 1⅛" x 1"

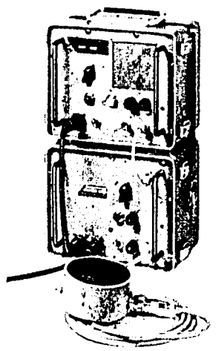
Hundreds of versions of the units shown as well as many other types of filters are offered by C.E.C. Our engineering group will be happy to meet with you and discuss your particular needs

## MICROWAVE COMPONENTS AND INSTRUMENTS

**ROTARY VANE FIXED ATTENUATORS**



C.E.C. offers resistive attenuators that cover an entire waveguide band. These attenuators maintain a flat attenuation characteristic over their entire waveguide band. ATTENUATION: 3 db, 10 db or 20 db are offered as Standard. Other attenuation values can be preset to your specifications.



**VHF-UHF FREQUENCY CALIBRATOR MODEL 121**

Range: 50 mc to 11,000 mc in crystal controlled steps of 50 or 100 mc.

Output Level: In excess of —70 dbm minimum for all markers.

Accuracy: ±0.005% at any frequency, unaffected by temperature or power input variations.

**HARMONIC MULTIPLIER AMPLIFIER ADAPTER**

Output Waveform: CW or Pulse.

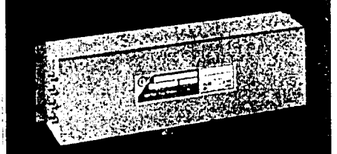
Output Level: increases amplitude to —30 dbm in frequency range from 1,000 to 11,200 mc with marker spacing of 1,600 mc. Lower amplitude (—60 dbm) markers are generated with a spacing of 400 mc.

**BROADBAND ANTENNA**

Designed for use with the Harmonic Adapter, this broadband antenna covers the entire range from 1,000 mc through 11,200 mc.

Used in combination, the three units provide a fast go-no go, remote calibration check on aircraft radar receivers, without the need for connecting cables to the aircraft.

## DELAY LINES



ILLUSTRATED: CODING TYPE 20.3μsec

**LUMPED CONSTANT FIXED & VARIABLE**

5 millimicro sec to .1 secs
Impedance to 20,000 Ω
Bandwidth to 250 mc



**DISTRIBUTED CONSTANT FIXED & VARIABLE**

Delays to 30 μ sec
Impedance to 10,000 Ω
Bandwidth to 20 mc



**MAGNETOSTRICTIVE FIXED & VARIABLE**

2-10,000μsec

Also available are driver & output circuits for the reshaping of pulses.

Numerous versions of the above models as well as a capability to meet all specifications enables C.E.C. to consistently supply the needs of industry. Our engineering staff is always at your service. Write today for complete literature on our product line.

CONTROL *Electronics* CO., INC.

Ten Stepar Place, Huntington Station, N. Y.

HA 7-7961






# Directory II. Components

## 52. Filters.

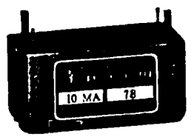
Astron Corp., N.J., 10c, 25c, 35c, 50c
Atlas Engineering Co., Inc., Mass., 10c, 20c, 25c, 35c, 45c, 50c, 55c
Automatic Coil Co., Inc., 195 Sackett St., Brooklyn 31, N.Y., 10c, 25c, 30c, 35c, 50c, Tel: ULster 2-5454
See ad on page 399
Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 5c, 10c, 25c, 35c, Tel: EVergreen 8-6057
See ad on page 409
Axel Electronics, Inc., 134-20 Jamaica Ave., Jamaica 18, N.Y., 50c, Tel: AX 1-3900
See ad on page 388
BI Electronics, Borg-Warner Controls, Calif., 60s
Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 15c, Tel: UNiversity 4-7420
See ad on page 280
Barker & Williamson, Inc., Pa., 5c, 10c, 25c, 35sc, 50c
Bellaire Electronics, Inc., N.J., 50c
Belling & Lee Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 50sc, Tel: ENfield 3322
See ad on page 411
Bendix Corp., The, Bendix-Pacific Div., Calif., 10sc
Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 10c, 25c, 35c, 50c, Tel: ATlas 8-2000
See ads on pages 103-106
Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 5sc, 10sc, 25sc, 35sc, Tel: CHurchill 8-1200
See ad on page 306
Blackhawk Engineering Co., Inc., 15c, 55c
Bliley Electric Co., 200 Union Station Bldg., Erie, Pa., 15sc, Tel: GLendale 6-7561
See ad on pages 92-93
Blonder-Tongue Laboratories, Inc., N.J., 10s, 20s, 35s, 60s
Bogart Mfg. Co., N.Y., 10c
Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 10sc, 45sc, Tel: WAlker 2-6000
See ad on page 150
Bruel & Kjaer, A/S, Denmark, 10s
Bruno-New York Industries Corp., N.Y., 45c
Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 25s, 35s, Tel: HEnderson 1-7166
See ad on page 625
Budd-Stanley Co., Inc., N.Y., 45c
Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 15sc, 25sc, 35sc, Tel: NEwtown 9-5700
See ad on page 426
Bundy Electronics Corp., N.J., 10c, 25c, 35c, 50c
Burnell & Co., Inc., 10 Pelham Pkwy., Pelham Manor, N.Y., 10sc, 15c, 20c, 25sc, 35sc, 55sc, Tel: PElham 8-5000
See ad on pages 88-89
C.E.S. Electronic Products, Inc., Calif., 10s
CGS Laboratories, Inc., Conn., 10c, 25c, 35c, 60c
Caledonia Electronics & Transformer Corp., N.Y., 10c, 25c, 35c
Canadian Marconi Co., Canada, 5c, 10c, 20c, 25c, 35c, 60c
Canadian Westinghouse Co., Ltd., Canada, 45c
Canoga Division, Underwood Corp., Calif., 45s
Capcon, Inc., N.Y., 20sc, 25sc, 35sc, 50sc, 60sc
Carad Corp., Calif., 10sc, 25sc, 35sc
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 10c, 25sc, 30sc, 35c, 45c, 50sc, 60c
Caswell Electronics Corp., Calif., 45c
Chance Vought Electronics Div., Texas, 5c, 10c
Channel Master Corp., N.Y., 5s, 60s
Chicago Electronic Engineering Co., 3223 W. Armitage Ave., Chicago 47, Ill., 10c, 25c, 35c, Tel: CApitol 7-3130
See ad on page 565
Chicago Magnetic Control, 1616 N. Damen Ave., Chicago 47, Ill., 10c, 35c, Tel: ARmitage 6-7400
See ad on page 565
Chicago Standard Transformer Corp., 3504 W. Addison St., Chicago 18, Ill., 10s, 25s, 35s, Tel: INdependence 3-7400
See ad on page 565
Chu Associates, Mass., 5c, 45c
Cleveland Electronics, Inc., Ohio, 30s
Clevite Electronic Components, Div. Clevite Corp., Ohio, 10sc
Coast Coil Co., Calif., 10c, 25c, 35c
Coil Winders, Inc., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 50c, 55c
Coilcraft, Inc., Ill., 10c, 25c, 35c
Collins Radio Co., Iowa, 40sc
Collins Radio Co., Central Sales Office, Tex., 5c, 10c, 15c, 20c, 25c, 35c, 40sc, 45c, 55c, 60sc
Collins Radio Co., Texas Division, Tex., 45c, 55c, 60c
Collins Radio Co., Western Div., Calif., 10sc, 40sc, 45sc, 55sc
Communication Accessories Co., 50 Highway & 71 By-Pass, Lee's Summit, Mo., 10sc, 25sc, 35sc, Tel: BRoadway 1-1700 (Kansas City)
See ad on page 182
Components Corp., Ill., 10c, 20c, 25c, 35c, 55c
Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 10sc, 20sc, 25sc, 35sc, 45sc, 55sc, 60sc, Tel: HAmilton 7-7961
See ad on page 440
Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 10s, 20s, 25s, 35s, 50s, Tel: PLainfield 6-9000
See ad on Cover 3
Cornwell Electronics Corp., Conn., 20c, 30c
Crown Engineering, N.M., 15c
Custom Components, Inc., N.J., 45c
Cycle Transformer Corp., N.J., 10c, 25c, 30c, 35c, 55c
D & R, Ltd., Calif., 30c, 25, 35, 50
Daven Co., Div. N.J., 10c, 25c, 35c, 50c, 55c, 60c
Dearborn Electronics Laboratories, Inc., III., 30c
DeVry Coils, Inc., N.J., 10c, 25c, 35c, 55c, 60c
DeMornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, Calif., 45c, Tel: SYcamore 2-4142
See ad on pages 52-56
Dearborn Networks, N.H., Mass., 5c, 10c, 15c, 35c
Dielectric Products Engineering Co., Inc., Mo., Pa., 50c
Direct TV Repair Co., Calif., 20s
Distributors Equipment Co., Ill., 10c, 25c, 35
Donner Scientific Co., Calif., Donner Corp., Calif., D
Dorsett Electronics Labs., Ill., Pa., 35sc
Douglas Microwave Co., 252 E. Third St., Mount Vernon, N.Y., 5s, 20s, 45sc, Tel: MOunt Vernon 8-6993
See ad on pages 90-91
Dynamic Instrumentation Co., Calif., 25c, 35c
Dynamics Corporation of America, 25c, 35c
E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, 35c, 45c, 50c, 60c, Tel: HAlifax 6-7491
See ad on page 460
ESC Electronics Corporation, 534 Bergen Blvd., Palisades Park, N.J., 10c, 25c, 35c, Tel: WIndsor 7-0800
See ad on page 436
Eclipse Electronics, Ltd., Canada, 40c, 50s, 60c
Edlo Electronics Instrument Co., N.Y., 10c, 25c, 35c
El Rad Mfg. Co., Ill., 5c, 20c, 25c, 30sc, 35c
Electro Assemblies, Inc., Pa.
Electro Networks, Inc., N.Y., Pa., 20c, 25c, 35c
Electronet Div., Rex Products, Calif., 25c, 35c, 60c
Electronic Applications, Inc., Calif., 25c, 30c, 35c, 45c, 60c
Electronic Specialty Co., Calif., Ill., Iowa, 25sc, 35sc, 45sc, 60sc
Elk Electronic Labs., Inc., N.Y.
Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 10sc, 35sc, 45sc, 60sc, Tel: VIctor 2-8400
See ads on pages 307, 309, 313, 315, 379, 584
Ensten Coil Co., Ill., Inc., 25c, 30c, 35c
Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 35s, Tel: GLendale 6-8592
See ad on pages 40-41
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 10c, 20c, 25c, 35c, 50c
Essex Electronics, Div. Nytronics, Inc., N.J., 5c, 10c, 25c, 35c, 50c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "S" indicates stock items; "C" indicates custom built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240

# HERMES OFFERS THE LARGEST AND MOST COMPLETE LINE OF CRYSTAL FILTERS IN THE INDUSTRY

## CRYSTAL FILTERS AND DISCRIMINATORS

### SYMMETRICAL BANDPASS



| MODEL NO. | CENTER FREQUENCY | BANDWIDTH 6 DB | BANDWIDTH 60 DB |
|---|---|---|---|
| 100KPA | 100Kc | 30cps | 200cps |
| 2215KA | 2215Kc | 2.8Kc | 12Kc |
| 2215KB | 2215Kc | 250cps | 1000cps |
| 9MA | 9Mc | 3Kc | 12Kc |
| 10MA | 10.7Mc | 30Kc | 60Kc |
| 10MB | 10.7Mc | 15Kc | 30Kc |
| 10ME | 10.7Mc | 6Kc | 15Kc |
| 10MF | 10.7Mc | 3.5Kc | 10Kc |
| 13MA | 13Mc | 30Kc | 56Kc |
| 13MB | 13Mc | 15Kc | 27Kc |
| 30MJ | 30Mc | 40Kc | 125Kc |
| 30MK | 30Mc | 25Kc | 62Kc |
| 30MP | 30Mc | 5Kc | 15Kc |

Hermes Bandpass Crystal Filters are widely used in commercial and military mobile FM receivers, spectrum analyzers, doppler radar, FSK systems, TRF receivers and other equipment requiring high selectivity and stability. Hermes Crystal Filters maintain the specified attenuation throughout the stopband region.

### SINGLE SIDEBAND



| MODEL NO | CENTER FREQ | SIDEBAND | PASSBAND | MINIMUM ATTENUATION (UNWANTED) |
|---|---|---|---|---|
| 100KUC | 100Kc | upper | 300 to 6000cps (2 db) | 60db |
| 100KLC | 100Kc | lower | 300 to 6000cps (2 db) | 60db |
| 3MUA | 3.2Mc | upper | 300 to 3000cps (3 db) | 40db |
| 2MUA | 2Mc | upper | 300 to 6000cps (2 db) | 60db |
| 2MLA | 2Mc | lower | 300 to 6000cps (2 db) | 60db |

Hermes Single Sideband Filters are recognized for their rapid carrier and adjacent sideband cut-off characteristics. These Crystal Filters simplify SSB generation by reducing the number of frequency conversions.

### CRYSTAL DISCRIMINATORS



| MODEL NO. | BANDWIDTH | CENTER FREQ | IMPEDANCE OHMS |
|---|---|---|---|
| 13M.DM | 50Kc peak to peak | 13Mc | Input 10K Output 500K |
| 10M.DC | 50Kc peak to peak | 10.7Mc | Input 10K Output 500K |

Hermes Crystal Discriminators are used in the construction of high-frequency, low distortion FM detectors at the first IF. The extreme stability of crystal discriminators makes them ideal for use in high- frequency AFC circuits.

## HERMES CUSTOM FILTERS

Hermes has successfully produced more different models than any other manufacturer. The experience acquired in producing tens of thousands of crystal filters can be used to your advantage. If your requirements differ from those met by Hermes Stock Filters, send us your specifications for center frequency, bandwidth, selectivity, and impedance level. Our proposal will be submitted promptly.

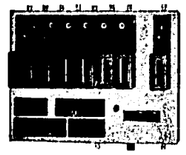
## NEWLY DEVELOPED CRYSTAL DEVICES

### VOLTAGE CONTROLLED CRYSTAL OSCILLATORS



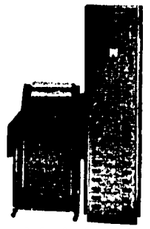
Hermes "VCXO" Voltage Controlled Crystal Oscillator provides greater stability, percentage deviation and linearity than similar devices offered in the past. These characteristics make VCXO especially suitable for FM generation and frequency control circuits.

### FREQUENCY SYNTHESIZERS



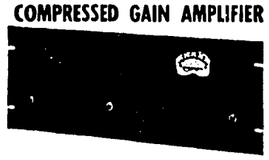
Custom-designed Frequency Synthesizers for transmitters and receivers can be built to operate at frequency ranges from 10Kc to 50Mc. These devices utilize a reference oscillator in conjunction with crystal filters to achieve stable multiple-frequency outputs.

### SPECTRUM ANALYZERS



Hermes has designed and produced Spectrum Analyzers having as many as 256 channels or more. Operating in real time, these Analyzers can be used for precise audio analysis, missile tracking, and frequency monitoring. Built-in programmers control the rate and deviation of scan. Solid-state circuitry and parallel output channels insure maximum reliability.

### COMPRESSED GAIN AMPLIFIER



Hermes Model 110 Compressed Gain Amplifier is used to measure and display attenuation vs frequency characteristics of frequency selective electronic components and equipment over a frequency range from 10Kc to 50 Mc.

*Write for Technical Data*

**Hermes**
ELECTRONICS CO.
75 CAMBRIDGE PARKWAY, CAMBRIDGE 42, MASS.
A DIVISION OF Itek




For details, circle #387 on Reader Service Card





# Directory II. Components

## 52. Filters.

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 45c, Tel: RAvenswood 1-9000**
**See ad on pages 125-128**

Fairchild Recording Equipment Corp., N.Y., 20s, 25s
Farinon Electric Co., Calif., 5c
Farr Company, Calif., 40sc
Ferritronics, Limited, Ontario, 5c, 10sc, 15c, 20c, 25c, 35c, 40c, 55c
Filtron Co., Inc., N.Y., 50c
**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 10c, 25c, 35c, Tel: YEllowstone 4-2691**
**See ads on pages 341, 399, 403, 437, 563, 569**
**Freed Transformer Co., Inc., 1713 Weirfield St., Brooklyn 27, N.Y., 10sc, 20c, 25sc, 30c, 35sc, 55c, 60c, Tel: EVergreen 6-1300**
**See ad on page 566**
**Frequency Standards, P.O. Box 504, Asbury Park, N.J., 5c, 10sc, 25sc, 35sc, 45sc, Tel: PRospect 4-0500**
**See ad on this page**
Fugle-Miller Labs., Inc., N.J., 5c, 10c, 25c, 35c, 50c, 60c
G B Electronics, Subsid. General Bronze Corp., N.Y., 5sc, 10c, 25c, 35c, 45sc
**Gabriel Electronics Div., Gabriel Co., Millis, Mass., 5, 10, 25, 35, 45, Tel: FR 6-2953**
**See ad on page 372**
Garrett Corp., The, Calif., 50c
General Automatics, Inc., Calif., 10c, 25c, 35c
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 10c, Tel: GRanite 6-4411**
**See ads on pages 263, 267, 435, 437, 501, 621**
**General Electric Co., Power Tube Dept., Building 267, Schenectady 5, N.Y., 45sc, Tel: FRanklin 4-2211, Extension 5-3433**
**See ad on page 582**
General Electric Co., Ltd., of England, The, Telephone Works, England, 10s, 15s, 25s, 35s
General Electronic Control, Inc., Minn., 5c, 60c
General Instrument Corp., Defense Engineering Products Group, N.Y., 10c, 45c, 60c
**General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 10c, 25c, 35c, 40c, Tel: WEst 9-8571**
**See ad on page 363**
**General Radio Co., 22 Baker Ave., West Concord, Mass., 10s, 25s, 35s, 60s, Tel: EMerson 9-4400**
**See ad on Cover 4**
Genistron, Inc., Calif., 10sc, 25sc, 35sc, 50sc
Geotronic Labs., Inc., Tex., 10c, 25sc, 35sc
Gertsch Products, Inc., Calif., 10s
Gilfillan Bros., Inc., Calif., 45c
Gombos Co., Inc., John, N.J., 45c
Goodmans Industries, Ltd., Axiom Works, England, 30s
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 45c
Gramer Halldorson Transformer Corp., Ill., 5s, 10c, 25c, 35c
Greenray Industries, Pa., 25c, 35c
**Gudeman Co., The, 340 W. Huron St., Chicago 10, Ill., 5c, 50c, Tel: DElaware 7-7400**
**See ad on page 393**
Gulton Industries, Inc., N.J., 35sc
Gyrex Corp., The, Calif., 40c
HRB-Singer, Inc., Pa., 25c, 35c, 50c
Hallett Mfg. Co., Calif., 50s
Hallicrafters Co., The, Ill., 5c, 10c, 15c, 25c, 35c, 45c, 50c, 55c, 60c
Hamilton Standard Div., United Aircraft Corp., Conn., 50c
Harder Co., Donald C., Calif., 10c, 25c, 30c, 35c
Hathaway Instruments, Inc., Colo., 10s, 40s, 50s
**Hermes Electronics Co., 75 Cambridge Pkwy., Cambridge 42, Mass., 10sc, 15sc, 55sc, Tel: UNiversity 4-7200**
**See ads on pages 266, 442**
Hermetic Seal Transformer Co., Tex., 10c, 15c, 20c, 25c, 35c
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 35s, 45s, 60s, Tel: DAvenport 6-7000**
**See ad on pages 3-18**
Hi-G, Inc., Conn., 10s
Highland Design, Inc., N.Y., 10c, 25c, 35c
**Hill Electronics, Inc., 300 N. Chestnut St., Mechanicsburg, Pa., 10s, 15s, Tel: POplar 6-7611**
**See ad on page 428**
Hisonic, Inc., Kan., 10s, 25s, 30s, 35s
Hopkins Engineering Co., Calif., 50sc
Hughes Aircraft Co., Industrial Systems Div., Calif., 15sc, 55sc, 60sc
Hycon Mfg. Co., Calif., 5c, 10c, 25c, 35c, 45c
I.D.E.A. Inc., Ind., 15s, 25s
Inductor Engineering, Inc., Del., 10c, 25c, 35c, 50c
Industrial Transformer Corp., Fla., 10c, 20c, 25c, 30c, 35c
Intercontinental Electronics Corp., N.Y., 5c
Interference Measurement Laboratory, Inc., N.Y., 50sc
International Electronics Mfg. Co., Md., 5sc, 10sc, 25sc, 35sc, 45sc, 60sc
Interstate Electronics Corp., Calif., 10s, 35s, 60s
**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 10sc, 25c, 35c, Tel: DEwey 1-1000**
**See ad on pages 76-77**
J-V-M Microwave Co., Ill., 45c
Jampro Antenna Co., Calif., 10sc, 35sc, 60c
**Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 10s, Tel: BAldwin 6-3456**
**See ad on pages 114-115**
Johnson Co., E. F., Minn., 35s
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 40sc, 45c, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kellogg Switchboard & Supply Co., Ill., 25c, 45c
Kennedy & Co., D. S., Mass., 10c, 25c, 35c, 45c
Keystone Electronics Co., N.J., 15c
Keystone Products Co., N.J., 10c, 25c, 35c
**Knights Co., The James, 101 E. Church St., Sandwich, Ill., 15c, Tel: 2141**
**See ad on page 430**
Krohn-Hite Corp., Mass., 10s, 25s, 35s
La Pointe Industries, Inc., Conn., 5c
Litton Industries, Maryland Div., Md., 5, 10
Lynch Carrier Systems, Inc., Calif., 10s, 20s, 25s, 35s
Magnetic Circuit Elements, Calif., 35c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 40s
Materials For Electronics, Inc., N.Y., 40sc
Maury & Associates, Calif., 5sc, 10sc, 25sc, 35s, 45s
**McCoy Electronics Co., Dept. P-10, Watts & Chestnut Sts., Mt. Holly Springs, Pa., 10sc, 15sc, 25sc, 35sc, 55sc, Tel: HUnter 6-3411**
**See ad on page 431**


## To Solve Your Microwave Filter or Measurement Problems:

Frequency Standards can supply from stock Microwave Filters and Wavemeters designed and fabricated for upmost versatility and accuracy for almost every application.

*Send for Literature on Standard Products.*

FREQUENCY STANDARDS
Box 504,
Asbury Park, N.J.
Phone: PRospect 4-0500

For details, circle #388 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# OFC *components*

*for defense and industry!*

**TOROIDS** **In addition to standard toroid features, O.F.C. units have—**

• Winding to minimize distributed capacity. Coil may be used at higher frequencies with higher "Q" factors. • Winding to inductance value on self-calibrating winding equipment yielding 1% units as standard tolerance at no cost premium for core calibrating, etc. • Availability of waxed, encapsulated, encased or taped units • Complete line of stock core sizes. Fast delivery on special orders • Facilities for winding from #44 to #10 AWG wire.



**HIGH TEMPERATURE TRANSFORMERS**

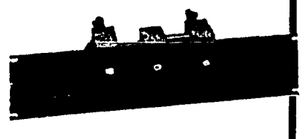
**In addition to meeting requirements of MIL-T-27A, grade 4, Class T, O. F. C. high temperature transformers feature—**

• Reduced iron losses • Large heat-radiating surface area • Very small height dimension • Negligible radiation of power frequency components • Reduced copper loss • Ability to use higher ambients because of smaller unit temperature rise • High reliability, simple construction, excellent shape factor • Excellent regulation and reduced weight.



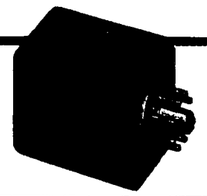
**VARIABLE RF ATTENUATORS** **These rotary adjustable variable attenuators are extremely accurate over wide frequency range. Available as individual unmounted units or in various combinations on rack-mounted panels, featuring—**

• Gold contacts • Resistive networks that function from D. C. to maximum operating frequency • Each resistor mounted in cavity. This eliminates reactive components over the unit's useful frequency range • Highly stable. Installed to prevent any element value shift due to heat • Fully tested for insertion loss and voltage standing wave ratio.
• Conservatively rated. Guaranteed for full year under normal conditions.



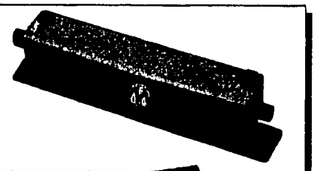
**PLUG-IN FILTERS**

• Standard octal socket makes interchange simple • Low distortion
• Toroid coil construction provides 70 db min rejection hum pickup
• Available, from stock, in wide range of frequencies
• Hermetically sealed.



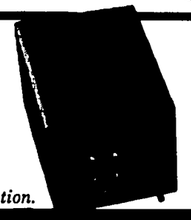
**ANTENNA FILTERS**

• Cutoff frequency range up to 450 MC • Attenuation of 40 to 90 db over stop band • Insertion loss less than 1.0 db over entire pass band • VSWR less than 1.5 over entire pass band • Designed to your size, weight, termination, power and impedance specifications • Slope of cutoff 60 db at 1.2 of cutoff frequency.



**MAGNETIC AMPLIFIERS** **Built to customer specifications, Ortho Filter's high voltage and high temperature units feature—**

• Use from milliwatt to kilowatt ratings • Special test procedures to insure excellent balance and minimum mill voltages • Tape wound toroids and cut cores to facilitate low cost prototypes promptly
• Controlled winding techniques that guarantee uniformity with respect to distributed capacity and leakage inductances.



*Write for complete information.*

**Ortho Filter Corporation**

**7 Paterson Avenue, Paterson 1, New Jersey • MUlberry 4-5858**




For details, circle #389 on Reader Service Card





# Directory II. Components

## 52. Filters.

McMillan Electronics Industries, Mass., 35s, 45s, 50s, 60s
Melabs, Inc., Calif., 5s, 10s, 25s, 35s, 45s, 60s
Melpar, Inc., Special Products Dept., Va., 5c, 10c, 25c, 35c, 45c, 60c
Meridian Metalcraft, Inc., Calif., 5c, 10c, 25c, 35c, 45c
Merit Coil & Transformer Corp., Fla., 5s, 10s, 25s, 35s, 50s
**Merrimac Research & Development, Inc., 517 Lyons Ave., Irvington 11, N.J., 10c, 20c, 25c, 30c, 35c, 45c, Tel: ESsex 1-1616**
See ad on page 381
Micamold Electronics Mfg. Corp., Div. Gen. Instrument Corp., N.J., 50sc
**Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 5s, 25s, 35s, 45s, 60s, Tel: WYman 2-5700**
See ad on page 390
Micromega Corp., Calif., 45c
**Microphase Corp., 1 Seneca Pl., P.O. Box 1166R, Greenwich, Conn., 5sc, 10c, 20c, 25sc, 35sc, 45sc, 60sc, Tel: NOrmandy 1-6200**
See ad on page 204
Microtech, Inc., Conn., 10c, 15c, 45c
Microwave Associates, Inc., Mass., 10s, 15s, 25s, 45s
Microwave Development Laboratories, Inc., Mass., 45sc
Microwave Electronic Tube Co., Inc., Mass., 10c, 45c
Midland Manufacturing Co., Kan., 10s, 15s, 25s, 30s
Miller Co., J. W., Calif., 5sc, 10sc, 25sc, 35sc, 50sc
Mitchell Industries, Inc., Tex., 60s
Mobil Electronics, Inc., Div. Radionic Labs., Inc., Ind., 15sc
Moloney Electric Co., Mo., 10c
Motorola Aviation Electronics, Inc., Calif., 5s
Motorola, Inc., 15c, 40c
Munzig International, Inc., Calif., 10s, 40s, 55s
Murata Mfg. Co., Ltd., Japan, 40c
N.R.K. Mfg. & Engineering Co., Ill., 10c, 45c
Narda Microwave Corp., The, N.Y., 25sc, 35sc, 45sc
National Coil Co., Wyo., 10c, 25c, 35c, 60c
National Scientific Laboratories, Inc., D.C., 50c
Neptune Electronics Co., N.Y., 10c
Nevada Antenna Co., Calif., 5, 60
New York Transformer Co., Inc., N.J., 10c, 20c, 25c, 30c, 35c
**North Hills Electronics, Inc., Alexander Pl., Glen Cove, L.I., N.Y., 5s, 10s, 20s, 25s, 30s, 35s, 55s, Tel: ORiole 1-5700**
See ads on pages 405, 445, 588
**Ortho Filter Corp., 7 Paterson St., Paterson 1, N.J., 5c, 10c, 20c, 25c, 35c, 60c, Tel: MUlberry 4-5858**
See ad on page 444
Osborne Electronics Sales Corp., Ore., 10c, 25c, 35c
Otis Elevator Co., Defense & Industrial Div., N.Y., 35c
Pacific Instrument Co., Calif., 10c, 25c, 35c
Packard Bell Electronics Corp., Calif., 50c
Parsons Company, The Ralph M., Electronics Div., Calif., 10sc
Penn-East Engineering Corp., Pa., 10c, 25c, 35c
Penn Resistor Corp., Pa., 50s
Philamon Laboratories, Inc., N.Y., 35c
Philips Electronics Industries, Ltd., Canada, 10c, 15c, 25c, 35c
**Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 45sc, Tel: EXeter 2-4500**
See ad on pages 107-108
Polydoroff & Assoc., W. J., D.C., 10c
Polyphase Instrument Co., Pa., 10sc, 20sc, 25sc, 35sc, 55c
**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 25c, 35c, 45c, Tel: WEstmore 9-4092**
See ad on page 592
Potter Co., The, Ill., 10c, 50sc
Precise Electronics & Development Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 50c
Precision Crystal Laboratory, Calif., 15c
Precision Microwave Corp., Mass., 45c
**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 25c, 35c, 45c, Tel: WEstmore 9-8900**
See ad on page 383
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 5c, 10c, 45c
Pulse Engineering, Inc., Calif., 10c, 20c, 25c, 35c, 60c
Pulse Techniques, Inc., N.J., 20s, 25s, 35s
RCA Victor Co., Ltd., Canada, 5c, 10c, 20c, 55c
Racal Engineering, Ltd., England, 55s
Radar Design Corp., N.Y., 5c, 10c, 15c, 25c, 35c, 45c
**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 45, Tel: OVerbrook 1-5600**
See ad on page 314
Radio Condenser Co., N.J., 10c, 25c, 35c
Radio Corp. of America, N.J., 10s, 20s, 35s
Radio Engineering Laboratories, Inc., N.Y., 10sc, 15sc, 25sc, 35sc, 45sc, 55sc, 60sc
Radio Engineering Products, Canada, 10s, 20s, 25s, 35s
Railroad Electronic Labs. of Omaha, Inc., Neb., 10c, 25c, 30c, 35c, 50c
Railway Communications, Inc., Mo., 10c, 20c, 25c, 35c, 55c
Rantec Corporation, Calif., 5sc, 10sc, 25sc, 35sc, 45sc, 55sc, 60sc, Telemetry sc
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 10s, 25s, 35s
Raytheon Co., Industrial Components Div., Mass., 10sc, 40s
**Reeves-Hoffman, Div. of Dynamics Corp. of America, 145 Cherry St., Carlisle, Pa., 15c, Tel: CHapel 3-5929**
See ad on page 432
Riverbank Laboratories, Dept. of Engineering, Ill., 10c, 40c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 20c, 25c, 35c, 45c, 50c, 55sc, 60c, Tel: LOckwood 5-4578**
See ad on page 324
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 5c
Rypinski Co., C. A., Calif., 5c, 10sc, 20c, 25c, 35c, 45c, 55sc, 60c
Rytron Co., Inc., Calif., 10sc, 15c, 20c, 25sc, 35sc
Sage Laboratories, Inc., Mass., 45c
San Fernando Electric Mfg. Co., Calif., 10sc
Sanders Associates, Inc., N.H., 45sc
Sangamo Electric Co., Ill., 10c, 25c, 35c, 50c
Sartron, Inc., Ore., 10c, 25c, 35c
Savoy Electronics, Inc., Fla., 50c
Schaevitz Engineering, N.J., 10c, 20c, 25c, 35c
Scientific Radio Products, Inc., Colo., 15c


**FILTERS**

**DESIGNED TO YOUR SPECIFICATIONS**

Whether for quality commercial or military—when you want the finest in precision and the most dependable in delivery—specify filters by North Hills Electric . . . specialists in custom production of toroids, filters and wideband transformers.

**ENGINEERING AND DESIGN CONSULTATION**

Where specifications are not supplied, take advantage of North Hills' efficient and courteous design service.

**FREE BULLETIN**

Standard toroids and wide-band transformers available.

Write or call for free Bulletin W-8G

Call us for advanced filters & wideband transformers

nh

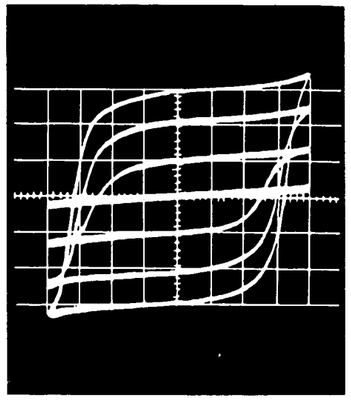
NORTH HILLS ELECTRONICS, INC.
Glen Cove, Long Island, New York
ORiole 1-5700

For details, circle #390 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

*Honoring the Minds that meet the Challenge of the '60s...*





**IRE remembers the MAN**

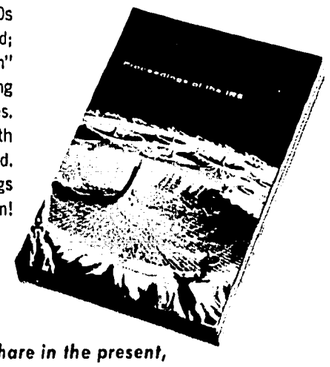
*...for*

*Improvements in Communications*

*J. A. Rajchman*

1960's *Morris Liebmann Memorial Prize* goes to J. A. Rajchman, of RCA Laboratories, for helping develop magnetic devices to process information. IRE is proud to honor Mr. Rajchman, and to salute all who, in this challenging decade of the '60s, work for the advancement of the radio art and apply it to the betterment of our lives.

Your company, too, has to meet the challenge of the '60s in the vast radio-electronics field; to do so, it too must "remember the man" — must reach the top-level minds who control purchasing for electronic equipment, components and supplies. 68,362 (ABC) of them read **Proceedings** every month — ACT on what they read. Present your company's facts in **Proceedings** — and watch the reaction!



***For a share in the present, and a stake in the future, make your product NEWS in***

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**Proceedings of the IRE**

**The Institute of Radio Engineers**

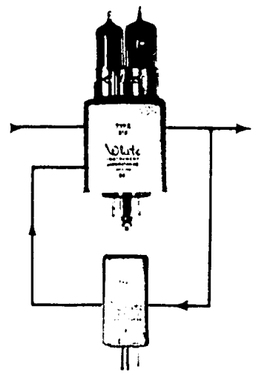
Adv. Dept. 72 West 45th St., New York 36, N. Y. • MUrray Hill 2-6606

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# filters networks



**ACTIVE FILTERS** Plug-in amplifier-feedback network pairs for use as filters or bandpass amplifiers. Widely used where LC filter sections are impractical. Available with tuned circuit response Q to 40, center frequency 1 cps to 500 cps, bandpass response with center frequency 5 to 500 cps. Ask for bulletin 212, 572.

**TWIN-T NETWORKS** For harmonic rejection, low-pass filtering, feedback circuits. Hermetically sealed, stable, plug-in or stud-mounted. Null frequencies 1 cps to 50 kc, wide range of impedance levels. Ask for bulletin 500.

**TOROIDAL WAVE FILTERS** Hermetically sealed LC filters with stable toroidal inductors. Low, high, bandpass models available over wide impedance and frequency ranges. Stud-mounting and plug-ins. Stock and special designs such as interstage filters. Ask for LC bulletins.

Complete engineering service for special filter and network designs. Instrumentation and control problems invited. Manufacturing facilities for prototypes or a thousand units. Fast delivery at competitive prices. Let us put you on our mailing list for our "Network Notes" and technical bulletins.

PLANT AT 5500 BALCONES TRAIL

White INSTRUMENT LABORATORIES

P.O. BOX 9006 • AUSTIN 17, TEXAS

For details, circle #391 on Reader Service Card

# Directory II. Components

## 52. Filters.

Scott, Inc., H. H., Mass., 10s, 25s, 35s
Secode Corp., Calif., 5s, 10s, 25s, 35s
Semi-Elements, Inc., Pa., 15c
Servomechanisms, Inc., Calif., 10c, 20c, 25c, 35c
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 10c, 25c, 35c, Tel: WOodlawn 5-2341**

See ad on page 258

Sickles Div., F. W., General Instrument Corp., Mass., 10c, 20c, 25c, 35c
Sierra Electronic Corp., Div. Philco Corp., Calif., 5s, 10s, 25s, 35s, 45s, 60s
Sigma Electronics Research Corp., Wash., 5c, 10c, 15c, 45c
Sinclair Radio Labs., Inc., N.Y., 5sc, 10sc, 25sc, 35sc, 45sc, 50sc, 60sc
Somerset Radiation Laboratory, Inc., N.J., 25s, 35s, 45s, 60s
Southwestern Industrial Electronics Co., Tex., 10c, 25c, 35c, 50c
Spectralab Instruments, Calif., 60c
Spectrum Instruments, Inc., N.Y., 10sc, 25sc, 35sc
Spencer-Kennedy Laboratories, Inc., Mass., 10s, 25s, 35s, Variable s
**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 10c, 45c, Tel: REdwood 6-4161**

See ad on pages 100-101

Sprague Electric Co., Mass., 50sc
Stanwyck Coil Co., E., N.Y., 5, 10, 25, 35
Systems, Inc., Fla., 15sc, 25c, 35c, 45c, 50c, 55sc, 60c
TRAK Electronics, Conn., 10c
TRG, Incorporated, N.Y., 5c
T T Electronics, Inc., Calif., 10s, 20c, 25s, 35s
Tamar Electronics, Inc., Calif., 5c
**Technical Appliance Corp., 1 Taco St., Sherburne, N.Y., 5c, 45c, Tel: ORchard 4-2211**

See ad on page 376

Technicraft Div., Conn., 45c
Tele Coil Co., N.J., 5c, 10c, 15c, 20c, 25c, 35c, 45c, 50c, 60c
Telechrome Mfg. Corp., N.Y., 10s, 25c, 35c
Telecomputing Corp., Electronic Components Div., Calif., 10sc, 25sc, 35sc
Telegraph Condenser Co., Ltd., The, England, 5s, 25s, 35s, 50s
Telerad Mfg. Corp., N.Y., 45c
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 10c, 20c, 25c, 35c, Tel: MIdway 6-7211**

See ads on pages 456, 556

**Telonic Engineering Corp., 773 Broadway, Laguna Beach, Calif., 10c, 25c, 35c, 60c, Tel: HYatt 4-7581**

See ad on page 71

**Telonic Industries, Inc., 60 N. First Ave., Beech Grove, Ind., 10sc, 25c, 35c, Tel: STate 7-7241**

See ad on page 70

Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 45c
Topic Incorporated, Mass., 35c, 50c
Topper Mfg. Co., Inc., N.Y., 10c, 25c, 35c
Topping Electronics, Ltd., E. V., Canada, 10c, 15c
**Torotel, Inc., 5512 E. 110th St., Kansas City 34, Mo., 5c, 10c, 20c, 25c, 35c, Tel: SOuth 1-6314**

See ad on page 405

Torwico Electronics, Inc., N.J., 10c, 25c, 35c
Transco Products, Inc., Calif., 5sc, 10sc, 45sc
Transformer Design, Inc., of Milwaukee, Wis., 10c, 25c, 35c
Transformer Technicians, Inc., Ill., 10c, 20c, 25c, 35c
Transformers, Inc., N.Y., 10c, 25c, 35c
**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 5c, 45c, Tel: ULysses 5-5131**

See ad on page 438

Union Electric Products Co., N.J., 20c, 25c, 35c
United Control Corp., Wash., 50c
United Shoe Machinery Corp., Mass., 10c, 25c, 35c, 45c, 60c
United States Electronics Corp., N.J., 5c
United States Radium Corp., N.J., 50sc
U. S. Sonics Corp., Mass., 10c, 55c
**United Transformer Corp., 150 Varick St., New York 13, N.Y., 10sc, 20sc, 25sc, 35sc, Tel: ALgonquin 5-3500**

See ad on Cover 2

**Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 10c, 25c, 35c, Tel: ESsex 4-9806**

See ad on page 407

University Loudspeakers, Inc., N.Y., 25sc, 30sc, 35sc
Valor Instruments, Inc., Calif., 5sc, 10sc, 25c, 35sc, 45c, 60c
Vanguard Electronics Co., Calif., 5c, 10c, 25c, 35c
Varo Mfg. Co., Inc., Tex., 10sc, 25sc, 35sc, 40sc
Wahlgren Magnetics, Div. Marshall Industries, Calif., 10c, 25c, 35c
Wave/Particle Corp., Calif., 45
Waveline, Inc., N.J., 10c, 45c
Wells Electronics Co., Ind., 10sc, 25sc, 35sc, 50c, 55c
Western Union Telegraph Co., The, N.Y., 20c
**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 45s, Tel: REgent 9-3611**

See ad on page 580

**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 10c, 30sc, 50sc, 55sc, Tel: JUdson 2-3030**

See ad on page 704

Wheeler Electronic Corp., Conn., 10c, 25c, 35c
**Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 45c, Tel: HUnter 2-7876**

See ad on page 664

**White Instrument Laboratories, P.O. Box 9006, Austin 17, Tex., 10c, 25c, 35c, Passive Network c, R-C c, Tel: GLendale 3-8447**

See ad on this page

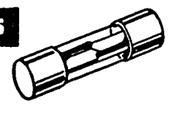

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# . . . You'll find the Type and Size Fuse you need

## • • • IN THE COMPLETE LINE OF BUSS AND FUSETRON FUSES

The following is only a representative selection. The complete BUSS line of fuses includes: single-element, quick-blowing type; single-element for normal circuit protection type; dual-element, slow blowing type and signal or visual indicating types . . . ranging in size from 1/500 ampere up — plus a companion line of fuse clips, blocks and holders.

**BUSS AGX FAST ACTING FUSES**



¼ x 1 in. Glass tube 1/500 to 2 amp.

**BUSS GLD SIGNAL ACTIVATING FUSES**



¼ x 1¼ inch. Silverplated pin pops out when fuse is blown and activates signal or alarm.

**FUSETRON MDL FUSES**



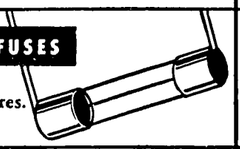
¼ x 1¼ inch. Dual-element — slow blowing type 1/100 to 30 amp.

**BUSS ABC CERAMIC TUBE FUSES**



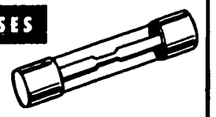
¼ x 1¼ inch. High interrupting capacity fuses ¼ to 30 amp.

**BUSS GJV PIG TAIL FUSES**



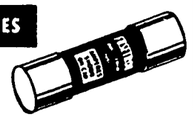
⅛ to 6 amp. Solder into circuit wires.

**BUSS SFE STANDARD FUSES**



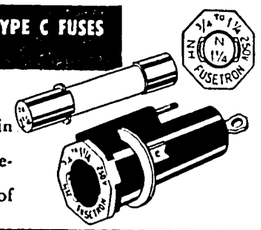
Fuses of different amperages are different lengths — to make it impossible to insert too large a size.

**FUSETRON FNM FIBRE TUBE FUSES**



1 3/32 x 1½ inch. Dual-element — slow blowing type.

**FUSETRON TYPE N and TYPE C FUSES and FUSEHOLDERS**



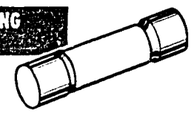
*Especially suitable for protection of TV*

Ears on fuses match slots in holder.

Marking on fuse and fuseholder in direct view.

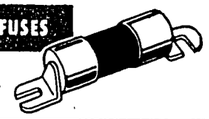
Safeguard against use of wrong size and type of fuse.

**BUSS KTK HIGH INTERRUPTING CAPACITY FUSES**



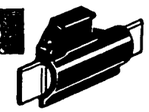
1 3/32 x 1½ inch. Capable of safely interrupting 68,000 amps.

**FUSETRON ACK CLAMP TYPE FUSES**



20 to 300 amp., Dual-element type.

**BUSS ACO AIRCRAFT FUSES**



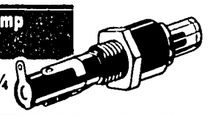
Mechanical Indicating — Limiter type 1 to 75 amp.

**BUSS Series HJ and HK Non-Indicating FUSEHOLDERS**



Panel mounted for ¼ x 1 inch and ¼ x 1¼ inch fuses.

**BUSS Series HJ and HK Lamp Indicating FUSEHOLDERS**



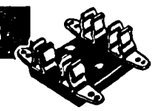
Panel mounted for ¼ x 1 inch and ¼ x 1¼ in. fuses.

**BUSS No. 4051 ONE-PIECE CLIP and TERMINAL**



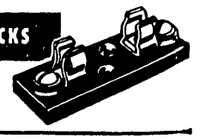
Solder type terminal for ¼ inch fuses.

**BUSS No. 4409 FUSE BLOCKS**



Small Base, solder type Side Terminals.

**BUSS No. 4512 FUSE BLOCKS**



Full Base, Screw type Terminals.

For more detailed information to help you select fuses and fuseholders to meet your electrical protection needs . . . Write for BUSS bulletin SFB.

Or tell us your problem and let our Fuse Engineers assist you in getting the protection you require.

**Bussmann Mfg. Division,** McGraw-Edison Co. University at Jefferson, St. Louis 7, Mo.

FUSETRON — TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION — BUSS

*Makers of a complete line of fuses for home, farm, commercial, electronic and industrial use.*






# Directory II. Components

## 52. Filters.

Whitewater Electronics, Inc., Wis., 10c, 25c, 35c, 40c, 55c

Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 10c, 20c, 25c, 35c, Tel: BEnton 1-0700
See ad on page 573

Findings & hardware: See class 91

Frequency converters: See class 47

Frequency indicating meters: See class 58

Frequency meters, microwave: See class 21

Frequency standards: See class 33

## 53. Fuses & Fuse Holders.

5. Fuses 10. Fuse holders

AMP Incorporated, Pa., 10s

Accurate Electronics Corp., Ohio, 10sc

Aerolite Electronics Corp., N.J., 10c

Alden Products Co., 140 N. Main St., Brockton 64, Mass., 10s, Tel: JUniper 3-0160
See ad on page 496

Alden Systems Co., Mass., 10s

Amatom Electronic Hardware Co., Inc., N.Y., 10c

American Brass Co., The, Fabricated Metal Goods Div., N.Y., 10c

Atlee Corporation, Mass., 10sc

Augat Brothers, Inc., 31 Perry Ave., Attleboro, Mass., 10s, Tel: CAstle 2-2202
See ad on page 543

Autotron, Inc., Calif., 10c

Bel Fuse, Inc., N.J., 5s, 10s

Bellaire Electronics, Inc., N.J., 5c

Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 5s, 10s, Tel: ENfield 3322
See ad on page 411

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 10s, Tel: WOrth 6-5611
See ad on page 607

Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 10s, Tel: HAwthorne 7-1773
See ads on pages 449, 537, 547

Bussmann Mfg. Div., McGraw-Edison Co., University at Jefferson, St. Louis 7, Mo., 5sc, 10sc, Tel: GArfield 1-1740
See ad on page 448

Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 10s, Tel: NEvada 2-2000
See ad on pages 46-47

## 53. Fuses & Fuse Holders.

Dante Electric Mfg. Co., Conn., 10s

Eagle Electric Mfg. Co., Inc., N.Y., 5s, 10s

Eby Co., Hugh H., Pa., 10c

Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 10s. Tel: IRving 8-5744
See ad on page 642

Franklin Engineering, Calif., 5 High Voltage DC sc, 10c

Franklin Fibre-Lamitex Corp., N.Y., 10c

G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 10s, Tel: WOodland 8-9661
See ad on page 640

Gemco Electric Co., Mich., 10s

General Electric Co., Wiring Devices Dept., R.I., 5s, 10s

Industrial Electronic Hardware Corp., N.Y., 10c

Janco Corp., Calif., 10c, Bus Bars sc

Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 10s, Tel: NEvada 2-2000
See ad on pages 46-47

Kolton Electric Mfg. Co., N.J., 10sc

Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 10s, Tel: MOunt Vernon 4-4024
See ads on pages 551, 558

Leviton Mfg. Co., Inc., N.Y., 10s

Littelfuse, Incorporated, Ill., 5sc, 10sc

Marine View Electronics, Inc., N.Y., 10c

Metal Findings Corp., N.Y., 10c

Micarta Fabricators, Inc., Ill., 10c

Molding Corporation of America, R.I., 10c

Monarch Electric Corp., N.Y., 5s

National Tel-Tronics Corp., 53 St. Casimir Ave., Yonkers, N.Y., 10sc, Tel: YOnkers 8-6400
See ad on page 559

Permonite Mfg. Co., Ill., 10c

Raytheon Co., Industrial Components Div., Mass., 13s

Rimak, Inc., Calif., 10c

Rodale Mfg. Co., Inc., Pa., 5s

Royal Electric Corp., Div. ITT, R.I., 5s

Sightmaster Corp., R.I., 5s

Smith, Inc., Herman H., N.Y., 10s

Staver Co., Inc., The, N.Y., 10c

Sylvania Electric Products Inc., Parts Div., Pa., 10c

Tech-Art Plastics Co., N.J., 10c

Telegraph Condenser Co., Ltd., The, England, 5s

Thermal Controls, Inc., 41 River Rd., North Arlington, N.J., 5sc, Tel: NOrth 1-1000
See ad on page 450

Zierick Mfg. Corp., N.Y., 10s

Galvanometers: See classes 14 & 58

Galvanometers, recording: See class 15

Gaussmeters: See class 14

Gears & gear-trains: See class 30

Geiger-Mueller tubes: See class 78

Generators, motor: See class 60

Germanium crystals: See class 49

Germanium diodes: See class 70

Germanium, raw: See class 101

Germanium rectifiers: See class 66

BTI

FUSE CLIPS



**BTI Fuse Clips** are available from stock in a wide range of sizes and designs to accommodate the NEC and SAE standard fuses. Integral lug type or specially designed fuse clips and non-standard parts made to meet your custom requirements.

Write for Bulletin #E-101.

BRAUN TOOL & INSTRUMENT Company, Inc. 141 Fifth Ave., Hawthorne, N. J.

For details, circle #393 on Reader Service Card



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Hermetically Sealed Connectors

CONSECO connectors represent an achievement of more experience in design and manufacture of glass-sealed hermetic items than can be found in any other organization in the United States.



"MINIKAY" CONNECTOR

"MINCON" HERMETICALLY SEALED CONNECTOR





MULTIPLE CONTACT "MS" CONNECTOR

Really rugged, CONSECO connectors provide genuine hermetic sealing. They are engineered out of top technical experience to meet military specifications and to perform under the toughest shock, vibration, and environmental conditions.

CONSECO

**Connector Seals Corp.**
300 North Lake Avenue, Pasadena, Calif.
TWX Pasa 8584

# Glass-to-Metal... Ceramic-to-Metal... Hermetic Seals for *EVERY* Electronic Use!

- Multiple Headers
- Recon Connectors
- Single Lead Terminals
- Crystal Bases
- Transistor Stems
- Diode Closures
- Custom Seals

Hermetic Seal Corporation is your prime source for seals in all sizes, terminations and shapes to fit your specifications. Hermetic is the pioneer in this specialized field and the originator of more than 10,000 different seals. Precision, quality-control from design, manufacture, and precious metal plating is assured.

SEALED-IN GLASS HERMETIC HEADERS

**Hermetic Seal Corp.**
43 River Road, North Arlington, N. J.
TWX KRN 717

HERMETIC-PACIFIC
4232 Temple City Blvd., Rosemead, Calif.
TWX EL MO 9672

# THERMAL Time Delay RELAYS




Thermal Controls' line of standard and miniature time delay relays are available for a wide range of electronic and electrical uses. Thermal delay relays are dependable, reliable, and stable to achieve the utmost in delay relays.

## and VACUUM FUSES



A high voltage, low amperage vacuum fuse that GLOWS when operating at normal load.

TCi

**Thermal Controls, Inc.**
41 River Road
North Arlington, N. J.

**HERMETIC SEAL CORPORATION**



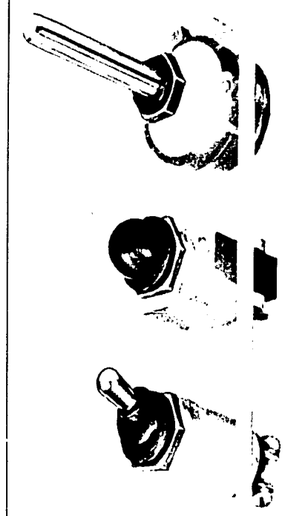

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# APM HEXSEALS®

*Modular*

## SWITCH and SHAFT SEALS



- Fit all industrial electrical controls.
- Meet Military Specifications: MIL-B-005423A (ASG), MIL-B-19257 (Ships), SCL-6303 (Sig. Corps), Par. 183.10-20, Part (B) U.S. Coast Guard.

SEND FOR CATALOG 359A-14

*describing items above, also seals for circuit breakers, indicator lights and other electronic components.*

TRADE MARK

APM **A.P.M. Corporation**
**252 Hawthorne Ave., Yonkers, N.Y.**
**YOnkers 8-2010**

*Designers and Manufacturers of*
HIGH PRESSURE STATIC AND MOVABLE SEALS
HEXSEALS® • SEELSKREWS® • SEELBOLTS® • SEELERIVETS®

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# Directory II. Components


Getters: See class 104

Graphic recorders: See class 16

Grid dip meters: See class 14

Grids & grid wire: See class 104

Guns & gun parts, vacuum tube: See class 104

Gyro testers: See class 14

Gyroscopes: See class 4

Hardware & findings: See class 91

Hardware, microwave: See class 83

Harnesses, preformed wire: See class 85

Headers: See class 54

Headphones: See class 56

Hermetic sealing services: See class 89


## 54. Hermetic Seals.

5. Ceramic to metal
10. Complete headers
15. Glass to metal
20. Quartz to glass

AMP Incorporated, Pa., 10s

A.P.M. Corp., 252 Hawthorne Ave., Yonkers 5, N.Y., Switch & Shaft sc, Tel: YOnkers 8-2010
See ads on page 451, 638

Acme Wire Company, The, Conn., 5s

Advanced Vacuum Products, Inc., Conn., 5

Aerolite Electronics Corp., N.J., 15c

Allegheny Ludlum Steel Corp., Pa., 15c

American Feldmuehle Corp., 11 W. 42nd St., New York 36, N.Y., 5c, Tel: PEnnsylvania 6-9751
See ad on page 619

American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 5s, Tel: AM 5-3411
See ad on page 178

American Sealants Co., Conn., 5s, 15s

Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 10s, Tel: BIshop 2-1000
See ad on page 146

Anchor Metal Co., Inc., N.Y., 15s

Anton Electronic Laboratories, Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 5sc, 15sc, Tel: EVergreen 6-5715
See ads on pages 319, 409, 581

Armoux Corp., Calif., 5s, 15s

Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 10s, 15s, Tel: ENfield 3322
See ad on page 411

Biggs Co., Inc., Carl H., Calif., 5s, 15s, 20s

Blackburn, Inc., P. W., N.Y., 15c

Bon-De Electronic Laboratories, Inc., Mass., 15c

CFI Corporation, Dept. IRE, Cottage Pl., Mineola, L.I., N.Y., 5sc, 10c, 15c, Tel: Pioneer 6-0571
See ad on page 619

Cannon Electric Co., Dept. 425, 3208 Humboldt St., Los Angeles 31, Calif., 15s, Tel: CApitol 5-1251
See ad on page 419

Carborundum Co., The, N.Y., 5c, 10c, 15c

Carborundum Co., The, Refractories Div., N.J., 5c

Cathodeon, Ltd., Meadowcroft Labs., England, 5c, 10s, 15s

Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 5c, Tel: WOodrum 2-9200
See ad on page 152

Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 5s, 10c, Sapphire to Metal s, Porcelain to Metal s, Tel: WEst Lebanon 3-5851
See ad on page 452

Constantin & Co., L. L., N.J., 10sc, 15sc

Coors Porcelain Co., Colo., 5c, 10c

Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 15c, Tel: FOrest 2-5571
See ads on pages 390, 523

Corning Glass Works, Electrical Products Div., N.Y., 15s

Dage Electric Co., Inc., 67 N. Second St., Beech Grove, Ind., 10s, 15s, Tel: STate 6-0458
See ad on pages 132-133

Davis Electronics, Inc., Calif., 15c

Deutsch Co., The, Electronic Components Div., Calif., 15sc

Electrical Industries, Div. Philips Electronics & Pharmaceutical Industries Corp., 691 Central Ave., Murray Hill, N.J., 10sc, 15sc, Tel: CRestview 7-4300
See ad on page 180

Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5c, 20c, Tel: BIgelow 2-2700
See ad on page 170

Farnsworth Electronic Co., Pacific Div., Calif., 5c, 15c

Frenchtown Porcelain Co., N.J., 5sc

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Fusite Corp., The, Dept. H-1, 6000 Fernview Ave., Cincinnati 13, Ohio, 15sc, Tel: REdwood 1-2020
See ad on page 194

Galaxy Engineering Corp., Calif., 5sc

General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 5, 10, 15, Tel: VAlley Stream 5-6363
See ad on page 284

Glass-Tite Industries, Inc., R.I., 5sc, 10sc, 15sc

Glasseal Products Co., Inc., N.J., 5sc, 10sc, 15sc

Greenfield Hermetic Components Corp., Mass., 5sc, 10sc, 15sc

Hamlin, Inc., Wis., 15c

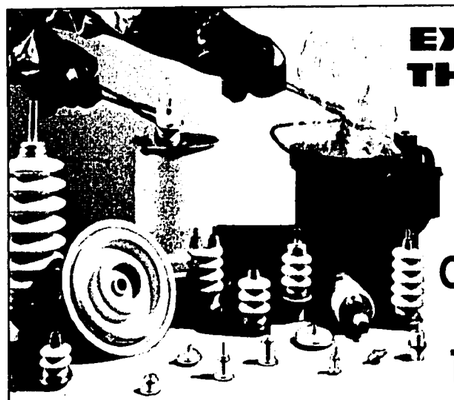
Heldor Mfg. Co., Inc., N.J., 5sc, 10c

Hercon Electronics Corp., N.J., 5c, 10sc, 15sc

Hermaseal Co., Inc., The, Ind., 15sc

Hermetic-Pacific Corp., 4232 Temple City Blvd., Rosemead, Calif., 5sc, 10sc, 15sc, Tel: GIlbert 3-1757
See ad on page 450

Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 5sc, 10sc, 15sc, 20sc, Tel: WYman 8-8080
See ad on page 450

**EXTREME THERMAL SHOCK won't damage these CERAMASEAL HERMETIC TERMINALS**

**SOME HAVE EVEN WITHSTOOD A SUDDEN 460°C CHANGE**

With an alumina content up to 99%, CERAMASEAL terminals are not only mechanically strong, but some have even been transferred directly from liquid nitrogen into hot solder without cracking!

The CERAMASEAL molecular bond between the ceramic and metal flanges, caps or tubes is stronger than the high alumina ceramic.

Easy to install too, by conventional brazing, heli-arc welding or soldering techniques.

FOR COMPLETE INFORMATION, catalog and spec sheets, write Ceramaseal, Inc., New Lebanon Center, N. Y. or phone: West Lebanon 3-5851.

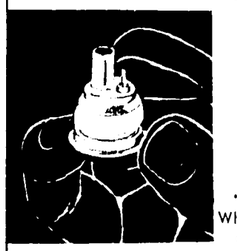
Hermetic Ceramic Terminals, Magnetron Wells, Sapphire-to-Metal Seals

**CERAMASEAL, inc.**

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**SEAL PROBLEMS?** *A CASE IN POINT*



**PROBLEM:**
GENERAL ELECTRIC required development of a current compact high current hermetic seal CONTROLLED RECTIFIER housing, constructed of materials and processes to withstand temperatures above solder range—design involves 5 seals to dissimilar materials.

**SOLUTION:**
Mechanical requirement dictated use of 3 metal cups, #52, OFHC and Ge "A" No. Braze material selected above 1335°F, so that subsequent welding or brazing can be done without detrimental effect. Tapered seals eliminate voids, provide uniformity.

**CERAMIC TO METAL ASSEMBLIES BY MITRONICS ARE:**

• More precise • More compact • More economical • More durable

Why struggle with metallizing problems when Mitronics' complete engineering facilities are at your disposal.

*METALLIZING SPECIALISTS* *Write, phone or wire for technical assistance, information*

**mitronics inc.**

1291 Central Ave., Hillside, N. J., WAverly 6-2250

For details, circle #397 on Reader Service Card


Kearfott Div., General Precision, Inc., Little Falls, N.J., Rotary sc, Tel: CLifford 6-4000
See ad on pages 120-121

Kimble Glass Co., Subsid. Owens Illinois Glass Co., Ohio, 15c

Kollmorgen Optical Corp., Mass., 5c, 15c, 20c

Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 5c, 15c, Tel: LE Roy 385
See ad on pages 62-63

Lignes Telegraphiques et Telephoniques, France, 10s, 15s

Materials For Electronics, Inc., N.Y., 5sc, 10sc, 15sc

Minneapolis-Honeywell Regulator Co., Ceramics Laboratory, Minn., 5c

Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5sc, Tel: WAverly 6-2250
See ad on this page

Molding Corporation of America, R.I., 10c

Mycalex Corporation of America, 126 Clifton Blvd., Clifton, N.J., 5c, Tel: PRescott 9-8866
See ad on page 658

Networks Electronic Corp., Calif., 5c, 10sc, 15sc, 20c

PEK Labs., Inc., Calif., 15c, 20c

Packard Bell Electronics Corp., Calif., 5sc, 10sc

Philips Laboratories, Div. North American Philips Co., Inc., N.Y., 5c, 15c

Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 5c, 15c, Tel: ORiole 6-8000
See ad on page 500

Precision Lapping Co., Inc., N.Y., 5c, 15c, 20c

Radian Laboratories, Inc., N.Y., 5sc, 10sc

Resitron Laboratories, Inc., Calif., 5c, 15c, 20c

Richfield Coined Products Co., N.J., 10c

Robertson Electric Co., Inc., N.Y., 5c, 10c, 15c, 20c

Scientific Electronic Labs., N.J., 5c, 10c, 15c, 20c

Sealtron Corp., Ohio, 10c, 15sc

Silicone Seals, Inc., Ill., Silicone to Rubber sc

Sphere Co., Inc., The, N.J., 5s, Plastic to Metal s

Standard Telephones & Cables, Ltd., England, 15s

Staver Co., Inc., The, N.Y., 10c

Strat-O-Seal Mfg. Co., Ill., 10c, Rubber to Metal s

Technical Ceramics & Lava Corp., N.J., 5

Technical Industries Corp., Calif., 5c, 10sc

Telegraph Condenser Co., Ltd., The, England, 5s

Thermal Controls, Inc., 41 River Rd., North Arlington, N.J., 5sc, 10sc, 15sc, 20sc, Tel: NOrth 1-1000
See ad on page 450

Thor Ceramics, Inc., N.J., 5c

Torwico Electronics, Inc., N.J., 10sc, Rubber to Metal s

Trionics Corp., P.O. Box 548, Madison 1, Wis., 5c, Tel: CEdar 8-2616
See ad on page 663

Tronex, Inc., N.J., 10sc, 15sc





# Directory II. Components

## 54. Hermetic Seals.

United Aircraft Products, Inc., Ohio, Metal to Metal s

United Components, Inc., 105 Lincoln Ave., Orange, N.J., 10sc, 15sc, Tel: ORange 3-6422
See ads on pages 453, 541

U. S. Stoneware Co., Alite Div., Ohio, 5c, 10s, Ceramic to Sapphire c

Vacuum Ceramics, Inc., Ill., 5c, 10c, 15c, 20c

Vitroseal Corp., The, Pa., 15sc

Warren Components Div., El-Tronics, Inc., Pa., 10c, 15c

Zell Products Corp., Conn., 10sc, 15sc

**Holders, cable:**
See class 91

**Holders, fuse:**
See class 53

**Holders, crystal:**
See class 49

**Horns, waveguide:**
See class 83

**Humidity indicators:**
See class 58

**Hybrid junctions:**
See class 83

**Iconoscopes:**
See class 79

**Image orthicons:**
See class 79

**Inductors:**
See class 45

**Instrument panels:**
See class 84

**Insulating materials:**
See class 93

**Insulators, ceramic:**
See class 86

**Insulators, molded:**
See class 98

**Insulators & spacers, vacuum tube:**
See class 104

**Inverters:**
See class 47

**Iron garnet:**
See class 49

**Isolation pads:**
See class 81

**Isolators:**
See class 83

## 55. Jacks, Jack Fields & Plugs.

5. Jacks
10. Jack fields
15. Patch cords
20. Plugs
25. Test clips
30. Test Jacks
35. Test leads

ADC, Incorporated, 2863 13th Ave. S., Minneapolis 7, Minn., 5c, 10c, 15c, 20c, Tel: PArkway 1-5551
See ad on page 564


**SEALS** *(Hermetic)*

Long experience in the semiconductor field has enabled us to develop hermetic sealing to the absolute in protection against corrosion and contamination, thus assuring the same characteristics out in space as at sea level on earth.

Our expert engineering group is at your disposal and will be pleased to offer assistance on any specific problem.

Your inquiries are invited.

**UNITED** *Components*
INCORPORATED
105 LINCOLN AVE. ORANGE, N.J.
ORange 3-6422

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**50% SAVINGS with BEAD CHAIN® Multi-Swage Parts**

CONTACT PINS

TERMINALS

JACKS

FRICTION CONTACTS

MINIATURE PINS

QUALIFIED BEAD CHAIN

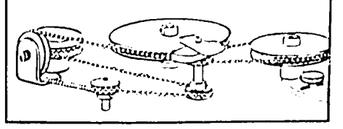
No. 3—3/32" Dia.
No. 6—⅛" Dia.
No. 10—3/16" Dia.
No. 13—¼" Dia.

**also PRINTED CIRCUIT MINIATURE PARTS**

Contact pins, terminals, jacks or any small tubular parts. Maximum ¼" diameter x 1¼" length.
*Send sketch for quotations.*

**BEAD CHAIN DRIVES**

Low-speed positive drives or motion transfer ... at far less cost!



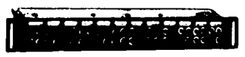
*Send for Multi-Swage or Bead Chain Drive Catalogs!*

**THE BEAD CHAIN MFG. CO.**

6 Mountain Grove St., Bridgeport 5, Conn.

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



## JACK PANELS and PATCH CORDS

Standard broadcast (audio and video) as well as custom built jack panels as used in a wide range of instrumentation and control applications requiring either regular switchboard or coaxial types of jacks. A complete selection of patch cords to fill all types of applications. Size range of special panels from two up to jumbo sizes with about one thousand jacks per panel.

## JACKS — PLUGS — KEYS



A complete selection of standard types of jacks and plugs plus an extensive line of coaxial types suitable for pulse circuitry, microwave, and video applications. Push button and turn type keys with a very wide variety of circuit combinations using well established telephone switchboard designs are available.



## HEADSETS

Thirty-five years of continuous production has produced fourteen basic types ranging from substantially all military types to specialized low cost units suitable for incorporating in toys as a sound generating device. All basic types produced in a wide assortment of variations.

Write for bulletins on these and the many additional standard stock items as well as an almost unlimited variety of manufactured-to-order products falling within the product classifications shown above.

## TRIMM INC.

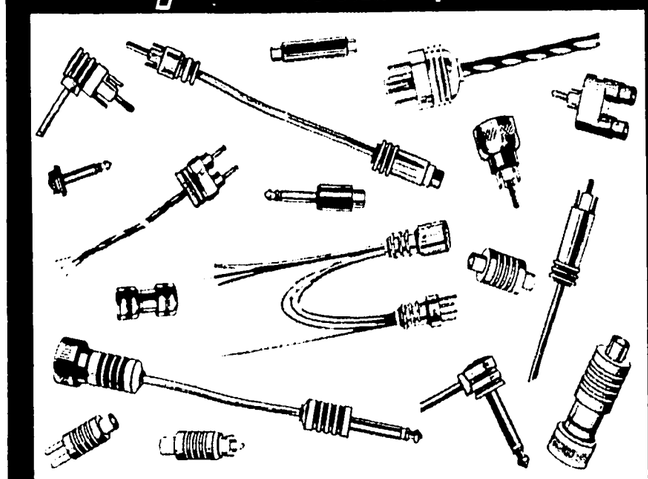
LIBERTYVILLE ILLINOIS



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## LAB-TRONICS CABLES and MOLDED TERMINATIONS

*Stock Types . . . or Designed to O.E.M. Specifications*



RELIABILITY ● LOW COST ● MOISTURE PROOF ● STRAIN RELIEF
UNBREAKABLE ● APPEARANCE ● STOCK MOLDS ● SPECIAL DESIGNS

*Send for your new LAB-TRONICS ENGINEERING DATA HAND BOOK — complete with drawings, specifications and design suggestions.*

**LAB-TRONICS, INC.**, 3656 No. Lincoln Ave., Chicago 13, Illinois

For details, circle #401 on Reader Service Card




## 55. Jacks, Jack Fields & Plugs.

AMP Incorporated, Pa., 5s, 10s, 15s, 20s, 25s, 30s, 35s

**A.P.M. Corp., 252 Hawthorne Ave., Yonkers 5, N.Y., 20s, Tel: YOnkers 8-2010**
See ads on pages 451, 638

Accurate Electronics Corp., Ohio, 5sc 10c, 15c, 20sc

Aerolite Electronics Corp., N.J., 5sc 15c, 25sc, 30sc, 35sc

Air-O-Tronics Engineering Co., Calif., 5s, 20s, 25s, 30s, 35sc

Aircraft Radio Corp., N.J., 5c

Airdesign Corp., Pa., 35c

Alcon Metal Products, Inc., Ill., 5c, 20c

**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 5s, 15s, 20s, 30s, 35s, Tel: JUniper 3-0160**
See ad on page 496

Amatom Electronic Hardware Co., Inc., N.Y., 5s, 15c, 20c, 25s, 30sc, 35sc

American Development Electronics Co., N.J., 15c

American Electronics Co., N.Y., 5s

**Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 5s, 15s, 20s, Tel: BIshop 2-1000**
See ad on page 146

Anchor Specialty Mfg. Co., N.J., 15c, 25sc, 30c, 35c

Argonne Electronics Mfg. Corp., N.Y., 5s, 15s, 20s, 25s, 30s, 35s

Associated Engineering Corp., Mass., 15s, 20s, 35s

Audiosears Corp., N.Y., 5sc, 15sc, 20sc

**Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 5sc, 20sc, Tel: EVergreen 8-6057**
See ad on page 409

Aviel Electronics, Inc., Calif., 5c, 15c, 20c

Avnet Electronics Corp., N.Y., 5s, 20s

**Bead Chain Mfg. Co., 6 Mountain Grove St., Bridgeport 5, Conn., 5s, 20s, Tel: EDison 4-4124**
See ad on page 453

**Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 5s, 15s, 20s, 25s, 30s, 35sc, Tel: WOrth 6-5611**
See ad on page 607

**Buchanan Electrical Products Corp., 607 U.S. Highway 22, Hillside, N.J., 20s, Tel: WAverly 3-7474**
See ad on page 557

**Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 5c, 35s, Tel: HEnderson 1-7166**
See ad on page 625

Cadre Industries Corp., N.Y., 35c

Cambridge Thermionic Corp., Mass., 5sc, 15sc, 20sc, 25sc, 30sc

Canadian Marconi Co., Canada, 5s, 15s

**Cannon Electric Co., Dept. 425, 3208 Humboldt St., Los Angeles 31, Calif., 30s, Tel: CApitol 5-1251**
See ad on page 410

Carter Parts Co., Ill., 5sc, 20sc

Chester-Morton Electronics Corp., Pa., 5s, 10s, 15s, 20s, 25s, 30s, 35s

**Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 20s, Tel: NEvada 2-2000**
See ad on pages 46-47





# Directory II. Components

## 55. Jacks, Jack Fields & Plugs.

Cole Electric Co., Calif., 20c

Collins Radio Co., Central Sales Office, Tex., 5s, 15s, 20s

Component Mfg. Service, Inc., Mass., 15, 20

**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 5sc, 20sc, Tel: YOnkers 3-5900**
See ad on page 523

Continental Electronics Corp., N.Y., 5c, 10c, 15c

Division Lead Co., Ill., 20s

Ecco Electronic Components Corp., N.Y., 5s, 15s, 20s, 25c, 30c, 35c

Electrocraft Component Div., G-C Electronics Co., Ill., 5sc, 15s, 20s, 25s, 30s, 35s

Empire Electronics Co., Inc., N.J., 15c

Enflo Corporation, N.J., 5c

Engineered Electronics Co., Calif., 15s, 35s

Etelco, Ltd., England, 5sc, 10sc, 15c, 20sc, 25sc, 30sc, 35sc

Federal Manufacturing & Engineering Corp., N.Y., 15c, 30c, 35c

**Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 5s, 20s, Tel: IRving 8-5744**
See ad on page 642

Franklin Fibre-Lamitex Corp., N.Y., 5c, 20c, 30c

**G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5sc, 20sc, 25sc, 30sc, 35sc, Tel: WOodland 8-9661**
See ad on page 640

**General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 15s, 20s, Tel: EMerson 9-4400**
See ad on Cover 4

Gotham Audio Sales Co., Inc., N.Y., 5s, 10s, 15s, 20s

Grayhill, Inc., Ill., 25s, 30s

**Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 20c, Tel: NEw Rochelle 3-8600**
See ad on page 643

Industrial Devices, Inc., N.J., 25s

Industrial Electronic Hardware Corp., N.Y., 15c

International Electric Industries, Inc., N.Y., 15c, 20sc, 35c

Jan Hardware Mfg. Co., Inc., 10s

Johnson Co., E. F., Minn., 5s, 20s

**Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 20s, Tel: NEvada 2-2000**
See ad on pages 46-47

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5s, 10s, 15s, 20s

Ken-Tron Corp., Mass., 5sc, 10c, 20sc, 30c

Keystone Electronics Corp., N.Y., 5s, 20s, 35s

**Kings Electronics Co., Inc., 49 Marbledale Rd., Tuckahoe 7, N.Y., 5sc, 15c, 20sc, Tel: STillwater 3-5000**
See ad on page 415

Koito Electronics Co., Ltd., Japan, 5s, 20s, 25s

Kurtston Electronics, N.Y., 15c, 25s, 35sc

**Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 5s, 10s, 15s, 20s, 25s, 30s, 35s, Tel: GRaceland 7-7900**
See ad on page 454

Lerco Electronics, Inc., Calif., 20sc

Litton Industries, U. S. Engineering Co. Div., Calif., 5s, 20s, 30s

Mallory & Co., Inc., P. R., Ind., 5s, 20s

Marine View Electronics, Inc., N.Y., 15c, 25c, 30c, 35c

Materials For Electronics, Inc., N.Y., 5sc, 20sc, 25s, 30s, 35s

**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5sc, 20sc, Tel: DAvenport 4-4108**
See ad on page 402

Minneapolis-Honeywell Regulator Co., Fall River Div., Mass., 5sc, 20s

Morse Co., Frank W., Mass., 20sc

Mueller Electric Co., Ohio, 25s

National Multi-Products Co., Ill., 15c, 35c

**National Tel-Tronics Corp., 53 St. Casimir Ave., Yonkers, N.Y., 5sc, 20sc, 30sc, Tel: YOnkers 8-6400**
See ad on page 559

Nems-Clarke Co., Div. Vitro Corp. of America, Md., 5sc, 10sc, 15sc, 20sc

Neptune Electronics Co., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c

Norrich Plastics Corp., N.Y., 5c, 10c, 15c, 20c, 30c, 35c

North Electric Co., Ohio, 5s, 10s, 20s

Painton & Co., Limited, England, 5sc, 20sc

Permonite Mfg. Co., Ill., 5sc, 20sc

Phalo Plastics Corp., Mass., 15c

Philmore Mfg. Co., Inc., N.Y., 5s, 20s, 25s, 30s, 35s

Pomona Electronics Co., Inc., Calif., 15s, 35s

Radio Corp. of America, N.J., 5s, 15s

Radio Engineering Products, Canada, 5s, 10s, 15s, 20s

Rapid Specialties Co., Ill., 25s

Raytheon Co., Industrial Components Div., Mass., 5s, 25s, 30s

Robins Industries Corp., N.Y., 15s

Royal Electric Corp., Div. ITT, R.I., 20s

Sealectro Corp., N.Y., 5c, 30s

Smith, Inc., Herman H., N.Y., 5s, 15s, 20s, 25s, 30s, 35s

Smith Mfg. Co., Inc., E. C., Pa., 5 Thermocouple c, 20 Thermocouple c

Standard Electric Time Co., The, Mass., 5s, 15s, 20s, 25s, 30s

Standard Telephones & Cables, Ltd., England, 5s, 20s

Star Precision Devices, N.Y., 20s

Steel Co., Herman D., Pa., 5c, 20c

**Stoddart Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif., 30s, Tel: HOllywood 4-9292**
See ads on pages 336, 382

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5s, 10c, 15s, 20s

Superex Electronics Corp., N.Y., 5s, 20s

**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 20s, Tel: LUdlow 2-9561**
See ads on pages 412, 468, 494, 572, 586

**Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 5sc, 10sc, 15sc, 20sc, Tel: SPring 4-1515**
See ad on page 554

**Taurus Corporation, 8 Coryell St., Lambertville, N.J., 30s, Tel: EXport 7-1571**
See ad on page 558

Telephonics Corp., N.Y., 5s, 15s, 20s

Tri-Point Plastics, Inc., N.Y., 30sc

**Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 5sc, 10sc, 15sc, 20sc, Tel: EMpire 2-3700**
See ad on page 454

Ucinite Co., Div. United-Carr Fastener Corp., Mass., 5, 10, 30

**Vector Electronic Co., Inc., 1100 Flower St., Glendale 1, Calif., 15sc, 20s, 25s, 35s, Tel: CHapman 5-1076**
See ad on page 544

Virginia Electronics Co., Inc., D.C., 10c, 15sc, 35c

**Walsco Electronics Mfg. Co., Div. G-C Textron Electronics, Inc., 400 S. Wyman St., Rockford, Ill., 5s, 20s, 25s, 30s, Tel: WOodland 8-9661**
See ad on page 640

**White Industrial Div., S. S., Dept. PR, 10 E. 40th St., New York 16, N.Y., 20 Acetate sc, Tel: MUrray Hill 3-3015**
See ad on page 682

Whitso, Inc., Ill., 5s

Winslow Co., Inc., The, N.J., 35sc

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**Joints, rotary; waveguide:**
See class 83

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**Junction transistors & diodes:**
See class 70

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**Junctions, hybrid:**
See class 83

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**Klystrons:**
See class 79

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**Knobs:**
See classes 91 & 98

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**Lacing cord & tape:**
See class 91

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**Laminations, core materials:**
See class 48

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**Leads, test:**
See class 55

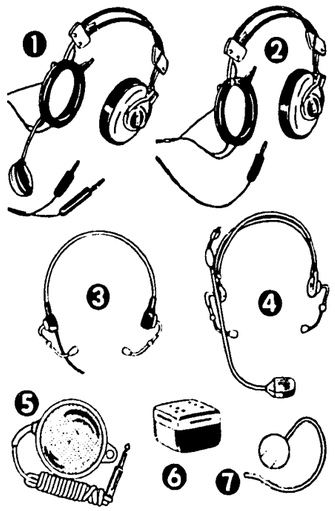
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

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**2. MAGNETIC HEADSET (MAGNA-TWIN®)**—For language learning, aircraft, ham and commercial broadcasting. Choice of boom mikes. Completely adjustable, weighs only 9 oz. Entire set easily sterilized.

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Telex Park, St. Paul 1, Minnesota, CA-501

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**Lighting equipment, tower:**
See class 39

**Lights, pilot:**
See class 62

## 56. Loudspeakers.

5. Commercial grade
10. Cones
15. Headphones
20. High-frequency
25. Low-frequency
30. Wide-range, 2 & 3 way systems

Acoustical Mfg. Co., Ltd., England, 30
Electrostatic s
Altec Lansing Corp., Calif., 5s, 10s, 20s, 25s, 30s, Air Modulated s
American Geloso Electronics, Inc., N.Y., 5s
Amplivox, Ltd., England, 15sc
Argonne Electronics Mfg. Corp., N.Y., 5s, 15s, 20s, 25s, 30s
Arkay Products Mfg. Co., Calif., 5s, Baffles s
Arnhold Ceramics, Inc., N.Y., 5s, 20s, 25s, 30s
Atlas Sound Corp., N.Y., 5sc, 20sc
Audax, Inc., N.Y., 5s, 10s, 20s, 25s, 30s
Audio Electronic Corp., Wis., Baffles c
Audiosears Corp., N.Y., 15sc
**Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., 25c, Tel: OLiver 8-8911**
See ad on page 278
Bozak Mfg. Co., The R. T., Conn., 5s
Brown, Ltd., S. G., N.Y., 15s
CBS Labs., Div. Columbia Broadcasting System, Inc., Conn., 5c, 20c, 25c, 30c
Calbest Electronics, Calif., 30sc
Cannon Co., C. F., N.Y., 15sc
Carbonneau Industries, Inc., Mich., 5c, 20c, 25c, 30c
Clark Co., Inc., Mass., 15sc
Cletron, Inc., Ohio, 5sc, 20sc, 25sc, 30sc
Cleveland Electronics, Inc., Ohio, 5sc, 20sc, 25sc, 30sc
Clevite Electronic Components, Div. Clevite Corp., Ohio, 15sc
Du Kane Corp., Ill., 5s
Dyna Magnetic Devices, Inc., N.Y., 15s
Electro-Voice, Inc., Mich., 20s, 25s, 30s
Electronic Applications, Inc., Conn., 15s, 30s
Electronic Research Associates, Inc., N.J., 20s, 25s, 30s
Farwest Mfg. Div., Inc., Wash., 15s

## 56. Loudspeakers.

Fisher Radio Corp., N.Y., 20s, 30s
Goodmans Industries, Ltd., Axiom Works, England, 5sc, 20s, 25s, 30sc
Hartley Products Co., N.Y., 30sc
**Hawley Products Co., 333 N. Sixth St., St. Charles, Ill., 10sc, Tel: JUno 4-3130**
See ad on this page
Heath Company, Subsid. Daystrom, Inc., Mich., 30s
Heppner Mfg. Co., Ill., 5sc, 20c, 25c
Intelex Systems, Inc., N.Y., 20s, 25s, 30s
**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 30s, Tel: DEwey 1-1000**
See ad on pages 76-77
Jensen Mfg. Co., Div. The Muter Co., Ill., 5sc, 15sc, 20sc, 25sc
KLH Research & Development Corp., Mass., 5c, 10s, 20s, 25s, 30s
Klipsch & Associates, Inc., Ark., 30s
Knowles Electronics, Inc., Ill., 15sc
Koito Electronics Co., Ltd., Japan, 15s
Lansky Die Cutting Corp., N.Y., Baffles c
**Ling Electronics Inc., Div. of Ling-Temco Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., Air modulated s, Tel: PRospect 4-2900**
See ads on pages 247, 285
Lowell Mfg. Co., Mo., Baffles sc
Magnavox Co., The, Ind., 5s, 10s, 15c, 20s, 25s, 30s
Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s
Marine Electric Corp., N.Y., 5s
Materials For Electronics, Inc., N.Y., 5sc, 15s
McGregor Electronic Industries, Inc., Iowa, 5c
Melody Master Mfg. Co., Ill., 15s
Motorola Aviation Electronics, Inc., Calif., 15s
Munzig International, Inc., Calif., 5s, 15s
Murdock Corp., The, Mass., 15sc
Oxford Electric Corp., Ill., 5sc, 20c, 25c, 30c
Parkway Specialties Co., Mich., 15s
Permoflux Products Co., Calif., 5s, 10s, 15s, 20s, 25s, 30s
Philips Electronics Industries, Ltd., Canada, 5s, 30s
Philmore Mfg. Co., Inc., N.Y., 5s, 15s
Pickering & Co., Inc., N.Y., 20s


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# Directory II. Components

## 56. Loudspeakers.

Quam-Nichols Co., Ill., 5sc, 20sc, 25sc, 30sc
Racon Electric Co., Inc., N.Y., 5s, 10s, 20s, 25s, 30s
Radio Corp. of America, N.J., 5s, 10s, 15s, 20s, 25s, 30s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 15s
Rek-O-Kut, Inc., N.Y., 20s, 25s, 30s
Remler Co., Calif., 15c
Rockbar Corp., N.Y., 5s, 20s, 25s, 30s
Rola Co., The, Ohio, 5c
**Saxton Products, Inc., 4320 Park Ave., New York 57, N.Y., Baffles s, Tel: WEllington 3-6400**
See ad on page 615
Sherwood Electronic Labs., Ill., 30sc
Sonotone Corp., N.Y., 20s, 25s, 30s
Sorrels-Johnson Corp., Mass., 30c
Standard Telephones & Cables, Ltd., England, 5sc, 15s, 30sc
Stephens Trusonic, Inc., Calif., 20s, 25s, 30s
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5s, 20s, 25s, 30s
Tandberg of America, Inc., N.Y., 20s
Telephonics Corp., N.Y., 15s
**Telex, Inc., Dept. CA-501, 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 15s, Tel: MIdway 6-7211**
See ads on pages 456, 556
Thompson Ramo Wooldridge Inc., Calif., 5sc
**Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 15sc, Tel: EMpire 2-3700**
See ad on page 454
University Loudspeakers, Inc., N.Y., 5s, 10s, 20s, 25s, 30s
Utah Radio Products Corp., Ind., 5sc, 20sc, 25sc, 30sc
Vari Corp., Minn., 15s
Waldom Electronics, Inc., Ill., 10s
Wells Co., Inc., Gary, N.Y., 15s
Westlab, Inc., N.Y., 5s, 30c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 20sc, 25sc, 30sc, Tel: JUdson 2-3030**
See ad on page 704
Wharfedale, N.Y., 20s, 25s
Wright-Zimmerman, Inc., Minn., 5sc, 20sc, 25sc

**Magnet wire:**
See class 85

**Magnetic clutches:**
See class 30

**Magnetic cores:**
See class 48

**Magnetic recorders:**
See class 29

**Magnetic recording accessories:**
See class 65

**Magnetizers:**
See class 96

**Magnetrons:**
See class 79

## 57. Magnets.

5. Electro
10. Permanent

Aircraft Electronics, Ariz., 5c
Allen-Bradley Co., Wis., 10sc
**Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., 5c, Tel: BUtterfield 8-7403**
See ad on page 508
Applied Radiation Corp., Calif., 5c
**Arnold Engineering Co., P.O. Box G, Marengo, Ill., 10sc, Tel: (Chicago) ANdover 3-6300**
See ad on pages 72-73
Atlas Engineering Co., Inc., Mass., 5c
Automation Industries, Inc., Magnetics Div., Calif., 5c
Bell Aircraft Corp., Avionics Div., N.Y., 5c


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## 57. Magnets.

Carmody Corp., N.Y., 5c
Chet Engineering Co., Calif., 5c
Cinaudagraph, Inc., Ill., 5c, 10c
Coil Co. of America, Inc., N.J., 5c
Coil Winders, Inc., N.Y., 5c
Cosmic Inc., D.C., 10s
Crowley Div., A. O. Smith Corp., N.J., 10c
Crucible Steel Company of America, Pa., 10sc
Cutler-Hammer, Inc., Wis., 5s
Eckel Valve Co., Calif., 5c
Edko Electronics Engineering Co., N.Y., 5c
**Electron Arc Division, Ionics Incorporated, 244 Broad St., Lynn, Mass., 5c, Tel: LY 8-2100**
See ad on page 485
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 10sc, Tel: CHerry 6-2811**
See ads on pages 267, 354, 423, 457, 525, 620
General Electric Co., Magnetic Materials Sect., Mich., 10sc
General Magnetic Corp., Mich., 10sc
Geotronic Labs., Inc., Tex., 5c
Harvey-Wells Electronics, Mass., 5
High Voltage Engineering Corp., Mass., 5c





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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Hillburn Electronics Corp., 55 Nassau Ave., Brooklyn 22, N.Y., 5c, Tel: STagg 2-3875
See ad on page 514
Hoskins Manufacturing Co., 4457 Lawton Ave., Detroit 8, Mich., 10c, Tel: TYler 5-2860
See ad on page 172
Indiana Steel Products, Div. Indiana General Corp., 405 Elm St., Valparaiso, Ind., 10sc, Tel: HOward 2-3131
See ad on page 457
Jobbins Electronics, Calif., 5
Land-Air, Inc., Calif, 5




For details, circle #406 on Reader Service Card


Magnaflux Corp., Subsid. General Mills, Ill., 10s
Marine Electric Corp., N.Y., 5c
Modelectric Products Corp., N.J., 5c
National Moldite Co., Inc., N.J., 10c
North Electric Co., Ohio, 10s
Permag Corp., 88-06 Van Wyck Expressway, Jamaica 18, N.Y., 10s, Tel: OLympia 7-1818
See ad on this page
Philips Electronics Industries Ltd., Canada, 10s
Process & Instruments, N.Y., 5sc
Racon Electric Co., Inc., N.Y., 5c, 10c
Sag Harbor Industries, N.Y., 5c
Simonds Saw & Steel Co., N.Y., 10c
Stackpole Carbon Co., N.Y., 10c
Steward Mfg. Co., D. M., Tenn., 10c
Sylvania Electric Products Inc., Special Products Div., N.Y., 5c
Thomas & Skinner, Inc., 1120 E. 23rd St., Indianapolis 7, Ind., 10sc, Tel: WAlnut 3-2501
See ads on pages 425, 427, 458
Union Electric Products Co., N.J., 5c
Varian Associates, Instrument Div., 611 Hansen Way, Palo Alto 42, Calif., 5s, Tel: DAvenport 6-4000
See ad on page 176
Varo Mfg. Co., Inc., Tex., 5c
Winatic Corp., The, N.Y., 5c

**Mass spectrometers:**
**See class 14**

**Megaphones, power:**
**See class 32**

**Megohmmeters:**
**See class 14**

**Memory devices for computers:**
**See class 9**

**Metals:**
**See class 97**

**Meter panels:**
**See class 84**


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## 58. Meters (Indicating Instruments).

5. Ammeters
10. Clock Radio
15. Frequency indicating
20. Galvanometers
25. Liquid level indicators
30. Micro-ammeters
35. Milli-ammeters
40. Positioning indicators
45. Strain indicators
50. Temperature indicators
55. Timers, automatic cycle
60. Timers, automatic reset
65. Timers, elapsed
70. Voltmeters
75. Volume level (DB & VU)
80. Wattmeters & watt hour meters

Acoustica Associates, Inc., N.Y., 25s
Acro Div., Robertshaw-Fulton Controls Co., Ohio, 55c, 60c
Aemco, Inc., 12 State St., Mankato, Minn., 55c, 60c, Tel: 5153
See ad on page 509
Aero Mechanism, Inc., Calif., 40c
Airpax Electronics Incorporated, Seminole Div., Fort Lauderdale, Fla., 5s, 15s, 30s, 35s, 70s, Tel: LUdlow 3-6160
See ad on pages 82-83
Allegany Instrument Co., Inc., Md., 65s
Allen Electric & Equip. Co., Mich., 5sc, 30sc, 35sc, 50sc, 70sc, 75c, 80c
Amerac, Inc., Mass., 15sc
American Development Electronics Co., N.J., 15c
American Hydromath Corp., N.Y., 55c
American Machine & Foundry Co., D.C., 15s, 70s
Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 55c, 60c, 65c, Tel: BUckingham 1-2727
See ads on pages 463, 577
Anadex Instruments, Inc., Calif., 15s
Antlab, Inc., Ohio, 40sc
Argonne Electronics Mfg. Corp., N.Y., 30s, 35s, 70s
Arnoux Corp., Calif., 50s
Assembly Products, Inc., Ohio, 5s, 30s, 35s, 50s, 70s, 75s, 80s
Associated Electrical Industries Limited, Instrumentation Div., England, 5s, 25s, 50s, 80s
Atomic Accessories, Inc., N.Y., 65s
Auto-Test, Inc., Ill., 5c, 70c
Automatic Timing & Controls, Inc., Pa., 15sc, 25sc, 40sc, 55sc, 60sc, 65sc, 75sc
Automation Management, Inc., Mass., 15sc
Avien, Inc., N.Y., 25c, 50c
Avo Limited, England, 5s, 30s, 35s, 70s
B & F Instruments, Inc., Pa., 45s
Bach Auricon, Inc., Calif., 15s
Bailey Meter Co., Ohio, 25c, 40c, 50c
Baldwin-Lima-Hamilton Corp., Electronics & Instrumentation Div., Mass., 45c
Barker & Williamson, Inc., Pa., 15c
Barnes & Reinecke, Ill., 40c, 55c
Beckman Instruments, Inc., Helipot Div., Calif., 5s, 15s, 70s, Loadmeters sc
Beckman Instruments, Inc., Berkeley Div., Calif., 15s 55s, 60s, 65s, 70s
Beckman & Whitley, Inc., Calif., 50sc
Beede Electrical Instrument Co., Inc., N.H., 5s, 30s, 35s, 50s, 70s, 75s
Bell & Gossett Co., Ill., 15c, 40sc
Bendix Corp., The, Bendix-Pacific Div., Calif., 55c, 60c, 65c
Bendix Corp., The, Montrose Div., Pa., 40sc
Bergen Laboratories, Inc., N.J., 65s
Bethlehem Instrument Co., Inc., Pa., 75, 80





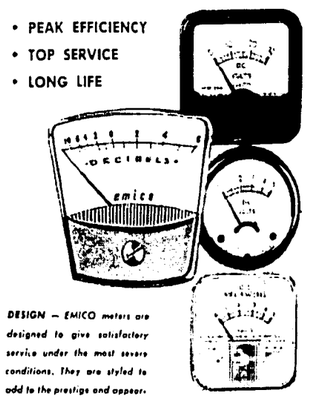
# Directory II. Components

## 58. Meters (Indicating Instruments).

Biddle Co., James G., Pa., 15s, 20s, 30s
Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 80sc, Tel: CHurchill 8-1200
See ad on page 306
Bristol Co., Conn., 5c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c, 65c, 70c, 80c
Bristol Motors, Div. Vocaline Co. of America, Conn., 55sc, 60sc, 65sc
Bruel & Kjaer, A/S, Denmark, 15s, 75s
Bruno-New York Industries Corp., N.Y., 70c
Burr-Brown Research Corp., Ariz., 70s
Bytrex Corp., Mass., 45s
Camera Equipment Co., Inc., N.Y., 55sc
Canadian Westinghouse Co., Ltd., Canada, 80c
Chicago Aerial Industries, Inc., Ill., 25c
Chrono-Log Corp., Pa., 65s
Clark Electronic Laboratories, Box 165, Palm Springs, Calif., 45s, Tel: FAirview 8-2210
See ad on page 561
Clipper Gear & Machine Co., Mich., 55c, 60c
Columbia Electric Mfg. Co., Ohio, 5sc, 70s
Computer-Measurements Co., Div. Pacific Industries, Inc., Calif., 15sc, 65sc
Consolidated Controls Corp., Conn., 15c
Consolidated Electrodynamics Corp., Calif., 20s, 70s
Control Indicating Corp., Conn., 50c
Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 5s, 70s, 80s, Tel: PLainfield 6-9000
See ad on Cover 3
Cramer Controls Corp., Conn., 55s, 60s, 65s
Crosby-Teletronics Corp., N.Y., 15s
Crown Engineering, N.M., 15c, 70c
Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 70sc, Tel: SWarthmore 1-0100
See ad on page 510
Cutler-Hammer, Inc., Wis., 25s, 55s
Daco Instrument Co., N.Y., 55c, 60c, 65c
Data Display, Inc., Minn., 40sc
Dawe Instruments, Ltd., England, 15s
Daystrom, Inc., Weston Instrument Div., N.J., 5sc, 15sc, 20sc, 30sc, 35sc, 40c, 50sc, 70sc, 75sc, 80sc
Daytronic Corp., Ohio, 40s, 45s
Decker Corporation, The, Pa., 25c, 40s, 45s
DeJur-Amsco Corp., Electronics Div., N.Y., 5sc, 30sc, 35sc, 50sc, 65sc, 70sc, 75sc
Del Electronics Corp., Dept. RE, 521 Homestead Ave., Mount Vernon, N.Y., Meter Multipliers sc, Tel: OWens 9-2000
See ads on pages 282, 481, 567
Designers for Industry, Inc., Ohio, 55c, 60c, 65c
Dicon Corporation, N.Y., 40c
Dimco-Gray Co., 212 E. 6th St., Dayton 2, Ohio, 65s, Tel: BAldwin 2-6703
See ad on page 641
Dmeter Mfg. Co., Inc., N.Y., Meter Shunts sc
Durant Manufacturing Co., Wis., 40sc
Dymec, Div. Hewlett-Packard Co., Calif., 15s, 70sc
Dynatran Electronics Corp., N.Y., 30s
E-H Research Laboratories, Calif., 30, 70
E P I C, Inc., N.Y., 5s, 20s, 30s, 35s, 50s, 70s, 80s
Eagle Signal Co., Ill., 55s, 60s, 65s
Eastern Technical Associates, Inc., Mass., Air Speed Indicators s
Ebauches S.A., Dept. Oscilloquartz, c/o Freeport Engineering Co., N.Y., 15c
Edison Industries, Thomas A., Instrument Div., N.J., 50s, 60s
Elcor, Inc., Va., 5sc
Electric Autolite Co., The, Ohio, 50sc
Electric Design & Mfg. Co., Iowa, 5c, 30c, 35c, 70c
Electro-Mechanical Instrument Co., 8th & Chestnut Sts., Perkasie, Pa., 5sc, 30c, 35sc, 70sc, 75c, Tel: ALpine 7-6561
See ad on this page
Electro Precision Corp., Ark., 55, 60, 65
Electronic Applications, Inc., Conn., 70s, 75s
Electronic Counters, Inc., N.Y., 55s, 60s, 65s
Electronic Instrument Co., Inc., (EICO) 33-00 Northern Blvd., Long Island City 1, N.Y., 35s, 70s, 80s, Tel: STillwell 6-8700
See ad on page 283
Electronic Processes Corp. of California, Calif., 50sc
Electronics Corp. of America, Mass., 55s, 60s
Ellison Draft Gage Co., Inc., Ill., 5s
Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 50s, Tel: BIgelow 2-2700
See ad on page 170
Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 15sc, 25sc, 55sc, 60sc, 65s, Tel: GLendale 6-8592
See ad on pages 40-41
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 15c
Exact Engineering & Mfg., Inc., Calif., 60s, 65s
FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 15s, Tel: RAvenswood 1-9000
See ad on pages 125-128
Fairchild Controls Corp., Components Div., N.Y., Air Speed Indicators sc
Farmer Electric Products Co., Inc., Mass., 55s, 60s, 65s
Farwest Mfg. Div., Inc., Wash., 5s, 70s
Federal Pacific Electric Co., N.J., 5, 30, 35, 70, 75, 80
Ferranti/Packard Electric, Ltd., Canada, 80s
Fidelity Amplifier Co., Ill., 55sc, 65sc
Fischer & Porter Co., Pa., 15s, 25s, 50s, 65s, 75s
Fisher-Pierce Co., The, Mass., 55sc, 60sc, 65sc
Fisher Research Lab., Inc., Calif., 25s, 45c, 70s
Flow Corporation, Mass., 70s
Fluke Manufacturing Co., Inc., John, Wash., 80s
Franklin Systems, Inc., 2734 Hillsboro Rd., P.O. Box 3250, West Palm Beach, Fla., 25c, 45c, Tel: TEmple 3-4602
See ad on page 320
Gemco Electric Co., Mich., 60s
General Electric Co., Apparatus Sales Div., N.Y., 5s, 15s, 20s, 25s, 30s, 35s, 40sc, 50sc, 55s, 60s, 65s, 70s, 75s, 80s
General Electric Co., Clock & Timer Dept., Mass., 10sc
General Electronic Laboratories, Inc., Mass., 70c
General Meters, Inc., Colo., 5sc, 20sc, 30sc, 35sc, 40sc, 50sc, 70sc, 75sc
General Time Corp., Central Research Lab., N.Y., 15s, 65s
Geotechnical Corporation, The, Tex., 20s
Giannini Controls Corp., Calif., 40sc, 50sc, Air Speed Indicators sc
Gilmore Industries, Inc., Ohio, 40sc, 45sc, 50sc
Globe Industries, Inc., Ohio, 55c, 60c, 65c


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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

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**PANEL METERS**
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MILITARY — COMMERCIAL
1-½" Ruggedized Meters

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**ELECTRONIC**
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*a complete line for every application*

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- D'Arsonval movements guarantee minimum accuracy of 2% (full scale)
- Rugged construction means trouble-free, long-lived service
- Durable plastic meter cases provide greater clarity, easier readability

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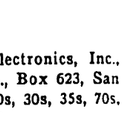
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Godfrey Mfg. Co., Ill., 55c, 65c
Good Electronic Corp., Fla., 45c
Gotham Audio Sales Co., Inc., N.Y., 75s
Green Instruments, Inc., Henry J., N.Y., Air Speed Indicators sc
**Greibach Instruments Corp., 329 North Ave., New Rochelle, N.Y., 5sc, 20sc, 30sc, 35sc, 50c, 70sc, 75c, Millivoltmeters sc, Tel: NEw Rochelle 3-7900**
**See ad on page 284**
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 55sc, 60sc, Tel: CHesapeake 3-1100**
**See ad on page 512**
Gulton Industries, Inc., N.J., 50sc
Hallikainen Instruments, Calif., 50s
Hamner Electronics Co., Inc., N.J., 55s, 65s
Hastings-Raydist, Inc., Va., 5s, 40s
Hathaway Instruments, Inc., Colo., 70s
Haydon Company, The A. W., Conn., 40c, 55c, 60c, 65c
Haydon Div., General Time Corp., Conn., 55s, 60s, 65s
Heath Company, Subsid. Daystrom, Inc., Mich., 10s, 35s, 55s, 70s, 75s, 80s
Henschel Corp., Mass., 25c
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 5s, 15s, 30s, 35s, 70s, Tel: DAvenport 6-7000**
**See ad on pages 3-18**
Hickok Electrical Instrument Co., The, Ohio, 5s, 15s, 20s, 25s, 30s, 35s, 50s, 70s, 80s
Holt Instrument Laboratories, Wis., 70 Thermal Transfer s
Howell Instrument Co., Tex., 20s
Hoyt Electrical Instrument Works, Inc., Burton-Rogers Sales Div., Mass., 5sc, 30sc, 35sc, 70c, 75sc
Huppert Co., K. H., Ill., 50s
**Ideal Precision Meter Co., Inc., 214 Franklin St., Brooklyn 22, N.Y., 5c, 30c, 35c, 70c, 75c, Tel: EVergreen 3-6904**
**See ad on this page**
Industrial Control Co., N.Y., 40sc
Industrial Devices, Inc., N.J., 70s
Industrial Timer Corp., N.J., 55s, 60s, 65s
**Inertia Switch, Inc., 311 W. 43rd St., New York 36, N.Y., 45s, Tel: JUdson 6-5880**
**See ad on page 551**
Instrument Laboratories, Ill., 75s
**International Instruments, Inc., Box 2954, New Haven, Conn., 5sc, 30sc, 35sc, 70sc, 75sc, Tel: FUlton 7-2515**
**See ad on this page**
International Register Co., Ill., 10s, 55s, 60s
Isotope Developments, Ltd., England, 25s
**J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 15, 20, 50, 65, Tel: STate 7-5825**
**See ads on pages 460, 546, 550**
Janco Corp., Calif., Shunts c
**Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 70s, Tel: CYpress 2-4025**
**See ad on page 550**
Kay-Townes Antenna Co., Ga., 80s
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 40c, 50c, Tel: CLifford 6-4000**
**See ad on pages 120-121**
**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., Box 623, San Diego 11, Calif., 5s, 20s, 30s, 35s, 70s, Tel: BRowning 7-6700**
**See ad on pages 110-111**
Knight Electronics Corp., Ill., 10s
**Korfund Co., Inc., 22D Cantiague Rd., Westbury, L.I., N.Y., 15s, 20s, 45s, Tel: RAvenswood 9-7580**
**See ad on page 587**
Kraus Electronics, Inc., Calif., 50s
Land-Air, Inc., Susid. California Eastern Aviation, Inc., Ill., 55 Pulse c
Landis & Gyr, Inc., N.Y., 80s, Amp Hour Meters s
**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 15s, Tel: LOwell 6-2600**
**See ad on page 312**
Lear, Inc., Calif., 40sc, 45sc, 50sc, 55sc, 60sc
Lear, Inc., Mich., 40sc
Leeds & Northrup Co., Pa., 20s, 30s, 35s, 50s
Lektra Laboratories, N.Y., 55sc, 60sc, 65sc
Leland Airborne Products, Div. of A.M.F., Ohio, 65s
Lessells & Associates, Inc., Mass., 45c
Lewis Engineering Co., The, Conn., 50c
Liquidometer Corp., The, N.Y., 25c, 40sc, 50c
Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Div., Calif., 45s


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Used wherever constant or known frequency is important to efficient operation of equipment.

Model 30-F

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- *Rugged Construction* simplified, patented.
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**ELAPSED TIME METERS**



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J-B-T elapsed time (or running time) meters provide a convenient means for timing tests, checking tube or machine life, and scheduling maintenance. Available in many case styles including round, square, clear plastic front, sealed, and others, compatible with all modern panel instruments. Standard models for 60 cycles, 100-130 volts register in 1/10 hour steps to 9999.9 hours then resets automatically. Variations such as 50 cycles, 230 volts 0-99,999 hours or 0-9999.9 minutes are also available.

Purchase of standard items through authorized electronic distributors is strongly recommended.

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J B T INSTRUMENTS INC
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# Directory II. Components

## 58. Meters (Indicating Instruments).

**Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 25s, 40c, 50s, 70s, Tel: ROgers 9-5312**
**See ad on page 424**
Maico Electronics, Inc., Minn., 40s
**Marconi Instruments, 111 Cedar Lane, Englewood, N.J., 70s, Tel: LOwell 7-0607**
**See ad on page 332**
Marion Instrument Div., Minneapolis-Honeywell Reg. Co., N.H., 5sc, 15sc, 30sc, 35sc, 40c, 50c, 65s, 70sc, 75sc
Marstan Electronics Corp., N.Y., 15s, 55s, 60s, 65s, 70c
Martindale Electric Co., Ohio, 5s, 70s
Mast Development Co., Inc., Iowa, 55c, 60c, 65c
Maxson Corp., The W. L., United Mfg. Co. Div., Conn., Phase Sequence Indicators sc
**Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 70s, Tel: DErfield 4-2131**
**See ad on page 335**
Meter-Makers, Inc., Ill., 5sc, 30sc, 35sc, 70sc, 75sc
Meters, Inc., Ind., 5c, 20c, 30c, 35c, 50c, 70c, 75c
Metrologie, Compagnie Generale de, France, 5s, 30s, 35s, 70s
Metropolitan Electronic & Instrument Co., N.Y., 30s, 35s, 70s
Miller-Harris Instrument Co., Wis., 55sc, 60sc
Millitest Corp., N.Y., 20s
Minco Products, Inc., Minn., 50s
Minicord Corp. of America, N.J., 5s, 30s, 35s, 70s
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 5s, 20s, 35s, 40s, 45s, 50s
Minneapolis-Honeywell Regulator Co., Rubicon Instruments, Pa., 20sc
**Moeller Instrument Co., Inc., Electronics Div., 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 40c, 50c, Tel: VIrginia 9-2100**
**See ad on page 588**
Moseley Co., F. L., Calif., 40s, 45c, 70s, 75s
Muirhead & Co., Ltd., England, 40s
Munzig International, Inc., Calif., 5s, 30s, 35s, 70s, 75s
National Electronics, Wyo., 5c, 15c, 20c, 30c, 35c, 50c, 70c, 80c
New England Scientific Instruments Co., Mass., 5s, 20s, 35s, 50s, 70s, 80s
Nichols, Ltd., R. H., Canada, 5s, 15s, 20s, 30s, 35s, 50s, 70s, 80s
**North Atlantic Industries Inc., Terminal Drive, Plainview, L.I., N.Y., 70s, Tel: OVerbrook 1-8600**
**See ad on page 286**
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 15s, 55s, 60s, 65s, Tel: NAtional 2-6485**
**See ad on pages 27-30**
Nuclear-Chicago Corp., Ill., 55s, 60s, 65s
Ohio Semiconductors Inc., Ohio, 70c, 80c
Ohmart Corp., The, Ohio, 25sc
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 40c, Tel: WOrth 6-0380**
**See ad on page 483**
**Oster Mfg. Co., John, Avionic Div., 1 Main St., Racine, Wis., 40c, 50c, Tel: MElrose 7-4445**
**See ad on page 466**
Owen Laboratories, Inc., Calif., 45s
PIC Automation Controls, Div. General Controls Co., Ill., 55s, 60s, 65s
Pace Electrical Instruments Co., Inc., N.Y., 5s, 20s, 30s, 35s, 70s, 75s
Packard Bell Electronics Corp., Calif., 40sc, 45sc, 50sc, 70sc
Pam Associates Inc., Md., 45c, 55c, 60c
**Panoramic Radio Products Inc., 528 S. Fulton Ave., Mount Vernon, N.Y., 15s, Tel: OWens 9-4600**
**See ad on page 334**
Parks Laboratory, Henry Francis, Wash., 50c, Humidity s
Partlow Corp., N.Y., 50s, 55s, 60s
Penn Keystone Corp., Conn., 40sc
Pennwood Numechron Co., Pa., 55c, 60c, 65c
Performance Measurements Co., Mich., 45s, 50s
Phaostron Instrument & Electronic Co., Calif., 5sc, 15c, 30sc, 35sc, 70sc, 75c
Philips Electronic Instruments, N.Y., 55s, 60s, 65s
Philips Electronics Industries, Ltd., Canada, 20s, 45s, 50s
Photron Instrument Co., Ohio, 20s
**Physics Research Laboratories, Inc., P.O. Box 555, Hempstead, L.I., N.Y., 5s, 20s, 30s, 35s, 70s, 80s, Tel: IVanhoe 3-8299**
**See ad on page 288**
Production Research Corp., Subsid. Radio Condenser Co., N.Y., 15c
Pyramid Instrument Corp., N.Y., 5s, 70s
Pyrometer Instrument Co., Inc., N.J., 50s
Q V S, Inc., N.J., 5c, 20c, 30c, 35c, 70c, 75c
Quan-Tech Laboratories, Inc., N.J., 5s, 30s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 30s, 70s, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Radiometer, Denmark, 20s
Ram Meter, Inc., Mich., 5c, 15c, 30c, 35c, 40c, 50c, 70c, Shunts sc
**Rawson Electrical Instrument Co., Inc., 118 Potter St., Cambridge 42, Mass., 30sc, 35sc, 70sc, 80sc, Tel: KIrkland 7-4041**
**See ad on this page**
Red Point Corp., Calif., 50s
Resdel Engineering Corp., Calif., 65s
Research, Inc., Minn., 40c, 45c, 50c
Research Industrial Laboratory of Electronics, Pa., 25c, 65c
Revere Corp. of America, Subsid. Neptune Meter Co., Conn., 25c, 45c
Richards Co., Inc., Arklay S., Mass., 50s
Robertshaw-Fulton Controls Co., A & I Div., Calif., 25s
Rowan Controller Co., The, Md., 5s, 15c, 30s, 35s, 70s
Ruge Associates, Inc., Arthur C., N.H., 50sc
Safe Flight Instrument Corp., N.Y., Air Speed Indicators sc
Sangamo Electric Co., Ill., 5s, 70s, 80s
Savoy Electronics, Inc., Fla., 15c
Schoene Electronics Laboratory, Ind., 30c
Scopes Company, Inc., The, N.Y., 70s
Seiscor, Div. Seismograph Service Corp., Okla., 40c
**Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N.Y., 5sc, 15c, 20sc, 30c, 35sc, 70sc, 80c, Tel: BEverly 5-2300**
**See ad on page 292**
Serdex, Inc., Mass., 50c, Humidity s
Serfass Corp., Div. Milton Roy Co., Pa., 25c, 40c
Servo-Tek Products Co., N.J., 40s, 70s
Servomechanisms, Inc., Calif., 25c, 40c
**Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 20s, 30s, 35s, Tel: WOodlawn 5-2341**
**See ad on page 258**




**RAWSON METERS**

**MULTIMETERS® and REGULAR METERS**
AC and DC types, multiple ranges, accuracy — ½ of 1%. 2 microamperes to 1 ampere DC. 2 milliamperes to 3 amperes AC.

**ELECTROSTATIC VOLTMETERS**
Ranges 100 V to 35,000 V, AC or DC. Resistance exceeds million megohms. Can measure static electricity.

**R. F. VOLTMETERS**
DC to 100 megacycles's. Thermocouple type. Ideal for laboratory standards. New bulletin.

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Laboratory and production measurements on magnets and magnetic circuits. Single push button return-to-zero.

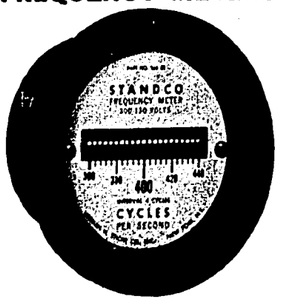
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Our most recent development for measuring magnetic field strengths. Measures from a few gausses to 120 kilogausses.

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**"STANDCO"**
**VIBRATING REED**
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**HERMETICALLY SEALED**

**and Ruggedized**
**3½" and 2½" Sizes**
**Meeting all MIL Specs**

Normal Frequencies
25, 50, 60 or 400 Cycles
Special Ranges
from 15-1500 cycles

***ALSO IN OTHER TYPES***

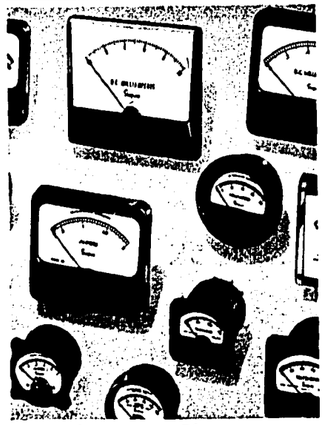
**PANEL MOUNTING:** 3½" Flush Bakelite.
**SWITCHBOARD MOUNTING:** 7¼" round surface, or 4½" square semi-flush cases.
**PORTABLES:** In large or small cases.

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**These are Simpson panel instruments . . . engineered and built to stay accurate . . . available from stock or custom-built**

Simpson
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**SIMPSON ELECTRIC CO.**
**5218 W. KINZIE ST., CHICAGO 44, ILLINOIS**
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In Canada: BACH-SIMPSON, LTD., LONDON, ONT.
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## 58. Meters (Indicating Instruments).

Shurite Meters, Conn., 5s, 35s, 70s
Sigma Electronics Research Corp., Wash., 15c, 80sc
Sillcocks-Miller Co., The, N.J., 50c
Simmonds Precision Products, Inc., N.Y., 25c, 50c

**Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 5s, 20s, 30s, 35s, 50s, 65s, 70s, 75s, 80s, Tel: EStebrook 9-1121**
**See ad on this page**

Sloan Company, The, Calif., 55sc, 60sc, 65sc
Smith-Florence, Inc., Wash., 70 Micro sc
Solartron Electronic Group, Ltd., The, England, 35s, 75s
Southwest Products, Inc., Tex., 80s
Southwestern Industrial Electronics Co., Tex., 5s, 30s, 35s, 70s
Sperry Gyroscope Co. of Canada, Ltd., Canada, 55c, 60c, 65c
Standard Electric Time Co., The, Mass., 55s, 60s, 65s
Steel Co., Herman D., Pa., 65c
Stereatronics, Inc., Mass., 55c, 60c

**Sticht Co., Inc., Herman H., 27 Park Pl., New York 7, N.Y., 15s, 65s, Tel: REctor 2-8163**
**See ad on this page**

Strandberg Engineering Labs., Inc., N.C., 55s, 60s, 65s
Sun Electric Corp., Instrument Div., Ill., 5c, 20c, 30c, 35c, 65c, 70c, 75c
Sunshine Scientific Instrument, Pa., 5sc, 15sc, 20sc, 30sc, 35sc, 65sc, 70sc, 75sc, 80sc

**Superior Instruments Co., 2435 White Plains Rd., New York 67, N.Y., 5s, 35s, 70s, Tel: TUlip 2-6880**
**See ad on page 295**

Supreme Electronics Corp., Subsid. Hickok Elect. Inst. Co., Miss., 5c, 20c, 30c, 35c, 40c, 50c, 70c
Systron-Donner Corp., Calif., 15s, 50s, 55s, 60s, 65s, 70s
Taber Instrument Corp., N.Y., 45c

**Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N.J., 15c, 50c, 70c, Tel: WIndsor 4-2221**
**See ad on page 555**

Technical Industries Corp., Calif., 40sc, 45sc, 50sc
Technique Associates, Div. Duncan Electric Co., Inc., Ind., 5s, 70s
Technology Instrument Corp., Mass., 40c, 70s
Telechrome Mfg. Corp., N.Y., 25c, 40c, 45s
Temperature Engineering Corp., N.J., 50s, 55s, 60s
Texas Instruments Incorporated, Geosciences & Instrumentation Div., Tex., 25s
Thermo Electric Co., Inc., N.J., 50sc
ThermoCal, Inc., Calif., 50
Theta Instrument Corp., N.J., 40s
Thompson Ramo Wooldridge Inc., Calif., 25sc
Thwing-Albert Instrument Co., Pa., 20c, 45c, 50c
Topping Electronics Ltd., F. V., Canada, 15c
Trans-Sonics, Inc., Mass., 25s, 50s

**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 70sc, Tel: OVerbrook 1-0400**
**See ad on page 294**

**Triplett Electrical Instrument Co., 286 Harmon Rd., Bluffton, Ohio, 5sc, 20sc, 30sc, 35sc, 70sc, 75sc, Tel: 3231**
**See ad on page 174**

Tullamore Electronics Corp., Ill., 55, 60
Union Switch & Signal, Div. Westinghouse Air Brake Co., Pa., 40s
United Control Corp., Wash., 40sc, 55c, 60c
U. S. Science Corp., Calif., 40c, 45c, 50c, 55c, 60c, 65c
Uniwave, Inc., N.Y., 40c, 55sc
Van Norman Industries, Inc., Electronics Div., N.H., 30sc, 35sc
Vapor Recovery Systems Co., Calif., 25sc, 50sc
Varo Mfg. Co., Inc., Tex., 15sc, 40sc

**Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 30s, Tel: ENdicott 1-6200**
**See ads on pages 535, 578**

WacLine, Inc., Ohio, 5s, 15s, 25c, 30s, 35s, 40c, 50c, 70s, 75c
Waldom Electronics, Inc., Ill., 5s, 30s, 35s, 70s, 75s
Wallace & Tiernan, Inc., N.J., 25s
Warren Components Div., El-Tronics, Inc., Pa., Humidity s
Waugh Engineering Co., Calif., 15sc
Waveline, Inc., N.J., 15s

**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 50s, 70s, Tel: LOcust 8-6820**
**See ad on page 255**

Webster Electric Co., Wis., 25s, 55s
Weighing & Controls, Inc., Pa., Humidity Indicators sc

**Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick St., Chicago 10, Ill., 5s, 20s, 30s, 35s, 70s, 80s, Tel: MIchigan 2-2000**
**See ad on page 681**

West Instrument Corp., Ill., 50s
Westinghouse Electric Corp., N.J., 5s, 15s, 20s, 30s, 35s, 40s, 50s, 70s, 80s
Wheaton Engineering Corp., Ill., 55c, 60c
Wickes Engineering & Construction Co., N.J., 55c, 65c
Winslow Co., Inc., The, N.J., 5s, 15sc, 20sc, 50c, 70s, 80s
Wintronics, Calif., 40c
Yellow Springs Instrument Co., Ohio, 50s

**Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 5c, 15c, 20c, 30c, 35c, 50c, 70c, 75c, Tel: BEekman 3-6720**
**See ad on page 296**

**Micro-ammeters:**
**See class 58**

**Microphones, Geophysical:**
**See class 15**





# Directory II. Components

## 59. Microphones & Stands.

5. Aircraft
10. Carbon
15. Ceramic
20. Condenser
25. Crystal
30. Dynamic
35. Velocity
40. Magnetic
45. Microphone stands

Altec Lansing Corp., Calif., 5s, 20s, 30s, 35s, 40s, 45s, Calibrated s
American Geloso Electronics, Inc., N.Y., 25s, 30s, 45s

**American Microphone Mfg. Co., Div. G-C Textron Electronics Inc., 412 S. Wyman St., Rockford, Ill., 10s, 15s, 25s, 30s, 45s, Tel: WOodland 8-9661**
**See ad on page 640**

Amplivox, Ltd., England, 5s, 40sc
Argonne Electronics Mfg. Corp., N.Y., 15s, 25s, 30s, 40s
Astatic Corp., Ohio, 5s, 10s, 15s, 25s, 30s, 45s
Atlantic Research Corp., Va., 15sc
Atlas Sound Corp., N.Y., 45sc
Audiosears Corp., N.Y., 5sc, 10sc, 15sc, 30sc, 40sc
B & K Instruments, Inc., Ohio, 15s, 20s
Bright Radio Labs., Inc., N.Y., 40sc
Bruel & Kjaer, A/S, Denmark, 20s, 45s
Budelman Electronics Corp., Conn., Wireless c
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 25s
Chance Vought Electronics Div., Texas, 5s, 30s
Clark Co., Inc., Mass., 10s, 30s
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s
Continental Electronics Corp., N.Y., 30c, 40c
Dyna Magnetic Devices, Inc., N.Y., 40sc
Electro-Sonic Laboratories, Inc., N.Y., 5sc, 30sc, 40sc
Electro-Voice, Inc., Mich., 5s, 10s, 15s, 25s, 30s, 45s
Electronic Applications, Inc., Conn., 20s, 30s, 45s
Electronic Teaching Laboratories, Inc., D.C., 25s, 30s
Fen-Tone Corp., N.Y., 10s, 15s, 30s, 35s, 40s, 45s
Flexo International Corp., Ill., 45s

**G-C Electronics Co., Div. Textron, Inc., 400 South Wyman St., Rockford, Ill., 10sc, 15sc, 25sc, 30sc, 45s, Tel: WOodland 8-9661**
**See ad on page 640**

Gotham Audio Sales Co., Inc., N.Y., 20s, 30s, 35s, 45s
Gulton Industries, Inc., N.J., Medical sc
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 20s
Knowles Electronics, Inc., Ill., 40sc

**Luxo Lamp Corporation, Dock St., Port Chester, N.Y., 45s, Tel: WE 7-4433**
**See ad on page 675**

Massa Division, Cohu Electronics, Inc., Mass., Hydrophones sc, Sound Pressure sc
Melody Master Mfg. Co., Ill., 30c
Mitchell Industries, Inc., Tex., 5s
Motorola Aviation Electronics, Inc., Calif., 5s
Motorola, Inc., Ill., 30s
Munzig International, Inc., Calif., 15s, 25s
National Cine Equipment, Inc., N.Y., 45s
Nippon Electric Co., Ltd., Japan, 20c
Pearce-Simpson, Inc., Fla., 10sc, 30c
Permoflux Products Co., Calif., 10s
Photocon Research Products, Calif., 20s
RCA Victor Co., Ltd., Canada, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s
Racon Electric Co., Inc., N.Y., 45s
Radio Corp. of America, N.J., 5s, 10s, 15s, 20s, 25s, 30s, 35s
Radio Corp. of America, Defense Electronic Products, N.J., 5sc, 10sc, 25sc, 30sc, 40sc
Remler Co., Calif., 5c
Rimak, Inc., Calif., 45c
Seg Electronics Co., Inc., N.Y., 25s
Sonotone Corp., N.Y., 15s, 45s
Southwestern Industrial Electronics Co., Tex., 30s, 35s
Standard Telephones & Cables, Ltd., England, 20s, 30s, 35s, 45s
Stephens Trusonic, Inc., Calif., 20sc, Wireless sc
Tandberg of America, Inc., N.Y., 25s, 30s
Telephonics Corp., N.Y., 5s, 10s, 30s

**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 10s, 25s, 30s, 40c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**

Tibbetts Industries, Inc., Maine, 40s
Turner Co., The, Iowa, 5s, 10s, 15sc, 25sc, 30s, 45s
United States Instrument Corp., Va., 30c
Vari Corp., Minn., 5s, 10s
Wickes Engineering & Construction Co., N.J., 10c, 30c
Wright-Zimmerman, Inc., Minn., 30sc

**Milli-ammeters:**
**See class 58**

**Mixers, crystal:**
**See class 83**

**Mixers, sound input:**
**See classes 34 & 51**

**Modules:**
**See class 64**

**Monoscopes:**
**See class 79**

**Motor brushes:**
**See class 91**

## 60. Motors & Synchros.

5. Blower & fan
10. Clock radio
15. Dynamotors
20. Fractional HP
25. Frequency changers
30. Motor-generators
35. Phonograph
40. Servo
45. Speed regulating
50. Synchros
55. Synchronous motors
60. Timing

**Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, L.I., N.Y., 5c, 20c, 55c, Tel: AMityville 4-3700**
**See ad on page 386**

Airborne Accessories Corp., N.J., 20sc

**Airpax Electronics, Inc., Seminole Div., Ft. Lauderdale, Fla., Tachometers c, Tel: LUdlow 3-6160**
**See ad on pages 82-83**

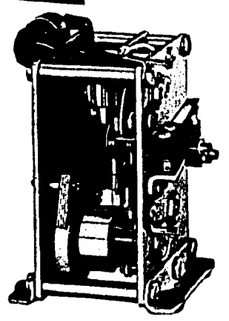
**Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 5s, Tel: UNderhill 7-8500**
**See ad on page 623**

**American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 5c, 20sc, 30c, 40sc, 50sc, 55sc, Tel: DUnkirk 5-7401**
**See ad on page 164**

**Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 20c, 55c, 60c, Tel: BUckingham 1-2727**
**See ads on pages 463, 577**

Ashland Electric Products, Inc., N.Y., 5c, 20c, 55c


**AMGLO Constant Speed DC Motors**



**Reed controlled, DC Motors offer constant speed from 900 RPM to 1 Rev. Per Day.**

- 3 to 110 V. DC operating voltage.
- 0.1 to 2 Watt Input.
- Built to specifications for use in timing, signalling and missile control.

***Write for Quotation and Recommendations***

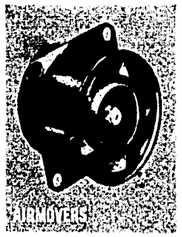
**AMGLO CORPORATION**
4333 No Ravenswood Ave
Chicago 13 Ill

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# imc

## precisioneered motors

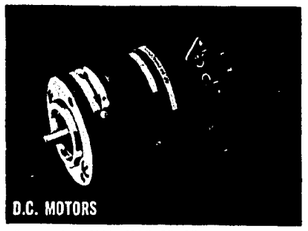


Centrifugal, propeller fan, vaneaxial. 1 cfm to 2000 cfm, pressures up to 20 in $H_2O$. High slip characteristic for altitude use. Non-stall vaneaxial characteristic powered by AC (60 - 400 cps) or DC.



SERVO MOTORS & SERVO MOTOR GENERATORS

Sizes 5 through 18.
Encapsulated for most rigid applications.
High acceleration at stall characteristic.
AVAILABLE WITH BROAD RANGE OF GEAR RATIOS.



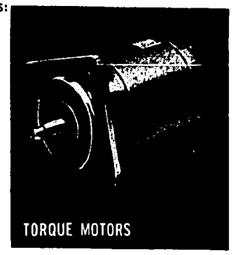
D.C. MOTORS

Frame sizes 1¼", 1½", 2", 3".
Permanent magnet or wound fields: shunt, series, or compound.
1/1000 to ½ H.P., 6V to 220V.
Gear reducers, clutches, radio noise filters.



HYSTERESIS MOTORS

SINGLE — DUAL — THREE & FOUR SPEED.
Ball Bearing or Sleeve Bearing
1/2500 H.P. to ¾ H.P. 60 - 400 cps.



TORQUE MOTORS

1 oz. in. to 300 oz. in.
2 - 4 - 6 - 8 poles.
60 - 400 cycle, 24V to 230V.



SPECIAL DESIGNS

Motors available with gear-clutch and brake.
Motor driven gear pump.
Governor controlled motors.



**IMC motors are manufactured to meet all MIL specs. and environmental conditions.**

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PSP Engineering Co.
(Div. IMC Magnetics Corp.)
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**CALIFORNIA (Northern)**
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Los Angeles 27, California
Hollywood 3-5694
P. O. Box 927
Los Altos, California
Whitecliff 8-3334

**CANADA**
M. J. Howard Co., Ltd.
1168 Gertrude Street
Ottawa, Ontario
Parkway 8-2991

**COLORADO, UTAH, WYOMING**
E. K. Kelley
336 East 4th Street
Loveland, Colorado
Normandy 7-1376

**E. PA., SO. N. J., MD., DEL., DIST. OF COLUMBIA, VA.**
Paragon Sales Co.
111 South 22 Street
Philadelphia 3, Pa.
Locust 3-7060

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Emory Design & Equip.
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Birmingham 9, Alabama
Tremont 1-1369
P. O. Box 507
Bradenton, Florida
Bradenton 7-1707

**ILLINOIS, IND., MILWAUKEE, WISC.**
Mermac Sales Co.
4740 No. Austin Avenue
Chicago, Illinois
Kildare 5-1033

**KANSAS, MISSOURI, IOWA**
Design & Sales Eng.
7603 Forsyth Street
St. Louis 5, Missouri

**LOUISIANA, OKLA., TEXAS**
Southwest Elec. Ind.
The Meadows Bldg.
Dallas 6, Texas
Emerson 3-1671
3815 Richmond Avenue
Houston, Texas

**METROPOLITAN N. Y., NEW JERSEY, & LONG ISLAND**
The Ellis-Haber Corp.
11 Northern Blvd.
Great Neck, New York
Hunter 7-5145

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D. A. Schultz Co.
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Minneapolis, Minnesota
Federal 9-7701

**MASS. & NEW ENGLAND STATES**
Gerber Sales Co.
48 Pearl Street
Brookline, Mass.
Beacon 2-2425
P. O. Box 2917
New Haven, Conn.
Spruce 7-6279
6 North Main Street
East Longmeadow, Mass.
Laurel 5-3059

**NEW YORK**
Frank W. Taylor Co.
4455 East Genesee Street
Box 222
DeWitt, New York
Gibson 6-0422

**OHIO, MICHIGAN**
B. E. K. Associates
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Dayton View Station
Dayton 6, Ohio
Crestview 8-1343

**WASHINGTON, OREGON IDAHO, MONTANA**
Shaffer & Nelson
312 Occidental Avenue
Seattle 4, Washington
Mutual 2-0186
1001 S. E. Water Avenue
Portland 14, Oregon
Belmont 4-7437



**imc Magnetics Corp.**
570 MAIN STREET/WESTBURY, L. I./NEW YORK

GRAY & KUHN, INC. GK WESTBURY, NEW YORK

PSP ENGINEERING CO. PSP MAYWOOD, CALIFORNIA

**Induction Motors of California**
MAYWOOD, CALIFORNIA



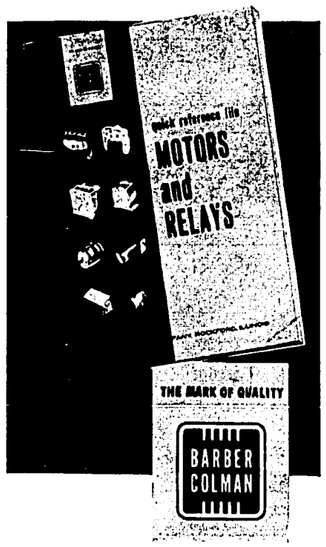
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# NEW, FREE

*quick reference file...a-c and d-c small motors, tach generators, relays...*




Get this helpful quick reference file that illustrates and gives typical specifications for the wide selection of Barber-Colman small motors (to 1/10 hp), relays and related components for electronic applications. Here you'll find many practical solutions to complex control problems . . .

**A-C SHADED-POLE MOTORS**
unidirectional • reversible
synchronous • geared

**A-C and D-C TACH GENERATORS**

**D-C PRECISION MOTORS**

**BATTERY-OPERATED MOTORS**

**A-C 400-CYCLE MOTORS**

**BLOWERS, GEARHEADS**

**ULTRA-SENSITIVE RELAYS**

Send for your copy Quick Reference File F-9765, or get at . . .

BARBER-COLMAN COMPANY
Dept. J, 1256 Rock Street
Rockford, Illinois

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# Directory II. Components

## 60. Motors & Synchros.

**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 5sc, 20sc, 30sc, 40sc, 55sc, Tel: WOodland 8-6833**
**See ad on this page**

Beckman Instruments, Inc., Helipot Div., Calif., 40sc

Bekey Electric Div., Genisco, Inc., Calif., 5c, 20c, 25c, 30c, 40sc, 45c, 55c, 60c

**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 40sc, 50sc, Tel: ATlas 8-2000**
**See ad on pages 103-106**

Bendix Corp., The, Industrial Controls Section, Mich., 40sc

Bendix Corp., The, Montrose Div., Pa., 15sc, 20, DC sc, 50 sc

Bodine Electric Co., Ill., 20sc, 35sc, 40c, 55sc, 60sc

**Borg Equipment Div., Amphenol-Borg Electronics Corp., 120 S. Main St., Janesville, Wis., 20sc, 55sc, Tel: PLeasant 4-6616**
**See ad on page 524**

Brevel Products Corp., N.Y., 20s, 40s

Bristol Motors, Div. Vocaline Co. of America, Conn., 10c, 55sc, 60sc

Camera Equipment Co., Inc., N.Y., 55sc, 60sc

Carter Motor Co., Ill., 5s, 15sc, 20sc, 25s, 45s

Cedar Engineering Div., Control Data Corp., Minn., 30c, 40c, 50c, 55c, 60c

**Celco—Constantine Eng. Labs. Co., 70 Island Ave., Mahwah, N.J., 5c, 20c, 30c, 40c, 50c, 55c, Tel: DAvis 7-1123**
**See ads on pages 60-61, 84-85**

Century Electric Co., Mo., 5s, 20s, 30s, 55s

Clifton Precision Products Co., Inc., Pa., 30s, 40s, 50s

Collins Radio Co., Central Sales Office, Texas, 20s, 40s, 50s

Collins Radio Co., Texas Division, Tex., 40s

Consolidated Diesel Electric Corp., Conn., 30c

Continental Electric Co., Inc., N.J., 15sc, 20c, 25c, 30sc

Control Data Corp., Minn., 25c, 40c, 50c

Controls Company of America, Appliance, Automotive & Electron Divs., Ill., 5c, 20c, 55c, 60c

Cook Electric Co., Ill., 55c, 60c, Solid State c

Cramer Controls Corp., Conn., 5c, 45c, 55c, 60c

**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 40sc, 45sc, 50sc, 55sc, 60sc, Variable Speed sc, Tel: SWarthmore 1-0100**
**See ad on page 510**

D & R, Ltd., Calif., 25sc, 30sc

Daco Instrument Co., N.Y., 45c

Dale Products, Inc., Nebr., 35sc, 55s

Daystrom, Inc., Transicoil Div., Pa., 40s, 50s, 55s

Diehl Mfg. Co., N.J., 5s, 30s, 40sc, Tachometers c

Dominion Electrohome Industries, Ltd., Canada, 5c, 20c

Dynamics Corp. of America, N.Y., 20c, 40c, 50c

Eastern Air Devices, Inc., N.H., 5sc, 20sc, 25sc, 30sc, 40sc, 45sc, 55sc

Edison Industries, Thomas A., Instrument Div., N.J., 40s

Eicor Division, The Scranton Corp., Ill., 5c, 15c, 20c, 25c, 30c, 45c, 55c

Electric Autolite Co., The, Ohio, 5sc, 20sc

Electric Indicator Co., Inc., Conn., 5c, 20c, 30c, 40c, 45c, 50c, 55c

Electric Machinery Mfg. Co., Minn., 25s, 30s, 40s, 55s

Electric Motors & Specialties, Inc., Ind., 20s, 25c

Electric Specialty Co., Conn., 5c, 15c, 20c, 25c, 30c, 40c, 45c, 50c, 55c, 60c

Electronic Communications, Inc., Fla., 20sc

Electronic Specialty Co., Calif., 5c, 20c, 30c

Engineering Associates, Ohio, 25c, 50c

Fasco Industries, Inc., N.Y., 5sc, 20sc, 35c, 55c

G-M Laboratories, Inc., Ill., 40sc

Gap Instrument Corp., N.Y., Variable Speed sc


ESCO ELECTRIC SPECIALTY COMPANY
Pioneers in Power

*Totally-enclosed DC servo motor for electronic field and armature control. Minimum inertia, for fast response. Torque: 15 ft-lbs.*



ESCO's years of experience as a motor designer and manufacturer encompass the solution of many unusual and difficult power problems. Your "special requirement" may be a stock item with ESCO.

FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL
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MOUNT VERNON, N.Y. • MOunt Vernon 4-7530
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WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# SIZE 8

## SYNCHROS · SERVO MOTORS · MOTOR TACH GENERATORS

**400 Cycle: Many for 125°C operation . . . Higher for special applications**

Many Immediately Available From Stock in Small Quantities

### SIZE 8 SYNCHROS

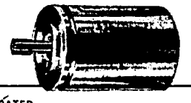


*Highly Stable. Minimum Error Variation from −55°C to +125°C*

| OSTER TYPE | CLASS | INPUT VOLTAGE | INPUT CURRENT AMPS | INPUT WATTS | OUTPUT VOLTAGE | PHASE SHIFT (° LEAD) | ROTOR RESISTANCE (OHM) | STATOR RESISTANCE OHMS | $Z_{ro}$ OHMS | $Z_{so}$ OHMS | $Z_{rss}$ OHMS | NULL VOLTAGE (MV) | MAX. ERROR FROM E.Z. (MIN.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4253-01* | LZ-CT | 11.8 | .087 | .21 | 23.5 | 9.0 | 157.0 | 24.0 | 212+j722 | 28+j119 | 263+j69 | 30 | ±7 |
| 4269-01* | Diff | 11.8 | .087 | .21 | 11.8 | 9.0 | 35.0 | 24.0 | 37+j139 | 28+j124 | 47+j13 | 30 | ±7 |
| 4273-01** | XMTR | 26.0 | .100 | .54 | 11.8 | 8.5 | 34.0 | 12.0 | 48+j255 | 12+j45 | 82+j31 | 30 | ±7 |
| 4277-01* | HZ-CT | 11.8 | .030 | .073 | 22.5 | 8.5 | 316.0 | 67.0 | 500+j1937 | 79+j350 | 594+j182 | 30 | ±7 |
| 4261-01** | Resolver | 26.0 | .043 | .39 | 11.8 | 15.0 | 162.0 | 22.0 | 208+j612 | 34+j159 | 243+j77 | 30 | ±7 |

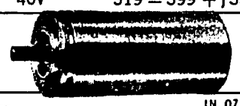
*Stator as Primary **Rotor as Primary

### SIZE 8 SERVO MOTORS



| OSTER TYPE | RATED VOLTAGES | Z = R + jX | IN. OZ. STALL TORQUE | RPM NO LOAD SPEED | WATTS PER PHASE | GM. CM. ROTOR INERTIA | LENGTH IN. MAX. | WEIGHT OZ. | T/I RATIO RAD/SEC² |
|---|---|---|---|---|---|---|---|---|---|
| 5004-01 | 26V<br>26V | 288 = 226 + j 176<br>294 = 238 + j 174 | .15 | 6200 | 2.0 | .47 | 0.863 | 1.2 | 22,500 |
| 5004-02 | 26V<br>36V | 288 = 226 + j 176<br>526 = 409 + j 332 | .15 | 6200 | 2.0 | .47 | 0.863 | 1.2 | 22,500 |
| 5004-03 | 26V<br>40V | 288 = 226 + j 176<br>715 = 582 + j 415 | .15 | 6200 | 2.0 | .47 | 0.863 | 1.2 | 22,500 |
| 5004-09 | 26V<br>40V | 230 = 190 + j 131<br>519 = 399 + j 332 | .20 | 6200 | 2.5 | .47 | 0.863 | 1.2 | 30,000 |

### SIZE 8 MOTOR TACH-GENERATORS



| OSTER TYPE | RATED VOLTAGES | Z = R + jX | IN. OZ. STALL TORQUE | RPM NO LOAD SPEED | WATTS PER PHASE | GM. CM. ROTOR INERTIA | LENGTH IN. MAX. | WEIGHT OZ. | T/I RATIO RAD/SEC² | GENERATOR VOLTAGE | INPUT WATTS | OUTPUT VOLTS PER 1000/RPM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6204-01 | 26V<br>40V | 230 = 190 + j 131<br>519 = 399 + j 332 | .20 | 6000 | 2.5 | .65 | 1.728 | 2.5 | 21,800 | 26 | 2.5 | .25 |
| 6204-03 | 26V<br>26V | 230 = 190 + j 131<br>230 = 190 + j 131 | .20 | 6000 | 2.5 | .65 | 1.728 | 2.5 | 21,800 | 26 | 2.5 | .25 |

Oster®

The Size 8 400 Cycle Servo Motor Tach Generators listed above have 150° max. cont. frame temperature, 110 MA input current, ±5° phase shift and Null Voltage (Total R. M. S.) of 15 millivolts.

OTHER PRODUCTS INCLUDE:
Resolvers · Servo Mechanisms · Computers · Servo Torque Units · Indicators · DC Motors

John Oster MANUFACTURING CO.
Avionic Division

EASTERN OFFICE 310 Northern Blvd • Great Neck, Long Island, New York • Phone HUnter 7-9030 • TWX Great Neck N Y 2980

WESTERN OFFICE 5333 South Sepulveda Blvd • Culver City, California • Phone EXmont 1-5742 • UPton 0-1194 • TWX S Mon 7671

*Engineers For Advanced Projects:* Interesting, varied work on designing transistor circuits and servo mechanisms. Contact Mr. Robert Burns, Personnel Manager, in confidence.



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# Directory II. Components

## 60. Motors & Synchros.

Garrett Corp., The, Calif., 5sc, 20c, 30c, 40c, 45c, 55c
General Control Company, Mass., 55s, 60s
General Controls Co., Calif., 20s
General Electric Co., Apparatus Sales Div., N.Y., 15c, 20s, 25sc, 30sc, 40c, 45s, 55s
General Electric Co., Clock & Timer Dept., Mass., 10sc, 60sc
General-Electro Mechanical Corp., N.Y., 15c
General Industries Co., The, Ohio, 5sc, 20sc, 35sc
Genisco, Incorporated, Calif., 20c, 25c, 30c, 40sc, 45c, 55sc
Giannini Controls Corp., Calif., 5c, 20sc, 30s, 40s, 50sc, 55sc, 60s, Variable Speed sc
Globe Industries, Inc., Ohio, 5c, 20c, 30c, 40c, 55c, 60c
Greenleaf Mfg. Div., Mandrel Industries, Inc., Mo., 40c
**Guidance Controls Corp., 110 Duffy Ave., Hicksville, L.I., N.Y., 40c, Tel: WElls 8-9500**
**See ad on page 342**
Hansen Mfg. Co., Inc., Ind., 40sc, 55sc, 60sc
Harowe Precision, Inc., Pa., 30c, 40c, 50c, 55c
Hathaway Instruments, Inc., Colo., 55c
Haydon Company, The A. W., Conn., 20c, 45c, 55c, 60c
Haydon Instrument, Conn., Printed Circuit Types s
Haydon Div., General Time Corp., Conn., 55s, 60s
Heinz Mueller Eng. Co., Inc., Ill., 5c, 15c, 20c, 30c
Heinze Electric Co., Mass., 5sc, 20c, 40s
Henschel Corp., Mass., 50c
**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., Tachometer generators s, Tel: DAvenport 6-7000**
**See ad on pages 3-18**
Holtzer-Cabot Motor Div., National Pneumatic Co., Inc., Mass., 5c, 15c, 20sc, 30c, 40sc, 55sc, 60sc
Hoover Co., Ltd., The, Canada, 5c, 15c, 20c, 40c
Hoover Electric Co., Calif., 5c, 15c, 20c, 25c, 30c, 40c, 45c
Horlick Co., Inc., William I., Mass., 25sc, 30sc
**IMC Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 5sc, 15sc, 20sc, 30sc, 40sc, 50sc, 55sc, Tel: EDgewood 4-7070**
**See ad on page 464**
Ideal Electric & Mfg. Co., The, Ohio, 25c, 30c, 55c
Induction Motors of California, Div. IMC Magnetics Corp., Calif., 5sc, 15sc, 20sc, 40sc, 50sc
Inland Motors Corp., N.Y., 20, 30, 40, 55
Inseo Company, Div. Barry-Wright Corp., Mass., 45s
Intelex Systems, Inc., N.Y., 5s, 20s, 35s
**Kato Engineering Co., 1420 First Ave., Mankato, Minn., 30c, 55c, Tel: 8-2941**
**See ad on this page**
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 5sc, 20sc, 30sc, 40sc, 50sc, 55sc, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kollsman Motor Corp., Pa., 30c, 50c, 55c
Kroker Engineering & Development Co., Ill., 5c, 20c, 45c
Lamb Electric Co., The, Div. American Machine & Metals, Inc., Ohio, 5c, 20c, 40c
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., Variable Speed s
Land-Air, Inc., Stepper Motors Div., Calif., Incremental sc
**Leach Corporation, 18435 Susana Rd., Compton, Calif., 30sc, Tel: NEvada 6-1061**
**See ad on page 514**
Lear, Inc., Calif., 20sc, 40sc, 50sc, 55sc, 65sc
Lear, Inc., Mich., 20sc, 40sc, 50c
Ledex, Incorporated, Ohio, Variable Speed s
Leland Airborne Products, Div. of A.M.F., Ohio, 30 AC sc
Librascope Div., General Precision, Inc., Calif., 40sc
Litton Industries, Maryland Div., Md., 40, 50
**Lytle Corporation, 1404 San Mateo Blvd. S.E., Albuquerque, N.M., 60sc, Tel: ALpine 5-8169**
**See ad on page 201**
Magnavox Co., The, Ind., 35s
**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 45s, Tel: CYpress 2-6610**
**See ads on pages 252, 364, 418**
Magtrol, Inc., N.Y., 40c
Mamco Corp., Wis., 5c, 20c, 35c
Marathon Electric Mfg. Corp., Wis., 5s, 20s, 25c, 30sc, 45c, 55c
Mechatrol, Div. Servomechanisms, Inc., N.Y., 55sc, Variable Speed sc, Tachometers sc
Minneapolis-Honeywell Regulator Co., Boston Div., Mass., 40sc, 50sc
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 40sc, 50sc
Motor Generator Corp., Ohio, 30
Motoresearch Co., Wis., 5c, 20c, 25c, 30c
Muirhead & Co., Ltd., England, 20s, 30s, 40s, 50s, 55s
Muirhead Instruments, Inc., N.Y., 20s, 30s, 40s, 50s, 55s, 60s
Nichols Ltd., R. H., Canada, 20s, 40s
**Oster Mfg. Co., John, Avionic Div., 1 Main St., Racine, Wis., 20sc, 30sc, 40sc, 50sc, 55sc, Tel: MElrose 7-4445**
**See ad on page 466**
Pace Controls Corp., Mass., Stepping
Pesco Products Div., Borg-Warner Corp., Ohio, 5sc, 20sc, 30sc
Philips Electronics Industries Ltd., Canada, 45s, 55s, 60s
**Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 40sc, Tel: ORiole 6-8000**
**See ad on page 500**
Pittman Electrical Developments Co., Pa., 20sc
Precision, Inc., Minn., 40c
Printed Motors, Inc., N.Y., 40
Radex Corp., Ill., 5c, 15c, 20c, 30c, 55c
Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 25c, 30sc, 55sc
Redmond, Inc., Subsid. Controls Co. of America, Mich., 5c, 10c, 15c, 20c, 30c
**Reeves-Hoffman, Div. Dynamics Corp. of America, 145 Cherry St., Carlisle, Pa., 20c, Tel: CHapel 3-5929**
**See ad on page 432**
**Rotating Components, Inc., 267 Green St., Brooklyn 22, N.Y., 5c, 20c, 30c, 40c, 55c, 60c, Sub-Fractional c, Tel: EVergreen 9-3490**
**See ad on page 389**
Sangamo Electric Co., Ill., 15s, 20s, 30s, 40s, 50s, 55s, 60s
Servo-Tek Products Co., N.J., 20s, 30s, 40s, 50s, 55s
Servomechanisms, Inc., Calif., 5c, 20sc, 30sc, 40sc, 45sc, 55sc, 60sc
**Sigma Instruments, Inc., 31 Pearl St., South Braintree 85, Mass., Variable Speed c, Tel: VIctor 3-5000**
**See ad on page 518**
Small Motors, Inc., Ill., 5c, 15c, 20c, 25c, 30c, 45c, 50c, 55c


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The demand for a compact "All in One" Frequency Converting Center that offers utmost convenience, looks neat and conserves space, has been met by Kato Engineers.

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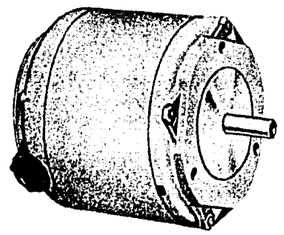
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# SLO-SYN® Synchronous Motors

- **INSTANT STARTING, STOPPING, REVERSING**
- **72 RPM SHAFT SPEED WITHOUT GEARS**
- **CAN BE USED AS D-C STEPPING MOTORS**
- **START AT FULL RATED TORQUE**

A SLO-SYN is a synchronous permanent magnet type motor having instant start, stop and reverse characteristics and a basic shaft speed of 72 RPM with 60 cycles applied. Although used extensively as a constant speed a-c motor, its use as a d-c stepping or incremental positioning device offers control system designers, machine tool and process control engineers unlimited application possibilities. It is compact and economical, has almost negligible overshoot, no ratchets or detents. A single-pole, three-position switch can give complete forward, reverse and "off" control because the motor has three leads only. Starts or stops in less than 0.025 seconds or approximately 1.5 cycles. There is no need for electrical or mechanical braking because it will stop in less than 5° of motor shaft rotation. The starting and operating currents are nearly identical and there is no excessive inrush current when the motor is turned on. All types have a ⅜" diameter shaft. Types having speed reduction assemblies are available.



TYPES SS150, SS150M, SS152, SS250

## Types SS150 and SS152

SLO-SYN types SS150 and SS152 are designed for 150 ounce-inch duty. Types are available also with a resistor and a capacitor integrally mounted in an enclosure on the end of the motor (suffix RC when ordering).

## Militarized Type SS150M

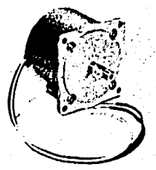
SLO-SYN type SS150M has a rating of 150 ounce-inches and is designed to meet or exceed applicable military specifications regarding materials (CCM-636-A), shock (MIL-T-17113), vibration, salt spray, humidity, and temperature (MIL-E-4970A).

## Type SS250

SLO-SYN type SS250 has a torque rating of 250 ounce-inches and is designed primarily for heavier duty applications. Its high torque makes it particularly well-adapted for duty as a prime mover for controlling valves, machine tool carriages and similar applications.

| | TYPES SS150 AND SS150M | TYPE SS152 | TYPE SS250 |
|---|---|---|---|
| INPUT | 120 volts, 40/70 cycles, 1 phase | 240 volts, 40/70 cycles, 1 phase | 120 volts, 40/70 cycles, 1 phase |
| OUTPUT SPEED* | 72 RPM | 72 RPM | 72 RPM |
| MAX. CURRENT* | 0.4 ampere | 0.2 ampere | 0.6 ampere |
| TORQUE* | 150 ounce-inches | 150 ounce-inches | 250 ounce inches |
| WEIGHT | 6.5 pounds | 6.5 pounds | 6.5 pounds |
| RESISTOR | 250 ohms ±5% 25W | 1200 ohms ±5% 25W | 150 ohms ±5% 50W |
| CAPACITOR | 3.75 mfd ±6%, 330 VAC | 1.0 mfd ±6%, 660 VAC | 6.5 mfd ±6%, 330 VAC |

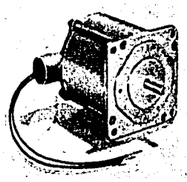
*Ratings for 60 cycle single-phase operation. Motors will operate satisfactorily at any frequency between 40 and 70 cycles with proportional change in speed and some reduction in torque.



## TYPE SS50

The small size of the 50 ounce-inch SLO-SYN type SS50 makes it particularly adaptable as an original equipment component where space is limited. Especially useful for actuating selector switches, tape handling and process timing. Uses Class B insulation and is rated for 75° C temperature rise from 40° C maximum ambient under continuous duty.

| | |
|---|---|
| INPUT | 120 volts, 40/70 cycles, 1 phase |
| OUTPUT SPEED | 72 RPM at 60 cycles |
| MAX. CURRENT | 0.3 ampere at 60 cycles |
| TORQUE | 50 ounce-inches |
| WEIGHT | 3 pounds |
| RESISTOR | 250 ohms ±5%, 25W |
| CAPACITOR | 2.6 mfd ±6%, 330 VAC |



## EXPLOSIONPROOF TYPE X250

Explosionproof type X250 has a torque rating of 250 ounce-inches. Provides safe operation in hazardous areas where a small arc or spark could cause an explosion. Underwriters' Laboratories Approved for Class 1, Group D service. Uses Class B insulation and is rated for 75° C temperature rise from 40° C maximum ambient under continuous duty.

| | |
|---|---|
| INPUT | 120 volts, 40/70 cycles, 1 phase |
| OUTPUT SPEED | 72 RPM at 60 cycles |
| MAX. CURRENT | 0.6 ampere at 60 cycles |
| TORQUE | 250 ounce-inches |
| WEIGHT | 7-3/4 pounds |
| RESISTOR | 150 ohms ±5%, 50W |
| CAPACITOR | 6.5 mfd ±6%, 330 VAC |

## AS A D-C STEPPING MOTOR

When used as an incremental positioning device, one revolution of the motor shaft can be divided into 200 precise increments through the use of a d-c power source and a suitable switching arrangement.

The motor will advance 1.8° for each change in polarity if the d-c voltage applied to the windings is switched in the proper sequence. Request SLO-SYN Data Sheet No. 1 for complete stepping information.

THE SUPERIOR ELECTRIC COMPANY
600 Ames Avenue, Bristol, Connecticut




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# Directory II. Components

## 60. Motors & Synchros.

Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 20c
Stancil-Hoffman Corp., Calif., 20c, 55c
**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 55s, Tel: LUdlow 2-9561**
**See ads on pages 412, 468, 494, 572, 586**
Telecomputing Corp., Calif., 20c, 35c, 55s
Telecomputing Corp., Electronic Components Div., Calif., 55sc
Telkor, Inc., Ohio., 20s
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 40c
United Aircraft Corp., Norden Div., Conn., 40s, 50sc
United Aircraft Corp., Norden Div., Ketay Dept., N.Y., 30sc, 40sc, 50sc
United Control Corp., Wash., 40c
Universal Match Corp., Armament Div., Mo., 20c, 40c
Upco, Inc., Ill., 20c, 35c, Subfractional c
Varo Mfg. Co., Inc., Texas, 25sc, 30sc, 45sc
**Vernitron Corp., 131 Old Country Rd., Carle Place, L.I., N.Y., 40s, 50s, Tel: PIoneer 1-4130**
**See ad on this page**
WacLine, Inc., Ohio, 45c
**Western Devices, Inc., 600 W. Florence Ave., Inglewood 1, Calif., 5sc, Tel: ORegon 8-7827**
**See ad on page 624**
Western Gear Corp., Electro-Products Div., Calif., 5c, 20c, 30c, 40c
Westinghouse Electric Corp., Small Motor Div. Aircraft Equip. Dept., Ohio, 5sc, 20sc, 30c
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 55sc, Tel: JUdson 2-3030**
**See ad on page 704**
Wheaton Engineering Corp., Ill., 60c
Wickes Engineering & Construction Co., N.J., 30c
Wincharger Corp., Iowa, 15c, 30c
**Wright Machinery Co., Div. Sperry Rand Corp., Durham, N.C., 20c, 30c, 40c, 50c, Tel: 2-8161**
**See ad on this page**
**Yokogawa Electric Works, Inc., 40 Worth St., New York 13, N.Y., 40c, 55c, Tel: BEekman 3-6720**
**See ad on page 296**
Yuba-Dalmotor Div., Yuba Consolidated Industries, Inc., Calif., 20c, 25c, 30c, 45c, 55c

**Multi-testers:**
See class 14

**Multipliers, waveguide:**
See class 83

**Nameplates:**
See class 91

**Neon lights:**
See class 62

**Networks, pulse forming:**
See class 43

**Networks, resistor:**
See class 69

**Networks, semiconductor:**
See class 70

**Noise suppressors, dynamic:**
See class 38

**Null indicators:**
See class 14

WRIGHT *Precision*

*Rotating Components and Servo Assemblies*

MOTORS • MOTOR TACHOMETERS
GEARED MOTORS • TORQUERS • SPIN MOTORS
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WRIGHT MACHINERY COMPANY / DURHAM, NORTH CAROLINA
DIVISION OF SPERRY RAND CORPORATION

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Ohmmeters:**
See class 14

**Orthicons, image:**
See class 79

**Oscilloscopes:**
See class 25

**Ovens, crystal:**
See class 49

**Panels, electroluminescent:**
See class 62

**Patch Cords:**
See class 55

**Patchboards:**
See class 91

**Permanent magnets:**
See class 57

**Phase shifters:**
See class 83

## 61. Phonographs, Pick-ups, Record Changers, etc.

5. Pick-ups—crystal
10. Pick-ups—dynamic
15. Pick-ups—magnetic
20. Pick-ups—reluctance
25. Playback arms
30. Record changers
35. Record players
40. Styli—diamond
45. Styli—metallic
50. Styli—sapphire
55. Tape phonographs & playback equipment

American Elite, Inc., N.Y., 30s, 55s
Ampex Corp., Ampex Data Products Co., Calif., 55s
Ampex Corp., Professional Prods. Co., Audio Div., Calif., 55s
Ampex Military Prods. Co., Calif., 55c
Andrea Radio Corp., N.Y., 55s
Argonne Electronics Mfg. Corp., N.Y., 5s, 25s, 35s
Astatic Corp., Ohio, 5s, 25s, 40s, 45s, 50s
Audax, Inc., N.Y., 15s, 25s
Audio-Master Corp., N.Y., 30sc, 35sc, 55sc
Bach Auricon, Inc., Calif., 5s
Birmingham Sound Reproducers Ltd., England, 30s, 35s, 55s
Bogen-Presto Co., N.J., 25s, 35s, 50s, 55s
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 5s, 25s, 35s, 40s, 45s, 50s, Pick-Up-Ceramic s
Channel Master Corp., N.Y., 35s
Co Engineering Co., N.J., 25c, 55c
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 50s, 55s
Components Corp., N.J., 25s, 35s
Cornwell Electronics Corp., Conn., 15c, 20c, 25c
Diamond Tool Engineering Co., Mass., 40c, 50c
Dominion Electrohome Industries, Ltd., Canada, 35s

## 61. Phonographs, Pick-ups, Record Changers, etc.

Du Kane Corp., Ill., 30s, 35s
Duotone Co., Inc., N.J., 5s, 40s, 45s, 50s
**Dyna-Empire, Inc., 1075 Stewart Ave., Garden City, L.I., N.Y., 15, 25, 35, Tel: PIoneer 1-2700**
See ad on page 282
Eicor Division, The Scranton Corp., Ill., 55c
Electro-Sonic Laboratories, Inc., N.Y., 10s, 25s
Electro-Voice, Inc., Mich., 5s, 40s, 45s, 50s
Electron Enterprises, Inc., Ill., 35sc
Electronic Applications, Inc., Conn., 10s, 40s, 55s
**Electronic Instrument Co., Inc., (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 30s, 35s, Tel: STillwell 6-8700**
See ad on page 283
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5s, Tel: GLendale 6-8592**
See ad on pages 40-41
Fairchild Recording Equipment Corp., N.Y., 15s, 25s, 35s, 40s, 55s
Fanon Electronic Industries, Inc., N.J., 35s
Federal Manufacturing & Engineering Corp., N.Y., 55sc
Fen-Tone Corp., N.Y., 5s, 10s, 15s, 30s, 35s, 40s, 50s, 55s
Fidelitone, Inc., Ill., 40s, 45s, 50s
Fisher Radio Corp., N.Y., 55s
Gables Engineering, Inc., Fla., 55c
Garrard, N.Y., 30s, 35s
Glaser-Steers Corp., N.J., 30sc
Gotham Audio Sales Co., Inc., N.Y., 10s, 25s, 35s
Gulton Industries, Inc., N.J., 5sc
Heath Company, Subsid. Daystrom, Inc., Mich., 30s, 35s
International Audio Stylus Corp., N.Y., 40sc, 45sc, 50sc
Keller, Jr., Hugo P., N.Y., 50s
M P Engineering Co., Conn., 35sc, 55c
Magnavox Co., The, Ind., 5s, 20s, 25s, 30s, 35s, 40s, 50s, 55s
Marconi's Wireless Telegraph Co., Ltd., N.Y., 35s
Motorola, Inc., Ill., 35s
Munzig International, Inc., Calif., 35s, 55s
Newcomb Audio Products Co., Calif., 35s
Ortho-Sonic Instruments, Inc., N.Y., 25s
Pacific Transducer Corp., Calif., 15s, 25s, 40s, 50s
Permoflux Products Co., Calif., 35s
Pickering & Co., Inc., N.Y., 15sc, 20sc, 25s
Potter Instrument Co., Inc., N.Y., 15c
RCA Victor Co., Ltd., Canada, 35sc
Radio Corp. of America, N.J., 30s, 35s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20s, 30s, 35s, 55sc
Rek-O-Kut, Inc., N.Y., 25s, 35s, 55s
Rheem Califone Corp., Calif., 35s
Roberts Electronics, Inc., Calif., 55sc
Rockbar Corp., N.Y., 30s, 35s
Rowe Industries, Ohio, 15s
Schulmerich Carillons, Inc., Pa., 55c
Scott, Inc., H. H., Mass., 15s, 20s, 25s
Sonotone Corp., N.Y., 5s, 40s, 50s
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 30s, 35s, 55s
Swiss Jewel Co., Pa., 40c, 50c
Sylvania Electric Products Inc., N.Y., 35s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 55sc, Tel: YE 2-8600**
See ad on page 338
Tetrad Co., Inc., The, N.Y., 40c
U. S. Recording Co., D.C., 55sc
Warwick Mfg. Corp., Ill., 30c, 35c, 55c
Waters Conley Co., Inc., Minn., 35sc
Webster Electric Co., Wis., 5s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 15sc, 55sc, Tel: JUdson 2-3030**
See ad on page 704

**Phosphors:**
See class 104

**Photo conductors:**
See class 70

**Photo multiplier tubes:**
See class 78

**Pick-ups:**
See class 61

**Picture tubes, television:**
See class 77

**Pilot light sockets:**
See class 71

## 62. Pilot and Indicator Lights.

5. Brackets, jewels, mounts
10. Incandescent lights
15. Neon lights
20. Numerical displays

Aerolite Electronics Corp., N.J., 5sc
Aerolux Light Corp., N.Y., 15sc, 20sc
**Aeronautical Electric Co., 5656 Northwest Hwy., Chicago 46, Ill., 5sc, Tel: SPring 4-5200**
See ad on page 471
**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 5s, 10s, 15s, Tel: JUniper 3-0160**
See ad on page 496
Alden Systems Co., Mass., 10s, 15s
Amatom Electronic Hardware Co., Inc., N.Y., 5s
**Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., 15sc, Tel: BUckingham 1-2727**
See ads on pages 463, 577
**Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 20s, Tel: WEIls 1-6200**
See ad on pages 42-45
Bird & Co., Inc., Richard H., Mass., 5
Brunswick Instruments, N.J., 15s
Burroughs Corp., Electronic Tube Div., N.J., 20s
Burton-Rodgers, Inc., Ohio, 20c
Canadian Aviation Electronics Ltd., Canada, 20c
Canadian Westinghouse Co., Ltd., Canada, 10c





# Directory II. Components

## 62. Pilot and Indicator Lights.

Carling Electric, Inc., Conn., 5sc, 10c, 15sc
Cerberus AG, Werk fur Elektronentechnik, Switzerland, 15s
**Chicago Miniature Lamp Works, 1508 N. Ogden Ave., Chicago 10, Ill., 10sc, 15s, Tel: MOhawk 4-1741**
See ad on this page
**Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 5s, 10s, 15s, 20s, Tel: WOodland 7-1113**
See ad on this page
Computer Control Co., Inc., Western Div., 2251 Barry Ave., Los Angeles 64, Calif., 15s, Tel: BRadshaw 2-9135
See ad on page 264
Control Switch Div., Controls Co. of America, Ill., 10sc, 15sc, 20sc, Electroluminescent Panels sc
Cutler-Hammer, Inc., Wis., 5s, 10s, 15s
Data Display, Inc., Minn., 20sc
Devco Engineering, Inc., N.J., 5c
**Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 5s, 10s, 15s, 20c, Annunciator Displays c, Tel: HYacinth 7-7600**
See ad on page 472
Dimensions, Inc., N.Y., 20c
**Drake Manufacturing Co., 4622 N. Olcott Ave., Chicago 31, Ill., 5sc, 10sc, 15sc, 20sc, Tel: UNderhill 7-7227**
See ad on page 473
Eagle Electric Mfg. Co., Inc., N.Y., 5s, 15s
Eldema Corp., Calif., 5sc, 10sc, 15sc, 20sc
Farwest Mfg. Div., Inc., Wash., 5s, 10s
Fawn Plastics Co., Inc., Md., 20sc, Electroluminescent Panels sc
Federal Mfg. & Eng. Corp., N.Y., 5c, 10c
**Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 5s, Tel: IRving 8-5744**
See ad on page 642
Fidelity Amplifier Co., Ill., 10s
**G-C Electronics Co., Div. Textron, Inc., 400 South Wyman St., Rockford, Ill., 5s, Tel: WOodland 8-9661**
See ad on page 640



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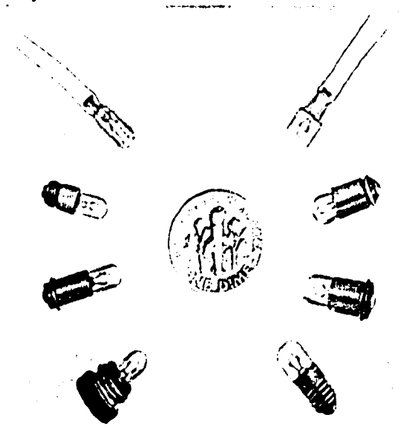
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1910 1960



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Shown in this illustration are several models of each of two lamps especially engineered by Chicago Miniature Lamp Works to perform a specific function for which standard lamps proved inadequate. Available for voltage ranging from 1.35 V to 28.0 V and with several types of base as shown, these lamps have a life expectancy that varies from 30 hours to an extremely long life approaching infinity.

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1508 No. Ogden Ave. Chicago 10, Ill.
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**MINI-LITES**
Transistor driven neon indicator, self-contained and operating from signals as small as two volts. With fourteen standard models the MINI-LITE fits most small signal indicator applications. Mounts in 3/8" hole. Back panel length 1 1/8". Special variations available.



TML SERIES
**MEMO-LITES**
Thyratron indicator complete with tube, holder and circuitry. The TML features a high impedance input, brilliant light. Its memory, when used on DC, makes it ideal for core circuitry, test and error circuits.



MBL SERIES
**MINIATURE BUTTON-LITES**
Combination neon indicator-push button switch eliminates need for separate switch and lamp holder. Choice of neon lamps; series limiting resistors. Normally open OR normally closed contacts in conjunction with indicator; both if lamp is omitted. Mounts in 3/8" hole.



MDL SERIES
**MINIATURE DISPLAY LITES**
Quality MINIATURE DISPLAY LITES conforming to all applicable MIL specifications. Choice of neons or incandescent lamps, with or without series resistors. Mounts in 3/8" holes on 7/8" centers. Colored lenses available upon request.




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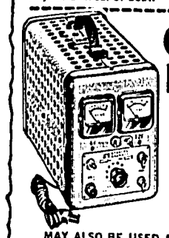




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# Directory II. Components

## 62. Pilot and Indicator Lights.

General Electric Co., Miniature Lamp Dept., Ohio, 10sc, 15sc
Green Rectifier Co., N.J., 5s
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 20c
Hudson Lamp Company, N.J., 10s, 15s
I.D.E.A., Inc., Ind., 20s
Image Instruments, Inc., Mass., 20sc
Industrial Devices, Inc., N.J., 10sc, 15sc
**Industrial Electronic Engineers, Inc., 5528 Vineland Ave., North Hollywood, Calif., 20, Tel: TRiangle 7-1144**
**See ads on pages 191, 473**
Itek Corp., Mass., 20c
Johnson Co., E. F., Minn., 5s
Kip Electronics Corp., Conn., 20c
Kirkland Co., The H. R., N.J., 5s, Annunciator Displays s
Korry Mfg. Co., Wash., 5sc, 10sc, 20sc, Annunciator Displays sc
Leecraft Mfg. Co., Inc., N.Y., 5c, 10c, 15c
**Luxo Lamp Corporation, Dock St., Port Chester, N.Y., 10s, 15s, Tel: WE 7-4433**
**See ad on page 675**
Madigan Electronic Corp., N.Y., 20c
Marco Industries Co., Calif., 5sc, 10sc, 15sc, 20sc
Marquardt Corp., The, Pomona Div., Calif., 20sc
Master Specialties Co., Calif., 5c, 10s, 15s
Micarta Fabricators, Inc., Ill., 5c
Milman Eng. Co., Inc., Calif., 20s
Molex Products Co., Ill., 10s, 15s
Motson Co., J. Frank, Pa., Electroluminescent Panels c
Non-Linear Systems, Inc., Calif., 20s
Oxford Electric Corp., Ill., 10sc
Panellit, Div. Information Systems, Inc., Ill., Annunciator Displays sc
Patwin, Div. Patent Button Co., Conn., 20s
Pendar, Inc., Calif., 10c, 15c
Penn Keystone Corp., Conn., 5c, 20c
Plasteck, Inc., Okla., 20c
Radar Relay, Inc., Calif., 10c, 20c, Annunciator Displays c
Raytheon Co., Industrial Components Div., Mass., 15s
**Sigma Instruments, Inc., 31 Pearl St., South Braintree 85, Mass., 20c, Tel: VIctor 3-5000**
**See ad on page 518**
Signal Indicator Corp., N.Y., 5s, 10sc, 15sc, 20c
Signalite, Inc., N.J., 15sc
Sittler Corp., Ill., 15s
Sloan Company, Calif., 10sc, 15sc, 20sc
Smith, Inc., Herman H., N.Y., 5s
Smith Mfg. Co., J. & H., N.Y. 10s
Staver Co., Inc., The, N.Y., 5c
Stocker & Yale, Inc., Mass., 10sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5s
Telechrome Mfg. Corp., N.Y., 20s
**Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 5sc, 10sc, 15sc, 20sc, Tel: WEst 9-6754**
**See ad on page 472**
**Tung-Sol Electric Inc., 1 Summer Ave., Newark 4, N.J., 10, 15, Tel: HUmboldt 2-4200**
**See ad on pages 74-75**
Ucinite Co., The, Div. United-Carr Fastener Corp., Mass., 15
Union Carbide Corp., Union Carbide Consumer Prods. Co., N.Y., 10s, 15s
Union Switch & Signal, Pa., 20c
United States Radium Corp., N.J., 5c
Universal Circuit Controls, Ill., 20s
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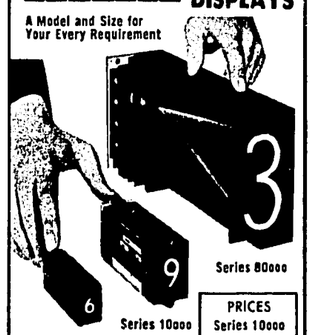
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**Playback arms:**
See class 61

**Playback equipment, computers:**
See class 9

**Plug-in circuits:**
See class 64

**Plugs:**
See class 55

**Point contact transistors:**
See class 70

**Potentiometers:**
See class 69

**Power dividers:**
See class 83

**Power supplies, infrared:**
See class 17

## 63. Power Supplies.

5. AC type
10. DC type
15. High voltage (kilovolt)
20. Low voltage
25. Magnetic
30. Medium voltage
35. Microwave
40. Primary power sources, fuel engine driven
45. Transistor
50. Variable
55. Voltage regulated

A C Electronics, Inc., Calif., 5sc, 10sc, 25c, 45c
ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 5c, 10sc, 15c, 20c, 30sc, 55sc, Tel: VIctoria 9-2414
See ad on page 474
ACF Electronics Div., ACF Industries, Inc., Md., 25sc, 45sc

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**fills the void...** with higher reliability for Military applications... higher environmental immunity to shock, vibration and humidity... 5 year life expectancy in continuous use... extended operating temperature −20°C to +65°C, wide choice of D.C. Voltages.

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## SPECIFICATIONS – all models

**input** 105-125 V.A.C., 50/60/400 cycles.

**outputs** Voltage ranges as shown in the table, continuously variable. Current zero to full load as shown. Outputs floating—either positive or negative may be grounded. 6.3 V.A.C. centertapped at Currents shown in table.

**regulation** 0.05% regulation for NL to FL, or line changes of ±10%, under any conditions of load current or line voltage within limits stated.

**ripple** 1 mV RMS maximum under any conditions of load current or line voltage within limits stated.

**transient response** Output voltage returns to within regulation limits within 25 microseconds in response to a 50% step change in the load.

**stability** Maximum long term stability is assured by the use of 20 ppm error-sensing resistors, and by pre-aging every RPM unit.

**output impedance** Maximum values as shown in the table.

**remote sensing** Terminals for remote sensing are brought out on the terminal board.

**multiple operation** RPM's may be paired off in series or parallel to achieve additional voltage or current capacities.

**ambient temperature** Industrial units: 0-50°C operating. Military units: −20° to +65°C operating. All units: −55° to +85°C Storage.

**construction** One-piece, cast aluminum housing, baked enamel finish. Input and output terminals compactly grouped for access through single, round access hole in chassis. Mounting by four 10-32 screws in any position.

| | | MODEL | DC RANGE | OUTPUT-IMPEDANCE DC | OUTPUT-IMPEDANCE 0-100KC | 6.3V CENTERTAPPED AMPS | |
|---|---|---|---|---|---|---|---|
| Dimensions Overall— 4½"×6¼"×6" High<br>Mounting— 3⅞"×6⅞"<br>Approximate Weight— 9 lbs. | **50ma SERIES** | INDUSTRIAL | RPM 50-150 | 125-175 | 1.5 | 1.5 | 5 |
| | | | RPM 50-200 | 175-225 | 2.0 | 2.0 | 5 |
| | | | RPM 50-250 | 225-275 | 2.5 | 2.5 | 5 |
| | | | RPM 50-300 | 275-325 | 3.0 | 3.0 | 5 |
| | | MILITARY | RPM 51-150 | 145-155 | 1.5 | 1.5 | 5 |
| | | | RPM 51-200 | 175-225 | 2.0 | 2.0 | 5 |
| | | | RPM 51-250 | 225-275 | 2.5 | 2.5 | 5 |
| | | | RPM 51-300 | 275-325 | 3.0 | 3.0 | 5 |
| Dimensions Overall— 5"×7⅝"×6" High<br>Mounting— 4⅛"×7"<br>Approximate Weight— 12 lbs. | **100ma SERIES** | INDUSTRIAL | RPM 100-150 | 125-175 | 0.7 | 0.7 | 6 |
| | | | RPM 100-200 | 175-225 | 1.0 | 1.0 | 6 |
| | | | RPM 100-250 | 225-275 | 1.2 | 1.2 | 6 |
| | | | RPM 100-300 | 275-325 | 1.5 | 1.5 | 6 |
| | | MILITARY | RPM 101-150 | 145-155 | 0.7 | 0.7 | 6 |
| | | | RPM 101-200 | 175-225 | 1.0 | 1.0 | 6 |
| | | | RPM 101-250 | 225-275 | 1.2 | 1.2 | 6 |
| | | | RPM 101-300 | 275-325 | 1.5 | 1.5 | 6 |
| Dimensions Overall— 5½"×9"×6½" High<br>Mounting— 4⅞"×8⅜"<br>Approximate Weight— 20 lbs. | **200ma SERIES** | INDUSTRIAL | RPM 200-150 | 145-155 | 0.3 | 0.6 | 10 |
| | | | RPM 200-200 | 175-225 | 0.5 | 1.0 | 10 |
| | | | RPM 200-250 | 225-275 | 0.6 | 1.2 | 10 |
| | | | RPM 200-300 | 275-325 | 0.7 | 1.4 | 10 |
| | | | RPM 200-350 | 325-375 | 0.8 | 1.6 | 10 |
| | | | RPM 200-400 | 375-425 | 1.0 | 2.0 | 10 |
| | | MILITARY | RPM 201-150 | 145-155 | 0.3 | 0.6 | 10 |
| | | | RPM 201-200 | 175-225 | 0.5 | 1.0 | 10 |
| | | | RPM 201-250 | 225-275 | 0.6 | 1.2 | 10 |
| | | | RPM 201-300 | 275-325 | 0.7 | 1.4 | 10 |
| Dimensions Overall— 6½"×9¼"×7" High<br>Mounting— 5⅞"×9⅛"<br>Approximate Weight— 28 lbs. | **400ma SERIES** | INDUSTRIAL | RPM 400-150 | 145-155 | 0.2 | 0.6 | 10 |
| | | | RPM 400-200 | 175-225 | 0.2 | 1.0 | 10 |
| | | | RPM 400-250 | 225-275 | 0.3 | 1.2 | 10 |
| | | | RPM 400-300 | 275-325 | 0.3 | 1.4 | 10 |
| | | | RPM 400-350 | 325-375 | 0.4 | 1.6 | 10 |
| | | | RPM 400-400 | 375-425 | 0.5 | 2.0 | 10 |
| | | MILITARY | RPM 401-150 | 145-155 | 0.2 | 0.6 | 10 |
| | | | RPM 401-200 | 175-225 | 0.2 | 1.0 | 10 |
| | | | RPM 401-250 | 225-275 | 0.3 | 1.2 | 10 |
| | | | RPM 401-300 | 275-325 | 0.3 | 1.4 | 10 |

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# Directory II. Components

## 63. Power Supplies.

ADC Incorporated, 2863 13th Ave., S., Minneapolis 7, Minn., 5c, 10c, 20c, 30c, 45c, 50c, 55c, Tel: PArkway 1-5551
See ad on page 564

AMP Incorporated, Pa., 5c, 10c, 15c, 25c, 35c, 45c, 55c

Accessory Controls & Equip. Corp., Conn., 10c

Accurate Instrument Co., Tex., 5sc, 45sc

Acme Electric Corp., 44 Water St., Cuba, N.Y., 10sc, 20sc, 25c, 30c, 35c, 45c, 50c, 55c, Tel: CUba 4
See ad on page 476

Admiral Corp., Ill., 45c

Advanced Research Associates, Inc., Md., 10sc, 20sc, 30sc, 45sc, 50sc, 55sc

Aerolab Development Co., Calif., 5c, 10c, 20c, 30c, 45sc, 50c, 55c

Airborne Accessories Corp., N.J., 5c, 10c

Aircom, Inc., 48 Cummington St., Boston 15, Mass., 35s, Tel: COpley 7-9115
See ad on page 309

Aircraft Armaments, Inc., Md., 45c

Aircraft Electronics, Ariz., 5c, 10c, 15c, 20c, 30c, 45c, 50c, 55c

Aircraft Radio Corp., N.J., 10s, 45s

Airdesign Corp., Pa., 5c, 10c, 20c, 25c, 30c, 45c, 55c

Airmec, Ltd., England, 35s

Airpax Electronics Incorporated, Seminole Div., Fort Lauderdale, Fla., 5c, Tel: LUdlow 3-6160
See ad on pages 82-83

Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 35sc, Tel: CHestnut 5-2990
See ad on page 589

Airtron, Inc., Div. Litton Industries, Inc., N.J., 35c

Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 10, Tel: FOrest 6-4467
See ad on page 276

Alfred Electronics, Calif., 10s, 15s, 35s, 50s

Allegany Instrument Co., Inc., Md., 10s, 45s, 55s

Allen Electric & Equip. Co., Mich., 5c, 10c, 15c, 20c, 45c, 50c, 55c

Allis-Chalmers Mfg. Co., Wis., 10c, 15c, 20c, 30c, Energy Conversion Devices c

Alto Scientific Co., Inc., Calif., 10c, 45c

American Development Electronics Co., N.J., 5c, 10c, 55c

American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 20s, 55s, Tel: WAlnut 5-8780
See ad on page 369

American Electronics, Inc., 9503 W. Jefferson Blvd., Culver City, Calif., 5sc, 10sc, 55sc, Tel: DUnkirk 5-7401
See ad on page 164

American Research & Mfg. Corp., Md., 5s, 10s, 15s, 20s, 25s, 45s, 50s, 55s

American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 5sc, 10sc, Tel: CApital 2-3791
See ad on page 472

Amplifier Corp. of America, N.Y., 5c, 10c, 20c, 45c, 50c, 55c

Analogue Controls, Inc., N.Y., 5c, 10c

Anders Electric Products, Inc., Mass., 10sc, 20sc, 30sc, 45sc, 50sc, 55sc

Applegate & Co., C. J., Colo., 10sc, 15sc, 20sc, 30sc, 45sc, 50sc, 55sc

Applied Radiation Corp., Calif., 10c, 15c, 20c, 35c, 55c

Arkay Products Mfg. Co., Calif., 45s

Arnold Magnetics Corp., Calif., 10c, 30c, 55c

Arnoux Corp., Calif., 5s, 10s, 15s, 20s, 25s, 30s, 45s, 55s

Associated Research, Inc., 3792 W. Belmont Ave., Chicago 18, Ill., 5sc, 10sc, 15sc, Tel: COrnelia 7-4040
See ad on page 279

Associated Specialties Co., 1751 Main St., Orefield, Pa., 55s, Tel: EXpress 5-1275
See ad on this page

Atlantis Electronics Corp., Tex., 10s, 30s

Atlas Engineering Co., Inc., Mass., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c

Auto-Test, Inc., Ill., 5c, 10c, 20c

Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 35c, Tel: EVergreen 8-6057
See ad on page 409

Automation Dynamics Corp., N.J., 15c

Automation Industries, Inc., Magnetics Div., Calif., 5c, 10c, 20c, 25c, 30c, 50c, 55c

Autotronics, Inc., Mo., 10s, 20s

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B & F Instruments, Inc., Pa., 55s

Bailey, Inc., P. A., Conn., 5c, 10c, 20c, 30c, 45c, 50c, 55c

Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 15s, 45s, Tel: UNiversity 4-7420
See ad on page 280

Barker & Williamson, Inc., Pa., 5sc, 10sc, 15c, 20c, 45sc, 55c

Barwood Electronics, Inc., Calif., 5c

Beckman Instruments, Inc., Scientific & Process Instruments Div., Calif., 5s, 10s, 35s, 40s

Behlman Engineering Co., 2911 Winona Ave., Burbank, Calif., 5s, 30c, 45c, 50s, 55c, Tel: VIctoria 9-5733
See ad on page 477

Bell Aircraft Corp., Avionics Div., N.Y., 5c, 10c, 25c, 45c

Bell & Gossett Co., Ill., 45c, 55c

Bellaire Electronics, Inc., N.J., 20c, 55c

Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 5c, 10c, 25c, 45c, 50c, 55c, Tel: ATlas 8-2000
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Precise, dependable AC power supplies in a broad variety of ranges and combinations, for use wherever specialized AC power is needed.

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The output voltage is continuously variable from 200 to 325 volts D.C. for load currents of 0 to 100 M.A. with an input voltage of 105 to 125 volts 60 cycle. Regulation is better than 1%. An isolated A.C. voltage of 6.3 volts at 3 amperes is available at the output terminal connections.

MODEL 3 ILLUSTRATED

| | |
|---|---|
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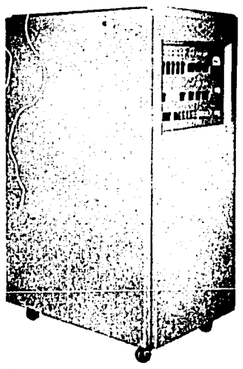



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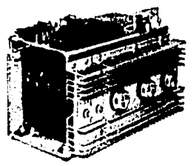
# ENGINEERED AND BUILT BY ACME ELECTRIC *Means* DEPENDABILITY

When dependable performance is the major factor, your best source of supply is Acme Electric. We offer the cooperation of an engineering staff well qualified by experience to assist in your design problems. These engineers have at their command all the modern facilities essential to manufacturing magnetic components. We invite your inspection of these facilities.

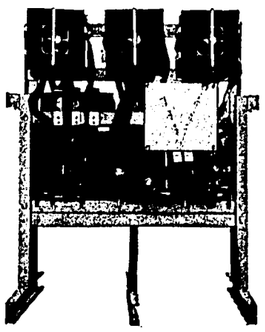
## DC REGULATED POWER SUPPLIES



Individually designed to the specific power requirements of the application. Acme Electric designed units are used with electronic business machines, industrial, research and military systems.



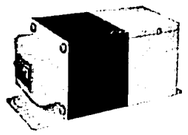
A typical production design incorporating transistorized panel, transformer, saturable reactor, rectifier and components into a compact dependable power supply.

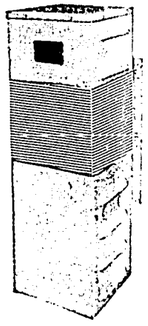


Magnet power supply module designed for an Alternating Gradient Synchrotron research project. Output power rating 175 KW dc. Also available in ratings to 1000 KW dc.

## CONSTANT VOLTAGE STABILIZERS

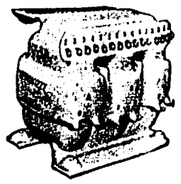
All designs are for continuous duty service with regulation ±1% of normal regardless of variations of input voltage. Current limiting design protects unit against overloads. Available in standard stock models from 15 va thru 2 kva. Primary voltage 95-130; 190-260. Secondary voltage: 6.3; 120; 240. Write for catalog.

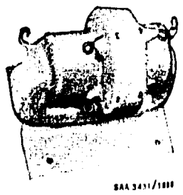




## MINIATURE AND HIGH TEMPERATURE TRANSFORMERS

Our experience in designing and producing transformers for high temperature operation is of definite value if you need a supply source for such components. Several hundred designs have been produced successfully. Write for catalog.





SAA 3431/1860

Acme Electric TRANSFORMERS

**ACME ELECTRIC CORPORATION**

44 Water St. Cuba, N. Y.
In Canada: Acme Electric Corp., Ltd.,
50 Northline Rd., Toronto, Ont.



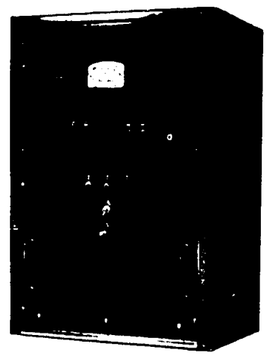
For details, circle #445 on Reader Service Card





stable
ac power
**INVERTRON**
from
Behlman

From a wide variety of "meet your needs" models, off the shelf or on special order, you can choose an electronically tailored **INVERTRON** for research, development and testing. Total harmonic distortion 1% max. with lower distortion on special order. Voltage regulation: 1% no load to full load standard; to .01% available on special order. Standard output voltage on single, two and three phase models, 0-130 variable. Response time: 20 milliseconds.



MODEL 751-C-4

***POWER RATINGS AVAILABLE:***

| SINGLE PHASE | | TWO PHASE | | THREE PHASE | |
|---|---|---|---|---|---|
| MODEL NO. | POWER | MODEL NO. | POWER | MODEL NO. | POWER |
| 21 | 20 VOLT AMPERES | 42 | 40 VOLT AMPERES | 63 | 60 VOLT AMPERES |
| 41 | 40 VOLT AMPERES | 82 | 80 VOLT AMPERES | 123 | 120 VOLT AMPERES |
| 81 | 80 VOLT AMPERES | 162 | 160 VOLT AMPERES | 253 | 250 VOLT AMPERES |
| 161 | 160 VOLT AMPERES | 502 | 500 VOLT AMPERES | 503 | 500 VOLT AMPERES |
| 251 | 250 VOLT AMPERES | 1002 | 1000 VOLT AMPERES | 753 | 750 VOLT AMPERES |
| 501 | 500 VOLT AMPERES | 2002 | 2000 VOLT AMPERES | 1003 | 1000 VOLT AMPERES |
| 751 | 750 VOLT AMPERES | 4002 | 4000 VOLT AMPERES | 1503 | 1500 VOLT AMPERES |
| 1001 | 1000 VOLT AMPERES | 6002 | 6000 VOLT AMPERES | 2003 | 2000 VOLT AMPERES |
| 1501 | 1500 VOLT AMPERES | 10002 | 10000 VOLT AMPERES | 3003 | 3000 VOLT AMPERES |
| 2001 | 2000 VOLT AMPERES | | | 6003 | 6000 VOLT AMPERES |
| 3001 | 3000 VOLT AMPERES | | | 9003 | 9000 VOLT AMPERES |
| 5001 | 5000 VOLT AMPERES | | | 15003 | 15000 VOLT AMPERES |

***OUTPUT FREQUENCIES AVAILABLE:***

| MODEL LETTER | FREQUENCY CYCLES PER SECOND | FREQUENCY ACCURACY 1 | 2 | 3 | 4 | 5 | 6 | MODEL LETTER | FREQUENCY CYCLES PER SECOND | FREQUENCY ACCURACY 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 60 FIXED | x | x | x | x | x | x | G | 50-1350 VARIABLE | x | | | | | |
| B | 50-75 VARIABLE | x | x | | | | | J | 55-65 VARIABLE | x | x | x | | | |
| C | 400 FIXED | x | x | x | x | x | x | K | 300-2000 VARIABLE | x | | | | | |
| D | 350-450 VARIABLE | x | x | x | | | | L | 300-3000 VARIABLE | x | | | | | |
| E | 300-500 VARIABLE | x | x | | | | | M | 20-2000 VARIABLE | x | | | | | |
| F | 150-1350 VARIABLE | x | | | | | | SF SV | ANY SPECIAL FIXED OR VARIABLE | | | | | | |

*Frequency Accuracy Code: 1=0.5%; 2=0.2%; 3=0.1%; 4=0.05%; 5=0.01%; 6=0.001%; 7=0.0001%; 8=0.00001%.*

**BEHLMAN**
ENGINEERING COMPANY
*2911 Winona Avenue Burbank, California*



For details, circle #446 on Reader Service Card



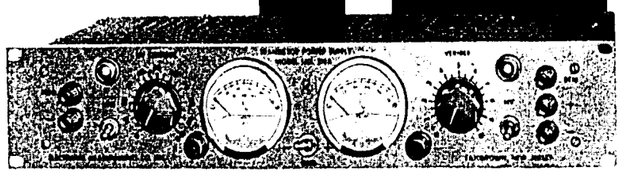
# Directory II. Components

## 63. Power Supplies.

Bendix Corp., The, Montrose Div., Pa., 10sc
Bendix Corp., The, York Div., Pa., 35c
Bergen Laboratories, Inc., N.J., 45c, 55c
Block Associates, Inc., Mass., 15c, 45c, 55c
Bogue Electric Mfg. Co., N.J., 15, 30, 55
**Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 35sc, Tel: WAlker 2-6000**
See ad on page 150
Bone Engineering Corp., Calif., 5c, 10c, 20c, 25c, 40c, 45c, 50c, 55c
Brach Mfg. Corp., Div. General Bronze Corp., N.J., 5sc, 10sc, 25sc, 45sc, 55sc
Bracke-Seib X-Ray Co., Inc., N.Y., 15c
Bright Radio Labs., Inc., N.Y., 10c, 15c
Britton Electronics Corp., N.Y., 10c, 15c, 20c, 30c
Brocker Laboratories, Calif., 5c, 10c, 15c, 20sc, 45c, 55sc
Brooks Research, Inc., N.Y., 25c, 55c
Buck Engineering Co., N.J., 5s, 10s, 20s
Budd Electronics, Inc., N.Y., 15c, 35c, 45c, 50c
**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 5c, 10sc, 20sc, 30sc, 45c, 50c, 55c, Tel: CLoverdale 3-8931**
See ad on page 321
Bundy Electronics Corp., N.J., 10c
Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 5sc, 10c, 15c, 20c, 30c, 45c, 50sc, 55c, Tel: ORiole 8-3070
See ad on page 479
Bytrex Corp., Mass., 10sc, 20sc, 45sc, 50sc, 55sc
Cadre Industries Corp., N.Y., 5c, 10sc, 20c, 30c, 45c, 55c
Calbest Electronics, Calif., 15c, 20c, 30c
California Computer Products, Inc., 10s, 45s
Canadian Aviation Electronics, Ltd., Canada, 5c, 10c, 20c, 30c, 50c, 55c
Canadian Westinghouse Co., Ltd., Canada, 20c, 30c, 45c
Canoga Division, Underwood Corp., Calif., 5c, 45c, 55c
Capehart Corp., Dynamic Electronics Div., N.Y., 5c, 10c, 15c, 20c, 30c, 35c, 45c, 50c, 55c
Carad Corp., Calif., 10c, 15sc, 20c, 30c, 45c, 50c, 55c
Catalyst Research Corp., Md., 10sc, 20sc, 30sc
Caterpillar Tractor Co., Engine Div., Ill., 40sc
Central Dynamics, Ltd., Canada, 10c, 20c, 45c
Central Transformer Co., Ill., 15c
Century Electric Co., Mo., 5s, 10s, 50s
Chesapeake Instrument Corp., Md., 5sc, 10sc
**Chicago Condenser Corp., 3255 W. Armitage Ave., Chicago 47, Ill., 10c, Tel: CApitol 7-7070**
See ad on page 392

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# the 42 most popular ®REGATRON POWER SUPPLIES are programmable



MODEL 212A $129 WITHOUT METERS

| 0.1% REGULATION MODELS | DC OUTPUT VOLTS | DC OUTPUT MA | 0.01% REGULATION MODELS |
|---|---|---|---|
| 220A | 0-50 | 0-500 | 220AK |
| 213A | 0-50 | 0-1000 | 213AK |
| 215A | 0-50 | 0-3000 | 215AK |
| 225A | 0-75 | 0-2000 | 225AK |
| 212A[1] | 0-100 | 0-100 | 212AK[1] |
| 2-212A[1, 3] | 0-100X2 | 0-100X2 | 2-212AK[1, 3] |
| 224A[1] | 0-100 | 0-200 | 224AK[1] |
| 221A | 0-100 | 0-500 | 221AK |
| 214A | 0-100 | 0-1000 | 214AK |
| 226A | 0-100 | 0-2000 | 226AK |
| 218A | 0-100 | 0-3000 | 218AK |
| 229A | 0-150 | 0-300 | 229AK |
| 228A | 0-150 | 0-1000 | 228AK |
| 230A | 0-200 | 0-1000 | 230AK |
| 231A[2] | 0-300 | 0-100 | 231AK[2] |
| 232A[2] | 0-300 | 0-200 | 232AK[2] |
| 233A[2] | 0-300 | 0-300 | 233AK[2] |
| 234A | 0-300 | 0-500 | 234AK |
| 237A | 0-300 | 0-1000 | 237AK |
| 236A[2] | 0-600 | 0-200 | 236AK[2] |
| 235A | 0-600 | 0-500 | 235AK |

[1] Has modulation input.
[2] Has additional 0-150 V DC output and 6.3 V AC CT output.
[3] Equivalent to two Model 212A's.

Why programmable? Because Regatron Programmable Power Supplies give the design engineer an extra margin of versatility. For example, in automatic test work, the programmable feature reduces control circuitry. In critical laboratory application, the programmable feature permits near-perfect reproducibility of test voltages.

There are other advantages too. The programmable feature provides for remote sensing. This provision eliminates the effect of voltage drops in power leads . . . places the point of regulation at the load terminals. And there's more.

For complete descriptions and specifications ask for Specification Sheets 3010B and 3023B.

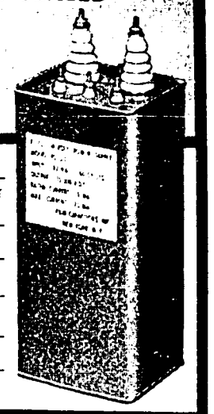
® Registered U.S. Pat. Off. Patents Issued and Pending.

**ELECTRONIC MEASUREMENTS COMPANY, INCORPORATED**
EATONTOWN • NEW JERSEY

For details, circle #447 on Reader Service Card



**fci** OIL FILLED HERMETICALLY-SEALED SELF-CONTAINED

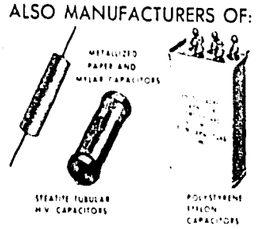


Electrical Characteristics

| PART NO | OUTPUT VOLTAGE | % RIPPLE AT RATED CURRENT | RATED CURRENT OUTPUT | MAX. CURRENT OUTPUT |
|---|---|---|---|---|
| PS-2S | 2 KVDC | 1% | 5 MA | 7.5 MA |
| PS-5S | 5 KVDC | 1% | 5 MA | 7.5 MA |
| PS-12T | 12 KVDC | 1.5% | 1 MA | 1.75 MA |
| PS-15T | 15 KVDC | 1.5% | 1 MA | 1.75 MA |
| PS-30T | 30 KVDC | 1.5% | 1 MA | 1.75 MA |

All models are designed with a full wave doubler circuit.
Voltages on all models can be varied from zero to maximum.
Safety-rated components assure long trouble-free life.
Neutral case may be positive, negative, or left floating.

ALSO MANUFACTURERS OF:




**Film Capacitors, Inc.** 3400-00 PARK AVENUE, NEW YORK 56

For details, circle #448 on Reader Service Card



# Directory II. Components

## 63. Power Supplies.

Chicago Standard Transformer Corp., 5504 W. Addison St., Chicago 34, Ill. 45c. Tel: INdependence 3-7400

See ad on page 505

Cinaudagraph Corp., 1161 N. Victory Blvd., Burbank, Calif. 20s, 25s, 30s, 35s.

Coil Co. of America, Inc., N.Y.

Coil Winder Inc., N.Y.

Colfax Electronics Co., 1500 E. Elm St., Glendale 5, Calif. 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s.

Collins Electronics Inc., N.Y. 10s.

Collins Radio Co., Dallas, Tex.

Collins Radio Co., Cedar Rapids, Iowa, Dallas, Tex., Los Angeles, Calif., Newport Beach, Calif., Phoenix, Ariz., Richardson, Tex., Washington, D.C. 55s.

Collins Radio Co., Texas Division, Dallas, Tex. 55s.

Colvin Laboratories, Inc., N.Y. 47

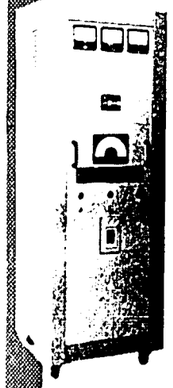
Communication Measurements Laboratory, Inc., 348 Leland Ave., Plainfield, N.J. 55c, 50sc, 55sc. Tel: PLainfield 4-5502

See ad on this page

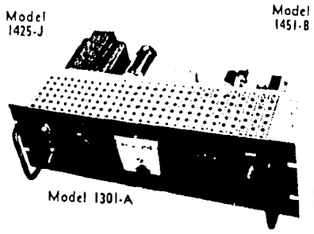
Components Corp., N.Y. 15

**WHERE DEPENDABILITY IS OF PRIME CONCERN**

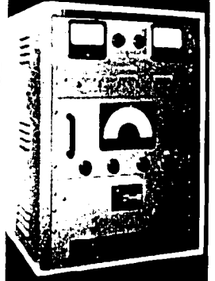
CML *The First Place To Look For*
**ELECTRONIC POWER SOURCES**



Model 1425-J



Model 1451-B



Model 1301-A

Wherever the need exists for a stable source of power, CML is the first place to look to meet your most stringent requirements.

The versatility in equipment, and the wide range of units available, make CML an important part of your plans.

Whatever your specific needs, contact CML engineers for the answers.

WRITE FOR COMPLETE DETAILS ON ALL CML ELECTRONIC POWER SOURCES.

**SIZE RANGE:** 6 Watts to 80,000 Watts
**OUTPUT:** Single, Two or Three Phase
**FIXED AND VARIABLE FREQUENCY**
**FREQ. STABILITY:** Ranging from .001% to 0.25%
**REGULATION:** From 0.1% to 1%

CML **COMMUNICATION MEASUREMENTS LABORATORY, INC.**
348 LELAND AVENUE, PLAINFIELD, NEW JERSEY
Tel. PL. 4-5502

For details, circle #449 on Reader Service Card

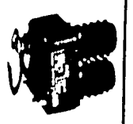
BURMAC
FOR THE FINEST IN ELECTRONICS

Serving the radar and microwave industry as a prime source of

- POWER SUPPLIES
- PULSE MODULATORS
- PULSE COMPONENTS







through its own integrated laboratory, test and production facilities under the supervision of most competent and creative senior engineers.

Technical data and illustrated literature describing Burmac equipment now reliably operating in universities, government installations and major corporate areas throughout the country is available.

Special attention particularly given to unique application problems. Contact our representative in your area, or our Development Staff direct.

BURMAC ELECTRONICS CO., INC.
*"reliability through creative design"*
142 South Long Beach Road, Rockville Centre, N. Y.

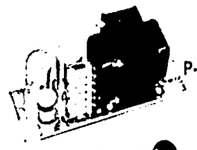
For details, circle #450 on Reader Service Card

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LABORATORY & INDUSTRIAL
POWER SUPPLIES
FOR YOUR SYSTEM

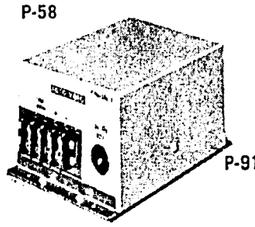
# FOTO-VIDEO OFF THE SHELF

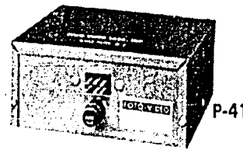
← Modular or Rack Mount →

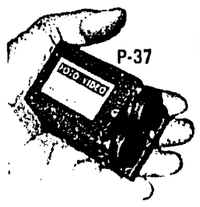

P-1801


P-1806


P-58


P-91


P-41


P-37


P-172

## FEATURES

- Silicon Rectifiers
- Large Power Handling
- Compactness; High Efficiency
- Line and Load Regulation
- Zero Warmup; Short Recovery Time
- Short Circuit Protected
- Continuous Rating; Conservative
- Long Period Stability
- Silicon Rectifiers
- Extremely Low Ripple
- Rack Height Economy
- Excellent Mechanically
- Swing Out Chassis
- Continuous Duty; 50-400 Cy
- 6.3 & 5 vdc Outputs Most Models
- Line and Load Regulation

## SPECIFICATIONS

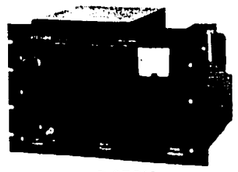
| Model | Input | Current in Amps | Voltage | Reg. in % | Ripple in mv. | Max Imp. | Price |
|---|---|---|---|---|---|---|---|
| P-37 | 22-30 VDC | 2.0 | 21 | 0.5 | 3 | 0.5 | $ 95 |
| P-58 | 115V-125V 50 to 400 Cy | 0.250 / 0.005 | 150 / —150 | 0.5 | 3 | 0.5 | 343 |
| P-60 | 115V-125V 50 to 400 Cy | 3 | 28 | 1.0 | 10 | 0.5 | 250 |
| P-91 | 115V-125V 50 to 400 Cy | 1 | 24-32 | 1.0 | 1 | 0.5 | 295 |
| P-291 | 115V-125V 50 to 400 Cy | 0.250 | 50 60 | 0.5 | 1 | 0.5 | 350 |
| P-158 | | * | | 0.5 | 3 | 0.5 | 595 |

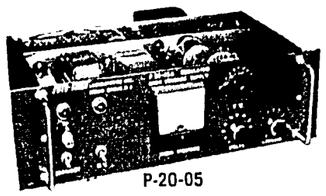
* Two P-58's and one P-91

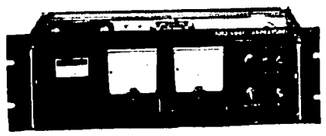
INPUT FOR ALL MODELS: 115-125V 50-400 CY

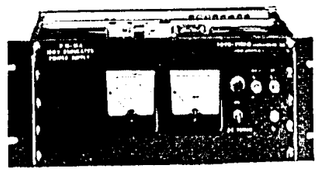
| Model | Current in ma | Voltage Note 2 | Reg. in % | Ripple in mv | ** | Rack Height | Price Note 1 |
|---|---|---|---|---|---|---|---|
| P-68 | 100 | 150 | 0.1 | 1 | 0.5 | 3½" | $185 |
| P-46 | 200 | 150 | 0.1 | 1 | 0.5 | 5¼" | 270 |
| P 8-15 | 800 | 150 | 0.1 | 1 | 0.5 | 7" | 395 |
| P15-15 | 1500 | 150 | 0.1 | 1 | 0.5 | 7" | 595 |
| P 73 | 200 | 300 | 0.1 | 1 | 0.5 | 5¼" | 225 |
| P-65 | 800 | 300 | 0.1 | 1 | 0.5 | 5¼" | 395 |
| P 15-30 | 1500 | 300 | 0.1 | 1 | 0.5 | 7" | 595 |
| P-250 | 1 | 15-30 kv | 0.5 | 10V | 2 | 10½" | 325 |
| P-20-05 | 10 | 300 to 1610 | 0.005 | 1 | 0.1 | 5¼" | 485 |
| P-1801 | 290 | 280 | — | 50 | 0.25 | — | 49 |
| P-1806 | 240 | 285 | 0.3 | 3 | 0.25 | — | 79 |

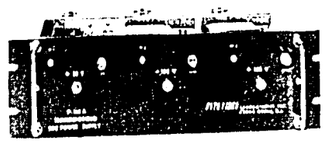
Note 1: All models furnished with meters for current and voltage at $10.00 additional.
Note 2: Voltage adjustable ±10% unless otherwise indicated
** Max Imp Source


P-250M


P-20-05

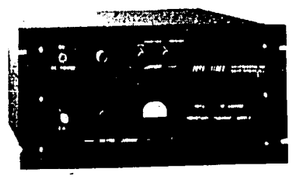

P-62M


P-15-15M


P-158 has 3 modules in 19" rack mount frame 5¼" high. Two P-58's + one P-91

## NEW 0-50 AMPERE CONSTANT-CURRENT SUPPLY

- High Current; 500-Watt
- Regulation 0.5% full scale
- Silicon Rectifiers; Power Transistors
- Emitter current for each pass transistor independently monitored


P-87

- Short-circuit protected; Heat sink thermal relays for added safety
- Current Ranges: 0.75, 1.5, 3.0, 7.5, 15, 30 and 50 amps; 10-12 volt output.

WRITE FOR CATALOG

# FOTO-VIDEO® ELECTRONICS INC.

ELECTRONICS • ENGINEERING AND MANUFACTURING



36 Commerce Road • Cedar Grove, N. J. • CEnter 9-6100
West Coast Engineering & Sales Office, 1317 W. 214 St., Torrance, Calif.

*A Complete Line of Television Terminal and Test Equipment*

For details, circle #451 on Reader Service Card






# Directory II. Components

## 63. Power Supplies.

Components for Research, Inc., 979 Commercial St., Palo Alto 2, Calif., 15c, Tel: DAvenport 1-5252
See ad on page 688

Computer Engineering Associates, Inc., Calif., 5c, 10s, 20s, 45s, 50s, 55s

Condenser Products Co., Conn., 10sc, 15sc, 20c, 45c

Consolidated Avionics Corp., N.Y., 5sc, 10sc, 20sc, 30sc, 45sc, 50sc, 55sc

Consolidated Diesel Electric Corp., Conn., 5c, 10c, 20c, 40c, Uninterrupted c

Consolidated Electrodynamics Corp., Calif., 5s, 10s

Continental Electric Co., Inc., 5sc, 10sc, 15c, 40c

Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 15c, Tel: EVergreen 1-1135
See ad on page 156

Control Electronics Co., Inc., 10 Stepar Pl., Huntington Station, L.I., N.Y., 5c, 10c, 35c, 45c, 55c, Tel: HAmilton 7-7961
See ad on page 440

Control Equipment Corp., Mass., 5c

Cook Electric Co., Ill., 5c, 10c

Cook Technological Center, Div. Cook Electric Co., Ill., 45c

Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 5s, 10s, 20s, 30s, 45s, 55s, Tel: PLainfield 6-9000
See ad on Cover 3

Cornwell Electronics Corp., Conn., 5c, 10c, 15c, 20c, 25c

Crown Engineering, N.M., 10c, 20c

Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 55sc, Tel: SWarthmore 1-0100
See ad on page 510

D & R, Ltd., Calif., 5sc, 10sc, 20sc, 30sc, 45sc, 50sc, 55sc

Datascan, Inc., N.J., 5s, 10s, 15c, 20s, 30s, 45s, 50s, 55s

Daven Co., The, N.J., 5c, 10c, 15c, 20c, 30c, 45c, 50c, 55c

Davenport Mfg. Co., Ill., 5sc, 10sc, 15sc, 20sc, 25c, 30sc, 45sc, 50sc, 55sc

Dayton Aircraft Products, Inc., Fla., 10c, 15c

Dayton Electronic Products Co., Ohio, 10sc, 45sc, 50sc, 55sc

Del Electronics Corp., Dept. RE, 521 Homestead Ave., Mount Vernon, N.Y., 5c, 10sc, 15sc, 20c, 30sc, 45sc, 50sc, 55sc, Tel: OWens 9-2000
See ads on pages 282, 481, 567

Delco Radio Division, General Motors Corp., Ind., 45sc

Delta-F, Inc., Ill., 10c, 15c, 55c

Deltek, Calif., 5c, 10c, 20c, 25c, 45c, 50c, 55c

Deltron, Inc., Pa., 5s, 10s, 15s, 20s, 25s, 30s, 35c, 45s, 50s, 55s

Deluxe Coils, Inc., Box 454, Wabash, Ind., 15c, Tel: 1720
See ad on page 398

DeRyder Electronics, N.J., 15s

Dial Products Co., N.J., 10s, 20s, 30s

Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 55c

Dicon Corporation, N.Y., 5c, 10c, 15c, 20c, 30c, 35c, 45c, 50c, 55c

Djordjevic Engineering Co., Dicco Div., Ill., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35c, 45sc, 50sc, 55sc

Donner Scientific Co., Subsid. Systron-Donner Corp., Calif., 10c, 50c, 55c

Dorsett Electronics Labs., Inc., Okla., 10sc

Douglas Radio Laboratories, Mass., 55s

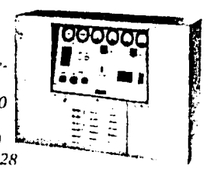
Dressen-Barnes Corp., Calif., 10s, 15s, 20s, 25s, 30s, 45s, 50s, 55s

Dresser Electric Co., Mich., 10c, 20c, 50c, 55c

Du Kane Corp., Ill., 10s

Dwyer Engineering Co., Inc., N.H., 10c


ESCO ELECTRIC SPECIALTY COMPANY
Pioneers in Power


*AC-AC "Packaged" 400 cycle Precise-Power Set. Input, 60 cps 3φ— Outputs, 400 cps, 3φ, plus 28 VDC, both voltage-regulated*

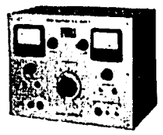
Every Electronic System needs a modern ESCO Rotary Precise Power Set to minimize cost, size, and maintenance — and optimize performance and reliability. Investigate Precise Power before you specify your system power supply!

FOR PROMPT, INFORMED SERVICE IN THE NORTHEAST ..... CALL
BURLINGAME ASSOCIATES
MOUNT VERNON, N.Y. • MOunt Vernon 4-7530
WALTHAM .....TWinbrook 4-1955
SYRACUSE .....GRanite 4-7409
PHILADELPHIA .....SHerwood 7-9080
WASHINGTON .....OLiver 4-6400
BALTIMORE .....ENterprise 9-6400
For details, circle #452 on Reader Service Card

DEL
HIGH VOLTAGE QUALITY RELIABILITY
POWER SUPPLIES


compact model 5-2-1

- High and low voltage
- Regulated and unregulated
- Oil, epoxy and air insulated
- Completely instrumented supplies available from 1 KV to 300 KV DC and up to 50 KVA


model PSC-30-5-1

Standard power supplies and transformers available from stock. Others built to your specific requirements from stock components.

For further information write to Dept. RE.

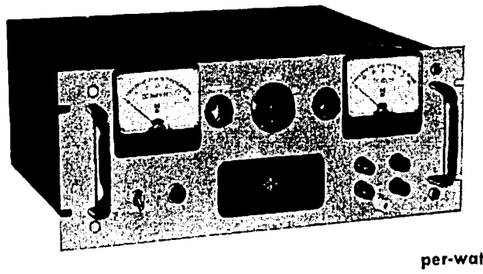
DEL ELECTRONICS CORPORATION
521 HOMESTEAD AVENUE • MOUNT VERNON, N. Y. • OWENS 9-2000
For details, circle #453 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## MID-EASTERN'S NEWEST LINE OF TRANSISTORIZED POWER SUPPLIES . . .

### THE ST SERIES



- Extremely high reliability
- Incomparable ease of servicing — interchangeable plug-in modules
- Economy — on a dollars-per-watt basis Mid-Eastern Power Supplies are the best buy on the market.

**MID-EASTERN ELECTRONICS POWER SUPPLIES AND INSTRUMENTS**

### SPECIFICATIONS

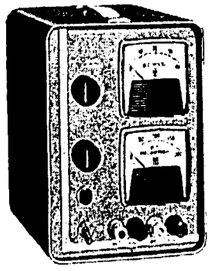
**INPUT:** 100-135 VAC, 60 cps. single phase
**LINE REGULATION:** 0.005% of max. rated V for 100-135 VAC change
**LOAD REGULATION:** 0.05% for 18V units, 0.03% for 36V units, 0.02% for 60V units, 0.01% for 100V units
**RIPPLE:** < 500 microvolts, rms.
**SIZE:** 19" rack panels 15" deep
**DELIVERY:** stock to 3 weeks
**PROTECTION:** no fuses — automatic variable current cut-off point
Complete troubleshooting and adjustment data provided.

### 19 NEW STANDARD MODELS

| DC OUTPUT | P.H. IN INS. | PRICE | DC OUTPUT | P.H. IN INS. | PRICE |
|---|---|---|---|---|---|
| 18V @ 6A | 5¼ | $595 | 60V @ 1.5A | 5¼ | $595 |
| 18V @ 9A | 7 | 750 | 60V @ 4A | 7 | 725 |
| 18V @ 12A | 8¾ | 845 | 60V @ 6A | 8¾ | 825 |
| 18V @ 18A | 10½ | 950 | 60V @ 10A | 8¾ + 8¾ | 1095 |
| 18V @ 35A | 8¾ + 8¾ | 1595 | 60V @ 15A | 8¾ + 8¾ | 1395 |
| 36V @ 3A | 5¼ | $595 | 100V @ 1A | 5¼ | $595 |
| 36V @ 6A | 7 | 695 | 100V @ 3A | 8¾ | 825 |
| 36V @ 10A | 10½ | 795 | 100V @ 5A | 10½ | 995 |
| 36V @ 15A | 8¾ + 8¾ | 985 | 100V @ 10A | 8¾ + 8¾ | 1595 |
| 36V @ 22A | 8¾ + 8¾ | 1225 | | | |

## THIS TRANSISTORIZED MINIATURE PORTABLE POWER SUPPLY SERIES GIVES MAXIMUM PERFORMANCE AT A MINIMUM PRICE . . .

### MP 40-.2 *



- Electronic overload protection
- Continuously variable electronic current limiting
- Completely programmable from a distant point
- Compact — only six inches wide
- Both current and voltage meters

### SPECIFICATIONS

**INPUT:** 105-125 VAC, 50-440 cps, single phase
**OUTPUT:** 0-40 VDC @ 0-200 ma, continuously variable
**REGULATION:** 0.05% 0-full load, 0.1% line
**RIPPLE:** less than 500 microvolts, rms.
**TERMS:** net 30 days F.O.B. Springfield, N. J.
**DELIVERY:** from stock
**QUANTITY DISCOUNTS START AT 25 UNITS**

**PRICE: $159.**

### APPLICATION

Primarily designed for convenient bench use to provide bias and other voltages, the MP 40-.2 can also be used as a component of an automatic system since it can be programmed at 500 ohms/volt from a distant point.

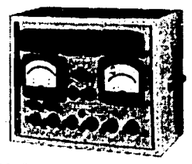
*Models with other current-voltage combinations available (please write).

## INSTRUMENTS

### UHR STANDARD BRIDGE MODEL 801

- The only standard in the Ultra High Resistance range
- 1000 Ω to 110 Million Megohms
- Accuracy 0.08% below 1100 megohms
- Completely self-contained

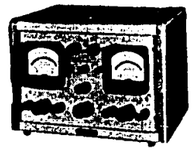
**PRICE:** $3495.00
**DELIVERY:** 90 days
**TERMS:** net 30 days F.O.B. Springfield, N. J.



### MEGATROMETER

- For the direct measurement of insulation resistance up to 5000 million megohms
- 0 to 1000 VDC continuously variable
- Built-in Calibration Standard 0.2%

**PRICE:** Model 710 — $865.00
Model 710H (to 5 x 10¹⁰ Ω) — $1495.00
**DELIVERY:** 45 days
**TERMS:** net 30 days F.O.B. Springfield, N. J.



**RESISTOR STANDARDS UP TO 10 MILLION MEGOHMS**

MID-EASTERN ELECTRONICS, INC.

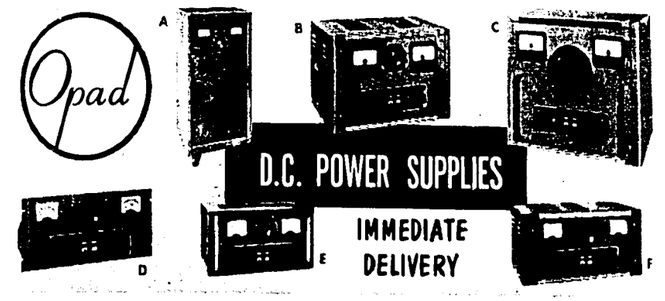
**32 COMMERCE STREET, SPRINGFIELD, NEW JERSEY • PHONE DREXEL 6-7130**

For details, circle #454 on Reader Service Card





Opad




## D.C. POWER SUPPLIES

**IMMEDIATE DELIVERY**

### 0-32 V.D.C. 100 Mv. Ripple

Input: 115 V.A.C. 60 Cycles, Single Phase

| Amps. | Model | Style | H | W | D | Fig. |
|---|---|---|---|---|---|---|
| 5 | KM75 | Rack | 8¾" | 19" | 9½" | D |
| | KM75B | Bench | 9" | 17" | 9" | E |
| 10 | KM81 | Rack | 8¾" | 19" | 9½" | D |
| | KM81B | Bench | 9" | 17" | 9" | E |
| 20 | KM87 | Rack | 8¾" | 19" | 9½" | D |
| | KM87B | Bench | 10½" | 22" | 12" | F |
| 40 | KM93 | Rack | 12¼" | 19" | 13" | — |
| | KM93B | Bench | 14" | 22" | 15" | B |

**FEATURES**

- Vacuum Varnish Impregnated Magnetic Components.
- 4½" Rectangular 2% Accuracy, D.C. Panel Meters (3½" on small units).
- Controls include power switch, line and load fuses, pilot light, voltage control knob, output binding posts.
- Voltage Regulation: 1/10 Load 35 Volts, Full Load 32 Volts
- Panel Type Carrying Handles.
- Convection Cooled Continuous Duty Ratings.

Bulletin No. 102A

### 0-125 V.D.C. 1% Ripple

Input: 115 V.A.C. 60 Cycles, Single Phase

| Amps. | Model | Style | H | W | D | Fig. |
|---|---|---|---|---|---|---|
| 2.5 | RS10 | Rack | 8¼" | 19" | 9" | D |
| | RS10B | Bench | 10½" | 22" | 12" | F |
| 5 | RS20 | Rack | 10½" | 19" | 13" | D |
| | RS20B | Bench | 12¼" | 22" | 15" | F |
| 10 | RS30 | Rack | 12¼" | 19" | 13" | — |
| | RS30B | Bench | 14" | 22" | 15" | B |
| 20 | RS40 | Rack | 17½" | 19" | 13" | — |
| | RS40B | Bench | 19¼" | 19" | 15" | C |

**FEATURES**

- Vacuum Varnish Impregnated Magnetic Components.
- Non-Aging Rectifiers (Germanium or Silicon).
- 4½" Rectangular 2% Accuracy D.C. Panel Meters (3½" on small units).
- Controls include Power Switch, Line and Load Fuses, Pilot Light, Voltage Control Knob and Output Binding Posts.
- Both D.C. Terminals above ground and isolated from A.C. Line.
- Panel Type Carrying Handles.
- Convection Cooled Continuous Duty Ratings.

Bulletin No. 204A

### 0.32 V.D.C. 4% Ripple

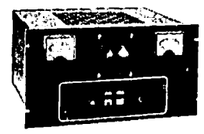
Input: 208 V.A.C. 60 Cycles, 3 Phase

| Amps. | Model | Style | H | W | D | Fig. |
|---|---|---|---|---|---|---|
| 100 | FR100 | Floor | 46" | 22" | 18" | A |
| 200 | FR200 | Floor | 46" | 22" | 24" | A |

**FEATURES**

- Fully Self-Protecting Circuit.
- Pushbutton Operated Magnetic Contractor.
- Indicating Type AC Input Fuses.
- Adjustable Overcurrent Control in D.C. Circuit.
- Thermal Overload Device on Rectifier.
- Overload Warning Light and Reset Button.
- 4½" Rectangular, 2% Accuracy Panel Meters.
- Low Voltage Regulation: Approx. 5-8%.
- Ball Bearing Type Casters.
- Input Receptacle and Mating Plug.
- All receptacles, terminals and controls clearly designated.
- Budget Priced.

Bulletin No. 155

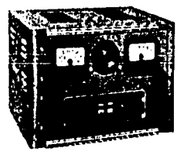


### New! TRANSISTOR REGULATED POWER SUPPLIES

| 4-32 Volts DC | | 24-32 Volts DC | |
|---|---|---|---|
| AMPS | MODEL | AMPS | MODEL |
| 1½ | TR10 | 5 | BR20 |
| 4 | TR20 | 10 | BR30 |
| 10 | TR30 | 20 | BR50 |
| 15 | TR40 | 30 | BR70 |
| Bulletin No. 105 | | Bulletin No. 107 | |

**FEATURES**

- Regulation ± ½% line & load.
- Input 105-125 V. AC. 60 CPS single phase.
- Zener Diode Reference.
- Ripple less than 5 M.V.
- Vacuum varnish impregnated magnetic components.
- Short Circuit Protection.
- Controls include power switch, fuses, pilot light, voltage control knob and output binding posts.
- 2% Accuracy Panel Meters.
- Both output terminals above ground and isolated from A.C. line.
- Panel type carrying handles.
- Continuous duty ratings.
- High efficiency.



**GENERAL PURPOSE UNITS**

OUTPUT: 0-30 Volts D.C. Unfiltered Full Wave.
INPUT: 115 V.A.C., 60 C.P.S.I. ϕ.
Model GM72 5 Amperes
Model GM78 10 Amperes
Model GM84 20 Amperes
Model GM90 50 Amperes
FEATURES: 2% accuracy Panel Meters. Line and Load Fuses. Switch. Pilot Light. Binding Posts. Many other standard models available.

Bulletin No. 178A

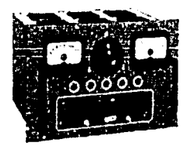


**AIRCRAFT BATTERY SUBSTITUTE**

Specifically designed to operate rotating equipment

OUTPUT: 0-30 V.D.C., 20 Amperes.
RIPPLE: Less than 1%.
INPUT: 115 V.A.C., 60 C.P.S. 1 ϕ.
REGULATION: 1/10 Load 35 Volts, Full Load 30 Volts
FEATURES: Ammeter overcurrent protection circuit prevents needle 'slam' when starting inverters & motors.
MODEL KM88 ...Rack Mount
MODEL KM88B...Bench

Bulletin No. 100A



**DUAL RANGE POWER SUPPLY**

OUTPUT: 0-32/64 V.D.C., 40/20 Amps.
RIPPLE: Within 1% of aver. DC.
INPUT: 115 V.A.C., 60 C.P.S. ϕ.
FEATURES: Thermal overload protection, indicating line and load fuses, overload warning light, dual range voltmeter.
MODEL KM95 ...Rack Mount
MODEL KM95B...Bench

Bulletin No. 103

Opad **OPAD ELECTRIC COMPANY** Opad
43-8 WALKER STREET • NEW YORK 13, N. Y.
Telephone WOrth 6-0380

For details, circle #455 on Reader Service Card




# Directory II. Components

## 63. Power Supplies.

Dynair Electronics, Inc., Calif., 55s
Dynamic Controls Co., Mass., 5c, 10sc, 20sc, 25c, 30c, 45sc, 50sc, 55sc
Dynamics Corp. of America, N.Y., 5c, 15c, 20c, 25c, 30c, 35c, 50c
Dynamics Instrumentation Co., Calif., 20s, 45s, 50s, 55s
Dynatran Electronics Corp., N.Y., 10s, 45s, 55s
E-H Research Laboratories, Calif., 10
E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, 25c, 35c, Tel: HAlifax 6-7491
See ad on page 409
E.M.I. Cossor Electronics, Ltd., Canada, 45s
E O Electronics, Inc., N.J., 15c
Eicor Division, The Scranton Corp., Ill., 5c, 10c, 40c, 45c, 50c, 55c
Elcor, Inc., Va., 10s, 15c, 20sc, 30c, 45sc, 50c, 55sc
Electric Eye Equipment Co., Ill., 5c, 10c
Electric Machinery Mfg. Co., Minn., 5s
Electric Specialty Co., Conn., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c
Electro Development Corp., Wash., 5c, 10c, 45sc, 55c
Electro Engineering Works, Calif., 5c, 10c, 15c, 30c
Electro-Seal Corp., Ill., 5c, 10c, 55sc
Electron Arc Division, Ionics, Incorporated, 244 Broad St., Lynn, Mass., 5c, 10c, 15c, 20c, 30c, 55c, Tel: LY 8-2100
See ad on page 485
Electronet Div., Rue Prods., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c
Electronic Assembly Co., Inc., Mass., 5sc, 10sc, 15c, 20sc, 25sc, 30sc, 45sc, 50sc, 55sc
Electronic Communications, Inc., Fla., 35c
Electronic Energy Conversion Corp., N.Y., Energy Conversion Devices
Electronic Instrument Co., Inc., (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 10s, Tel: STillwell 6-8700
See ad on page 283
Electronic Measurements Co., Inc., Maple Ave. & Lewis St., Eatontown, N.J., 10s, 20s, 30s, 45s, 50s, 55s, Tel: LIberty 2-0300
See ad on page 478
Electronic Measurements Corp., N.Y., 10s
Electronic Plastics Co., Calif., 45c
Electronic Production & Development, Inc., Calif., 10sc, 20sc, 25sc, 50sc, 55sc
Electronic Research Associates, Inc., N.J., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 45sc, 50sc, 55sc
Electronic Specialty Co., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 45c, 55c
Electronic Tube Corp., Pa., 15c, 20c, 45c, 55c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Directory II. Components

## 63. Power Supplies.

Emerson Electric Mfg. Co., The, Mo., 10c, 15c, 20c, 35c, 45c, 50c

**Empire Devices Products Corp.**, 37 Prospect St., Amsterdam, N.Y., 5sc, 50sc, Tel: VIctor 2-8400
See ads on pages 307, 309, 313, 315, 379, 584

Engineered Electronics Co., Calif., 10s, 20s, 45s

Engineering Associates, Ohio, 5c, 10c, 15c, 20c, 30c, 35c, 40c, 50c, 55c

Ensco, Inc., Utah, 10c, 15c, 45c, 55c

Entron, Inc., Md., 5s, 20s

Erie Pacific Div., Erie Resistor Co., Calif., 5c, 10c, 20c, 45c, 55c

Espey Mfg. Co., Inc., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c

Essex Electronics, N.J., 15sc

**FXR, Inc.**, 25-26th 50th St., Woodside 77, N.Y., 15sc, 35sc, 55sc, Tel: RAvenswood 1-9000
See ad on pages 125-128

Fairchild Recording Equipment Corp., N.Y., 5s

Fansteel Metallurgical Corp., North Chicago, Ill., 10c, 30c, 55c, Tel: DExter 6-4900
See ad on pages 130-131

Farwest Mfg. Div., Inc., Wash., 5c, 10c, 15c, 30c, 55c

Fecker Division, J. W., Pa., 5sc

Federal Mfg. & Eng. Corp., N.Y., 35c

**Federal Tool Engineering Co.**, 1400 Pompton Ave., Cedar Grove, N.J., 5s, 10s, Tel: CLifford 6-5300
See ad on page 670

Ferranti/Packard Electric, Ltd., Canada, 55c

Fidelity Instrument Corp., Pa., 5c, 10c, 15c, 55c

**Film Capacitors, Inc.**, 3400 Park Ave., New York 56, N.Y., 5s, 15s, 50s, Tel: CYpress 2-5181
See ad on page 479

Filtron Co., Inc., N.Y., 15c

Fluke Manufacturing Co., Inc., John, Wash., 10sc, 15sc, 20sc, 30sc, 45sc, 50sc, 55sc

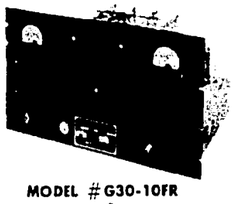
**Foto-Video Electronics, Inc.**, 36 Commerce Rd., Cedar Grove, N.J., 5sc, 10sc, 15sc, 20sc, 30sc, 45sc, 55sc, Tel: CEnter 9-6100
See ad on page 480

**Freed Transformer Co., Inc.**, 1713 Weirfield St., Brooklyn 27, N.Y., 5s, 10s, 25s, Tel: EVergreen 6-1300
See ad on page 566

Fugle-Miller Labs., Inc., N.J., 15c

Garrett Corp., The, Calif., 5c, 10c, 20c, 25c, 30c, 45c, 50c, 55c

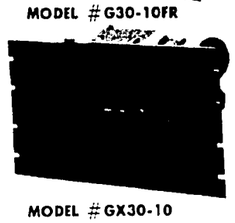

**DC POWER SUPPLIES**
**SILICON & SELENIUM RECTIFIERS**



MODEL #G30-10FR

**SILICON POWER RECTIFIER**

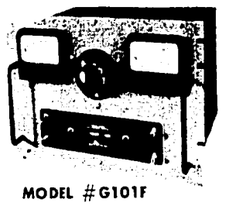
INPUT: 115 Volts AC, 60 Cycles, Single Phase
OUTPUT: 0-30 Volts DC, 0-10 Amperes, continuous duty
CONTROL: Continuously variable over entire range
REGULATION: 7 No Load to Full Load
RIPPLE: 0.2% RMS
METERS: 2% Accuracy
DIMENSIONS: 19"Wx13"Dx10½"H
PRICE: $175.00 NET



MODEL #GX30-10

**SILICON RACK MOUNT SUPPLY**

INPUT: 115 Volts AC, 60 Cycles, Single Phase
OUTPUT: 30 Volts DC, 0-10 Amperes, continuous duty
REGULATION: 10% No Load to Full Load
RIPPLE: Below 0.5% RMS
DIMENSIONS: 8¾"Hx19"Wx10"D
PRICE: $125.00 NET



MODEL #G101F

**AIRCRAFT BATTERY ELIMINATOR**

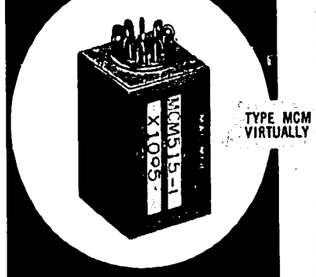
INPUT: 115 Volts AC, 60 Cycles, single phase
OUTPUT: 0-30 Volts DC, 0-20 Amperes, continuous duty
RIPPLE: 0.5% RMS Unique overload device prevents needle slam and shows overload condition
REGULATION: D.C.V. at full load: 30 D.C.V. at 1/10 load: 35
METERS: 2% Accuracy
PRICE: $185.00 LESS DUST COVER
PRICE: $200.00 NET
May be used for Rack or Bench

**GATES ELECTRONIC CO.**
1705-I Taylor Ave., New York 60, N.Y.

For details, circle #456 on Reader Service Card



Another reliable GENERAL MAGNETICS "MAG MOD" Miniature



TYPE MCM 515-1 SHOWN ACTUAL SIZE. COMPLETELY RUGGEDIZED, VIRTUALLY SHOCK AND VIBRATION PROOF. WEIGHS ONLY ONE OZ.

NEW **MAGNETIC** *multiplying* **MODULATOR**

Specifically designed to deliver an analog output voltage which is the continuous product of two variable input voltages. One of these is an excitation voltage which varies over a pre-determined range; in this case, 0 to 1 VRMS 400 cycles per second. The other signal is a DC current which varies between 0 and ± 400 μa. The output voltage is 400 cycles AC, and is always in phase or 180° out of phase with the variable excitation or fixed reference, i.e., in phase when the variable amplitude DC signal is positive, and 180° out of phase when the DC signal is negative.

*THERE IS NO SUBSTITUTE FOR RELIABILITY!*

Specify "MAG MOD" miniature components for infinite life, faster response time, negligible hysteresis and extreme stability. Call or write for new Brochure 102 on "MAG MOD" Miniaturized Magnetic Modulators and Magnetic Multiplying Modulators.



**General Magnetics • Inc**
135 BLOOMFIELD AVENUE
BLOOMFIELD, NEW JERSEY
Telephone: Pilgrim 8-2400

For details, circle #457 on Reader Service Card



*a tradition in voltage regulated dc power supplies*

**kepco**

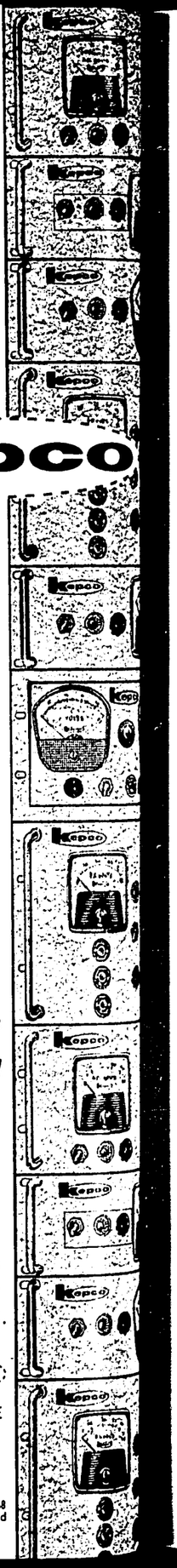
*the standard for the "state of the art" for over 14 years*

*More than 120 standard active models • transistorized • vacuum tube • magnetic*

For complete specifications send for Catalog B-601.

**kepco** Inc.
131-42 SANFORD AVENUE
FLUSHING 52, N. Y.
IN 1-7000
TWX # NY 4-5196

For details, circle #458 on Reader Service Card


**ELECTRON ARC**



Typical compact DC power pack with output 70 to 265v DC in 5v steps, 45 amps max. Automatic on-off sequence isolates on-off transients from silicon rectifier. Fast acting current overload circuit automatically shuts down the system in proper sequence. Typical uses: Ionics processes for purification of brackish water, electroplating, charging high energy capacitor banks and other applications requiring exceptional dependability and compactness.

**SPECIAL TRANSFORMERS AND POWER SUPPLIES**
- Up to 100 kw and higher
- Wide range of frequencies and voltages

**DC POWER SOURCES AND RECTIFIERS**
- Accurately controlled outputs
- Wide range of voltages and currents

**SPECIAL ELECTRONIC EQUIPMENT**
- With transistorized circuitry where required

**HIGH INTENSITY LIGHT SOURCE POWER SUPPLIES**
- Infrared or visible light
- Controls for voice communication by light beam
- 2 to 300 watts; light source diameters from 0.005" to 0.110"; brightness from 15,000 to 30,000 candles/sq. in.

For your specialized electrical or electronic equipment needs, send complete specifications. Our Engineering Department will submit a firm quotation with performance guarantee and delivery date.

IONICS

**ELECTRON ARC DIV.**
**Ionics, Incorporated**
**244 Broad Street • Lynn, Mass.**

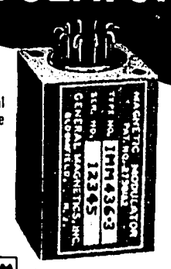
For details, circle #459 on Reader Service Card



*Engineers! Designers!*
**THERE IS NO SUBSTITUTE FOR RELIABILITY!**
*Specify—*
**PERFORMANCE PROVEN "MAG MOD"**

**MAGNETIC MODULATORS**

Actual Size



*For complete specifications and application data on "Mag Mod" Miniature and Standard Components, call or write.*

Miniaturized design permits engineers to employ these new components in transistorized printed circuit assemblies and wafer type structures. All models offer maximum reliability, fully ruggedized construction and conform to MIL-T-27A specifications.

- COMPLETE RELIABILITY
- INFINITE LIFE
- FASTER RESPONSE TIME
- NEGLIGIBLE HYSTERESIS
- EXTREME STABILITY (Ambient Temp. Range from −75° to +135°C)
- COMPACT SIZE
- LIGHTWEIGHT

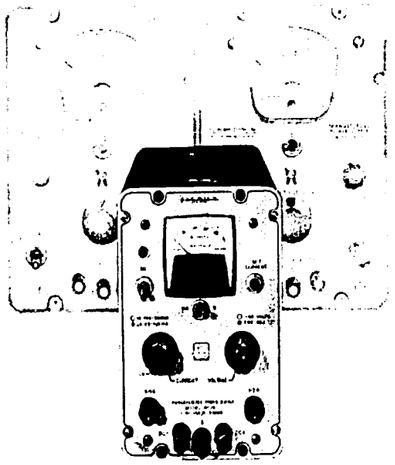
Typical circuit applications for Magnetic Modulators are algebraic addition, subtraction, multiplying, raising to a power, controlling amplifier gains, mechanical chopper replacement in DC to fundamental frequency conversion, filtering and low signal level amplification.

**GENERAL MAGNETICS • INC**
135 BLOOMFIELD AVENUE
BLOOMFIELD, NEW JERSEY
Telephone: Pilgrim 8-2400

For details, circle #460 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# RECOGNIZED RELIABILITY



**CONSTANT VOLTAGE**
**CONSTANT CURRENT**

- +

## FROM THE SAME TERMINALS!

The Power Designs Inc. Model 4005 Power Supply adds a new dimension to the application of d-c sources for laboratory instrumentation. Truly universal, the Model 4005 may be operated as a *constant voltage* source, a *constant current* source, a *constant voltage* source with *automatic current limiting* or a *constant current* source with *automatic voltage limiting*.

The Model 4005 employs semiconductor devices exclusively in a new proprietary circuit called.....*AMBITROL

AMBITROL* is a dual regulator system permitting continuous control of voltage or current with automatic electronic cross-over to either mode of operation.

The supply also features remote voltage programming, dual concentric controls for both coarse and fine adjustment of voltage or current and the HEATRAN® circuit for electronic control of power transistor dissipation.

*TM

**MODEL 4005 SPECIFICATIONS**
INPUT: 105-125 volts, 55-440 cycles single phase.
TEMPERATURE: Continuous duty at full load 0-50° C. ambient
POLARITY: Positive or negative output terminal may be grounded
DIMENSIONS: 5¾" W x 8⅛" H x 11¾" D.

**CONSTANT VOLTAGE**
Range: 1-40 vdc, 0-0.5 amperes.
Regulation: .05% or 10 millivolts max. for line or load variations.
Ripple: .001% or 500 microvolts max.
Response Time: Less than 50 microseconds.
Source Z: 0.1 ohms to 20 kc, 0.5 ohms to 1 mc.

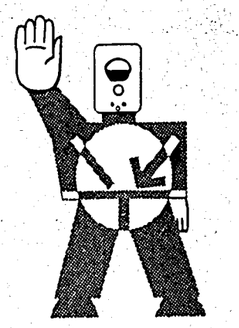
**CONSTANT CURRENT**
Range: 25 to 500 milliamperes.
Voltage compliance: Output current constant to full rated output voltage of 40 volts
Regulation: .05% or 250 microamperes max., for line or load variations.
Ripple Content: .01% or 25 microamperes max.
Source Impedance: 100,000 ohms approx.

AMBITROL V-1

**$143.50**
F.O.B. FACTORY

†Prices subject to change without notice.

**POWER DESIGNS**
Semiconductorized Power Supplies utilize the unique properties of semiconductor devices to create new circuit concepts achieving performance, efficiency and reliability hitherto unattainable. These instruments are NOT conventional transistorized versions of vacuum tube regulators.



## ROBOTEC
## HEATRAN
## VOLTRAN

MODEL 1515
1-15VDC • 0-1.5A
$159.50

MODEL 1515A
1-15VDC • 0-1.5A
$174.50

MODEL 3206
1-32VDC •
0-600MA
$174.50

MODEL 2050
1-20VDC • 5A
$289.50

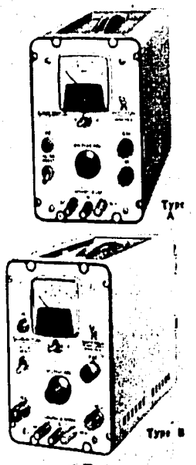
MODEL 1210
1-12VDC • 0-10A
$349.50

MODEL 1010T
1-100VDC • 0-1A
$374.50

MODEL 3240
1-32VDC • 0-4A
$349.50

MODEL 105TA
1-100VDC •
0-500MA
$239.50

MODEL 5015
1-50VDC • 0-1.5A
$249.50










Dual Voltammeter on all models. Voltmeter only on Model 1515.

**SIZES:** Models 1515, 1515A and 3206—5¾"W. x 8⅝"H. x 10"D. Model 5015—5¾" W. x 8⅛"H. x 11¾"D. Model 2050—7¾"W. x 8⅛"H. x 13⅛"D. Model 105TA—5¾"W. x 8⅝"H. x 11¾"D. Model 1010T—7¾"W. x 8⅝"H. x 13⅛"D.

INPUT: 105-125VAC 55-440 Cy
REGULATION: .05%
RIPPLE: Model 1515, 1515A: 250 Microvolts
All Others—1.0 Millivolt
Internal Imp: Model 2050, 1210, 1010T, 3240; .005 ohms
All Others—.01 ohms

**Power Designs inc.** 1700 SHAMES DRIVE WESTBURY, NEW YORK
EDgewood 3-6200 (Long Distance Area Code 516)



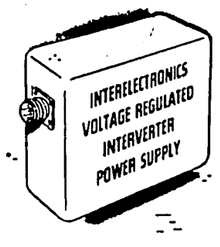


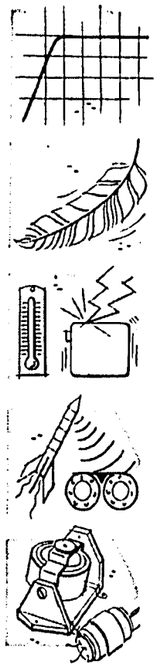

# Directory II. Components

## 63. Power Supplies.

Gates Electronic Co., 1705-I Taylor Ave., New York 60, N.Y., 10sc, 20s, 45s, 50s, 55s, Tel: TYrone 2-6490
See ad on page 484
Gemco Electric Co., Mich., 5c, 10c, 20c, 25c, 30c, 45c, 50c, 55c
General Automatics, Inc., Calif., 10c, 45c, 55c
General Devices, Inc., N.J., 5sc, 10sc, 45sc, 50c, 55c
General Electric Co., Pa., 5sc, 10sc, 15sc, 20sc, 25sc, 45sc, 50sc, 55sc
General Electric Co., Apparatus Sales Div., N.Y., 5sc, 10sc, 15c, 20sc, 30c, 45c, 50c, 55c
General Electric Co., Specialty Transformer Dept., Ind., 10c, 15c, 55c
General Electronic Controls, Inc., Minn., 45c
General Electronic Laboratories, Inc., Mass., 45sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 35c, 45c, Thermoelectric e
General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 5c, 10c, 20c, 25c, 45c, 55c, Tel: WEst 9-8571
See ad on page 363
General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N.J., 25c, Tel: PIlgrim 8-2400
See ads on pages 484, 485
General Measurements Co., Inc., Mass., 30
General Meters, Inc., Colo., 15sc, 50sc
General Nuclear Corp., N.Y., 10sc, 20sc, 30sc, 50sc, 55sc
General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, 20s, 30s, 50s, 55s, Tel: EMerson 9-4400
See ad on Cover 4
Geotronic Labs., Inc., Tex., 5c, 10c, 15sc, 20c, 25c, 45sc, 55sc
Gibbs Mfg. & Research Corp., Wis., 15c, 20c
Glentronics, Inc., 5c, 10sc, 15c, 20sc, 30sc, 45sc, 50sc, 55sc
Good-All Electric Mfg. Co., Neb., 10sc, 50c
Good Electronic Corp., Fla., 55c
Gow-Mac Instrument Co., N.J., 10s
Grand Transformers, Inc., Mich., 10c, 20c, 30c, 55c
Green Rectifier Co., N.J., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 50sc, 55sc
Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 5sc, 10sc, 45sc, Tel: CHesapeake 3-1100
See ad on page 512
Gulton Industries, Inc., N.J., 5sc, 10sc, 20sc, 25sc, 45sc, 55sc
Gyra Electronics Corp., Ill., 10s, 15s, 20s, 50s, 55s
Gyrex Corp., The, Calif., 5c
Hallicrafters Co., The, Ill., 5c, 10c, 15c, 20c, 30c, 35c, 50c, 55c
Hamilton Standard Div., United Aircraft Corp., Conn., 5c, 10c, 20c, 30c, 45c, 50c, 55c
Hammer Electronics Co., Inc., N.J., 10sc, 15sc, 20sc, 30sc, 55sc
Harrison Electrosonics, Inc., B. M., Mass., 5s, 55s
Harrison Laboratories, Inc., 45 Industrial Rd., Berkeley Heights, N.J., 10s, 20s, 30s, 45s, 50s, 55s, Tel: CRestview 3-9123
See ad on pages 58-59
Harvey-Wells Electronics, Mass., 25, 45, 50, 55, Current regulated sources
Hathaway Instruments, Inc., Colo., 5s, 10s, 45s, 55s
Heath Company, Mich., 10s, 50s, 55s
Hermetic Seal Transformer Co., Tex., 5c, 10c, 15c, 20c, 25c, 30c, 45c, 55c
Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 10s, 20s, 30s, 35s, 45s, 55s, Tel: DAvenport 6-7000
See ad on pages 3-18
Highland Design, Inc., N.Y., 5c, 10c, 20c, 50c
Hoffman Electron Tube Corp., N.Y., 35s
Hoffman Eng. Corp., Conn., 5c, 10c, 55c


**PROVEN RELIABILITY—**
**SOLID-STATE POWER INVERTERS**
**over 260,000 logged hours— voltage-regulated, frequency-controlled, for missile, telemeter, ground-support, 135°C all-silicon units available now—**



Interelectronics all-silicon thyratron-like gating elements and cubic-grain toroidal magnetic components convert DC to any desired number of AC or DC outputs from 1 to 10,000 watts.

Ultra-reliable in operation (over 260,000 logged hours), no moving parts, unharmed by shorting output or reversing input polarity. Wide input range (18 to 32 volts DC), high conversion efficiency (to 92%, including voltage regulation by Interelectronics patented reflex high-efficiency magnetic amplifier circuitry).

Light weight (to 6 watts/oz.), compact (to 8 watts/cu. in.), low ripple (to 0.01 mv. p-p), excellent voltage regulation (to 0.1%), precise frequency control (to 0.2% with Interelectronics extreme environment magnetostrictive standards or to 0.0001% with fork or piezoelectric standards).

Complies with MIL specs. for shock (100G 11 misc.), acceleration (100G 15 min.), vibration (100G 5 to 5,000 cps.), temperature (to 150 degrees C), RF noise (I-26600).

AC single and polyphase units supply sine waveform output (to 2% harmonics), will deliver up to ten times rated line current into a short circuit or actuate MIL type magnetic circuit breakers or fuses, will start gyros and motors with starting current surges up to ten times normal operating line current.

Now in use in major missiles, powering telemeter transmitters, radar beacons, electronic equipment. Single and polyphase units now power airborne and marine missile gyros, synchros, servos, magnetic amplifiers.

Interelectronics—first and most experienced in the solid-state power supply field produces its own all-silicon solid-state gating elements, all high flux density magnetic components, high temperature ultra-reliable film capacitors and components, has complete facilities and know how—has designed and delivered more working KVA than any other firm!

For complete engineering data, write Interelectronics today, or call LUdlow 4-6200 in New York.

**INTERELECTRONICS CORPORATION**
**2432 Grand Concourse, New York 58, N. Y.**
For details, circle #462 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240

FROM MILLIWATTS TO KILOWATTS

# HIGH VOLTAGE POWER SUPPLIES AND EQUIPMENT

We have sold quantities of these power supplies to laboratories, industrial concerns, the government and universities. Only the best available selected material goes into these units, so that you will have many years of dependable service. Only a few of our standard models are shown below. Quotations on special supplies cheerfully given.

# PRECISE MEASUREMENTS COMPANY

## HIGH VOLTAGE POWER SUPPLIES

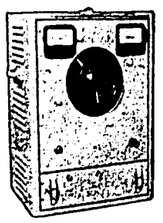


One of the most popular power supplies on the market. Completely redesigned for greater ruggedness and convenience of operation. Widely used for powering electronic equipment and for routine breakdown and insulation testing. Output voltage is well filtered D.C. which is adjustable with convenient front panel control. Input is 115 Volt, 60 cycle A.C. Equipment is available without meter, with one meter (4½"), with two meters, or with larger 6" precision 1% mirror scale movement. Regulated models offer closely stabilized output voltage regardless of line or load changes.

| Model | | Maximum Voltage | Price | Price Regulated Model |
|---|---|---|---|---|
| 6001 | With Kilovolt Meter | 1,000 | $ 75.00 | |
| 6000 | | 2,500 | 60.00 | |
| 6000-A | With Kilovolt Meter | 2,500 | 80.00 | $120.00 |
| 6005 | | 5,000 | 75.00 | |
| 6005-A | With Kilovolt Meter | 5,000 | 95.00 | 135.00 |
| 6010 | | 10,000 | 85.00 | |
| 6010-A | With Kilovolt Meter | 10,000 | 105.00 | 145.00 |
| 6015 | | 15,000 | 95.00 | |
| 6015-A | With Kilovolt Meter | 15,000 | 115.00 | 155.00 |
| 6025-A | With Kilovolt Meter | 25,000 | 175.00 | 205.00 |

MIRROR SCALE HIGHER ACCURACY METERS: Recommended where more exact settings or measurements are needed. Meter size has been increased to 6 inches for easier reading. Price $35.00 additional on any meter equipped model.
TWO METER MODEL ..... ADD $35.00

## INDUSTRIAL POWER SUPPLIES



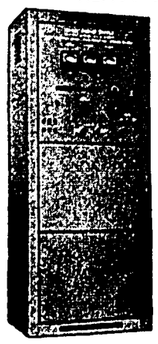
These industrial type power supplies are built for service and efficiency. All are of the transformer type and employ husky components that have been selected for their power handling capacity. Controls are arranged so that operation is greatly simplified and a number of safety features are built in for maximum protection of personnel and equipment. Output is continuously variable from zero to full rated value. Polarity reversing models (as illustrated) can be had at additional cost.

**Regulated Types Available**

Standard hum level 5% or less. .01% to 1% ripple available. All power supplies have automatic overload cutout control circuits. Regulated models available.

| Model | Voltage | Current | Price |
|---|---|---|---|
| F-500V | 0-500 | 3 Amp | $800.00 |
| F-6001 | 0-1000 | 2 Amp | 975.00 |
| F-6002 | 0-2000 | 1 Amp | 985.00 |
| F-6003-A1 | 0-3000 | 100 MA | 375.00 |
| F-6003-AV | 0-3000 | 500 MA | 550.00 |
| F-6003-AK | 0-3000 | 1 Amp | 1100.00 |
| F-6005-A1-H | 0-5000 | 100 MA | 550.00 |
| F-6005-AV | 0-5000 | 500 MA | 750.00 |
| F-6005-A1K | 0-5000 | 1 Amp | 1200.00 |
| F-6010-A1 | 0-10,000 | 100 MA | 800.00 |
| F-6020-A05 | 0-20,000 | 50 MA | 975.00 |
| F-6050-T | 0-50,000 | ½ MA | 600.00 |
| F-6100-T | 0-100,000 | ½ MA | 1100.00 |

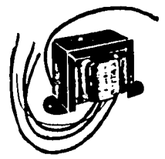
## HEAVY DUTY POWER SUPPLIES



For use in applications where high voltages at extra high currents are required. Illustrated is our 100 KW Model, rated for 0 to 7,000 Volts at 14 Amperes DC. This unit is housed in a single convenient cabinet. Output voltage is regulated against line and load changes. Voltage is smoothly adjustable from zero to full output. Automatic circuits protect against overvoltage or over current conditions, turning off main power in a split second. Use of special transformer construction allows constant load drain at full rated output. All power supplies in this series are available with fixed or adjustable output and with or without regulation.

| Model | Voltage | Current |
|---|---|---|
| A-10 | 0-1000 | 5 amperes |
| A-30 | 0-3000 | 5 amperes |
| A-31 | 0-3000 | 10 amperes |
| A-32 | 0-3000 | 20 amperes |
| A-50 | 0-5000 | 5 amperes |
| A-51 | 0-5000 | 10 amperes |
| A-72 | 0-7000 | 15 amperes |
| A-100 | 0-10,000 | 5 amperes |
| A-110 | 0-10,000 | 10 amperes |
| A-300 | 0-30,000 | 5 amperes |

## TRANSFORMERS, HIGH VOLTAGE

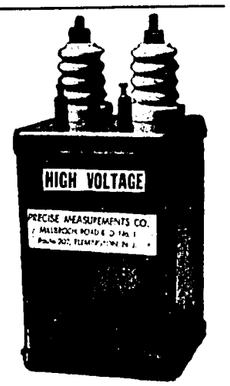


For experimental, industrial, or production use. These units are small and compact and rated for constant service. Primary designed for 115 Volts, 60 cycle. Secondary is isolated. Only standard models are listed. We can wind Specials for any frequency or voltage.

| Model | Voltage | Model | Voltage |
|---|---|---|---|
| 1 KVT | 1 KV | 10 KVT | 10 KV |
| 2 KVT | 2 KV | 15 KVT | 15 KV |
| 3 KVT | 3 KV | 25 KVT | 25 KV |
| 5 KVT | 5 KV | 50 KVT | 50 KV |

## PACKAGED POWER SUPPLIES

These conveniently packaged power units will be found ideal for applications requiring minimum size and weight. Features isolated high voltage terminals permitting either the positive or negative side to be grounded. Rectifier tubes are operated from separate filament transformers so that DC output voltage can be varied from zero to full rated value. Selenium rectifier types have extra cells to assure operation under high line voltage or light loading. All standard units have well filtered DC output. Power packs with AC output available on order.

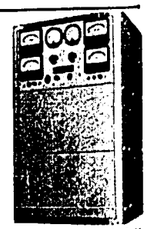



| Model | Output Voltage | Current | Model | Output Voltage | Current |
|---|---|---|---|---|---|
| 05-KV-5MA | 500 Volts DC | 5 Ma. | 20-KV-1MA | 20 KV DC | 1 Ma. |
| 1-KV-5MA | 1 KV DC | 5 Ma. | 20-KV-5MA | 20 KV DC | 5 Ma. |
| 2-KV-5MA | 2 KV DC | 5 Ma. | 30-KV-1MA | 30 KV DC | 1 Ma. |
| 5-KV-1MA | 5 KV DC | 1 Ma. | 30-KV-5MA | 30 KV DC | 5 Ma. |
| 5-KV-5MA | 5 KV DC | 5 Ma. | 50-KV-1MA | 50 KV DC | 1 Ma. |
| 10-KV-1MA | 10 KV DC | 1 Ma. | 50-KV-5MA | 50 KV DC | 5 Ma. |
| 10-KV-5MA | 10 KV DC | 5 Ma. | 75-KV-1MA | 75 KV DC | 1 Ma. |
| 15-KV-1MA | 15 KV DC | 1 Ma. | 100-KV-1MA | 100 KV DC | 1 Ma. |
| 15-KV-5MA | 15 KV DC | 5 Ma. | | | |

## CONSTANT CURRENT POWER SUPPLIES

Designed for application where output current must remain constant regardless of loading resistance changes. Used for magnet fields, plating applications, gaseous lamps. Dependable magnetic current stabilizer has no moving parts, no tubes, no transistors to replace. Simply set current to desired level, no balancing or other adjustments needed. Ideal for lamp operation since operating state ionizing voltage in no way affects lamp current. Standard hum level 5%. Lower hum levels available on order.

| Model | Maximum Voltage | Maximum Current |
|---|---|---|
| C-25-700 | 25 Volts | 700 Amperes |
| C-70-70 | 70 Volts | 70 Amperes |
| C-500-10 | 500 Volts | 10 Amperes |
| C-Duel 500-10 | 500 or 1,000 Volts | 10 or 20 Amperes |
| C-800-2 | 800 Volts | 2 Amperes |
| C-1000-100 | 1000 Volts | 100 Amperes |



Duel 500 V - 500 V, 10 Ampere Power Supply. Isolated outputs may be seried or paralleled.

## AC INSULATION and BREAKDOWN TESTERS



Used in testing insulation where AC voltages are desired. Dual instruments are also available which provide choice of AC or DC output with simple toggle switch selection. Units include kilovoltmeter, current meter and automatic overload cutout circuits.

| Model | Voltage | VA | AC | AC and DC Price |
|---|---|---|---|---|
| 3000 | 0 to 3,000 | 75 | $150.00 | $ 250.00 |
| 3010 | 0 to 3,000 | 300 | 250.00 | 400.00 |
| 3050 | 0 to 3,000 | 1,500 | 500.00 | 650.00 |
| 3100 | 0 to 6,000 | 3,000 | 700.00 | 1,100.00 |
| 5000 | 0 to 5,000 | 75 | 175.00 | 300.00 |
| 1000 | 0 to 10,000 | 75 | 200.00 | 350.00 |
| 1500 | 0 to 15,000 | 75 | 250.00 | |

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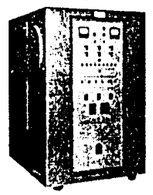


# Directory II. Components

## 63. Power Supplies.

Holt Instrument Laboratories, Wis., 5s, 10s, 55s
Homelite, Div. of Textron, Inc., N.Y., 40sc
Hoover Co., Ltd., The, Canada, 45c
Hoover Electronics Co., Md., 5c, 10c, 20c, 25c, 45c, 50c, 55c
Horlick Co., Inc., William L., Mass., 5c, 10c, 20c, 50c, 55c
Hycon Mfg. Co., Calif., 45c
Hydel, Inc., Mass., 45sc
Hydro-Aire Co., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 45c, 55c
Ideal Electric & Mfg. Co., The, Ohio, 5c, 10c, 15c, 20c, 30c, 40c, 50c, 55c
**Industrial Test Equipment Co., 55 E. 11th St., New York 3, N.Y., 5sc, 50sc, 55s, Tel: GRamercy 4-4684**
**See ad on page 333**
Intercontinental Electronics Corp., N.Y., 5sc, 15sc, 25c, 45c, 55c
**Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 5sc, 10sc, 15c, 20c, 25c, 30sc, 45sc, 50sc, 55sc, Tel: LUdlow 4-6200**
**See ads on pages 355, 487**
International Electronic Research Corp., ELIN Div., Calif., 5s, 15s, 20s, 30s, 55s
International Electronics Mfg. Co., Md., 15c
International Fermont Machinery Co., N.Y., 5c, 10c, 40c
International Telephone & Telegraph Corp., ITT Industrial Prods. Div., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 45c, 50c, 55c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 15c, 20c, 25c, 35c, 45c, 50c, 55c
Interstate Electronics Corp., Calif., 5s, 10s, 15s, 55s
Invar Electronics Corp., Calif., 10sc, 20sc, 45sc, 50sc, 55sc
Jansky & Bailey, Inc., D.C., 10c, 20c, 25c
Jobbins Electronics, Calif., 5, 10, 20, 30, 50, 55
Jordan Electronics, Div. Victoreen Instrument Co., Calif., 5sc, 10sc, 20sc, 30sc, 45sc, 55sc
Joy Mfg. Co., Electrical Products Div., Mo., 5s, 10s, 20s
Kaiser Electronics, Inc., N.J., 5sc, 10sc, 15sc, 20sc, 25c, 30sc, 35c, 45sc, 50sc, 55sc
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 15c
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 5c, 10c, 30c, 55c, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Keithley Instruments, Inc., Ohio, 30s, 55s
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 5c, 10c
**Kepco, Inc., 131-42 Sanford Ave., Flushing 52, N.Y., 5c, 10s, 15s, 20s, 25s, 30s, 35c, 45s, 50s, 55s, Tel: INdependence 1-7000**
**See ad on page 484**
Key Resistor Corp., Calif., 5c, 10c, 15c, 20c, 45c, 55c
Kidde & Co., Inc., Walter, N.J., 5c, 10c, 15c, 20c, 30c, 50c, 55c
Kidde Ultrasonic & Detection Alarms, Inc., N.J., 5s, 10s
Kilovolt Corp., N.Y., 5c, 10sc, 15sc, 50sc
**Kin Tel, Div. Cohu Electronics, Inc., 5725 Kearny Villa Rd., Box 623, San Diego 11, Calif., 10s, 55s, Tel: BRowning 7-6700**
**See ad on pages 110-111**
King Radio Corp., Kan., 45s
Knight Electronics Corp., Ill., 10s, 20s, 50s
Krohn-Hite Corp., Mass., 5s, 10s, 20s, 45s, 50s, 55s
**Kupfrian Manufacturing Corp., 157 Prospect Ave., Binghamton, N.Y., 5sc, 10sc, 15sc, 20sc, 30sc, 45sc, 50sc, 55sc, Tel: RAymond 3-6426**
**See ad on this page**

**L. LEVINTHAL ELECTRONIC PRODUCTS**
**Subsidiary of Radiation Incorporated**



*Levinthal Model 225P Power Supply is rated for 6 kw at 15 kv*

Levinthal's power-supply capabilities are specialized in the kilovolts-at-amperes level.
In this area there are available a number of standard designs that meet many routine requirements. Where needs are more specialized, custom designs can be produced. Ask for a proposal on your particular problem.

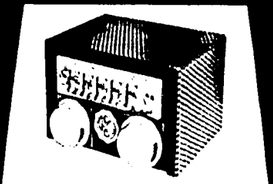
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PAGES 19-26
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and
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**KUPFRIAN**
**TRANSISTORIZED POWER SUPPLIES**



**STANDARD AND SPECIAL**

For low-cost standard supplies and special custom built units, consult Kupfrian Manufacturing Corp. The years of engineering and design experience by the Kupfrian organization guarantee a quality product economically priced.

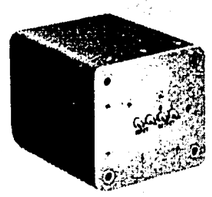
- STANDARD TRANSISTORIZED POWER SUPPLIES — Converters and Inverters (similar to above unit) available from stock. Outputs range from 20 to 750 watts.
- CUSTOM BUILT UNITS — Designed and engineered to commercial and military specifications. Send your requirements for a prompt quotation.
- STANDARD FEATURES INCLUDE — 80% efficiency — wide temperature range — excellent voltage regulation — approximately .4% ripple solid state design.

Write for Bulletin 6074 giving details and prices.

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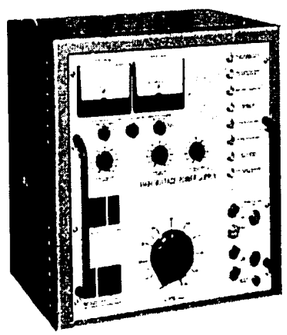
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



**Model QM6.3-.32.** Miniature Transistorized Regulated D-C Supply features regulation to ±0.05% for combined line and load variations. This is one of more than 180 miniature component-type power packs offered by Sorensen. They include, in addition to highly regulated d-c supplies, dc-to-ac inverters and dc-to-dc converters.



**Model Q12-15A.** One of the 15 Sorensen Q Series high-precision transistorized low-voltage supplies, features voltage regulation to ±0.05% for combined line or load variations. Models for 6, 12, 28 vdc out, with power capacities up to approximately 240 watts. Similar QR Series features precision regulation with wide output voltage adjustment range. Two models: 0-75vdc at 2 amps max and 0-36vdc at 4 amps max.



**Model 2150-5 (Control Section).** This is just one of a tremendous variety of Sorensen high-voltage d-c supplies, high-voltage a-c and a-c/d-c testers, and electrostatic-generators. Models completely cover the voltage range from 1000 to 600,000 volts. Power outputs range up to 60 kilowatts.

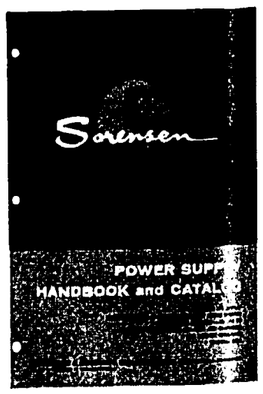
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**32-pages of important specifying data on...**

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# Directory II. Components

## 63. Power Supplies.

LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 45c, Tel: AMityville 4-2200
See ad on page 365

Lambda Electronics Corp., 11-11 131st St., College Point 56, N.Y., 10s, 20s, 30s, 45s, 50s, 55s, Tel: INdependence 1-8500
See ad on pages 19-26

Leach Corporation, 18435 Susana Rd., Compton, Calif., 5sc, 10sc, 20sc, 25sc, 30sc, 40c, 50sc, 55sc, Tel: NEvada 6-1061
See ad on page 514

Lear, Inc., Calif., 5sc, 10sc

Lee Electric & Mfg. Co., Calif., 10c, 15c, 20c, 25c, 30c, 45c, 55c

Leesona Corp., P.O. Box 1605, Providence 1, R.I., Fuel Cells c, Tel: WIllams 1-5200
See ad on page 674

Leland Airborne Products Div. of A.M.F., Ohio, 5sc, 10sc, 15c, 20sc, 25c, 30c, 40c, 45c, 55sc

Levinthal Electronic Products, Inc., Calif., 15c, 35c

Light Electric Corp., N.J., 15c

Litton Industries, Maryland Div., Md., 20, 45, 55

Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Div., Calif., 5s, 10s, 15s, 20s, 25s, 30s, 45s, 55s

M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 45c, Tel: GRamercy 3-5899
See ad on page 419

Macarr, Inc., N.Y., 10s, 20s, 25s, 55s

MacLaren & Co., Inc., F. B., N.Y., 55c

Madigan Electronic Corp., N.Y., 35c

Magnatran, Inc., N.J., 5c, 10c, 15c, 30c, 55c

Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 5sc, 10sc, 25c, 45sc, 55sc, Tel: CYpress 2-6610
See ads on pages 252, 364, 418

Magnetic Circuit Elements, Inc., Calif., 10c, 25c

Magnetic Controls Co., Minn., 5c, 10c, 20c, 25sc, 30c, 55c

Magnetic Instruments Co., Inc., 637 Commerce St., Thornwood, N.Y., 5c, 10c, 15s, 20c, 45c, 55c, Tel: ROgers 9-5312
See ad on page 364

Magnetics, Inc., Dept. P-80, P.O. Box 391, Butler, Pa., 25s, Tel: 7-3787
See ad on page 424

Maico Electronics, Inc., Minn., 5c, 10c, 45c

Mallory & Co., Inc., P. R., Ind., 10s, 45sc

Mandrel Industries, Inc., Tex., 10s, 45s

Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 5c, 10c, 15c, 30c, 35c, 55c, Tel: DAvis 5-1391
See ad on pages 96-97

Marconi's Wireless Telegraph Co., Ltd., N.Y., 5s, 45s, 55s

Marine Electric Corp., N.Y., 15c, 20c, 55c

Marine View Electronics, Inc., N.Y., 5c, 10c, 55c

Marstan Electronics Corp., N.Y., 10s, 45s, 55c

Mast Development Co., Inc., Iowa, 10c

Master Specialties Co., Calif., 5c, 10c, 45c

Matthew Laboratories, N.Y., 5sc, 10sc, 20sc, 25c, 30sc, 45sc, 50sc, 55sc

Mayberry Electronics Co., Calif., 5c, 10c, 20c, 30c, 45c, 50c, 55c

Mechanrod, Div. Servomechanisms, Inc., N.Y., 5s, 20s, 55s

Melpar, Inc., Special Products Dept., Va., 15c

Menlo Park Engineering, 711 Hamilton Ave., Menlo Park, Calif., 35sc, 55sc, Tel: DAvenport 6-9080
See ad on page 366

Metrolog Corp., Calif., 5, 45

Metrologie, Compagnie Generale de, France, 55s

Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N.J., 10s, 20s, 30s, 45s, 55s, Tel: DRexel 6-7130
See ad on page 482

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 30s, Tel: DAvenport 4-4108
See ad on page 402

Miller Company, Sanford, N.Y., 10c, 20c

Milro Controls Co., Inc., N.J., 5c, 10c, 15c, 20c, 25c, 45c, 55c

Minneapolis-Honeywell Regulator Co., Fall River Div., Mass., 10s

Minneapolis-Honeywell Regulator Co., Twin Cities, Minn., 5s

Miratel, Inc., Minn., 10s, 15s, 20s, 30s, 55s

Model Rectifier Corp., N.Y., 10sc, 20sc, 45sc, 50sc, 55sc

Moloney Electric Co., Mo., 5c, 10c, 15c, 55c

Montek Associates, Inc., Utah, 5sc, 10sc, 20sc, 45sc, 50sc, 55sc

Moran Instrument Corp., Calif., 15c, 55c

Motoresearch Co., Wis., 5c, 10c, 20c, 25c, 30c, 40c, 55c

Motorola Aviation Electronics, Inc., Calif., 10s, 45s

Multi-Amp Electronic Corp., N.J., 55s

Multi Products Co., Mich., 20s, 55s

NJE Corporation, N.J., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 45sc, 50sc, 55sc

Nacimco Products, Calif., 10s

Namiloa Corporation, Ohio, 10c, 20c, 45c, 55c

Narda Microwave Corp., The, N.Y., 15sc, 35s

National Instrument Laboratories, Inc., D.C., 10c, 55c

National Scientific Laboratories, Inc., D.C., 45c

National Semiconductor Corp., Conn., 45sc

Neff Instrument Corp., Calif., Strain Gage sc

Neptune Electronics Co., N.Y., 5c, 10c, 15c

Netarck Industries, Inc., N.J., 5c, 10c, 15c, 20c, 30c, 50c, 55c

Netarck Electronics Corp., Calif., 5c, 10sc, 20s, 25s, 55s

Neutronic Associates, Inc., N.Y., 5c, 15c, 50c, 55c

New London Instrument Co., Conn., 10s, 30s, 55s

New York Transformer Co., Inc., 5c, 10c, 25c, 45c, 55c

Nichols, Ltd., R. H., Calif., 5c, 10c, 30c, 50c, 55c

North Hills Electronics, Inc., Alexander Pl., Glen Cove, L.I., N.Y., 5s, 10s, 15s, 20s, 30s, 45s, 50s, Tel: ORole 1-5700
See ads on pages 405, 445, 558

Northeast Scientific Corp., Mass., Inc., 15sc, 30sc, 35sc, 55sc, 55sc

Nuclear Electronics Corp., Pa., Inc., Inc., 45c, 50c, 55c

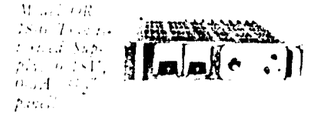
Nutron Mfg. Co., Inc., N.Y., 5sc, Inc., 20sc, 25sc, 30sc, 45sc, 55sc, 55sc

Ohio Semiconductors, Inc., Ohio, 55c

Oram & Sons, Inc., D. W., Mass., 30c

Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 5c, 10sc, 15sc, 20sc, 25sc, 30sc, 35c, 45sc, 50sc, 55sc, Tel: WOrth 6-0380
See ad on page 483


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Electronic Power Supplies of every type, size, and performance. The largest catalog line in the industry. Complete power-supply systems are our specialty.

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**"TECHNICAL APPARATUS BUILDERS"**

**AC & DC POWER TRANSFORMERS!**
**TABTRON®—TABPAK®TABTRAN®TABSTAT®**
**High Current Power Supplies**
***Five Year Guarantee*****
Variable Stepless from Zero to Full Voltage DC
Full Wave Selenium or Silicon Rectifier.
Isolation Power Transformer, Variac®, Meters, Cabinet.
***Per Factory Warrantee — Write Details*
*INPT—115 VAC 1 ϕ 60 cys STD! Others Write?*

| Stock # Volts & Amps | Continuous Rating | With Meters |
|---|---|---|
| T15V10ACC | 0-16 VDC @ 10A 0.5% Rip @ 5A | $48 |
| T32V5A | 0-32 GVDC @ 5 Amps | $63 |
| T32V5ACC | 0-32 VDC @ 5A/1% Ripple | $84 |
| T32V5A2CC | 0-32 VDC @ 5A/0.1% Ripple | $108 |
| T32V12A | 0-32 WVDC @ 12 Amps | $145 |
| T32V12ACC | 0-32 VDC @ 12A/1% Ripple | $174 |
| T32V20A7C | 0-32 VDC @ 20 A/0.5% Ripple | $234 |
| T32V24A | 0-32 VDC @ 24 Amps | $178 |
| T32V24ACC | 0-32 VDC @ 24A/1% Ripple | $234 |
| T32V24ACC | 0-32 VDC @ 24 A/0.1% Ripple | $320 |
| T32V50A | 0-32 VDC @ 50 Amps. | $327 |
| T32V50ACC | 0-32 VDC @ 50 A/1% Ripple | $400 |
| T130V1A | 0-130 WVDC @ 1 Amp | $99 |
| T130V1ACC | 0-130 WVDC @ 1 A/1% Ripple | $124 |
| T130V5A | 0-130 WVDC @ 5 Amp. | $224 |
| T130V5ACC | 0-130 WVDC @ 5 A/1% Ripple | $299 |
| T130V10ACC | 0-130 WVDC @ 10 A/1% Ripple | $453.75 |

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| 0 to 32 WVDC—REGULATION 1% AT 24-32 VDC | | |
|---|---|---|
| MRT12V2A | 0-32 VDC @ 2 A/0.5% Ripple | $135 |
| MRT12V4A | 0-32 VDC @ 4 A/1% Ripple | $189 |
| MRT12V12A | 0-32 VDC @ 12 A/1% Ripple | $384 |
| MRT12V25A | 0-32 VDC @ 25 A/1% Ripple | $459 |
| MRT12V50A | 0-32 VDC @ 50 A/1% Ripple | $695 |

**CASED FILTERED RELAY SUPPLIES**
12-16 VDC; 24-28 VDC/115 VAC/60

| | | |
|---|---|---|
| B12VER | 12-16 VDC @ 2 Amps | $9.80 |
| B12VGR | 12-16 VDC @ 6 Amps | $12.80 |
| B24VAR | 24-28 VDC @ 1 Amp | $8.40 |
| B24VER | 24-28 VDC @ 2 Amps | $12.80 |
| B24VJR | 24-28 VDC @ 6 Amps | $24.80 |

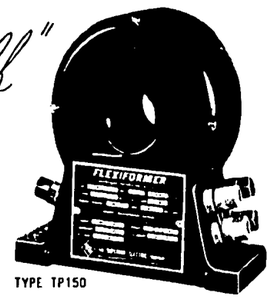
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| | F. W. CENTER TAP | | |

# FLEXIFORMER® *Packaged Transformer Primary*

"A *Do-it-yourself*" TRANSFORMER

- A MULTIPLE SOURCE OF A-C VOLTAGES
- A CURRENT TRANSFORMER



TYPE TP150

This "do-it-yourself" transformer is a self-contained toroidal primary coil complete with SUPERIOR 5-WAY Binding Posts for connections. The binding posts are colored for relative polarity identification. The primary consists of a strip-wound silicon steel core having a coil of 400 turns of #24 B&S gauge copper wire. When used as a source of a-c voltage, the center opening permits hand threading the proper number of secondary winding turns to obtain the desired output voltage. When used as a current transformer, the FLEXIFORMER winding becomes the secondary winding with the current induced by a wire passing through the center opening.

**. . . AS A CURRENT TRANSFORMER**

FLEXIFORMER type TP150 becomes the secondary winding when used as a current transformer. A current carrying conductor passing through the center opening serves as the primary. When used with a 0-1 ampere ammeter, currents up to 400 amperes can be measured with an accuracy of 1% at 60 cycles. Can be portable or fastened permanently in place.

**. . . AS A SOURCE OF A-C VOLTAGE**

FLEXIFORMER type TP150 has an input rating of 120 volts, 50/60 cycles single phase and an output rating of 150 VA. The voltage of the secondary is proportional to the number of turns hand wound through the center opening. The correct number of turns is determined by dividing the desired output voltage (plus approximately 25%) by 0.3.

## POWERSTAT® *Decade Line Corrector*


Type DLC1005

**INPUT: 120 v., 50/60 cycles, single phase**
**OUTPUT: 5.0 amperes maximum**

| | OUTPUT RANGE | |
|---|---|---|
| | Line Corrector* | Variable Low Voltage Supply* |
| DIAL #1 | 90%-110% | 10%-0-10% |
| DIAL #2 | 99%-101% | 1.0%-0-1.0% |
| DIAL #3 | 99.9%-100.1% | 0.1%-0-0.1% |

*Percent of line voltage.

Can be used as either a variable low voltage supply or as a line corrector. Essentially consists of three POWERSTAT variable transformers individually connected to three buck-boost fixed-ratio transformers. SUPERIOR 5-WAY binding posts with jumpers are provided and arranged so that outputs can be inserted in the line or removed as desired. The output voltage adjustments can be made in any combination or individually as desired.

## EXEL *Loading Reactor*


Type LR2

120 volts, 60 cycles
2.0 amperes at 120 volts
Inductive reactance 60 ohms
D-C resistance 4.0 ohms
Inductance 0.16 henrys

Designed to provide a convenient inductive load which can be made adjustable when used in conjunction with a POWERSTAT variable transformer. Used primarily for testing apparatus at various lagging power factors, i.e., to simulate an inductive load. Essentially consists of a gapped, strip-wound silicon steel toroid core, wire-wound and imbedded in epoxy compound. Entire assembly enclosed in a self-contained, durable, high grade phenolic case having two SUPERIOR 5-WAY binding posts for connections. At 60 cycles, the EXEL has essentially a linear current curve from 0 to nominal 2.0 amperes for continuous duty and up to 3.0 amperes for intermittent duty.

## VARICELL® adjustable *A-C/D-C Power Supply*


Type V4050-3

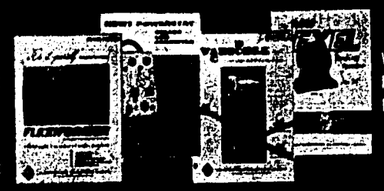
A-C INPUT: 240 v., 50/60 cycles, 3-phase (Primary delta connected) 480 v., 50/60 cycles, 3-phase (Primary wye connected)

A-C OUTPUT: 0-25 v., 40 amps., 3-phase (Secondary delta connected) 0-50 v., 25 amps., 3-phase (Secondary wye connected)

D-C OUTPUT: 0-35 v., 50 amps. (Secondary delta connected) 0-60 v., 30 amps. (Secondary wye connected)

Provides a source of adjustable low a-c or d-c voltage from a-c power lines. Essentially consists of a 3-phase. low voltage POWERSTAT variable transformer combined with a static d-c power supply. Power supply uses highly efficient silicon rectifier cells connected for full-wave 3-phase operation. The a-c and d-c outputs cannot be simultaneously loaded or externally interconnected. The a-c output can be used either single or three-phase.

THE SUPERIOR ELECTRIC COMPANY
600 Ames Avenue, Bristol, Connecticut



WRITE FOR LITERATURE






# Directory II. Components

## 63. Power Supplies.

Standard Electronics Div., Reeves Instrument Corp., N.J., 5c, 15c, 20c, 25c, 30c, 35c, 50c
Standard Telephones & Cables, Ltd., England, 10sc, 20sc, 30sc, 35sc, 55sc
State Testing Laboratory, Inc., Conn., 50c, 55c
Stelma, Inc., Conn., 10c, 20c, 45c, 55c
Stereatronics, Inc., Mass., 10sc, 45sc
Strand Labs., Inc., Mass., 35sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c
**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 5s, 10s, 50s, Tel: LUdlow 2-9561**
**See ads on pages 412, 468, 494, 572, 586**
**Syntron Co., Semiconductor Div., 83 Lexington Ave., Homer City, Pa., 10c, 50c, 55c, Tel: GRidley 9-8011**
**See ad on page 506**
TRG, Incorporated, N.Y., 5c, 10c, 15c, 35c, 45c
T T Electronics, Inc., Calif., 10s, 20s, 30s, 45s, 55s
Technical Measurement Corp., Conn., 15s, 55s
Tel-Instrument Electronics Corp., N.J., 5s, 50s
Telechrome Mfg. Corp., N.Y., 5s, 10s, 25s, 30s, 45s, 50s, 55s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, 10c, Tel: YE 2-8600**
**See ad on page 338**
Telephonics Corp., N.Y., 5c, 20c, 30c, 45c, 55c
Telerad Mfg. Corp., N.Y., 35c
**Television Utilities Corp., Division of Nord, 300 Denton Ave., New Hyde Park, L.I., N.Y., 5sc, 10sc, 20s, 55s, Tel: TWining 8-1000**
**See ad on page 260**
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 5c, 10c, 25c, 30c, 45c, 55c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**
Telkor, Inc., Ohio, 5c, 10c, 20c, 45c, 50c
**Teltronics, Inc., 277 Main St., Nashua, N.H., 10c, 20c, 30c, 45c, 50c, 55c, Tel: TUxedo 2-6264**
**See ad on page 337**
Temco Electronics, Div. Ling-Temco Electronics, Inc., Tex., 10c, 35c
Texas Instruments Incorporated, Geosciences & Instrumentation Div., Tex., 10s, 30s, 45s
Thermo Electron Engineering Corp., Mass., Thermoelectric c
Thomas Electronics, Inc., N.J., 15c
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c, 10c, 20c, 25c, 45c
Topping Electronics, Ltd., F. V., Canada, 5c, 10c, 20c, 45c, 55c
**Torotel, Inc., 5512 E. 110th St., Kansas City 34, Mo., 5c, 10c, 25c, 30c, 45c, 55c, Tel: SOuth 1-6314**
**See ad on page 405**
Torwico Electronics, Inc., N.J., 10c
Tracerlab, Inc., Mass., 10sc, 15sc, 20sc, 50sc, 55sc
Trans Electronics, Inc., Calif., 5c, 10sc, 15c, 20c, 25c, 30c, 45c, 50sc, 55sc
Trans-Sil Corp., N.J., 10c, 15c, 20c, 25c, 30c, 50c, 55c
Trans-Sonics, Inc., Mass., 10c
Transdyne Corp., N.Y., 5c, 10c, 30c, 55c
Transformer Specialty Co., Pa., 5c, 10c, 15c, 25c
Transformer Technicians, Inc., Ill., 5c, 10c, 20c, 30c, 55c
Transformers, Inc., N.Y., 25c
Transistor Devices, Inc., N.J., 5c, 10sc, 15c, 20sc, 30c, 45sc, 50sc, 55sc
**Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 20sc, 45sc, Tel: WEst 9-6754**
**See ad on page 472**
Transistor Specialties, Inc., N.Y., 20s, 45s, 55s
Transval Electronics Corp., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 45c, 50c, 55c
Trenton Transformer Corp., N.J., 5sc, 10sc, 15sc, 20sc, 30sc
Trott Electronics, Inc., N.Y., 5c, 10c, 20c, 50c, 55c
Trygon Electronics, Inc., N.Y., 10sc, 20sc, 25sc, 30sc, 35sc, 45sc, 50sc, 55sc
Tullamore Electronics Corp., Ill., 15, 55
USI Western Design, Div. U.S. Industries, Inc., Calif., 30
Ultek Corp., Calif., 5s, 55s
United Control Corp., Wash., 5c, 10c, 45c, 55c
United Electrodynamics, Inc., Calif., 10s, 20s, 30s, 35c, 45s, 55s
United States Motors Corp., Wis., 35sc, 40sc
U. S. Recording Co., D.C., 5c, 10c
U. S. Science Corp., Calif., 5c, 10c, 15c, 20c, 30c, 35c, 40c
Unitek Corp., Weldmatic Div., Calif., 10s
Universal Electronics Co., Calif., 10sc, 15sc, 20sc, 25sc, 30sc, 45sc, 50sc, 55sc
**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 5c, 15c, Tel: AN 1-2660**
**See ad on page 678**
Valor Instruments, Inc., Calif., 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 50sc, 55sc
Van Norman Industries, Inc., Electronics Div., N.H., 5sc, 10sc, 15sc, 20sc, 30sc, 45sc, 50sc, 55sc
**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 15c, 35c, Tel: DAvenport 6-4000**
**See ad on pages 116-117**
Varo Mfg. Co., Inc., Tex., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 45sc, 50sc, 55sc
VecTrol Engineering, Inc., Conn., 10c, 20c, 55c
Vickers, Inc., Electric Products Div., Mo., 5c, 10c, 20c, 25c, 35c, Frequency Regulated c
**Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 15s, Tel: ENdicott 1-6200**
**See ads on pages 535, 578**
Video Instruments Co., Inc., Calif., 10, 20, 45, 50, 55
Viking Industries, Inc., Calif., 10c, 45c
Vinco Electronics Corp., Conn., 5c, 10c, 20c, 30c, 45c, 50c, 55c
Virginia Electronics Co., Inc., D.C., 5c, 10c, 15c, 20c, 30c, 45c, 55c
**Wallson Associates, Inc., 912-914 Westfield Ave., Elizabeth, N.J., 5c, 10c, 15c, 20c, 25c, 30c, 50c, 55c**
**See ad on page 294**
Warren Mfg. Co., Inc., The, Mass., 5c, 10c, 15c
Wave/Particle Corp., Calif., 10, 15, 20, 30, 35, 55
**Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 35, Tel: LOckwood 4-0121**
**See ads on pages 315, 384**
Wesco Electrical Co., Inc., Mass., 10sc, 15sc, 50sc, 55sc
Westinghouse Electric Corp., Small Motor Div., Aircraft Equip. Dept., Ohio, 5c
Westronics of California, Calif., 45c
Wheeler Electronic Corp., Conn., 5c, 10c, 20c, 25c, 30c, 45c, 50c, 55c
Wickes Engineering & Construction Co., N.J., 5c, 10c, 20c, 25c, 45c, 50c, 55c
**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5s, 10s, 20s, 30s, 45s, Tel: BEnton 1-0700**
**See ad on page 573**
Wintronics, Calif., 20s, 45s, 50s
Yuba-Dalmotor Div., Yuba Consolidated Industries, Inc., Calif., 15s, 40sc

**Power tubes:**
**See class 79**

**Pre-amplifiers:**
**See class 38**

**Printed circuit machinery:**
**See class 96**

**Printed circuit sockets:**
**See class 71**

## 64. Printed & Packaged Circuits.

5. Etched or screened prewired chassis
10. Modules
15. Plug-in
20. Potted type
25. Printed electronic assemblies
30. Solder dipped prewired chassis

ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 10c, 15c, 20c, Tel: VIctoria 9-2414
See ad on page 474
ACF Electronics Div., ACF Industries, Inc., Md., 5c, 10sc
AMP Incorporated, Pa., 10s, 15s, 25s
A.R.F. Products, Inc., Ill., 5c
Accurate Electronics Corp., Ohio, 25c
Adage, Inc., Mass., 10s, 15s
Advance Instrument Corp., N.J., 10c, 15c, 25c
Aerovox Corp., Mass., 10s

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

ALDEN

# Plug-in components for electronic systems

Alden plug-in components offer far more than the convenience and ease of modular packaging . . . the prime advantage of these basic building blocks is that they make possible **more reliability in service.**

**More in-service reliability through:**



**Tell-tale monitoring** — all controls easily accessible, up front. Tiny tell-tales spot trouble instantly, isolate it to a specific modular unit.

**Quick removal** — malfunctioning unit can be removed with a half turn of the wrist, reducing down-time to 30 seconds with plug-in spare.

**Quick replacement** — malfunctioning component can be snapped out and replaced in seconds.

**In-service checks** — Alden Adapter Cable brings chassis out into the open while in operation for quick checking.

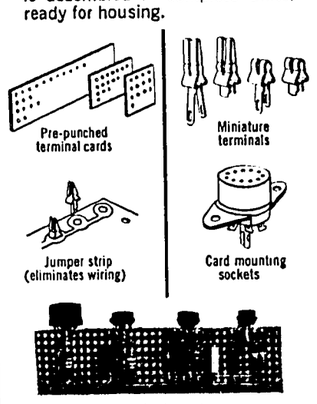
**Single point of check** — all leads brought to single checkpoint — makes possible color coded, vividly illustrated circuit legends.

**Quick repair** — rugged, portable carrying case protects chassis. Replacement of malfunctioning chassis is only air mail time away from service center.

## From layout to finished equipment...in just 3 steps:

**1**

Unitize circuitry in compact, vertical planes with Alden Terminal Card Mounting System — Your circuitry is assembled in complete units, ready for housing.



Pre-punched terminal cards

Miniature terminals

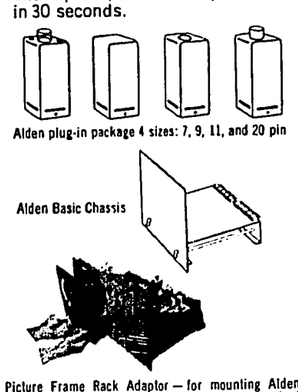
Jumper strip (eliminates wiring)

Card mounting sockets

Complete circuits ready for plug-in package or chassis

**2**

Mount cards in Alden Basic Chassis for tremendous variety with standard components — Alden provides standard plug-in or slide housings. With spares, units are replaceable in 30 seconds.



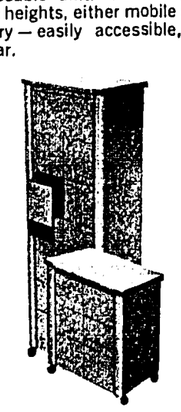
Alden plug-in package 4 sizes: 7, 9, 11, and 20 pin

Alden Basic Chassis

Picture Frame Rack Adaptor — for mounting Alden Basic Chassis in any combination. Mounts in standard rack or Alden UniRacks.

**3**

Mount sub-assemblies in Alden UniRacks — UniRacks fully utilize all the features of plug-in construction, give you a more compact, serviceable unit. Furnished in 2 basic heights, either mobile or stationary — easily accessible, front or rear.



### Assign Alden testing and sensing elements to each unit to spot trouble instantly



Miniature test jacks — Miniature indicator lights — Miniature Pan-i-lite Switch (momentary contact) — Stacking and patch cord



**Write today for new Alden Plug-in Booklet and handy, up-dated Quick Order Guide.**

### Two time saving, money saving, "GET STARTED" KITS



**Terminal Card Mounting Kit #42** — Includes new Alden Staking Tool plus prepunched terminal cards, ratchet terminals, eyelets, brackets, and card mounting tube sockets —everything for simplified, time saving circuitry layout. **$49.95**



**Basic Chassis and Terminal Card Assortment Kit #37** — All necessary components to mount, house, fasten and monitor your electronic circuitry. Makes sense, save time, establishes reliability. **$249.50**

Other kits from **$11.50**

ALDEN PRODUCTS COMPANY, 140 N. Main Street, Brockton, Mass.

For details, circle #473 on Reader Service Card








# Directory II. Components

## 64. Printed & Packaged Circuits.

Airborne Instruments Lab., N.Y., 10sc
Aircraft Radio Corp., N.J., 5sc, 15s, 30s
**Airflyte Electronics Co., 537 Avenue A, Bayonne, N.J., 20c, Tel: HEmlock 6-2230**
See ad on page 408
Airtronics International Corp., Fla., 25c
Alcon Metal Products, Inc., Ill., 15c, 30c
**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 5s, 10s, 15s, Tel: JUniper 3-0160**
See ad on page 496
Allied Allegri Co., Inc., N.J., 5c, 25c, 30c
American Printed Circuits Co., N.J., 5sc
American Research & Mfg. Corp., Md., 10s, 15s, 25s
**Ansley Mfg. Co., Arthur, New Hope, Pa., 5c, 10c, 15c, 20c, 25c, 30c, Tel: AXtel 7-2711**
See ad on this page
**Anton Electronic Laboratories, Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 30sc, Tel: EVergreen 6-5715**
See ads on pages 319, 409, 581
Applegate & Co., C. J., Colo., 15sc, 20sc
Applied Dynamics, Inc., Mich., 5c, 10c, 15c
Applied Electro Mechanics, Inc., Va., 5c
Artronic Instr. Co., Md., 15s, 20s, 25s
Atlantis Electronics Corp., Tex., 10sc, 15sc, 20sc
Auerbach Electr. Corp., Pa., 10sc, 15sc
Avionics, Ltd., Canada, 5c, 10c, 15c, 20c, 25c, 30c
**Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass., 20c, 25c, Tel: UNiversity 4-7420**
See ad on page 280
Barber Labs., Alfred W., N.Y., 10s
Bartlett Mfg. Co., Ill., 5c
Beck's, Inc., Minn., 5c, 15c, 25c
Bell & Gossett Co., Ill., 10c, 15c, 20c, 30c
Bellandi Co., Inc., M., Ill., 5c, 10c, 15c, 20c, 25c, 30c
Bendix Corp., The, Cincinnati Div., Ohio, 10c, 15c, 20c
Bendix Corp., The, Industrial Controls Section, Mich., 10s, 15s, 25s
Bendix Corp., The, York Division, Pa., 10c, 15c, 20c, 25c
Berneo Engineering Corp., Ind., 5c
Bo Myte Co., The, Pa., 5c
Buckbee Mears Co., Minn., 5c
**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 10c, 15c, Tel: CLoverdale 3-8931**
See ad on page 321
**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 10c, 15c, 20c, 25c, 30c, Tel: NEwtown 9-5700**
See ad on page 426
Bureau of Engraving, Inc., Minn., 25sc
Burr-Brown Research Corp., Ariz., 10s, 15s, 25s
Burroughs Corp., Electronic Instruments Div., Pa., 10c, 15c, 20c
Burton-Rodgers, Inc., Ohio, 5c, 10c, 15c, 25c
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 10c, 25c
C.E.S. Electronic Products, Inc., Calif., 15s
Cadre Industries Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c
California Computer Products, Inc., Calif., 15c, 25c
Cambridge Thermionic Corp., Mass., 10s
Canadian Aviation Electronics, Ltd., Canada, 15c
Central Dynamics, Ltd., Canada, 15c, 25c, 30c
**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 10c, 15c, 25sc, Tel: WOodruff 2-9200**
See ad on page 152
Chance Vought Electronics Div., Tex., 5c, 20c, 25c, 30c
Chicago Aerial Industries, Inc., Ill., 15c, 25c
Chicago Electronic Div., Land Air, Inc., Ill., 5c, 10sc, 15c, 20c, 25c, 30c


*Printed Circuits*

QUALITY BOARDS MANUFACTURED UNDER RIGID CONTROLS FOR..

- DATA PROCESSING SYSTEMS
- MISSILE GUIDANCE
- QUALITY INSTRUMENTS
- COMPUTERS
- COMMERCIAL PROJECTS

**DEFIANCE PRINTED CIRCUIT CORPORATION**

81 ALBION ST. WAKEFIELD, MASS.

For details, circle #474 on Reader Service Card

PRINTED CIRCUITS

**DESIGN · PRODUCTION · ASSEMBLY**

**Completely Integrated Service**

*Printed Circuits for Military and Industrial Electronic Equipment*

"Packaging" of circuits, from schematic diagram into Printed Circuit or Modular form

Production in small or medium quantities — prototypes to a few thousand boards.

Secondary operations: Plating — Fabrication — Assembly — Dip Soldering — Encapsulation

Rigid Inspection and Quality Control insure the production of High Reliability Printed Circuits to Exacting Specifications.

Ansley | PLUS | Module

Adds a third dimension to printed circuitry. It may answer your design problem. Ask us for details.

PRINTED ANSLEY CIRCUITS

*PRINTED CIRCUIT DESIGN and PRODUCTION*

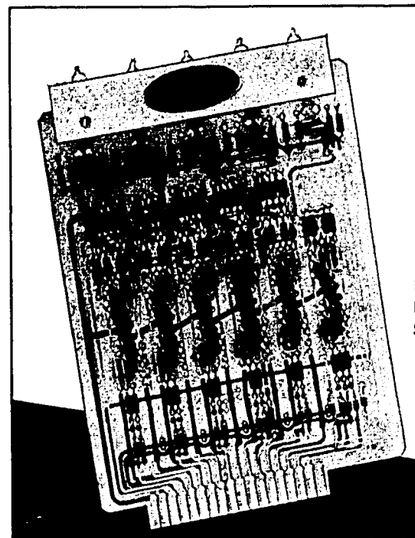
**ARTHUR ANSLEY MFG. CO.**

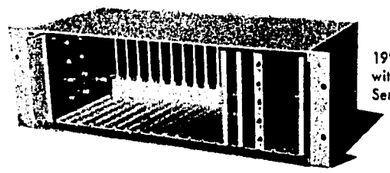
NEW HOPE, PA. PHONE, AXTEL 7-2711

Write for our booklet . . . "Some Suggestions on Printed Circuit Layout and Design."

For details, circle #475 on Reader Service Card

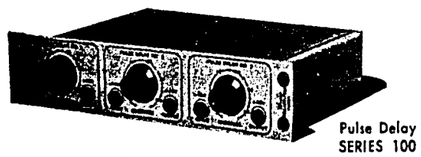

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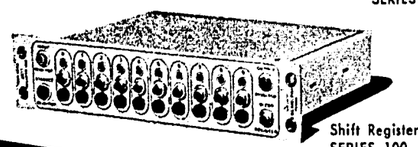


19" Relay Rack Housing with new Series 300 5" x 6" modules

5 Stage Reversible Binary Counter SERIES 300

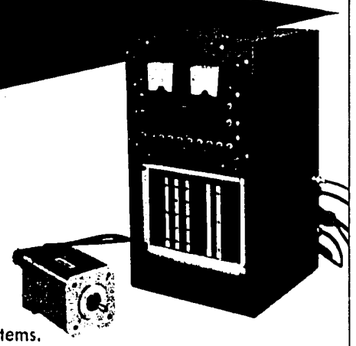


Pulse Delay Tri-Unit SERIES 100



Shift Register Decade Unit SERIES 100

# TRANSISTORIZED DIGITAL SYSTEMS BLOCKS



**FREE**

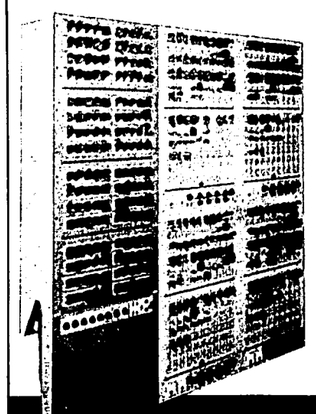
Send for complete data and specifications on either the 100 Series or 300 Series systems blocks.

Creative engineering by NAVCOR has successfully developed the 100 Series transistorized modules - for digital test equipment and prototype development, and the newer 300 Series card modules - for constructing complete data handling systems. Delivered complete and attractively packaged, these economical systems modules are ready to operate with a minimum of inter-unit wiring.

NAVCOR can engineer and manufacture complete systems to your requirements. Years of experience, devoted exclusively to semiconductor digital systems design, have produced well over 100,000 operating logic stages.

**UNITS AVAILABLE**

- PULSE GENERATORS
- PULSE DELAYS
- FLIP-FLOP STORAGE REGISTERS
- SHIFT REGISTERS
- REVERSIBLE SHIFT REGISTERS
- BINARY COUNTERS
- COMPLEMENTING FLIP-FLOPS
- REVERSIBLE BINARY COUNTERS
- BINARY DECIMAL COUNTERS
- PULSE STANDARDIZERS
- AMPLIFIED NOR LOGIC
- COMPARATORS
- ELECTRONIC SWITCHES
- PULSE SORTERS
- LOW LEVEL AMPLIFIERS
- DIGITAL TO ANALOG CONVERTERS
- DIGITAL DECODERS & ENCODERS
- DIODE GATES
- DELAY MULTIVIBRATORS
- INVERTERS, EMITTER FOLLOWERS



## GENERAL CHARACTERISTICS

**100 SERIES**

Time proven 100 Series modules have been used extensively for bench top test equipment and for rapidly building system prototypes. Complete 10 stage BINARY COUNTERS, SHIFT REGISTERS, etc., are attractively packaged in 2¼" x 10½" slide-in units, which assemble into portable cabinets or relay rack housing.

The completely compatible 100 Series transistor circuitry is operable from D. C. to 200KC.

**300 SERIES**

The completely compatible 300 Series transistor circuitry is operable from D. C. to 300KC and is packaged on 5"x6" glass epoxy cards, with neon indicators and pull handles. There are five stage BINARY COUNTERS, SHIFT REGISTERS, etc. per card.

As many as 100 bits of logic circuitry may be contained in a single 19" relay rack housing. Gold taper pin connectors facilitate inter-unit wiring.

**NAVIGATION COMPUTER CORPORATION**

1621 SNYDER AVE., PHILA. 45, PA. • HOward 5-7700

Navcor






# Directory II. Components

## 64. Printed & Packaged Circuits.

**Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 15s, Tel: NEvada 2-2000**


See ad on pages 46-47


**Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif, 25sc, Tel: WOodland 7-1113**


See ad on page 471


Cleveland Metal Specialties Co., Ohio, 5sc, 10sc, 15sc, 20sc, 25sc, 30c

Coils-Electronics Co., Pa., 10c, 15c, 25c

Collins Radio Co., Central Sales Office, Tex., 5sc, 10sc, 15sc, 20sc, 30sc

**Computer Control Co., Inc., Eastern Div., 983 Concord St., Framingham, Mass., 10s, 15s, Tel: TRinity 5-6185**


See ad on page 264


**Computer Control Co., Inc., Western Div., 2251 Barry Ave., Los Angeles 64, Calif., 10s, 15s, Tel: BRadshaw 2-9135**


See ad on page 264


Conductorlab, Inc., Mass., 5c, 10c, 15c, 25c, 30c

Consolidated Avionics Corp., N.Y., 5sc, 10sc, 15sc

**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 5sc, 10sc, 15c, 20sc, 25sc, 30sc, Tel: YOnkers 3-5900**


See ad on page 523


Control Equipment Corp., Mass., 5c, 10s, 15s, 20c, 25c, 30c

Cook Electric Co., Ill., 5c, 15c, 25c

Cook Technological Center, Div. Cook Electric Co., Ill., 5c, 10c, 25c, 30c

**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 5c, 10sc, 15c, 30c, Tel: FOrest 2-5571**


See ads on pages 390, 523


Corning Glass Works, Electrical Products Div., N.Y., 10s, Boards, P.C. s

Croname, Inc., Ill., 5c

Curtiss-Wright Corp., Electronics Div. IMI Branch, N.M., 10c, 15c, 20c

Data Products Co., Inc., Md., 5c, 10c, 15c, 25c

Datex Corp., Calif., 10sc, 15sc

Daven Co., The, N.J., 10c, 15c, 20c, 25c

Dayton Electronic Products Co., Ohio, 5sc, 10sc, 15sc, 20sc, 25sc

**Defiance Printed Circuit Corp., 81 Albion St., Wakefield; Mass., 5c, 25c, 30c, Tel: CRystal 6-5311**


See ad on page 497


Delta-F, Inc., Ill., 15c

**Dependable Printed Circuit Corp., 827 Black Oak Ridge Rd., Wayne, N.J., 5c, 10c, 15c, 20c, 25c, 30c, Tel: TEmple 5-2765**


See ad on this page


Designers for Industry, Inc., Ohio, 10c, 30c

Developmental Electronics Corp., Calif., 15sc, 20sc

Di/An Controls, Inc., Mass., 10sc, 20sc, 25c

Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 10c, 25c

Digital Equipment Corp., Mass., 10, 15, 25

Digitran Co., The, Div. Endevco Corp., Calif., 10s

Digitronics Corp., N.Y., 15c, 25c

Dwyer Engineering Co., Inc., N.H., 5c, 10c, 15c, 20c, 25c, 30c

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 20c, 25c, Tel: HAlifax 6-7491**


See ad on page 400


Eaton Electronics Corp., Conn., 5c, 20c, 25c, 30c

Eby Co., Hugh H., Pa., 5c

Ehrenpreis, David, Consulting Engineers, N.Y., 5c, 10c, 15c, 20c, 25c, 30c

**Electralab Printed Electronics Corp., 179 "A" St., Industrial Ctr., Needham Heights 94, Mass., 5c, 25c, Tel: HIllcrest 4-3912**


See ad on this page


Electric Specialty Co., Conn., 10c

Electro-Chemical Engraving Co., Inc., N.Y., 5c

Electro-Etch Circuits, Inc., Calif., 5c, 10c, 15c, 25c

Electro Precision Corp., Ark., 5

Electro-Seal Corp., Ill., 10sc, 15sc, 20sc, 25sc, 30sc

Electronet Div., Rue Products, Calif., 5c, 10s, 15s, 20s

Electronic Associates, Inc., N.J., 5c, 10c, 15c

Electronic Cable Corp., Mass., 10c, 15c, 20c, 25c, 30c

Electronic Plastics Co., Calif., 5c, 10c, 15sc, 20sc, 25c, 30c

Electronic Processes Corp. of California, Calif., 15sc, 20sc

Electronic Production & Development, Inc., Calif., 20c

Electronic Specialty Co., Calif., 10c, 15c, 20c

Electronics, Inc. of Pa., Pa., 5c, 10c, 15c, 30c

Emerson Electric Mfg. Co., The, Mo., 15c, 20c

Engineered Electronics Co., Calif., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc

Epsco, Inc., Mass., 10s, 15s, 20s, 30s

Erie Pacific Div., Erie Resistor Co., Calif., 5c, 10c, 15c

**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 10sc, 15sc, 20sc, 25sc, 30c, Tel: GLendale 6-8592**


See ad on pages 40-41


Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 20c, 25c, 30c

Essex Electronics, Div. Nytronics, Inc., N.J., 10c, 15c, 20c


**Electralab Printed Electronics Corporation**

EPEC

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Tel.: HIllcrest 4-3912

**Western Division**
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Tel.: Plateau 3-1181

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DEPENDABLE PRINTED CIRCUIT CORP.

827 Black Oak Ridge Rd., Wayne, N.J.

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# "FIRST IN PRINTED CIRCUITS"

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CORPORATION

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PHOTOCIRCUITS CORP. OF CALIF.
ANAHEIM, CALIFORNIA KEllogg 2-3338



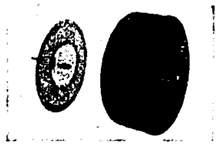
**PRODUCTION CAPACITY**
complete job shop facilities

You can have the world's largest and most flexible printed-circuit manufacturer at your service. Whether it's 100 or 1,000,000 boards, IBM punched card scheduling, experienced production people and stringent quality control methods assure you dependable quality and reliability . . . on time.



**TUF-PLATE HOLES**
reliable thru-hole construction

PC's famous plated-thru holes are substantially more reliable than eyelets under experimental cycling. Will pass MIL-E-5272A without a failure. Plating is dense, ductile and fine grained. Tuf-Plate holes assure reliable dip soldering as a homogenous portion of your circuitry.



**PRINTED DC SERVO MOTORS**
provide direct drive

PMI permanent magnet dc motors feature a disc-type armature with no rotating iron. They are ideal for instrument applications requiring unusually low inertia, smooth torque, high pulse torque capability, and minimum inductance. Applications include positioning servos, tape reel drives, numerical positioning devices, and intermittent motion systems.

**MINIFY**
tested and proven miniaturization

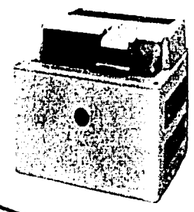
Landless, plated thru-hole construction saves up to 80% of board space. Components are the size limiting factors, not the circuitry. Each board has the same Tuf-Plate reliability—production proven in thousands of military uses.



PC

**PHOTOELECTRIC TAPE READER**
whisper-quiet operation

This completely transistorized reader has only one moving part (the PMI printed drive motor), thus guaranteeing high reliability. Reading speeds up to 60 characters per second in Model #100, and block reading up to 80 bits in the Model #200 photoelectric tape reader are available. Whisper-quiet operation without brakes or clutches reduce maintenance to a minimum.



Timely tech bulletins written for engineers and designers who wish to keep pace with the newest developments in printed circuitry. Bulletins give specifics on materials, layout, design, assembly, etc. To receive them contact your nearest PC field office.

Streamlined prototype system puts finished boards in your hands quickly. From quote to shipment, your requirements are handled rapidly . . . in a matter of hours. Complete and separate from general production, the Proto-Circuits Division is staffed by experts to help you with money-saving pre-production boards.

ENCAPSULAYER: a multiple layer printed sandwich allows high packaging densities through TUF-PLATE plated hole interconnections. Ideal for miniaturized back panel wiring.
CERAMICIRCUITS: provide ceramic-based printed circuits for applications requiring special mechanical and electrical stability.



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fast service on prototypes






FOR DETAILED INFORMATION ON ANY OF THESE DEVELOPMENTS, CONTACT YOUR NEAREST PC SALES ENGINEER

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# Directory II. Components

## 64. Printed & Packaged Circuits.

Earwest Mfg. Div., Inc., Wash., 5c, 15sc, 20sc
Ferranti/Packard Electric Ltd., Canada, 10c, 15c
**Franklin Systems, Inc., 2734 Hillsboro Rd., P.O. Box 3250, West Palm Beach, Fla., 5sc, 10sc, 15sc, 20sc, 25sc, Tel: TEmple 3-4602**
See ad on page 320
Frenchtown Porcelain Co., N.J., 10c
Gavitt Wire & Cable Co., Mass., 15c, 20c, 25c
Gemco Electric Co., Mich., 5c, 15c
General Applied Science Labs., Inc., N.Y., 5c, 10sc, 15sc, 20sc, 25sc, 30c
General Automatics, Inc., Calif., 5s, 10s, 15s
General Circuits, Inc., N.Y., 5c, 10c, 15c, 20c, 25c, 30c
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 10c, 15c, 20c, 25c, Tel: GRanite 6-4411**
See ads on pages 263, 267, 435, 437, 501, 621
General Electric Co., Receiving Tube Dept., Ky., 10s
General Electric Co., Ltd., of England, The, Telephone Works, England, 5s, 10s, 20s, 30s
**General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 10c, 15c, 20c, Tel: WEst 9-8571**
See ad on page 363
General Mills, Inc., Mechanical Div., Minn., 15s
Gilfillan Bros., Inc., Calif., 10c, 15c, 25c
Globe Electrical Mfg. Co., Calif., 5c
Good Electronic Corp., Fla., 5c, 10s, 15s, 20c, 25s, 30c
Goodrich Aviation Products, B. F., Ohio, 5c
Goodyear Aircraft Corp., Ariz., 10c, 20c, 25c
Graphik-Circuits, Div. Cinch Mfg. Co., Calif., 5c, 10c, 15c, 20c, 25c, 30c, Flexible c
Greene Electronics, Inc., R.I., 5c, 10c, 15c, 25c, 30c
Gulton Industries, Inc., N.J., 5sc, 15sc
Hallicrafters Co., The, Ill., 10c, 15c, 20c, 25c
Hamilton Standard Div., United Aircraft Corp., Conn., 5c, 10c, 15c, 20c, 25c, 30c
Harman-Kardon, Inc., N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 30c
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 10c
Hildebrand Co., John G., Mass., 10c, 15c, 20c
Hoover Electronics Co., Md., 5c, 10c, 15c, 20c, 25c, 30c
Hydro-Aire Co., Calif., 5c, 10c, 15c, 20c, 25c
Industrial Control Co., N.Y., 15sc, 20sc
Instant Circuits, N.Y., 15s, 20s
Intercontinental Electronics Corp., N.Y., 25c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 25c
Jeffers Electronics, Div. Speer Carbon Co., Pa., 10s
**Jettron Products, Inc., 56 Route 10, Hanover, N.J., 10sc, 15sc, TUcker 7-0571**
See ads on pages 413, 544
**Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 15s, Tel: NEvada 2-2000**
See ad on pages 46-47
Keil Engineering Products, Inc., Mo., 5c, 25c
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 10sc, 15c, 20c, 25c
Keuffel & Esser Co., N.J., PC layout film
Key Resistor Corp., Calif., 10c, 20c
**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 5sc, 15sc, 25sc, Tel: TWining 9-5600**
See ad on page 268
Labko Scientific, Inc., Okla., 25c
Laboratory for Electronics, Inc., Mass., 25s
Lacey Engineering & Mfg. Co., Ill., 5c, 25c
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 5sc, 10sc, 15sc, 20sc, 25c, 30sc
La Pointe Industries, Inc., Conn., 5c, 10sc, 15sc, 20sc, 25sc, 30sc
Lear, Inc., Calif., 5c, 10c, 15c, 25c, 30c
Link Division, General Precision, Inc., N.Y., 5sc, 10sc, 15sc, 20sc, 25sc
Litton Industries, U. S. Engineering Co. Div., Calif., 5sc, 10c, 15c, 25c, 30c
Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Div., Calif., 5s, 10s, 15s, 20s, 25s, 30s
**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 5c, Tel: REgent 9-4321**
See ad on pages 112-113
**Lytle Corporation, 1404 San Mateo Blvd., S.E., Albuquerque, N.M., 5sc, 10sc, 15sc, 20sc, Tel: ALpine 5-8169**
See ad on page 201
**M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 10sc, 20sc, Tel: GRamercy 3-5899**
See ad on page 419
MacLaren & Co., Inc., F. B., N.Y., 15s, 20s
Magnavox Co., The, Ind., 5s, 25s
Magnetics Research Co., Inc., N.Y., 10sc, 15sc, 20sc
Maico Electronics, Inc., Minn., 5c
Mallory & Co., Inc., P. R., Ind., 10c, 15c, 25c
Marquardt Corp., The, Pomona Div., Calif., 25sc
Martin Co., The, Md., 5c, 10c, 15c, 20c, 25c, 30c
Mayberry Electronics Co., Calif., 10s, 15s, 20s, 25s
Melpar, Inc., Special Products Dept., Va., 5c, 10sc, 15sc, 20sc, 25c, 30c
**Methode Manufacturing Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 5sc, 20sc, 25sc, 30sc, Tel: UNderhill 7-9600**
See ad on page 415
Micarta Fabricators, Inc., Ill., 5c, 15c
Miltronics Co., Wis., 25c
Miratel, Inc., Minn., 15s
**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5c, 10c, 25c, Tel: WAverly 6-2250**
See ad on page 452
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 10s, 15s, 25c
Molex Products Co., Ill., 10s, 15s, 20s
Montek Associates, Inc., Utah, 10sc, 15sc, 25sc
Motorola, Inc., Military Electronics Div., Ariz., 5c, 10c, 15c
**Mycalex Corporation of America, 126 Clifton Boulevard, Clifton, N.J., 5c, Tel: PRescott 9-8866**
See ad on page 658
Naniloa Corporation, Ohio, 10c, 15c
National Scientific Laboratories, Inc., D.C., 10c, 15c, 25c
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 5s, 10s, 15s, 20s, Tel: HOward 5-7700**
See ad on page 498
Neff Instrument Corp., Calif., 10c
Ohio Semiconductors, Inc., Ohio, 10c, 20c




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General Electric's Custom Packaging Service creates small, lightweight, high density electronic circuit modules tailored to specific application and space requirements. Expert engineering and proven manufacturing knowledge transform customer requirements into small, self-supporting electronic packages — inverters, flip-flops, encoders, amplifiers. Provide only your design requirements and receive tested prototypes in the shortest possible time. 217-26

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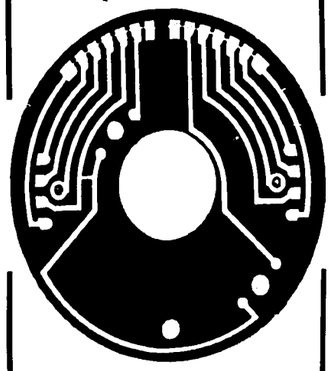
DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK

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COMPANY

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The PELLEY Company
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FLUSH TYPE MINIATURE & MICRO-MINIATURE ENGRAVED CIRCUITS

made of hi-temp, stable materials

Unsurpassed for reliability in hi-temp applications, these engraved circuits are available in hard ceramics, quartz, titanates, ferrite, sapphire, steatite, alumina, etc. Send prints for quotation.

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PO 7-3949

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## 64. Printed & Packaged Circuits.

Ortronix, Inc., Fla., 5c, 10c, 15c, 20c, 25c, 30c
Pacific Automation Products, Inc., Calif., 25c
Packard Bell Computer Corp., Calif., 10s, 15s
Packard Bell Electronics Corp., Calif., 5c, 10sc, 15sc, 20c, 25c, 30c
Paktron Division, Illinois Tool Works, Va., 10s, 15s, 20s, 25s
Panellit, Div. Information Systems, Inc., Ill., 15s
Paraplegics Mfg. Co., Inc., Ill., 25c, 30c
**Pelley Co., The, 37 Hurley St., Cambridge, Mass., 5c, 25c, Tel: UNiversity 4-9788**
**See ad on this page**
Penn Keystone Corp., Conn., 10c, 20c
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., 10s, 15s, 25s, Tel: COmmonwealth 6-5375**
**See ad on page 270**
**Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 5c, 15c, Tel: ORiole 6-8000**
**See ad on page 500**
Plug-In Instruments, Inc., Tenn., 5s, 10s, 15s, 25s, 30s
Polyphase Instrument Co., Pa., 10c, 20c
**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 25c, Tel: WEstmore 9-4092**
**See ad on page 592**
Precision Circuits, Inc., N.Y., 5c, 10c, 15c, 20c, 25c
**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 25c, Tel: WEstmore 9-8900**
**See ad on page 383**
Pulse Engineering, Inc., Calif., 10c, 20c
**Pyrocircuits Div., Microtron, Inc., 6 Manhasset Ave., Port Washington, L.I., N.Y., 25sc, Tel: POrt Washington 7-3949**
**See ad on this page**
Q-Circuits Div., Etching Corp. of Calif., Calif., 5c
RMS Associates, Inc., N.Y., 15c, 25c
Racal Engineering, Ltd., England, 15s
**Radio Corporation of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 10sc, Tel: RAndolph 2-3200**
**See ad on pages 56-57**
Rank Cintel, Ltd., England, 10s, 25s
Raytheon Co., Industrial Components Div., Mass., 10sc, 15sc, 20sc
Raytheon Co., Semiconductor Div., Mass., 10sc, 15sc, 20sc
Reeves Instrument Corp., N.Y., 10s
Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 10sc, 15sc, 20sc, 25c, Tel: LOckwood 5-4578**
**See ad on page 324**
Rogers Mfg. Co., Dayton, Minn., 5c, 10c, 15c, 20c, 25c, 30c
Rowe Engravers, N.J., 5c, 25c
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 30c
Sanders Associates, Inc., N.H., 10sc, 20sc, 25sc, Flexible sc
Sangamo Electric Co., Ill., 25c
Scientific Components, Inc., Calif., 25s
Serfass Corp., Div. Milton Roy Co., Pa., 5c, 25c
Servomechanisms, Inc., Calif., 10c
Sheltered Workshops, Inc., Calif., 25c
Sibley Company, The, Conn., 5c, 10c, 15c, 20c, 25c, 30c
Sickles Div., F. W., General Instrument Corp., Mass., 10c, 15c, 20c, 25c
Sigma Electronics Research Corp., Wash., 15c, 20c, 25c
Sillcocks-Miller Co., The, N.J., 5c, 25c
Smith-Florence, Inc., Wash., 5sc, 25sc
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 10c, 15c, Tel: EMpire 4-2271**
**See ad on page 420**
Space Electronics Corp., Calif., 5c, 10c, 15c, 20c, 25c, 30c
Spec-Tronics, Calif., 5c, 10c, 15c, 20c, 25c, 30c
Specialty Electronics Development Corp., N.Y., 10c
Sperry Gyroscope Co. of Canada, Ltd., Canada, 10c, 15c, 20c, 25c
Sprague Electric Co., Mass., 10sc, 15sc, 20sc, 25sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 10c, 15c, 25c, 30c
Sunshine Scientific Instrument, Pa., 10c, 15c, 20c
Sylvania Electric Products Inc., N.Y., 10s, 15s
Sylvania Electric Products Inc., Data Systems Operations, Mass., 10c, 15c, 20c
Sylvania Electric Products Inc., Sylvania Electronic Systems Div., Mass., 5c, 10c, 15c, 25c, 30c
Tap-A-Line Mfg. Co., Fla., 15s
Techniques, Inc., N.J., 5c, 10c, 15c, 30c
Technograph Printed Electronics, Inc., N.C., 5c, 25c
Techron Corp., Mass., 5c, 25c, 30c
Telechrome Mfg. Corp., N.Y., 10s, 15s, 20s, 25s
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 25sc, Tel: YE 2-8600**
**See ad on page 338**
Telegraph Condenser Co., Ltd., The, England, 5s, 15s, 25s, 30s
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 10c, 15c, 20c, 25c, 30c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**
**Teltronics, Inc., 277 Main St., Nashua, N.H., 10c, 15c, Tel: TUxedo 2-6264**
**See ad on page 337**
Topper Mfg. Co., Inc., N.Y., 10sc, 15sc, 20c
Topping Electronics, Ltd., F. V., Canada, 25c
**Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 10c, 15c, 20c, 25c, Tel: WEst 9-6754**
**See ad on page 472**
Transistor Specialties, Inc., N.Y., 25s, 30s
Transval Electronics Corp., Calif., 5c, 10c, 15c, 20c, 25c, 30c
**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 10, 15, 25, Tel: LOwell 7-3810**
**See ad on page 520**





# Directory II. Components

## 64. Printed & Packaged Circuits.

**Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 10sc, 15sc, 20sc, Tel: OVerbrook 1-0400**
**See ad on page 294**
**Trionics Corp., P.O. Box 548, Madison 1, Wis., 10c, 20c, Molecular c, Tel: CEdar 8-2616**
**See ad on page 663**
Ucinite Co., The, Div. United-Carr Fastener Corp., Mass., 25
Ultronix, Inc., Calif., 10c, 15c, 20c, 25c
U. S. Science Corp., Calif., 25c
U. S. Semiconductor Products, Div. United Industrial Corp., Ariz., 10sc
Van Norman Industries, Inc., Electronics Div., N.H., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc
Varo Mfg. Co., Inc., Tex., 5sc, 10sc, 15sc, 25sc, 30sc
Vinson Co., E. R., Calif., 5c, 15c
Virginia Electronics Co., Inc., D.C., 10c, 15c
Walkirt Co., Calif., 10sc, 15sc, 20sc
Warwick Mfg. Corp., Ill., 5c, 30c
Wells Electronics Co., Ind., 5c, 10c, 15c, 20c, 30c
Wells Industries Corp., Basic Electronic Controls Div., Calif., 25sc
Westinghouse Electric Corp., Air Arm Div., Md., 10c, 15c, 20c
Wheeler Electronic Corp., Conn., 10c, 15c, 20c
Whitney Blake Co., Conn., 5c, 10c, 15c, 25c, 30c
Wintronics, Calif., 25c
Zenith Optical Laboratory, N.Y., 5c, 10c

**Probes, waveguide:**
**See class 83**

**Prongs, vacuum tube:**
**See class 104**

**Processors, film:**
**See class 65**

**Programming devices, computer:**
**See class 9**

**Pulse transformers:**
**See class 76**

**Quartz crystals:**
**See class 49**

**Quartz, raw:**
**See class 49**

**Rack panels, relay:**
**See class 84**

**Racks:**
**See class 87**

**Racks, aging:**
**See class 14**

**Radomes:**
**See class 39**

**Reactors, saturable:**
**See class 45**

**Receivers:**
**See Directory I**

**Receiving tubes:**
**See class 77**

**Record players & changers:**
**See class 61**

**Recorders:**
**See class 29**

**Recorders, data; telemetering:**
**See class 36**

**Recording equipment:**
**See class 29**

**Recording equipment, computers:**
**See class 9**

## 65. Recording Accessories.

5. Blank disks
10. Cutting heads
15. Cutting styli
20. Demagnetizers
25. Magnetic recording, playback & erase heads
30. Magnetic recording tape—acetate base
35. Magnetic recording tape—paper base
40. Magnetic recording wire
45. Tape splicing equipment

AMP Incorporated, Pa., 45s
Alonge Products, Inc., N.Y., 45s
American Geloso Electronics, Inc., N.Y., 30s
**American Molded Products Co., 2723 W. Chicago Ave., Chicago 22, Ill., Reels sc, Tel: ARmitage 6-3235**
**See ad on page 639**
**American Time Products, Inc., 61-20 Woodside Ave., Woodside 77, L.I., N.Y., 20sc, Tel: OLympia 1-7800**
**See ad on page 348**
Ampex Corp., Ampex Data Products Co., Calif., 20s, 25sc, 30sc, 45sc
Ampex Corp., Professional Prods. Co., Audio Div., Calif., 20s, 25sc
Ampex Military Prods. Co., Calif., 35s
Amplifier Corp. of America, N.Y., 20s
Applied Magnetics Corp., Calif., 25c
Argonne Electronics Mfg. Corp., N.Y., 20s, 45s
Astatic Corporation, Ohio, 10s, 30s
Audax, Inc., N.Y., 10s
Audio Devices, Inc., N.Y., 5s, 15s, 20s, 30s, 35s
**Audiotex Mfg. Co., Div. G-C Textron Electronics, Inc., 412 S. Wyman St., Rockford, Ill., Tel: WOodland 8-9661**
**See ad on page 640**
BJ Electronics, Borg-Warner Controls, Calif., 25sc
Bogen-Presto Co., N.J., 5s, 10s, 15s
Bryant Computer Prods. Div., Vt., 25sc
Caltron Products Co., Calif., 20c
Capps & Co., Inc., N.Y., 15sc
Clevite Electronic Components, Div. Clevite Corp., Ohio., 25sc
Collins Radio Co., Central Sales Office, Tex., 20s, 30s, 45s
Consolidated Electrodynamics Corp., Calif., 30s
Duotone Co., Inc., N.J., 5s, 10s, 15s, 30s
**Dyna-Empire, Inc., 1075 Stewart Ave., Garden City, L.I., N.Y., 20, Tel: PIoneer 1-2700**
**See ad on page 282**
E.M.I.-Cossor Electronics, Ltd., Canada, 30s, 45s
Electronic Engineers, Inc., Ill., 20s, 25sc, 30s
Electronic Teaching Laboratories, Inc., D.C., 20s, 25s, 30s, 45s
Fairchild Recording Equipment Corp., N.Y., 10s, 25s
Ferrodynamics Corp., N.J., 30s
Fidelitone, Inc., Ill., 15c, 25c, 40c
Flo-Tronics, Inc., Minn., 25s
**G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 45s, Tel: WOodland 8-9661**
**See ad on page 640**
General Transistor Corp., Magne-Head Div., Calif., 25sc
Gotham Audio Sales Co., Inc., N.Y., 10s, 30s
Green Rectifier Co., N.J., 20c
Gregory Research Engineering Group, N.Y., 25sc
Houston Fearless Corp., Calif., Film Processors s
Laboratory for Electronics, Inc., Mass., 25s
Lipps Engineering Co., Edwin A., Calif., 10sc, 25sc
Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Div., Calif., 5s, 25s
Magnasync Corp., Calif., 25c
Magnavox Co., The, Ind., 25c, 30c
Magnecessories, D.C., 45s, Film Processors s
Maico Electronics, Inc., Minn., 25sc
Masonware Co., R.I., Reels c
Midwestern Instruments, Inc., Okla., 25sc
Minicord Corp. of America, N.J., 25s, 40s
Minneapolis-Honeywell Regulator Co., Industrial Systems Div., Md., 25sc

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

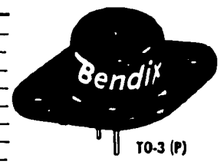
*Your guide to*

# BENDIX SEMICONDUCTORS

**MAXIMUM RATINGS AND TYPICAL OPERATION OF BENDIX* GERMANIUM PNP TRANSISTORS**

| TYPE NUMBER | PRIMARY APPLICATIONS | | | | MAXIMUM RATINGS | | | | | TYPICAL OPERATION | | CASE TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Audio | Push-Pull | Switch | Power Supply | Collector Voltage Vce (a) | Collector Current Ic | Collector Dissipation Pc | Thermal Resistance | Junction Temp. Tj | Current Gain hFE — | Current Gain Ic Adc | |
| **High Power Transistors** | | | | | | | | | | | | |
| 2N176 | X | | | | 40 Vcb | 3 Adc | 25 W | — | 90°C | 45 (c) | 0.5 | TO-3 (P) |
| 2N234A | X | | | | 30 | 3 | 25 | 2° C/W | 90°C | 25 (c) | 0.5 | TO-3 (P) |
| 2N235A, B | X | | | | 40 | 3 | 25 | 2 | 90 | 40, 60 (c) | 0.5 | TO-3 (P) |
| 2N236A, B | X | | | X | 40 | 3 | 25 | 2 | 95 | 40, 60 (c) | 0.75 | TO-3 (P) |
| 2N242 | X | | | | 45 Vcb | 2 | 25 | 3 | 100 | — | — | TO-3 (P) |
| 2N255 | X | X | | | 15 Vcb | 3 | 25 | 3 | 85 | 40 | 0.5 | TO-3 (P) |
| 2N256 | X | X | | | 30 Vcb | 3 | 25 | 3 | 85 | 40 | 0.5 | TO-3 (P) |
| 2N285A | X | | | X | 40 | 3 | 25 | 2 | 95 | 150 (c) | 0.5 | TO-3 (P) |
| 2N307, A | X | | | | 35 Vcb | 1, 2 | 10, 17 | 5, 3 | 75 | 80 | 0.2 | TO-3 (P) |
| 2N399 | X | X | | | 40 | 3 | 25 | 2 | 90 | 40 (c) | 0.75 | TO-3 (P) |
| 2N401 | X | X | | | 40 | 3 | 25 | 2 | 90 | 40 (c) | 0.5 | TO-3 (P) |
| 2N418 | | | X | X | 80 | 5 | 25 | 2 | 100 | 50 | 4.0 | TO-3 (P) |
| 2N420, A | | | X | X | 40, 70 | 5 | 25 | 2 | 100 | 50 | 4.0 | TO-3 (P) |
| 2N637, A, B | X | | X | X | 40, 70, 80 | 5 | 25 | 2 | 100 | 45 | 3.0 | TO-3 (P) |
| 2N638, A, B | X | | X | X | 40, 70, 80 | 5 | 25 | 2 | 100 | 30 | 3.0 | TO-3 (P) |
| 2N639, A, B | X | | X | X | 40, 70, 80 | 5 | 25 | 2 | 100 | 23 | 3.0 | TO-3 (P) |
| 2N677, A, B, C | X | | X | X | 30, 40, 70, 80 | 25 (b) | 50 | 1.5 | 100 | 40 | 10.0 | TO-3 (P) |
| 2N678, A, B, C | X | | X | X | 30, 40, 70, 80 | 25 (b) | 50 | 1.5 | 100 | 75 | 10.0 | TO-3 (P) |
| 2N1031, A, B, C | X | | X | X | 30, 40, 70, 80 | 25 (b) | 50 | 1.5 | 100 | 40 | 10.0 | TO-3 (L) |
| 2N1032, A, B, C | X | | X | X | 30, 40, 70, 80 | 25 (b) | 50 | 1.5 | 100 | 75 | 10.0 | TO-3 (L) |
| 2N1073, A, B | X | | X | | 40, 80, 120 | 10 | 35 | 2.0 | 100 | 40 | 5.0 | TO-3 (L) |
| 2N1136, A, B | X | | X | X | 40, 70, 80 | 6 | 37 | 2.0 | 100 | 75 | 3.0 | TO-3 (P) |
| 2N1137, A, B | X | | X | X | 40, 70, 80 | 6 | 37 | 2.0 | 100 | 115 | 3.0 | TO-3 (P) |
| 2N1138, A, B | X | | X | X | 40, 70, 80 | 6 | 37 | 2.0 | 100 | 150 | 3.0 | TO-3 (P) |
| B-177 | X | | | X | 30 | 3 | 25 | 2.2 | 90 | 150 (c) | 0.5 | TO-3 (P) |
| B-178 | X | | | | 30 | 3 | 25 | 2.2 | 90 | 40 (c) | 0.5 | TO-3 (P) |
| B-179 | X | | | | 40 | 3 | 25 | 2.2 | 90 | 25 (c) | 0.5 | TO-3 (P) |
| B-1017 | X | | | | 20 | 3 | 25 | 2 | 85 | 25 (c) | 0.5 | TO-3 (P) |
| **Medium Power Transistors** | | | | | | | | | | | | |
| 2N1008, A, B | X | X | X | | 20, 40, 60 | 300mA | 400mW | 0.15°C/mW | 85 | 95 (c) | 10mA | TO-9 |
| 2N1176, A, B | X | | X | | 15, 40, 60 | 300mA | 300mW | 0.20°C/mW | 85 | 70 (c) | 10mA | TO-9 |
| **Military Types** | | | | | | | | | | | | |
| 2N297A | X | | X | X | 50 | 5 | 35W | 2.0 | 95 | 70 | 0.5 | TO-3 (P) |
| 2N331 | X | | X | | 30 Vcb | 200mA | 200mW | 0.15°C/mW | 85 | 50 (c) | 1.0mA | TO-9 |
| 2N1011 | X | | X | X | 70 | 5 | 35W | 2.0 | 95 | 55 | 3.0 | TO-3 (P) |
| 2N1120 | X | | X | X | 70 | 15 | 45W | 1.5 | 95 | 35 | 10.0 | TO-3 (L) |

(a) Vce except where noted. Equivalent Vcb's are 20-50% higher. (b) Peak collector current. (c) hfe, AC current gain.
(d) Diffused—Alloy—Power DAP transistor.



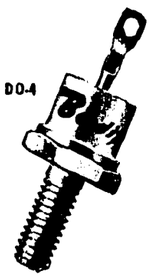
TO-3 (P)



TO-3 (L)



TO-9


DO-4

**MAXIMUM RATINGS OF BENDIX* SILICON RECTIFIERS**

**Commercial Types**

| Type Number | Io Adc | PRV Vdc | Ilb @150°C | Case Type |
|---|---|---|---|---|
| 1N1612 | 5 | 50 | 1 mAdc | DO-4 |
| 1N1613 | 5 | 100 | 1 mAdc | DO-4 |
| 1N1614 | 5 | 200 | 1 mAdc | DO-4 |
| 1N1615 | 5 | 400 | 1 mAdc | DO-4 |
| 1N1616 | 5 | 600 | 1 mAdc | DO-4 |

**Military Types**

| Type Number | MIL-E- | Io @150°C | PRV Vdc | Ilb @25°C | Epp | Ilb @150°C | Case Type |
|---|---|---|---|---|---|---|---|
| 1N1614 | 1/1240 | 5 Adc | 200 | 50 μAdc | 140 | 750 μAdc | DO-4 |
| 1N1615 | 1/1241 | 5 Adc | 400 | 50 μAdc | 280 | 750 μAdc | DO-4 |
| 1N1616 | 1/1242 | 5 Adc | 600 | 50 μAdc | 420 | 750 μAdc | DO-4 |

*Trademark

West Coast Sales office: 117 E. Providencia Ave., Burbank, California

Midwest Sales office: 2N565 York Rd., Elmhurst, Ill.

New England Sales office: 4 Lloyd Road, Tewksbury, Massachusetts

Export Sales office: Bendix International Division, 205 E. 42nd Street, New York 17, N. Y.

Canadian Affiliate: Computing Devices of Canada, Ltd., P.O. Box 508, Ottawa 4, Ontario, Canada

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**Red Bank Division**

LONG BRANCH, N. J.

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# Directory II. Components

## 65. Recording Accessories.

Minnesota Mining & Mfg. Co., Magnetic Products Div. & Electrical Prods. Div., Minn., 30sc, 45s, Magnetic Recording Tape-Polyester sc
Munzig International, Inc., Calif., 30s
Norton Associates, Inc., N.Y., 25sc
Nortronics Co., Inc., Minn., 25s
Ohio Semiconductors, Inc., Ohio, 25c
OPTOmechanisms, Inc., N.Y., Film Processors c
Orr Industries, Div. Ampex Corp., Calif., 30s, 45s, Reels s
Penn-Transformer Corp., Pa., 20c
Potter Instrument Co., Inc., N.Y., 25c
Precision Instrument Co., Calif., 20s, 25sc
RCA Victor Co., Ltd., Canada, 45s
Radio Corp. of America, N.J., 25s, 45s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S 5th St., Harrison, N.J., 30s, 45s, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Reeves Soundcraft Corp., Conn., 5s, 15s, 30s, 45s
Rek-O-Kut, Inc., N.Y., 10s
Robins Industries Corp., N.Y., 10s, 20sc, 25s, 45sc, Reels s
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 35s, Tel: TWinbrook 4-6300**
**See ad on pages 64-65**
Shepard Laboratories, Inc., N.J., 45c
Shepherd Industries, Inc., N.J., 25sc
SoundScriber Corp., The, Conn., 5s, 20s, 25s, 30s
Southwestern Industrial Electronics Co., Tex., 25sc, 30s
Stancil-Hoffman Corp., Calif., 20s, 25sc
Standard Record Mfg. Co., Calif., Reels sc
Tally Register Corp., Wash., 35c, Film Processors sc
U. S. Recording Co., D.C., 30sc
Webster Electric Co., Wis., 25s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 10sc, 15sc, 20sc, 25sc, 45sc, Tel: JUdson 2-3030**
**See ad on page 704**

## 66. Rectifiers.

5. Controlled semiconductor
10. Copper oxide
15. Copper sulfide
20. Germanium
25. Selenium diodes
30. Selenium stacks
35. Silicon

American Elite, Inc., N.Y., 20s
**Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 20s, 35s, Tel: WEIls 1-6200**
**See ad on pages 42-45**
Avnet Electronics Corp., N.Y., 25s
Barco, Inc., Wis., 30s, 35s
**Bendix Corp., The, Red Bank Div., Semiconductor Products, 201 Westwood Ave., Long Branch, N.J., 35s, Tel: CApital 2-6220**
**See ad on page 504**
Bergen Laboratories, Inc., N.J., 5s
Bradley Semiconductor Corp., Conn., 10s, 25s, 30s, 35s
Britton Electronics Corp., N.Y., 5sc, 25sc, 30sc, 35sc
C&D Batteries, Div. The Electric Autolite Co., Pa., 35sc
**Clark Electronic Laboratories, Box 165, Palm Springs, Calif., 5s, 20s, 30s, 35s, Tel: FAirview 8-2210**
**See ad on page 561**
Collins Radio Co., Central Sales Office, Tex., 20s, 25s, 30s, 35s
**Columbus Electronics Corp., 1010 Saw Mill River Rd., Yonkers, N.Y., 35s, Tel: YOnkers 8-1221**
**See ad on this page**
Conant Laboratories, Neb., 10sc, 30sc
Connolly & Co., Wallace E., Calif., 30sc
Continental Device Corp., Calif., 35sc
Controls Company of America, Appliance, Automotive & Electron Divs., Ill., 5c, 35c
Dallons Semiconductors, Div. Dallons Laboratories, Inc., Calif., 35sc
Daystrom, Inc., Weston Instrument Div., N.J., 5sc
Delco Radio Division, General Motors Corp., Ind., 35s
Djordjevic Engineering Co., Djeco Div., Ill., 5sc, 20sc, 25sc, 30sc, 35sc
Edal Industries, Inc., Conn., 10c, 25c, 30c
Electro-Seal Corp., Ill., 5sc
Electronic Devices, Inc., N.Y., 25sc, 30sc
Electronic Transistors Corp., N.J., 5sc, 20sc, 35sc
English Electric Valve Co., Ltd., England, 20s, 35s
**Fansteel Metallurgical Corp., North Chicago, Ill., 25s, 30s, 35s, Tel: DExter 6-4900**
**See ad on pages 130-131**
**Gates Electronic Co., 1705-I Taylor Ave., New York 60, N.Y., 30s, 35s, Tel: TYrone 2-6490**
**See ad on page 484**
General Electric Co., Semiconductor Products Dept., N.Y., 5s, 10s, 20s, 25s, 30s, 35s
General Electric Co., Ltd., of England, N.Y., 5s, 20s, 25s, 30s, 35s
General Instrument Corp., Defense Engineering Products Group, N.Y., 30c
General Instrument Corp., Semiconductor Div., N.J., 35sc, Silicon Stacks sc
General Nuclear Corp., N.Y., 30sc
Good-All Electric Mfg. Co., Neb., 25s, 30s
Great Eastern Mfg. Co., N.Y., 20s, 35s
Green Rectifier Co., N.J., 5sc, 25sc, 30sc, 35sc


**COLUMBUS SEMICONDUCTORS**

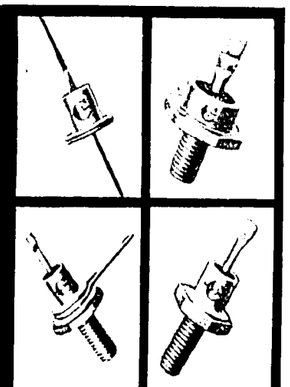
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-2.0.

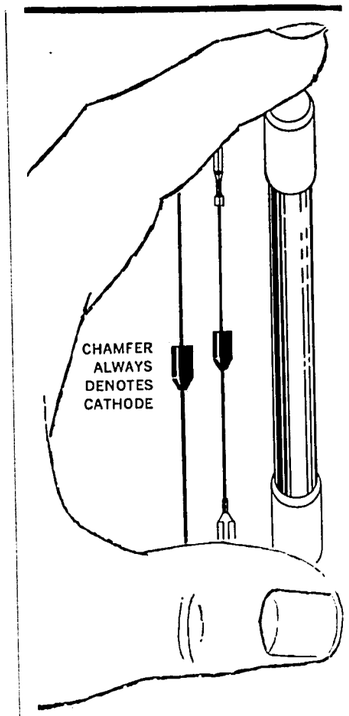
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- Controlled Switches
- Miniature Controlled Rectifiers

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The SELENIUM RECTIFIER that does not age!

Tri-Amp is superior in every way to conventional stacks. Our special manufacturing process forms a true P-N junction, removing the need for an artificial barrier layer, thus eliminating the cause of deterioration due to aging.

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Solitron Devices—the first to introduce a hermetically sealed, diffused silicon rectifier by a new process of pressure molding and bonding under heat and vacuum—our own thermal set formula.

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- Will exceed thermal shock test 150°C to —65°C with cycling.
- Will exceed pressure bomb test 120 lbs. of pressure under water for over 4 hours.

*Tested by a leading independent laboratory for hermetically-sealed qualities.

*Sales representatives in all key cities, write for literature.*

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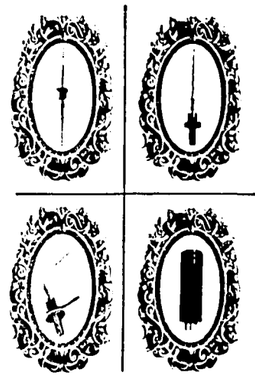



# Directory II. Components

## 66. Rectifiers.

Hallicrafters Co., The, Ill., 5c
Hanson-Gorrill-Brian, Inc., N.Y., 5c, 35c
Hoffman Electronics Corp., Calif., 35s
Hoffman Electronics Corp., Semiconductor Div., Calif., 35sc
**Hughes Aircraft Co., Hughes Semiconductor Div., P.O. Box 278, Newport Beach, Calif., 5c, 35sc, Tel: LIberty 8-0671**
**See ads on pages 188, 538**
Industro Transistor Corp., N.Y., 5s, 35s
**International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 5s, 25s, 30s, 35s, Tel: OREgon 8-6281**
**See ad on pages 118-119**
International Resistance Co., Pa., 25s
International Telephone & Telegraph Corp., ITT Components Div., N.J., 5sc, 25sc, 30sc, 35sc
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 20c, 25c, 30c, 35c
Kemtron Electron Products, Inc., Mass., 20sc, 35sc
Ledex, Incorporated, Ohio, 30s
Macarr, Inc., N.Y., 5s, 20s, 35s
Mallory & Co., Inc., P.R., Ind., 10c, 35c
Miller Co., Sanford, N.Y., 30sc, 35sc
Miller Electric Mfg. Co., Wis., 30sc
Milro Controls Co., Inc., N.J., 5c, 20c, 25c, 30c, 35c
**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5c, Tel: WAverly 6-2250**
**See ad on page 452**
**Motorola Semiconductor Products, Inc., 5005 E. McDowell Rd., Phoenix, Ariz., 35s, Tel: BRidge 5-4411**
**See ad on page 192**
Nichols, Ltd., R. H., Canada, 10s, 20s, 25s, 30s
Nippon Electric Co., Ltd., Japan, 10s, 20s, 30sc, 35s
North American Electronics, Inc., Mass., 5s, 35sc
Nucleonic Products Co., Calif., 10c, 35c
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 5sc, 20sc, 30sc, 35sc, Tel: WOrth 6-0380**
**See ad on page 483**
Ovitron Corp., N.Y., 5c, 35c
Pacific Semiconductors, Inc., Calif., 35sc
Philips Electronics Industries, Ltd., Canada, 20s, 35s
Physics Research Laboratories, Inc., P.O. Box 555, Hempstead, L.I., N.Y., 10sc, Tel: IVanhoe 3-8299
See ad on page 288
Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 35s, Tel: HUmboldt 5-3900
See ad on pages 54-55
Radio Corporation of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 5sc, 20sc, 35sc, Tel: RAndolph 2-3200
See ad on pages 56-57
Radio Development & Research Corp., N.J., 30sc, 35sc
Radio Industries, Inc., Ill., 25c
**Radio Receptor Company, Inc., Subsid. General Instrument Corp., 242 Wythe Ave., Brooklyn 11, N.Y., 30c, Tel: EVergreen 8-6000**
**See ad on page 506**
**Rapid Electric Co., Inc., 2881 Middletown Rd., New York 61, N.Y., 30sc, Tel: TAlmadge 8-2200**
**See ad on page 493**
Raytheon Co., Semiconductor Div., Mass., 20s, 35s
Rectico, Inc., N.J., 10s, 30s, 35s
Republic Electr. Indust. Corp., N.Y., 5c
**Rheem Semiconductor Corp., Dept. C1, 350 Ellis St., P.O. Box 1327, Mountain View, Calif., 35s, Tel: YOrkshire 8-9211**
**See ad on pages 94-95**
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, Tel: LOckwood 5-4578**
**See ad on page 324**
Sarkes Tarzian, Inc., Semiconductor Div., Ind., 30s, 35s
Schauer Mfg. Corp., Ohio, 10sc
Sel-Rex Corp., N.J., 20c, 35c
Semi-Elements, Inc., Pa., 20s, 35s
**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 5c, 35sc, Tel: CRestview 4-8542**
**See ad on this page**
**Solid State Products, Inc., 1 Pingree St., Salem, Mass., 5s, Tel: PIoneer 5-2900**
**See ad on page 506**
**Solitron Devices, Inc., 67 S. Lexington Ave., White Plains, N.Y., 5sc, 35sc, Tel: WHite Plains 6-7591**
**See ad on page 506**
Standard Rectifier Corp., Calif., 35s
Standard Telephones & Cables, Ltd., England, 5sc, 20sc, 30sc, 35sc
Sylvania Electric Products Inc., N.Y., 5sc, 20sc, 35sc
**Syntron Co., Semiconductor Div., 83 Lexington Ave., Homer City, Pa., Tel: GRidley 9-8011**
**See ad on page 506**
**Texas Instruments Incorporated, Semiconductor-Components Div., 13500 N. Central Expressway, Dallas, Tex., 5s, 35s, Tel: ADams 5-3111**
**See ad on page 394**
Topping Electronics, Canada, 35c
Trans-Sil Corp., N.J., 35sc
Transitron Electronic Corp., Mass., 5s, 35s, Silicon Stacks s
**Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 30, 35, Tel: HUmboldt 2-4200**
**See ad on pages 74-75**
U. S. Science Corp., Calif., 5c


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SILICON RECTIFIERS



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| IN530 THRU IN536 | IN561 THRU IN599 | IN1247 THRU IN1276 | IN1695 THRU IN1763 |
| IN535 THRU IN537 | IN600 THRU IN1095 | IN1486 THRU IN1492 | IN1764 THRU IN2080 |
| IN538 THRU IN540 | IN1096 THRU IN1100 | IN1556 THRU IN1560 | IN2081 THRU IN2086 |

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| IN532 THRU IN539 | IN1101 THRU IN1107 | IN1537 THRU IN1541 | IN2547 THRU IN2557 |

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CRestview 4-8542

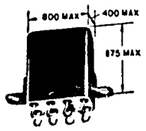
For details, circle #489 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# ALLIED CONTROL RELAYS

## MILITARY RELAYS

**SUBMINIATURE**
**TYPE KHJ-6D**
**DPDT ● DC**

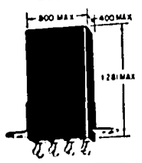



**OPERATING CONDITIONS for KHJ-6D**

**Contact Rating:** Low level up to 2 amps. non-inductive at 29 volts d-c or 115 volts a-c. 3 amp. contacts available on request.
**Ambient Temperature:** —65°C to +125°C
**Vibration:** 5-28 cps at 0.5 in. double amplitude, 28-2000 cps at 20g.
**Shock:** 50g operational.
**Terminals:** 0.2 in. grid spaced plug-in, printed circuit or hooked type solder terminals.

| OTHER RELAY TYPES | Electrical Characteristics: Maximum Contact Pile-Up | Contact Rating Amps. | Coil Operation | Max. Basic Dimensions: Width & Length | | Seated Height |
|---|---|---|---|---|---|---|
| JH-6D | DPDT | 5 | DC | .400 | .800 | .906 |
| JH-18D | 6PDT | 2 | DC | .800 | 1.200 | .781 |
| KH-6D | DPDT | .5 | DC | .396 | .800 | .843 |
| KHY-6D | DPDT | 2 | DC | .359 | .797 | .759 |

**SENSITIVE**
**TYPE JSH-6D**
**DPDT ● DC**

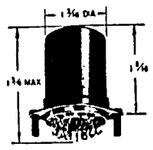



**OPERATING CONDITIONS for JSH-6D**

**Average Pull-in Power at 25°C:** SPDT-25 milliwatts; DPDT-40 milliwatts.
**Contact Rating:** 2 amps. non-inductive at 29 volts d-c or 1 amp. at 115 volts a-c. Low level contacts are available on request.
**Ambient Temperature:** —65°C to +125°C
**Vibration:** 5-55 cps at 0.12 in. double amplitude; 55-2000 cps at 20g.
**Shock:** 50g operational.
**Weight:** 1.1 ounce maximum.

| OTHER RELAY TYPES | Electrical Characteristics: Maximum Contact Pile-Up | Contact Rating Amps. | Coil Operation | Max. Basic Dimensions: Width & Length | | Seated Height |
|---|---|---|---|---|---|---|
| RSH | DPDT | 2 | DC | .765 dia. | | 1.609 |
| SW | DPDT | 5 | DC | .906 | 1.406 | 1.625 |

**MINIATURE**
**TYPE MHJ-18**
**6PDT ● AC or DC**



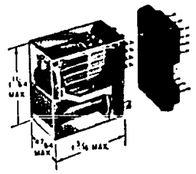

**OPERATING CONDITIONS for MHJ-18**

**Contact Rating:** Low level up to 5 amps. non-inductive at 29 volts d-c or 2 amps. at 115 volts a-c.
**Ambient Temperature:** —65°C to +125°C
**Vibration:** 5-28 cps at 0.5 in. double amplitude; 28-2000 cps at 20g.
**Shock:** 50g standard.
**Weight:** 4.2 ounces maximum.
**AC:** This relay is supplied with self contained diodes for 60 to 400 cps operation.

| OTHER RELAY TYPES | Electrical Characteristics: Maximum Contact Pile-Up | Contact Rating Amps. | Coil Operation | Max. Basic Dimensions: Width & Length | | Seated Height |
|---|---|---|---|---|---|---|
| CH-12 | 4PDT | 10 | AC or DC | 1.203 | 1.203 | 1.718 |
| MH-6D | DPDT | 5 | DC | .645 dia. | | 1.328 |
| MH-12D | 4PDT | 5 | DC | 1.056 dia. | | 1.328 |
| MH-18D | 6PDT | 5 | DC | 1.197 dia. | | 1.328 |
| MHJ-12 | 4PDT | 5 | AC or DC | 1.056 dia. | | 1.328 |
| MHY-12 | 4PDT | 10 | AC or DC | 1.197 dia. | | 1.328 |

## COMMERCIAL RELAYS

**TELEPHONE**
**TYPE T-154**
**4PDT ● DC**

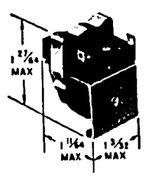



**OPERATING CONDITIONS for T-154**

**Contact Rating:** 2 amps. resistive or 1 amp. inductive at 29 volts d-c or 115 volts a-c. Low level or 5 amp. contacts available.
**Nominal Coil Power:** 700 milliwatts.
**Minimum Coil Power:** DPDT-125 milliwatts; 4PDT-300 milliwatts.
**Dielectric:** 1000 volts rms at sea level.
**Terminals:** Open relay—plug-in solder lugs or octal plug. Sealed relay—hooked type solder terminals, 14-pin miniature plug or octal plug.
**Enclosure:** Open, dust cover or hermetically sealed.

| OTHER RELAY TYPES | Electrical Characteristics: Maximum Contact Pile-Up | Contact Rating Amps. | Coil Operation | Max. Basic Dimensions: Width & Length | | Seated Height |
|---|---|---|---|---|---|---|
| GK | 6PDT | 2 | DC | 1.140 | 1.687 | 1.828 |
| LK | 6PDT | 2 | DC | 1.078 | 1.718 | 1.890 |
| LKH | 4PDT | 2 | DC | 1.437 | 1.625 | 2.656 |
| SK | 6PDT | 2 | DC | .968 | 1.687 | 1.468 |
| SKH | 4PDT | 2 | DC | 1.437 | 1.625 | 2.062 |
| TAH | 4PDT | 2 | DC | .953 | 1.343 | 1.593 |

**GENERAL PURPOSE**
**TYPE FC-3D**
**SPDT ● DC**




**OPERATING CONDITIONS for FC-3D**

**Contact Rating:** 2 amps. resistive or 1 amp. inductive at 29 volts d-c or 115 volts a-c.
**Nominal Coil Power:** 2.0 watts.
**Minimum Coil Power:** 300 milliwatts.
**Capacity:** Closed contacts to frame or between open contacts 3.0 mmf; open contacts to frame 1.5 mmf.
**Dielectric Strength:** 1000 volts rms at sea level.
**Terminals:** Solder lugs or "Miniature Faston" solderless tabs.

| OTHER RELAY TYPES | Electrical Characteristics: Maximum Contact Pile-Up | Contact Rating Amps. | Coil Operation | Max. Basic Dimensions: Width & Length | | Seated Height |
|---|---|---|---|---|---|---|
| AS-3 | SPDT | 5 | AC or DC | 1.000 | 1.687 | 1.296 |
| BJ-6 | DPDT | 5 | AC or DC | .875 | 1.703 | 1.968 |
| F | DPST | 2 | DC | 1.375 | 1.656 | 1.203 |
| ME-6 | DPDT | 5 | AC or DC | .828 | 1.406 | 1.203 |

**POWER**
**TYPE BO**
**DPDT ● AC or DC**




**OPERATING CONDITIONS for BO**

**Contact Rating:** 15 amps. non-inductive; 10 amps. inductive or 8 amps. motor load at 29 volts d-c or 115 volts a-c.
**Dielectric Strength:** 1500 volts rms at sea level.
**Nominal Coil Power:** 2.5 watts d-c or 5.0 volt amps. a-c.
**Enclosure:** Dust cover or hermetically sealed with hooked type solder terminals or octal plug.

| OTHER RELAY TYPES | Electrical Characteristics: Maximum Contact Pile-Up | Contact Rating Amps. | Coil Operation | Max. Basic Dimensions: Width & Length | | Seated Height |
|---|---|---|---|---|---|---|
| BNA-18D | 6PDT | 10 | DC | 1.750 | 3.016 | 2.578 |
| BOHR-6 | DPDT | 10 | AC or DC | 1.671 | 1.796 | 2.687 |
| BOY-6D | DPDT | 10 | DC | 1.843 | 1.500 | 1.937 |
| CNA-13 | SPST | 50 | AC or DC | 2.093 | 2.281 | 2.406 |
| PB | 4PDT | 10 | AC or DC | 1.218 | 1.437 | 1.859 |
| PK | 4PDT | 10 | AC or DC | 1.156 | 2.078 | 2.109 |
| PO | 4PDT | 15 | AC or DC | 1.906 | 2.281 | 2.250 |

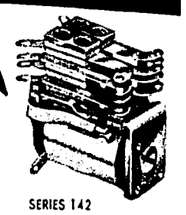
**ALLIED CONTROL** RELAYS • SOLENOID VALVES • SWITCHES
Allied Control Company, Inc., 2 East End Ave., N. Y. 21, N. Y. • BU 8-7403




For details, circle #490 on Reader Service Card




# New miniature telephone-type DC relay!




Takes less space... available up to 4PDT!

Designed to occupy less than ½ the space needed for similar type relays, this compact Aemco Series 142 relay is only 1 1/16" wide! Open and enclosed types available from SPST to 4PDT with coil resistances up to 10,000 ohms. Type G5 or G10 insulation for temperatures up to +125°C. All coils tested for 1000 V breakdown to ground—vacuum varnished and baked on open types. Rugged armature design reduces magnetic loss—boosts relay's efficiency. Silver, palladium or gold alloy contacts are rated up to 3 amps. Contact springs are beryllium copper—all metal parts are cadmium plated with cronak finish.

*Type "K" enclosure...*



The 142 Series Miniature Telephone-Type Relay is also available with a Type "K" enclosure—either as a hermetically sealed unit or with a removable dust cover. Your choice of plug-in or solder terminals.

**Need relays?**
Here's why hundreds of manufacturers choose ... AEMCO



Many manufacturers consider AEMCO a prime source for relays . . . and here's 3 reasons why! 1. We're easy to work with—offer you prompt, personal service and close coordination! 2. Prototype delivery is fast—product reliability and quality is excellent! 3. Imaginative engineering plus a complete line of standard relays in a wide choice of spring and coil combinations, contact arrangements and ratings to choose from!

Your inquiries are invited. Write for our newest relay catalog today, or send specs. for information and prices on specials to your requirements!



AEMCO INCORPORATED
12 STATE ST. • MANKATO, MINN.
For details, circle #491 on Reader Service Card




# Directory II. Components

## 66. Rectifiers.

U. S. Semiconductor Products, Div. United Industrial Corp., Ariz., 5sc, 35sc
VecTrol Engineering, Inc., Conn., 5sc
Vickers, Inc., Electric Products Div., Mo., 25s, 30s, 35s
Wells Electronics Co., Ind., 20s, 35s
Westinghouse Electric Corp., Semiconductor Dept., Pa., 5sc, 35sc

## 67. Rectifiers, Vacuum Tube.

5. Grid controlled
10. Mercury vapor
15. Receiving
20. Transmitting

Aerolux Light Corp., N.Y., 10c
American Elite, Inc., N.Y., 15s
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 15s
Central Electronic Mfrs., Div. Nuclear Corp. of America, N.J., 5s, 20s
Cetron Electronic Corp., Ill., 5sc, 10sc, 20sc
Clark Electronic Laboratories, Box 165, Palm Springs, Calif., 10s, Tel: FAirview 8-2210
See ad on page 561
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 20s
D.K.E. Electronic Bases, Inc., N.J., 15s, 20s
Djordjevic Engineering Co., Djeco Div., Ill., 5c, 10c
Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., 5s, 10s, 20s, Tel: LYtell 1-1451
See ad on pages 80-81
Electronic Enterprises, Inc., N.J., 5sc, 10sc, 15sc, 20sc
Electrons, Inc., N.J., 5s, 10s
English Electric Valve Co., Ltd., England, 10s, 20s, Xenon Filled s
General Electric Co., Power Tube Dept., Bldg. 267, Schenectady 5, N.Y., 5s, 10s, 20s, Tel: FRanklin 4-2211, Extension 5-3433
See ad on page 582
General Electric Co., Receiving Tube Dept., Ky., 15s
General Electric Co., Ltd., of England, N.Y., 10s, 15s, 20s
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 5sc, 10sc, 15sc, 20s
Industrial Tubes, Inc., Ill., 5c, 10c
Intelex Systems, Inc., N.Y., 15s
Kuthe Laboratories, Inc., Subsid. Int. Tel. & Tel. Corp., N.J., 5s, 20s
Nippon Electric Co., Ltd., Japan, 5s, 10s, 15s, 20s
PEK Labs., Inc., Calif., 20c
Penta Laboratories, Inc., Calif., 20s
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 15s, 20s
Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 5s, 10s, 15s, 20s, Tel: HUmboldt 5-3900
See ad on pages 54-55
Raytheon Co., Industrial Components Div., Mass., 15sc, 20sc
Resitron Laboratories, Inc., Calif., 20sc

## 67. Rectifiers, Vacuum Tube.

Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 15c, Tel: CRestview 4-8542
See ad on page 507
Sonotone Corp., N.Y., 15s
Standard Telephones & Cables, Ltd., England, 5s, 10s, 15s, 20s
Stich Chemicals, Inc., N.Y., 10c
Sylvania Electric Products Inc., N.Y., 5sc, 15sc, 20sc
Thermosen, Inc., Conn., 15s
Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 15, Tel: HUmboldt 2-4200
See ad on pages 74-75
VecTrol Engineering, Inc., Conn., 5sc
Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 5s, 10s, 15s, 20s, Tel: REgent 9-3611
See ad on page 580
Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 15s, 20s, Tel: BEnton 1-0700
See ad on page 573

**Reels, recording: See class 65**

**Reflectors, radar: See class 39**

**Reflectors, waveguide: See class 83**

**Relay rack panels: See class 84**

**Relay racks: See class 87**

**Relay sockets: See class 71**

**Relay testers: See class 14**

## 68. Relays.

5. Coaxial
10. D'Arsonval
15. Differential
20. Frequency selective
25. Hermetically sealed
30. Impulse
35. Keying
40. Latching
45. Mercury contact
50. Polarized
55. Power control & overload
60. Rotary
65. Sensitive
70. Stepping
75. Sub-miniature
80. Telephone
85. Time delay

AMP Incorporated, Pa., 20c, 25c, 30c, 50c, 55c, 65c, 75c, 85c
Acro Div., Robertshaw-Fulton Controls Co., Ohio, 55s, 75s
Ad-Yu Electronics Lab., Inc., 249 Terhune Ave., Passaic, N.J., 65sc, Tel: GRegory 2-5622
See ad on page 329
Adams & Westlake Co., Ind., 45sc, 65s, 85c
Advanced Electronics, Inc., Conn., 65c
Aemco, Inc., 12 State St., Mankato, Minn., 5c, 25c, 35c, 40c, 55c, 65c, 75c, 85c, Tel: 5153
See ad on this page

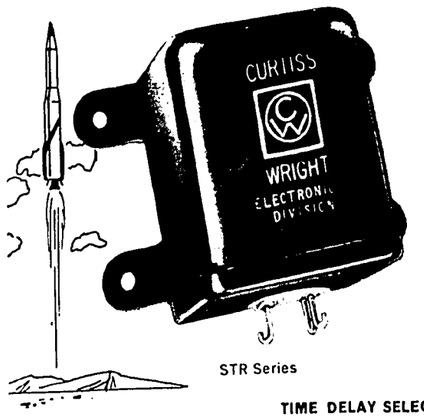
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

CURTISS WRIGHT

# TIME DELAY RELAYS

SNAP-ACTION • INSTANT RESET • VOLTAGE AND TEMPERATURE COMPENSATED

Precision built to meet a wide range of military and industrial requirements, these snap-action relays are factory pre-set for delays from 3 to 180 seconds. Features are small size, chatter-free, hermetically sealed with instantaneous resetting contacts. All are metal-cased except "G" and "K" series, glass.




STR Series



G & K Series hermetically sealed in glass




H and S Series for military applications

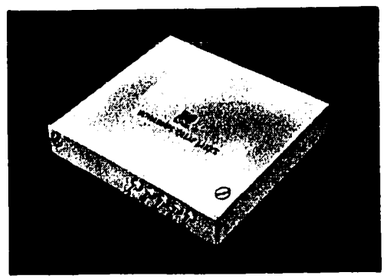
TIME DELAY SELECTION CHART

| RELAY SERIES | "H" | "S" | "G & "K" | "IR" | "MR" | "CR" | "STR" |
|---|---|---|---|---|---|---|---|
| DELAY RANGE (SECS.) | 3-180 | 3-60 | 3-60 | 20-180 | 3-60 | 3-180 | 10-180 |
| CONTACT ARRANGEMENT | SPNO SPNC or | SPDT | SPDT SPST | SPNO | SPDT | DPDT | SPDT |
| CONTACT RATING (RESISTIVE LOAD) | 3A-120AC 1A-28DC | 3A-120AC 3A-28DC | 2A-120AC 2A-28DC | 2A-28DC | 2A-28DC | 5A-120AC 5A-28DC | 2A-28DC |
| INPUT VOLTAGE | 6.3, 26.5 117 | 6.3, 26.5 117 | 6.3, 26.5 117 | 22-32 | 28 | 28,117 | 22-32 |
| INPUT FREQUENCY | AC or DC | AC or DC | AC or DC | DC | DC | AC or DC | DC |
| VIBRATION CPS | 5-55 5-500 | 5-55 | — — | 5-500 | 5-500 | 5-55 | 5-500 |
| AMBIENT TEMP. °C. | −65+125 | −55+100 | −55+85 | −65+125 | −65+125 | −55+85 | −65+125 |

**WRITE OR PHONE FOR FREE CATALOG #260E**

Special recommendations on your application requirements available.

## DELAY LINES

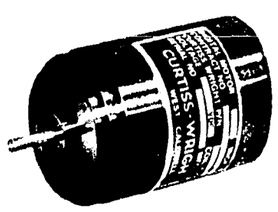


Small, lightweight, hermetically-sealed magnetostrictive delay lines with delays from 5 to 12,000 microseconds. Ambient temperature range, −55° to +100° C. A ratio of delay to pulse rise time up to 800:1 with storage capacity up to 6,000 bits. Input and output impedances from 50 to 2,000 ohms with carrier or pulse frequencies up to one megacycle. An adjustment of ±3 microseconds is supplied on standard units. Taps are available with or without the adjustment feature. Withstand vibration to 500 cps at 15 g and shock to 50 g.

## STEPPING MOTORS

### DM SERIES

**Bi-Directional**
**Dynamically Balanced**
**Temperature −65° F. to +165° F.**
**Vibration—20 g to 500 cps**
**Shock—30 g**
**Voltage—28V DC, other voltages available**




For—Missile, Aircraft, Computors, and Navigational Devices—Flight Controls—Automation Feeds for Machine Tools and Controls for positioning and synchronization of aerial cameras, actuator for automatic pilots, controls for food processing machinery. Withstand severe environmental requirements, operate under high shock and vibration. Positive indexing and locking. low power requirement.

**VOLTAGE:** Standard voltage 28 volts DC, other voltages available upon request.
**LIFE:** In excess of five million operations in each direction at rated load.
**TEMPERATURE:** −65° F. +165° F.

**RELIABILITY:** The unit does not fail to convert a single pulse in 1,000,000 operations into equivalent angular rotation.
**VIBRATION:** 20 g to 500 cps.
**SHOCK:** 30 g for 11 milliseconds along each axis.

| | ANGULAR ROTATION | PULSING RATE | WEIGHT | TORQUE |
|---|---|---|---|---|
| MODEL DMA | 36° Bi-directional per pulse | To 40 pulses per second | 8.5 oz. | 8 in. oz. |
| MODEL DMB | 30° Bi-directional per pulse | To 30 pulses per second | 28 oz. | 24 in. oz. |

CURTISS WRIGHT
CORPORATION • ELECTRONICS DIVISION
COMPONENTS DEPT. • SWARTHMORE 1-0100
35 MARKET STREET • EAST PATERSON, N. J.

For details, circle #492 on Reader Service Card






# Directory II. Components

## 68. Relays.

Allen-Bradley Co., Wis., 55s
Allen Electric & Equip. Co., Mich., 65sc
**Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., 5c, 15c, 25sc, 30sc, 35sc, 40sc, 50sc, 55c, 60sc, 65sc, 75sc, 80sc, 85c, Tel: BUtterfield 8-7403**
**See ad on page 508**
Alto Scientific Co., Inc., Calif., 85s
Amerelay Corp., N.Y., 65s, 75s
American Instrument Co., Inc., Md., 45s, 85s
**Amperite Co., Inc., 561 Broadway, New York 12, N.Y., 85s, Tel: CAnal 6-1446**
**See ad on page 579**
Artisan Electronics Corp., N.J., 15c, 25c, 30c, 35c, 40c, 55c, 60c, 65c, 70c
Assembly Products, Inc., Ohio, 10s, 15s, Meter-Type s
**Automatic Electric Co., Northlake, Ill., 25c, 40c, 50sc, 70sc, 75c, 80c, Tel: FIllmore 5-7111**
**See ad on pages 66-67**
**Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 5c, Tel: EVergreen 8-6057**
**See ad on page 409**
Automatic Switch Co., N.J., 15c, 20c, 55sc, 85sc
Automatic Timing & Controls, Inc., Pa., 30sc, 55sc, 70s, 85sc
Aviel Electronics, Inc., Calif., 5c
Aviomics, Ltd., Canada, 35s, 55s, 80s
Avnet Electronics Corp., N.Y., 25s, 35s, 45s, 50s, 70s, 75s, 80s
Babcock Relays, Inc., Calif., 5c, 15c, 25s, 30s, 35s, 40s, 45c, 50s, 55s, 60s, 65s, 75s, 80s, 85c
Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 15s, 50s, Tel: WOodland 8-6833
See ad on page 465
Basic, Inc., Wis., 25s, 65s, 85s
Beckman Systems Division, Calif., 45s
Bell & Gossett Co., Ill., 20sc
**Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 85c, Tel: ENfield 3322**
**See ad on page 411**
Berneo Engineering Corp., Ind., 45c
Bethlehem Instrument Co., Inc., Pa., 80
Biddle Co., James G., Pa., 20s
**Branson Corp., 41 S. Jefferson Rd., Whippany, N.J., 25sc, 30sc, 50c, 60sc, 75sc, 85sc, Tel: TUcker 7-1100**
**See ad on this page**
Bristol Co., Conn., 10sc, 15sc, 20sc, 25sc, 50sc, 65sc, 75sc
Bristol Motors, Div. Vocaline Co. of America, Conn., 85sc
Cathodeon, Ltd., Meadowcroft Labs., England, 20s
Chicago Electronic Div., Land-Air, Inc., Ill., 30c, 35c, 60c, 70c, 85c
Clare & Co., C. P., Ill., 25c, 30c, 35c, 40c, 45c, 50c, 60c, 65c, 70c, 75c, 80c, 85c
Clark Controller Co., The, Ohio, 40s, 55s, 85s
**Clark Electronic Laboratories, Box 165, Palm Springs, Calif., Solid State s, Tel: FAirview 8-2210**
**See ad on page 561**
**Comar Electric Co., 3349 Addison St., Chicago 18, Ill., 25c, 30c, 35c, 65c, 75c, 80c, 85c, Tel: JUniper 8-2410**
**See ad on page 166**
Continental Electronics Corp., N.Y., 5c, 60c, 85c
Control Corp., Minn., 40c
Control Dynamics Corp., Calif., 25s, 55s, 65s, 75s
Cook Electric Co., Ill., 25c, 50c, 65c, 70c, 75c, 80c, 85c
Corbett Science Laboratories, F. W., Calif., 70c, 80s
Cornwell Electronics Corp., 25c, 65c
Corona Engineering Service, N.Y., 45sc
Couch Ordnance, Inc., Mass., 25sc, 60sc, 65sc, 75sc
Cramer Controls Corp., Conn., 25c, 85sc
Cunningham Son & Co., Inc., N.Y., 40s
**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 25sc, 35sc, 55sc, 75sc, 85sc, Solid State sc, Tel: SWarthmore 1-0100**
**See ad on page 510**
Curtiss-Wright Corp., Electronics Div. IMI Branch, N.Mex., 25c, 85c
Cutler-Hammer, Inc., Wis., 25s, 55s
Daystrom, Inc., Weston Instrument Div., N.J., 10sc, 25sc, 65sc, 80sc, 85sc
Destron Co., Calif., 85c
Dialtron Corp., N.Y., 25c, 65c, 75c, 85c
Dixon Electronics Co., Mich., 20sc
Dow-Key Co., Inc., Minn., 5s, 55c
Durakool, Inc., Ind., 45s, 85sc
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5sc, Tel: HAlifax 6-7491**
**See ad on page 400**
E.M.I.-Cossor Electronics, Ltd., Canada, 75s
E-T-A Products Co. of America, Ill., 55s
Eagle Signal Co., Ill., 25s, 40s, 85s
Ebert Electronics Corp., N.Y., 25c, 40c, 45c, 55sc, 65sc, 85sc
Edison Industries, Thomas A., N.J., 10s, 25s, 50s, 60s, 65s, 85s
**Elastic Stop Nut Corp. of America, Agastat Timing Instruments Div., Dept. A37-76, 1027 Newark Ave., Elizabeth 3, N.J., 85s, Tel: ELizabeth 2-2900**
**See ad on page 513**
Electric Regulator Corp., Conn., 50sc, 55sc, 65sc
Electro-Mechanical Specialties Co., Inc., Calif., 15c, 20c, 25s, 30c, 40c, 50c, 55s, 60s, 65c, 70s, 75s
Electro Tec Corp., N.J., 25c, 60c


NEW

*the first four-pole*
**crystal can relay**



**FOUR POLE DOUBLE THROW NOW AVAILABLE**

2000 cps
125° C
one tenth grid spacing

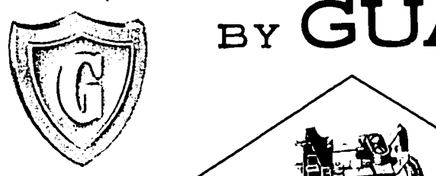
*Write* for details.

BRANSON Corp. 41 South Jefferson Road
Whippany, New Jersey TUcker 7-1100

For details, circle #493 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# *Everything* UNDER CONTROL BY GUARDIAN®



Series 1200

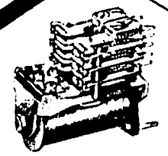
GENERAL PURPOSE RELAYS

A complete variety of basic controls ranging from small multi-contact relays to sensitive and heavy-duty power types.

General Purpose Catalog "B"




Telephone Type Catalog "C"



Series 695-T

TELEPHONE TYPE RELAYS

Sensitive units for precision instrumentation and communications to heavier duty types for industrial use.




Aircraft Catalog "D"

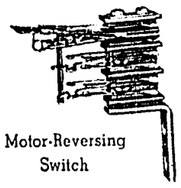
The fact is established that Guardian general purpose relays, telephone type relays and aircraft controls are the standard of comparison when original equipment designers and government technicians specify electromagnetic controls. Catalogs B - C - and D contain completely detailed information. All designs are basic and available in innumerable variations. Write for catalogs on your business stationery.



Series 3005 10 Amperes 4 P.D.T.

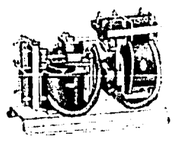
AIRCRAFT CONTROLS Relays, solenoid contactors, control switches, grip assemblies and miniaturized units. Features Guardian exclusive hermetic sealing techniques. Many units meet and surpass AN, MS, MIL and/or JAN specifications.



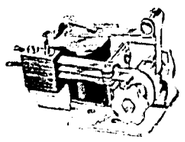



Motor-Reversing Switch

*Submit your requirements for specific recommendations*



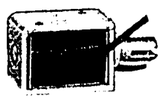
1200/1200 Interlock



Impulse Ratchet



M.E.R. Stepper



No. 22 Solenoid

GUARDIAN ELECTRIC MANUFACTURING COMPANY

1672 W. CARROLL AVENUE, CHICAGO 7, ILLINOIS

For details, circle #494 on Reader Service Card



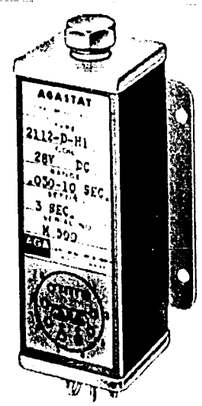



# Directory II. Components

## 68. Relays.

Electron-Radar Products, Ill., 25sc, 45sc, 55s, 85sc
Electronic Associates, Inc., N.J., 15c
Electronic Computer Co., Inc., Pa., Reed-Type sc
Electronic Control Corp., Mich., 55s
Electronic Specialty Co., Calif., 5sc, 10sc, 20sc, 25sc, 30c, 40c, 50c, 55sc, 65sc, 75sc, 85sc
**Elgin National Watch Co., Elgin Advance Relays, 2435 N. Naomi St., Burbank, Calif., 5, 25, 30, 35, 40, 55, 60, 65, 75, 80, 85, Tel: VIctoria 9-1446**
See ad on this page
Engineering Associates, Ohio, 5c, 15c, 30c, 50c, 70c, 80c
Essex Wire Corp., RBM Controls Div., Ind., 25s, 55s, 80s, 85s
Etelco Ltd., England, 25sc, 40sc, 45c, 50sc, 60sc, 65c, 70sc, 75sc, 80sc, 85sc
Exact Engineering & Mfg., Inc., Calif., 15s, 25s, 55s
Executone, Inc., N.Y., 25c, 65sc, 80sc
Fairfield Engineering Corp., Conn., 55c, Solid State c
Farwest Mfg. Div., Inc., Wash., 25s, 30s, 40s, 50s, 80s
Federal Manufacturing & Engineering Corp., N.Y., 20c, 85c
Filtors, Incorporated, N.Y., 25sc, 40sc, 50sc, 55sc, 60sc, 65sc, 75sc
Fisher-Pierce Co., The, Mass., 55s
Five Star Co., Inc., The, Conn., 55sc, 65sc
G-V Controls, Inc., N.J., 20c, 25sc, 75sc, 85sc
General Automatic Corp., N.J., 15sc, 25sc, 30c, 35sc, 40c, 55c, 65sc, 80sc, 85sc
**General Communication Co., 677 Beacon St., Boston 15, Mass., 5sc, Tel: COpley 7-6030**
See ad on page 331
General Controls Co., Calif., 85s
General Electric Co., Apparatus Sales Div., N.Y., 15s, 40s, 50s, 55s, 75s, 85s
General Electric Co., Specialty Control Dept., Va., 25s, 75s, 85s
General Electric Co. Ltd. of England, The, Telephone Works, England, 80s
**General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 25, Tel: VAlley Stream 5-6363**
See ad on page 284
Giannini Controls Corp., Calif., 25s, 75s
Globe Electrical Mfg. Co., Calif., 25c, 35c, 40c, 55c, 60c, 80c
Gordos Corp., N.J., 45c
**Greibach Instruments Corp., 329 North Ave., New Rochelle, N.Y., 10c, 15c, 65c, Tel: NEw Rochelle 3-7900**
See ad on page 284
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 15c, 25sc, 30sc, 35sc, 40sc, 55sc, 60sc, 65sc, 70sc, 75sc, 80sc, 85sc, Tel: CHesapeake 3-1100**
See ad on page 512
Gyrex Corp., The, Calif., 20c
Haledy Electronics Co., N.Y., 25s, 45s, 65s
Harman-Kardon, Inc., N.Y., 85c
Harrel, Inc., N.Y., 65c
**Hart Manufacturing Co., 265 Bartholomew Ave., Hartford 1, Conn., 25sc, 50c, 55c, 65sc, 75sc, Tel: JAckson 5-3491**
See ad on page 515
Hathaway Instruments, Inc., Colo., 65c
Haydon Company, The A.W., Conn., 70c, 85c
Hedin Tele-Technical Corp., N.J., 15c, 25c, 65c, 85c
Heinemann Electric Co., N.J., 55s, 85s
Hi-G, Inc., Conn., 25sc, 40sc, 60sc, 65sc, 75sc, 85sc
Hi-Spec Electronics Corp., Calif., 25sc, 65sc
**Hillburn Electronics Corp., 55 Nassau Ave., Brooklyn 22, N.Y., 25sc, 30sc, 35sc, 40sc, 50sc, 55sc, 65sc, 70sc, 75sc, 80sc, Tel: STagg 2-3875**
See ad on page 514
Hufco Industries, Calif., 25c, 75c, 80c


DESIGN TIMING RELIABILITY INTO YOUR CIRCUITS *specify...*




**NEW MINIATURE AGASTAT®**

**time/delay/relays**

- **Recycling virtually instantaneous—less than .020 seconds**
- **Unaffected by Voltage fluctuations (from 18 to 32 volts DC)**
- **Repeat Accuracy ±5%**

This new AGASTAT meets the environmental requirements of MIL-E-5272A. Built to withstand the rugged conditions of missile and aircraft applications. Lightweight—less than 15 ounces. Space saving—4⅛" tall . . . 1 3/16" wide . . . 1½" deep. Adjustable, with time delays from .030 to 120 seconds. Choice of operation for energizing or de-energizing. For complete specifications, write Dept. A37-76

ESNA

**AGASTAT TIMING INSTRUMENTS**

ELASTIC STOP NUT CORPORATION OF AMERICA
1027 NEWARK AVENUE, ELIZABETH 3, NEW JERSEY

For details, circle #495 on Reader Service Card

**ELGIN ADVANCE RELAYS**

*—for aircraft, missile and industrial use*

**ELGIN ADVANCE** is the relay source you can depend on to meet your manufacturing requirements now and to help you keep ahead in new product development for tomorrow.

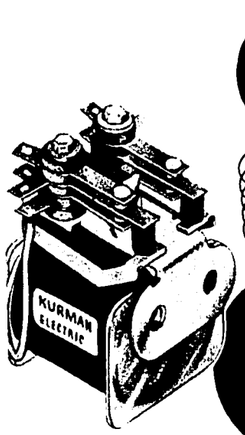
New and expanded research programs assure constantly improved performance and reliability in the design of high performance, precision type relays.

ELGIN ADVANCE RELAYS

**ELGIN ADVANCE RELAYS**
ELGIN NATIONAL WATCH COMPANY
2435 NORTH NAOMI STREET
BURBANK / CALIFORNIA

For details, circle #496 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-2 0.



KURMAN RELAYS

25 MW TRULY SENSITIVE 100 MW

50 MW

2 PDT
4 PDT

SERIES 52C 54C

SERIES 5D2C 5D3C with polystyrene cover

NEW MULTIPOLE KURMAN PLATE RELAYS

THREE ADJUSTMENTS AVAILABLE (Per Pole)
25 MW • 50 MW • "OFF THE SHELF" 100 MW

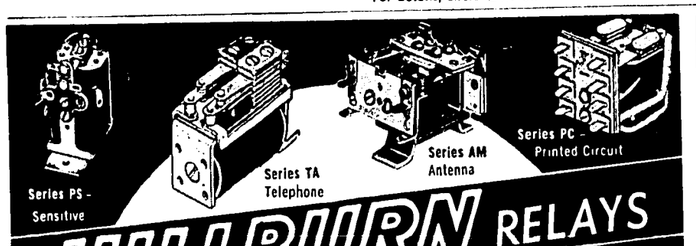
COIL RESISTANCE up to 20,000 OHMS
5 AMP CONTACTS • SMALL and LIGHTWEIGHT
AVAILABLE HERMETICALLY SEALED

SEND FOR COMPLETE SPECIFICATIONS

**KURMAN ELECTRIC CO.**
Subsidiary of Crescent Petroleum Corp. • Quality Relays Since 1928
191 NEWEL STREET, BROOKLYN 22, N. Y.
Export: 135 Liberty Street, New York City Cable: TRILRUSH

KURMAN

For details, circle #497 on Reader Service Card




HILLBURN RELAYS

for Reliability—

HILLBURN relays are the result of careful design, evaluation, and the thorough inspection, adjustment and testing of every completed product.

Your order for HILLBURN relays assures you of a quality product, "on-time" delivery and reliable performance.

HILLBURN manufactures relays to your special requirements plus a complete line, including:

- General Purpose
- Plate Circuit
- Industrial Control
- Printed Circuit
- Latching—Mechanical
- Midget 4—Pole
- Telephone
- Sensitive
- Stepping
- Antenna
- Power
- Plug-in

*More than 25 types*—over 500 variations to meet specific applications.

*Write Dept. RE for catalog covering all relay types.*

Since 1945

Series GMP Plug-In

Series 500 Stepping Relay-Counter Electrical Read-out

Series BC - Control

Series ML - Power

HILLBURN ELECTRONICS CORP.
55 Nassau Ave. Brooklyn 22, N.Y. Tel STagg 2 3875 6, 7
Subsidiary of LORAL ELECTRONICS CORP

For details, circle #498 on Reader Service Card

LOOK TO LEACH

RELIABLE RELAYS
Miniature • Sub-Miniature • Contactors

INTELLIGENT RELAYS
Time Delay • Fault Sensing • O/U Voltage and Frequency • Solid State "Static" Switching

PRECISE POWER
Engine Generators • Motor Generators • Large Rectifiers

POWER CONTROL AND DISTRIBUTION
Control Consoles • Patch Panels • Distribution Systems

INSTRUMENTS
Airborne Tape Recorders • Recording Accelerometers • Accessory Electronics • Command Receivers

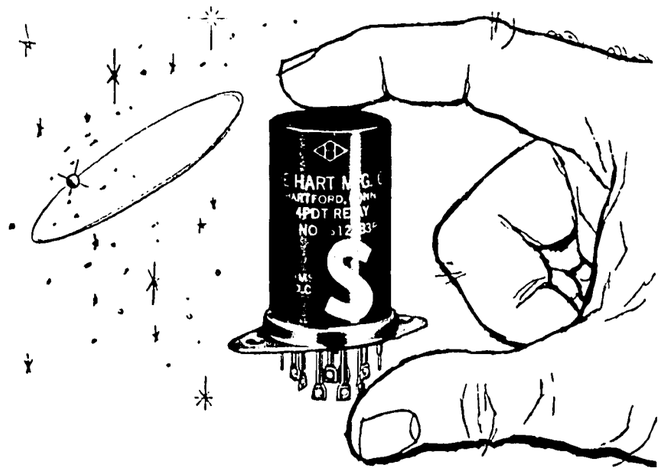
PACKAGED ELECTRONICS
Instrumentation • Special Power Supplies • Check-out and Test

LEACH CORPORATION
18435 SUSANA ROAD, COMPTON, CALIFORNIA
RELAY DIVISION 5915 AVALON BOULEVARD
LOS ANGELES 3, CALIFORNIA

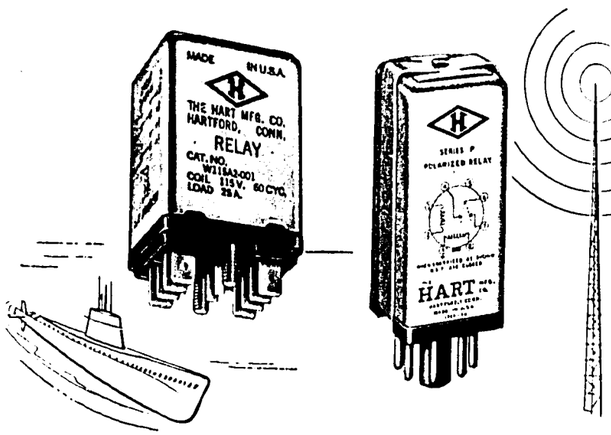
For details, circle #499 on Reader Service Card







Heart of the Control System




"DIAMOND H" Relays

Look into the heart of the control system for a missile, a computer, a nuclear submarine, or a great many other critical applications. You might be surprised how often you'll find "Diamond H" relays.

Unless, of course, you're one of the increasing number of engineers who've already selected "Diamond H" relays for a spot where they just have to work despite all sorts of adverse conditions.

Hart makes relays of three basic types: miniature, hermetically sealed, aircraft-missile relays (Series R/S); high speed, sensitive, polarized relays (Series P), and general purpose AC, DC relays (Series W).

Technical literature outlining the wide range of characteristics available with each type relay is yours for the asking. You'll find "Diamond H" engineers uncommonly adept at working out a variation of the basic designs to meet your set of specific requirements.

Tell us your needs . . . by phone, wire or letter.

THE HART MANUFACTURING COMPANY
265 Bartholomew Ave., Hartford 1, Conn.
For details, circle #500 on Reader Service Card




# Directory II. Components

## 68. Relays.

Hydro-Aire Co., Calif., 85sc

Imtra Corporation, Mass., 40c, 70c, 80c

Industrial Products-Danbury Knudsen, Div. Amphenol-Borg Electronics Corp., 33 E. Franklin St., Danbury, Conn., 5s, 25s, Tel: PIoneer 3-9272
See ad on page 160

Industrial Timer Corp., N.J., 85s

Intelex Systems, Inc., N.Y., 50s, 70s, 75s, 80s

Iron Fireman Mfg. Co., Electronics Div., Ore., 25sc, 40sc, 60sc, 65sc, 75sc

J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 20, Tel: STate 7-5825
See ads on pages 460, 546, 550

Jaidinger Mfg. Co., Inc., Ill., 20c, 25c, 30c, 40c, 65c, 75c, 85c

James Electronics, Inc., Ill., 5sc, 15s, 50s, 65s

Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 5s, 55s, Tel: CYpress 2-4025
See ad on page 550

Jordan Electronics, Div. Victoreen Instrument Co., Calif., 85sc

Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 70c

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 25s, 30c, 60s, 65c, 80s, 85c

Kidde & Co., Inc., Walter, N.J., 15c, 20c, 30c, 35c, 40c, 50c, 55c, 65c, Statu c

Kuhnke Elektrotechnische Fabrik, H., Germany, 40sc, 55sc, 65sc

Kurman Electric Co., Subsid. Crescent Petroleum Corp., 191 Newel St., Brooklyn 22, N.Y., 25s, 30s, 35s, 40c, 50s, 55s, 65s, 75s, 80s, 85c, Tel: EVergreen 3-8000
See ad on page 514

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 30s, 60s, 65s, 70s

Land-Air, Inc., Stepper Motors Div., Calif., 25sc, 60c, 70c, 75sc, 80sc, 85sc

Larson Instrument Co., N.Y., 10c, 30c, 35c, 50c, 55c, 65c, 85c

Leach Corporation, 18435 Susana Rd., Compton, Calif., 25sc, 30sc, 35sc, 40sc, 50sc, 55sc, 60sc, 65sc, 75sc, 85sc, Tel: NEvada 6-1061
See ad on page 514

Leach Corp., Leach Relay Div., 5915 Avalon Blvd., Los Angeles 3, Calif., 25c, 30c, 35c, 40c, 50c, 55c, 60c, 70c, 75c, 80c, 85c, Tel: ADams 2-8221
See ad on page 514

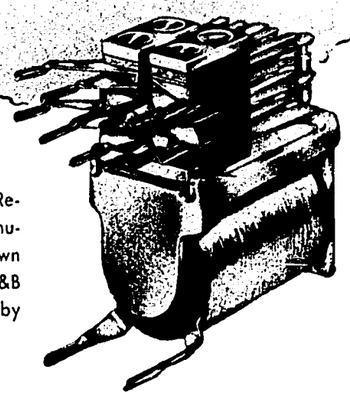
Ledex, Incorporated, Ohio, 25c, 60sc, 70s

Lee Electric & Mfg. Co., Calif., 85c

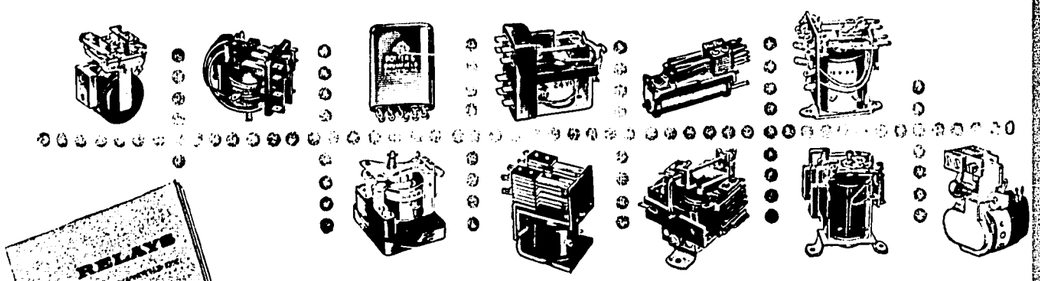
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TO ALL RELAY USERS

PRODUCING SPECIAL RELAYS FOR SPECIFIC NEEDS IS A P&B FORTE- IN 26 YEARS WE HAVE DESIGNED MORE THAN 20,000 VARIATIONS OF 57 BASIC RELAY TYPES- CHANCES ARE, WE CAN SAVE YOU BOTH TIME AND MONEY=



Let us have your toughest relay problems. Remember, designing, engineering and manufacturing relays is our sole business. Shown here are just a few of the broad line of P&B quality relays . . . the relays preferred by most engineers.






**FREE CATALOG upon request. Write today.**

See Potter & Brumfield relays in SWEET'S PRODUCT DESIGN FILE.

**POTTER & BRUMFIELD**

DIVISION OF AMERICAN MACHINE & FOUNDRY COMPANY - PRINCETON, INDIANA

For details, circle #501 on Reader Service Card





**Relays**

From One Source — Relay Sales

Advance Relays
Automatic Electric
C. P. Clare
Elgin Neomite
Guardian Electric
Leach Relays
Phillips Control
Potter & Brumfield
Struthers Dunn
Monitor Relays
Besson & Robinson
And Others

*Order Large or Small Quantities*

| | |
|---|---|
| Telephone Relays | Latching Relays |
| Midget Relays | Stepping Relays |
| Keying Relays | Delay Relays |
| Rotary Relays | Timers |
| Sealed Relays | Contactors |
| Sensitive Relays | Motor Starting Relays |
| Mercury Wetted | Differential Relays |

Write for New Relay Sales Bulletins And Catalog C-10

*For 24 Hour Delivery Call*
**West Chicago 1100**




**RELAY SALES, INC.**

Box 186-IR West Chicago, Illinois
TWX West Chicago, Ill. 3464-U · WUX

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# Directory II. Components

## 68. Relays.

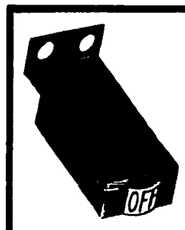
Life Instrument Co., Inc., Mass., 15c, 25c, 55sc, 65sc, 75c, 85c
Line Electric Co., N.J., 40sc, 55c, 65sc, 80s, 85sc
Liquidometer Corp., The, N.Y., 65sc
Magnecraft Electric Co., Ill., 15c, 20c, 25c, 30c, 35c, 40c, 55c, 60c, 65c, 75c, 80c, 85c
**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 55sc, Tel: CYpress 2-6610**
**See ads on pages 252, 364, 418**
Mallory & Co., Inc., P. R., Ind., 75c, 85c
Marion Instrument Div., Minneapolis-Honeywell Reg. Co., N.H., 10c
Marstan Electronics Corp., N.Y., 15s, 20s, 25s, 55s, 65s, 70s, 75s, 85s
Master Specialties Co., Calif., 85s
Mayberry Electronics Co., Calif., 85sc
Mercoid Corp., The, Ill., 45s
Mercury Contacts, Inc., Ohio, 45c
Microdot, Inc., Calif., 5s
Minneapolis-Honeywell Regulator Co., Twin Cities, Minn., 55s
Molex Products Co., Ill., 30sc, 55sc, 65c
Muirhead & Co., Ltd., England, 15s
Muirhead Instruments, Inc., N.Y., 15s
Multi-Amp Electronic Corp., N.J., 55s
Munzig International, Inc., Calif., 25s, 40s, 45s, 70s, 75s, 80s
**Naybor Laboratories, Inc., E.V., 26 Manorhaven Blvd., Port Washington, N.Y., 25sc, 55c, 60c, 75sc, 85sc, Tel: POrt Washington 7-4300**
**See ad on this page**
Networks Electronic Corp., Calif., 25s, 85s
Nippon Electric Co., Ltd., Japan, 50s, 70s, 80s, 85s
North Atlantic Industries, Inc., Terminal Drive, Plainview, L.I., N.Y., 60s, Tel: OVerbrook 1-8600
**See ad on page 286**
North Electric Co., Ohio, 25sc, 30sc, 40sc, 50sc, 60sc, 65sc, 70sc, 75sc, 80sc, 85sc
Oak Manufacturing Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 25c, 60c, 70c, Tel: MOhawk 4-2222
**See ad on pages 86-87**
**Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 25c, 40c, 55sc, 65sc, 80sc, 85c, Tel: ORchard 5-2600**
**See ad on pages 78-79**
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 20c, 55sc, 65sc, Tel: WOrth 6-0380**
**See ad on page 483**
Otis Elevator Co., Defense & Industrial Div., N.Y., 40c, 45c, 55c
Pacific Relays, Inc., Calif., 25c, 65c, 75c


**TIME DELAY RELAYS**



*Accuracy:* ±10% under all environmental conditions. ±5% on special order.
Single, double and triple pole, double throw at 5 amperes.

**SYMBOL INDICATORS**




*Temperature Range:* From −55 Degrees C. to +125 Degrees C.
*Operating Time:* .05 seconds.
*Displacement:* 70 Degrees Minimum.

*SPECIAL SOLENOIDS*

**E. V. NAYBOR**
LABORATORIES, INC.
PORT WASHINGTON, NEW YORK

For details, circle #504 on Reader Service Card

**DIRECT FACTORY SOURCE FOR**

General Electric Microminiature Relays
Elgin Advance Relays

*SAME-DAY SHIPMENT ASSURED*

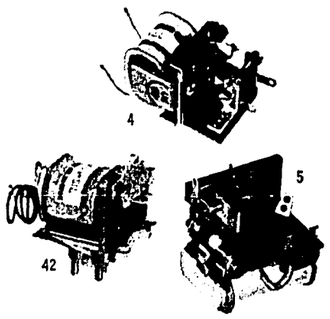
**Schweber** *ELECTRONICS*

60 HERRICKS ROAD, MINEOLA, L.I., N.Y. PIONEER 6-6520. TWX G-CY-NY-580U

For details, circle #503 on Reader Service Card




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**GENERAL PURPOSE SENSITIVE DC**

**Series 4**
SPDT, 20 & 50 mw.
Commercial Applications
Long Life

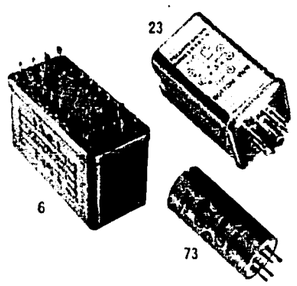
**Series 11**
SPDT, 50 & 200 mw.
Unenclosed Only
R/C Model and Toy Applications
Printed Circuits

**Series 42**
DPDT Version of "41"
100 & 200 mw.
Long Life

**Series 5**
SPDT, 1 to 100 mw.
Extremely Sensitive
Versatile

**Series 41**
SPDT, 32 to 200 mw.
Transistor, Tube and Machine Tool
Control Circuits
Long Life

**Series 7**
SPDT, Polar
0.5 to 2 mw.
Single or Dual Coil




**POLAR, 3-POSITION CENTER-OFF**

**Series 6**
Up to 4PDT, 8 to 44 mw.
Single or Dual Coil
Fast enough for follow-up systems

**Series 72**
SPDT, 1.5 mw.
Center-stable Version of High Speed Pulse Relay (See High Speed)

**Series 23**
SPDT, 6 & 12 mw.
DPDT, 12 or 24 mw.
Single or Dual Coil
High Thermal Stability

**Series 73**
SPDT, 35 and 70 mw.
Miniature
Hermetically Sealed




**SENSITIVE AC**

**Series 11**
SPDT, 0.30 v-a.
Shaded Pole
Unenclosed Only
Low Cost

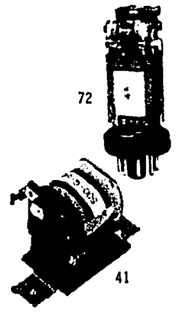
**Series 41**
SPDT, 0.06 to 0.40 v-a.
Current or Voltage Adjustments
Quiet, Shaded Pole
Low Cost, Long Life

**Series 5**
Rectifier AC
20 to 150 mw.
Operate, 5 to 100 volts

**Series 42**
DPDT Version of "41"
0.30 or 0.50 v-a.
Economical of Power
Low Cost

# SIGMA

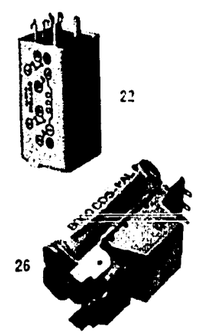
## SENSITIVE RELAYS




**HIGH SPEED**

**Series 41**
SPDT, 32 to 150 mw.
Keying up to 100 pps.
Low Cost

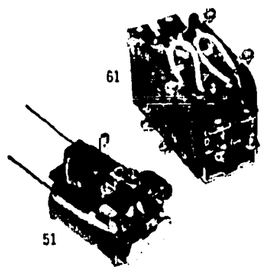
**Series 72**
SPDT, 0.3 to 40 mw.
Polar. Magnetic Latching
Telegraphy, High Speed Switching up to 500 pps.
Contacts Replaceable




**MINIATURE GENERAL PURPOSE SENSITIVE DC**

**Series 22**
SPDT, 12 to 40 mw.
DPDT, 20 to 80 mw.
Military Applications

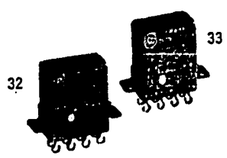
**Series 26**
SPDT, 4 to 20 mw.
R/C Model Applications




**25 AMP. SENSITIVE CONTACTORS**

**Series 51**
SPST, Double-break, 100 mw.
Switches up to 1 kw.
For Switching Lighting Loads
Inrush ratio, 10:1

**Series 61**
DPDT, 225 to 500 mw.
Polar. Magnetic Latching or Bias
Machine Tool Control Systems




**SUBMINIATURE .288 CUBIC IN.**

**Series 32**
DPDT, Magnetic Latching
Single or Dual Coil
50 & 100 mw.
30 g to 5000 cps. Vibration

**Series 33**
DPDT, Magnetic Bias
100 & 200 mw.
30 g to 5000 cps. Vibration

BULLETINS ON REQUEST

SIGMA

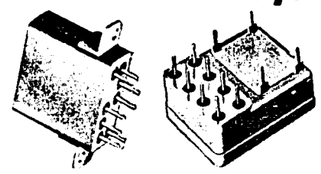
SIGMA INSTRUMENTS, INC.
31 Pearl St., So. Braintree 85, Mass.

AN AFFILIATE OF THE FISHER-PIERCE CO. (Since 1935)



For details, circle #505 on Reader Service Card

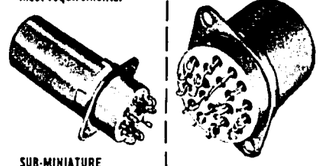
# PRICE ELECTRIC
## ... Reliable Relays



**MICRO-MINIATURE**

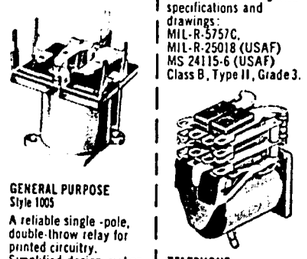
**Style 6**
Lightweight, crystal can type relay is simple, reliable and versatile. Ideal for miniaturized assemblies. Termination can be provided to meet most requirements.

**Style 6A**
Designed specifically for use in printed circuitry. Installed height is approximately 0.44". Meets applicable portions of MIL-R-5757C and MIL-R-25018 (USAF) Class B, Type II, Grade 3.



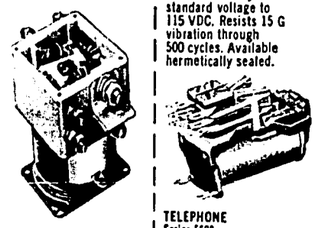
**SUB-MINIATURE**
**Style 506**
For Low Level Circuits and General Purpose use. Meets requirements of MIL-R-25018. Available with solder or plug type termination.

**MINIATURE**
**Style 520**
A 6 PDT General purpose relay of simple design and high reliability. Available with isolated contact chamber for low level circuitry use. Meets the following MIL specifications and drawings:
MIL-R-5757C,
MIL-R-25018 (USAF)
MS 24115-6 (USAF)
Class B, Type II, Grade 3.



**GENERAL PURPOSE**
**Style 1005**
A reliable single-pole, double-throw relay for printed circuitry. Simplified design makes it ideal for television and automotive control circuits.

**TELEPHONE**
**Series 5400**
For communications and other circuit control applications. Available in any standard voltage to 115 VDC. Resists 15 G vibration through 500 cycles. Available hermetically sealed.



**HIGH CURRENT**
**Series 8200**
200 amp, high shock relay for aircraft and missile use. Temperature range from —65° C to +125° C. DC only.

**TELEPHONE**
**Series 5600**
New series with bifurcated contacts. Provides high contact reliability. Ideal for computer circuitry. Available in standard voltages. Contact combinations to 6 PDT.

Price Electric has a complete line of relays to meet your requirements. Write for literature and specifications.

**PRICE ELECTRIC CORPORATION**

316 Church St. Frederick, Maryland
MOnument 3-5141 TWX: Fred 565-U

For details, circle #506 on Reader Service Card

# OPTEL



SINGLE LENS PHOTO-ELECTRIC RELAY

For High Speed Reflection Counting

MODEL FT

Capable of sensing lines and filaments of less than .001" section at rates to 1.5 KC. A focused beam is projected against the plane on which the lines or threads lay. Changes in light reflectance during the scanning process are translated into square wave pulses. Gear teeth can be counted in the same manner. Light is projected and returned through the same lens. Other reflex models for pulse or relay output operating with special corner reflectors or from light-dark contrasts. Also scanning beam reflex systems for sensing of random spots in line and for counting small and oddly shaped objects.

**PRESIN CO.**
2014 BROADWAY
SANTA MONICA, CALIF.

For details, circle #507 on Reader Service Card



# Directory II. Components

## 68. Relays.

Pendar, Inc., Calif., 25sc, Hi-G sc
Penn Keystone Corp., Conn., 25sc, 40sc, 50sc, 65sc, 85c
Phaostron Instrument & Electronic Co., Calif., 60c, 65c
Philadelphia Scientific Glass Co., Pa., 25s, 45s, 65s
Philips Electronics Industries Ltd., Canada, 25s, 35s, 45s, 65s, 70s, 75s, 85s
Phillips Control Corp., Ill., 15c, 25c, 40c, 55c, 75sc, 80c, 85c
Photo-Crystals, Inc., Ill., 45s, 55s, 85s
Plug-in Instruments, Inc., Penn., 65s, 85s
Pollak Corp., Joseph, 75-95 Freeport St., Boston 22, Mass., 25c, 55c, 65c, 75c, 80c, 85c, Tel: AVenue 2-9550
See ad on page 554
Potter & Brumfield, Div. of American Machine & Foundry Co., Princeton, Ind., 25sc, 30sc, 40sc, 50sc, 55sc, 60sc, 65sc, 70c, 75sc, 80sc, 85sc, Tel: FUlton 5-5251
See ad on page 516
Presin Company, 2014 Broadway, Santa Monica, Calif., Photo electric, Tel: EXbrook 3-9738
See ad on this page

# reson-ator

## FREQUENCY SELECTIVE DEVICES




**RESONANT REED RELAYS AND OSCILLATOR CONTROLS**

Reson-ator Resonant Reed Relays and Oscillator Controls are precision electro-mechanical devices engineered to provide the finest, most economical method of detection and generation of frequencies in the audio range. Ideal for any application requiring the stability and long life characteristic of this tuning fork type device.

***Brief Specifications—***

Frequencies: 20 cps to 1600 cps
Coil Resistances: 1 to 1500 ohms DC
Temperature stability: ±.0025%/C °from −40°C to +100°C.
Reference 25°C
Enclosure: Drawn copper can, .750"x .750"x3.281" overall. Provided with standard 7 pin hermetic seal header.
Relay Bandwidths: To suit customer's requirements. From ±.1% to ±4%
Complete specifications and application data available upon request.

- SIGNALING SYSTEMS
- DATA TRANSMISSION
- TONE GENERATORS
- FREQUENCY STANDARDS
- REMOTE CONTROL
- FREQUENCY DETECTION
- AUDIO FILTERS
- TELEMETERING

**SECURITY DEVICES LABORATORY**
ELECTRONICS DIVISION OF SARGENT & GREENLEAF, INC.
ROCHESTER 21, NEW YORK

For details, circle #508 on Reader Service Card



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

IMPORTANT UNITED STATES GOVERNMENT AGENCIES USING

**TREPAC**

AIR FORCE
ARMY
CENTRAL INTELLIGENCE AGY.
FEDERAL AVIATION AGY.
MARINE CORPS
NAVAL GUN FACTORY
NAVAL SECURITY AGY.
ORDNANCE ARSENAL
SIGNAL CORPS
WEATHER BUREAU
ALASKA COMMUNICATION SYSTEM

CANADIAN DEPT. OF TRANSPORT

and hundreds of Telephone, Railway and Communications companies throughout the world

*This* TELEPRINTER RELAY *is*



The TREPAC Model SSR-530-C works in ANY Teleprinter.

THREE YEARS OF FIELD EXPERIENCE PROVE ABSOLUTE DEPENDABILITY!

TESTED in hundreds of communication circuits, world-wide.

PROVEN RELIABLE by complete dependability under extremes of temperature, shock, vibration, humidity.

ADOPTED as superior replacement for electromechanical polar relays by major telecommunication networks . . . Telephone Companies, Railroads, Gov't Agencies, many others.

ELIMINATES RELAY PROBLEMS.
NO MOVING PARTS —
NO ADJUSTMENTS —
NO MAINTENANCE.

INPUT polar, neutral, either polarity, 15-100 mils. SSR-530-C actually corrects characteristic signal distortion, works perfectly on marginal signals!

OUTPUT Isolated Adj. 60-80 mils (independent of input level!) into any load from 44-2100Ω. Increases teleprinter range.

SPEED Tested to 800 WPM! Suitable for high-speed teleprinter or data circuits.

WANT MORE DETAILS?
WRITE, WIRE, PHONE!
TWX-1077 Phone-LOwell-7-3810

TREPAC

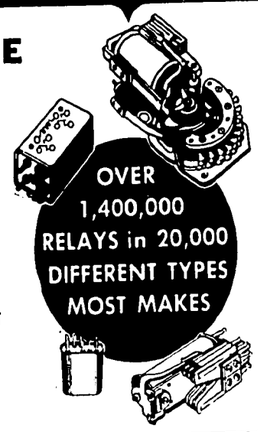
CORPORATION OF AMERICA
Solid State Electronics For Telecommunications
[illegible] W. Hamilton Ave. Englewood 3, N.J.

For details, circle #509 on Reader Service Card

SAVE TIME and EXPENSE
on PURCHASING **RELAYS**

**IMMEDIATE DELIVERY**
Off Shelf Items

CONTACTORS
SOLENOIDS
AN TYPES
CHOPPERS
DELAY
CRYSTAL CAN
SUB-MINIATURE
FREQUENCY RESONANT
POWER TYPES
HERMETICALLY SEALED TYPES
IMPULSE TYPES
MERCURY WETTED CONTACT TYPES
LELAND ROTARIES



OVER 1,400,000 RELAYS in 20,000 DIFFERENT TYPES MOST MAKES

WE DELIVER RELAYS NOT PROMISES

**DELIVERY WITHIN 1 WEEK**
Items requiring assembly and/or adjustment

SENSITROLS
STEPPERS
A-C TYPES
TELEPHONE TYPES
MINIATURE TYPES
PLATE CIRCUIT TYPES
POLARIZED TYPES
OVERLOAD
HIGH VOLTAGE TYPES
AIRCRAFT TYPES
MINOR SWITCHES

SEND FOR CATALOG R

PRODUCTION QUANTITIES IN STOCK

Universal RELAY CORP.
42 WHITE ST., NEW YORK 13, N. Y. • WAlker 5-9257

For details, circle #510 on Reader Service Card

## 68. Relays.

**Price Electric Corp., 316 Church St., Frederick, Md., 5c, 25c, 40c, 50c, 55c, 60c, 65c, 70c, 75c, 80c, 85c, Tel: MOnument 3-5141**
See ad on page 519

Radio Engineering Products, Canada, 50s

Relays, Inc., N.Y., 25c, 35c, 55c, 65c, 80c

Research Industrial Laboratory of Electronics, Pa., 65c

Resitron Laboratories, Inc., Calif., Vacuum Contact sc

Rhodes, Inc., M.H., Conn., 85sc

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 35sc, 50sc, Tel: LOckwood 5-4578**
See ad on page 324

Rowan Controller Co., The, Md., 10c, 40c, 55c, 85c

Sag Harbor Industries, N.Y., 45c, 60c

Scherma Mfg. Co., Inc., F. A., N.Y., 35, 25s, 65s, 80s

**Security Devices Laboratory, Electronics Div. of Sargent & Greenleaf, Inc., 24 Seneca Ave., Rochester 21, N.Y., 20sc, Tel: HOpkins 7-3200**
See ads on pages 385, 519

Servo-Tek Products Co., N.J., 65s

**Sigma Instruments, Inc., 31 Pearl St., South Braintree 85, Mass., 15sc, 25sc, 35sc, 40sc, 50sc, 60sc, 65sc, 70sc, 75sc, Tel: VIctor 3-5000**
See ad on page 518

**Simpson Electric Co., 5218 W. Kinzie St., Chicago 44, Ill., 10sc, Tel: ESTebrook 9-1121**
See ad on page 462

Sivers Lab., Sweden, 5s

Sloan Company, The, Calif., 85sc

Sorensen Industrial Electronic Co, N.J., 5c, 50c, 85sc

Sorrels-Johnson Corp., Mass., 25c, 40c, 45s, 50c, 55s, 85c

Standard Electrical Products Co., Ohio, 20c, 45c, 55c, 70c

Standard Telephones & Cables, Ltd, England, 25s, 40s, 50s, 70s, 75s, 80s

Stelma, Inc., Conn., 35c

**Stevens-Arnold, Inc., 7 Elkins St. South Boston 27, Mass., 15s, 20s, 25s, 35s, 50s, Tel: ANdrew 8-1170**
See ad on page 421

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 80s

Struthers-Dunn, Inc., N.J., 5c, 15c, 20c, 25c, 30c, 35c, 40sc, 45c, 55sc, 65sc, 70sc, 75c, 80c, 85sc

Telechrome Mfg. Corp., N.Y., 25s

Telecomputing Corp., Calif., 75s

Telecomputing Corp., Electronic Components Div., Calif., 25sc, 75sc

Tempo Instrument, Inc., N.Y., 85sc

Terado Company, Minn., 25sc, 65sc

Texas Instruments Incorporated, Metals & Controls Div., Mass., 25c, 55c

**Thermal Controls, Inc., 41 River Rd. North Arlington, N.J., 25sc, 50sc, 55sc, 65sc, 75sc, 85sc, Tel: NOrth 1-1000**
See ad on page 450

ThermoCal, Inc., Calif., 65, 70, 75, 85

Thompson Ramo Wooldridge Inc. Tapco Group, Ohio, 5c, 85c

Torwico Electronics, Inc., N.J., 20c, 40c, 50c, 65c, 85c





# Directory II. Components

## 68. Relays.

Transco Products, Inc., Calif., 5sc
Transelectric Mfg. Co., Pa., 80s
Transistor Devices, Inc., N.J., 85sc
**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 20, 35, 50, 65, Tel: LOwell 7-3810**
See ad on page 520
Tri-Tronics Co., Ill., 30sc
**Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 25, 55, 65, 85, Tel: HUmboldt 2-4200**
See ad on pages 74-75
Union Switch & Signal, Div. Westinghouse Air Brake Co., Pa., 25s, 30s, 60s, 65s, 75s
United States Instrument Corp., Va., 30c, 40c, 60c, 70c, 80c
U. S. Relay-Electronics, Calif., 20c, 25c, 40c, 50c, 55c, 65c, 75c, 80c, 85c
Vap-Air Div., Vapor Heating Corp., Ill., 55c
Varo Mfg. Co., Inc., Tex., 15sc, 20sc, 85c
Vemaline Products Co., N.J., 85sc
Video Instruments Co., Inc., Calif., 45
WacLine, Inc., Ohio, 10c
Ward Leonard Electric Co., N.Y., 55s, 65s
Waters Mfg., Inc., Mass., 10s
Western Union Telegraph Co., The, N.Y., 15s, 35s, 50s
Westronics of California, Calif., 5c
Wheelock Signals, Inc., N.J., 5c, 15c, 25s, 35c, 40c, 50c, 55s, 65s, 75s, 80s
Winatic Corp., The, N.Y., 40s, 55s, 85s
Zenith Electric Co., Ill., 85sc

**Remote controls:**
**See class 4**

**Repeaters & resolvers, servo:**
**See class 30**

**Resistor testers:**
**See class 14**

## 69. Resistors.

5. Carbon fixed, molded
10. Carbon, variable
15. Deposited carbon
20. Potentiometers
25. Potentiometers, precision
30. Precision film
35. Printed circuit
40. Rheostats
45. Thermistors
50. Vacuum sealed
55. Very high megohm
60. Wirewound, fixed
65. Wirewound, variable
70. Wirewound, precision

Accuracy, Inc., Mass., 20c, 25c
Ace Coil & Electronics Co., N.J., 70c

## 69. Resistors.

**Ace Electronics Associates, Inc., Dept. A3, 99 Dover St., Somerville, Mass., 20c, 25c, 35c, 65c, 70c, Tel: SOmerset 6-5130**
See ad on page 522
Aerovox Corp., Mass., 15s, 70s
Allen-Bradley Co., Wis., 5sc, 10sc, 30sc, 40sc
Allen Electric & Equip. Co., Mich., 10c, 60c
Allies' Products Corp., Fla., 15sc
Analogue Controls, Inc., N.Y., 20sc, 25sc, 60sc, 65sc, 70sc
**Anton Electronic Laboratories, Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 20sc, 35sc, 70sc, Tel: EVergreen 6-5715**
See ads on pages 319, 409, 581
Applied Technology Corp., N.Y., 25c

**DIRECT FACTORY SOURCE FOR**

Daystrom Squaretrim

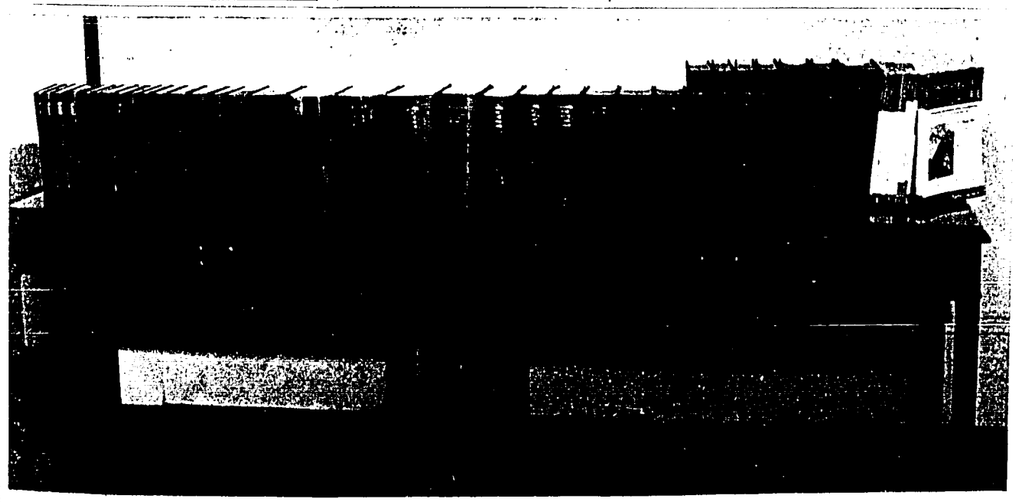
Bourns Trimpot®

*SAME-DAY SHIPMENT ASSURED*

Schweber ELECTRONICS

60 HERRICKS ROAD, MINEOLA, L.I., N.Y. PIONEER 6-6520. TWX G-CY-NY-5800

For details, circle #511 on Reader Service Card



**FORTY-EIGHT YEARS OF RADIO-ELECTRONIC HISTORY**

are recorded in "Proceedings of the IRE." The photo above shows the issues from 1912 through 1947—thirteen years of rapid advances and earth-shaking accomplishments are not even included in this panorama of progress! Since publication of its first issue, "Proceedings of the IRE" has paced and pioneered in every field of radio from the first vacuum tube through today's giant computers and tiny transistors. The engineers who write, read and use this magazine have transformed the world in forty-eight short years! Is it any wonder that so many advertisers believe these engineers must learn about their products in the fact-packed advertising pages of "Proceedings of the IRE"?

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# ACE

## Potentiometers - Trimmers

## RELIABILITY IN MINIATURIZATION

### ACEPOT®-500 ACEPOT X-500*

Sub-miniature, linear and non-linear potentiometers. Single turn unit, ½" size, ±2% resistance tolerance and ±0.3% ind. linearity.



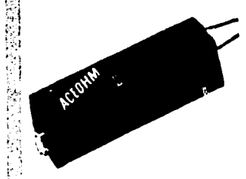
actual size

| | |
|---|---|
| Size | ½" x ½" |
| Weight | 0.25 ounce |
| Resistance Range | 2Ω to 500K |
| Resistance Tolerance | ±2% |
| Linearity | ±0.3% ind. standard |
| Temperature* | −55°C to 125°C* |
| Mechanical Rotation | Continuous or with stops |
| Electrical Angle | 325° std. ≷ available |
| Resolution | 0.12% for 50 K Others comparable |
| Torque | .05oz./in. at 20°C (Bronze) .035oz./in. (Ballbearing) |
| Power | 2W for 60°C rise or 2.5W for 65°C (X-500) |
| Mounting | Threaded bushing, servo, flush or flanged. Ganged up to 6 cupt. |

* X-500 standard high temperature potentiometer. Range: −55°C to 150°C.

### ACEOHM®

Sub-miniature trimmers . . . high temperature, humidity proof for severe environment.



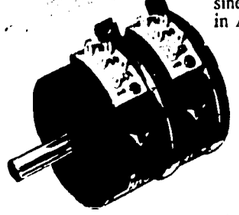
actual size

| | |
|---|---|
| Size | 1¼" x ¼" x 5/16" Standard Mounting holes |
| Weight | 0.2 ounce |
| Resistance Range | 10Ω to 75K — Special to 100K |
| Mechanical Rotation | 25 Turns on lead screw, adjustable over 100% of winding |
| Power Rating | 1.6W at 40°C Derates to 0 at 225°C |
| Temperature Range | −55 to 225°C |
| Resolution | .13% for 75K. Other resistances comparable |
| Dielectric Strength | 1000 volt DC for 60 sec. |
| Load Life | 1000 hours at 180°C |
| Capacitance | Extremely low distributed capacity (moulded hitemp. phenolic case & cover) |

Completely sealed element. Meets and surpasses all applicable requirements of MIL-E-5272A and MIL STD. 202A.

### ACEPOT®

Standard non-linear and linear potentiometers. 0.25% terminal conformity with out padding resistors. Immediately available in sine, cosine, square law and log functions in AIA sizes.



| Typical Spec's: | Sine-cosine | Double Sided Square-law |
|---|---|---|
| Size | 3" | 3" |
| Resistance | 20K ±5% driving | 25K ±5% driving |
| Conformity | ½% pk-pk | ±0.25% |
| Function angle | 360° | ±180° |
| Power | 4 watts | 3 watts |
| Mounting | Servo | Servo |

Submit your design requirements to our Engineering Group for evaluation and quotations.

### ACESET®

Sub-miniature Trimmers. Heat dissipation . . . 2 watts at 60°C. Immediate delivery in resistances of 50Ω to 50 K.

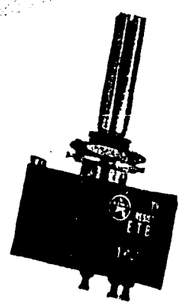


actual size

| | |
|---|---|
| Size | ½" x 5/16" |
| Weight | ½ ounce, including lock washer and nuts |
| Resistance Range | 50Ω to 100K ±10% std. tol. |
| Linearity | ±5% |
| Temperature Range | −55°C to +125°C |
| Mechanical Rotation | 330° Nominal |
| Electrical Angle | 320° Nominal |
| Power | 2 watts for 60°C. rise |
| Mounting | ¼"-32 threaded bushing |

### ACEMHO®

Conductive plastic element. Infinite resolution. Extremely long life. No sudden open-circuit failure possible. Low, low noise. Meets JAN & MIL specs. Patents pending. In sizes from ½" to 1 5/16".



| | |
|---|---|
| Size | 1 5/16" |
| Weight | 3.5 ounces |
| Resistance | to 250K ohm |
| Linearity | 0.5% Ind. standard 0.1% Ind. special |
| Resolution | essentially infinite |
| Power | 3W at 65°C |
| Mounting | bushing and servo |

### ACETRIM*

Sub-miniature trimmers . . . A wide range of resistances are available in this low-cost, space and weight saving unit.



actual size

| | |
|---|---|
| Size | ½" x ½" |
| Weight | 0.25 ounce |
| Resistance Range | 2Ω to 250K ±5% std. tol. |
| Linearity | ±3% |
| Temperature | −55°C to 125°C (to 150°C (X-500) |
| Mechanical Rotation | continuous or with stops |
| Electrical Angle | 325° std. ≷ available |
| Power | 2W for 60°C rise or 2.5W for 65°C |
| Mounting | Threaded bushing, printed circuit, flush, flanged, ganged. |

*Trade Mark

Exact requirements for your particular applications, can be custom designed and mass produced with short lead time. All units are anti-fungus treated and fully sealed against dust, moisture and humidity. Meets applicable JAN-MIL specs including shock and vibration. Send us your specifications for engineering assistance on designs and applications. Complete Fact File and Application Data Sheets available on request. CALL, wire or teletype Dept. A3 at Ace Electronics Associates, Inc., 99 Dover Street, Somerville, Mass. SOmerset 6-5130, TWX SMVL 181.

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ACE ELECTRONICS ASSOCIATES INC.

For details, circle #512 on Reader Service Card





# TIN OXIDE RESISTORS by CORNING

## Type N

**MIL-R-10509B**—½, 1, 2W at 40°C. Derating to 140°C. Up to 4.2 megohms.

**MIL-R-10509C** New fusion-sealed resistor. ⅛ and ¼-watt. Can be boiled in water without failing moisture specs. 100 ohm to 360 K ohm at 70°C., derating to 150°C.

## Low-Power

For radio, television and similar applications. LPI-3: 3W, 125-40 K. LPI-4: 4W, 125-90 K. LPI-5: 5W, 180-110 K. LPI-7: 7W, 180-90 K. LPI-10: 10W, 180-70 K.

**Also C-42 resistor:** a low-cost, 2W, 70°C. resistor to meet the performance requirements of MIL-R-11B; 130 ohm to 1.4 K.

## High-Power

**Type R** 7 to 115W at 40°C., derate to 235°C.; 10 ohms to 1 megohm. To MIL-R-11804C.

## High Temperature

**Type S** High-temperature to MIL-R-11804C. 1, 2, and 4W at 40°, derate to ½-power at 120°C. Up to 4.2 megohms.

**Type WC-5** Water-cooled HF. Can mount direct on coax line and at RF ground potential. 10 to 300 ohms with ± 15% standard; 10%, 5%, and 1% also available. Dissipates up to 5 KW.

**Type H** High-frequency for dummy antennas, circuit loading, damping, and terminating. 10 ohms to 1 megohm. 5 to 140W.

**Type ST** for highest wattage-to-volume ratio of any metallic oxide resistor. 2½, 5, and 10 W at 25°C., derating to 350°C. 2% and 5% tolerances.

For more information on any or all of these resistors, write for data sheets. Corning Glass Works, 550 High Street, Bradford, Pa.

**CORNING ELECTRONIC COMPONENTS**

CORNING GLASS WORKS, BRADFORD, PA.

For details, circle #513 on Reader Service Card




# Directory II. Components

## 69. Resistors.

Ardente Acoustic Labs., Ltd., England, 15s, 20sc

Arnhold Ceramics, Inc., N.Y., 15s, 30s, 55c

Atohm Electronics, Calif., 25s, 65s, 70s

Automatic Production Research, N.Y., 35c

Autotron, Inc., Calif., 60c, 65c, 70c

Barco, Inc., Wis., 20s, 60s, 65s, 70s

Beckman Instruments, Inc., Helipot Div., Calif., 20sc, 25sc

Bellandi Co., Inc., M., Ill., 35c

Biddle Co., James G., Pa., 10s, 65s

Bond Electronics Corp., N.J., 35c, 60c, 70c

**Borg Equipment Div., Amphenol-Borg Electronics Corp., 120 S. Main St., Janesville, Wis., 25sc, Tel: PLeasant 4-6616**


See ad on page 524


Bourns, Inc., Calif., 10sc, 15sc, 20sc, 40s, 65sc

Bradford Components, Inc., N.Y., 60sc, 70sc

**CTS Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 10c, 20c, 35c, 40c, 55c, 60c, 65c, 70c, Tel: ELkhart 3-0310**


See ad on page 2


Calbest Electronics, Calif., 20sc, 25sc, 70c

Carborundum Co., N.Y., 5c, 45c

Carter Mfg. Corp., Mass., 20sc, 25sc, 70sc

Carter Parts Co., Ill., 20s, 40s, 65s

**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 10sc, 20sc, 65sc, Tel: WOodruff 2-9200**


See ad on page 152


Chicago Telephone of California, Inc., Calif., 10c, 20c, 35c, 65c

Clark Controller Co., The, Ohio, 60c

Clarostat Mfg., Co., Inc., N.H., 10sc, 15sc, 20sc, 25sc, 40sc, 60sc, 65sc, 70sc

Colber Corporation, N.J., 60c

Colvin Laboratories, Inc., N.J., 25c, 70c

**Computer Instruments Corp., 90 Madison Ave., Hempstead, L.I., N.Y., 20sc, 25sc, 30sc, 65sc, 70sc, Tel: IVanhoe 3-8200**


See ad on pages 528-529


**Consolidated Resistance Co. of America, Inc., 44 Prospect St., Yonkers 1, N.Y., 35sc, 60sc, 65sc, 70sc, Tel: YOnkers 3-5900**


See ad on this page


Constanta Co. of Canada, Ltd., The, Canada, 5s, 15s, 30s, 55c

Continental-Wirt Electronics Corp., Pa., 5s, 15s, 20s, 30s, 40s, 60s, 65s, 70s

Corbett Science Laboratories, F. W., Calif., 65c, 70sc

**Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 45s, Tel: PLainfield 6-9000**


See ad on Cover 3


**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 15s, 30s, 35s, Tel: FOrest 2-5571**


See ads on pages 390, 523


Corning Glass Works, Electrical Products Div., N.Y., 30s

Dale Products, Inc., Neb., 15s, 20s, 35s, 60s, 65s, 70s

Daven Co., The, N.J., 15s, 20s, 30s, 35s, 40s, 55s, 60s, 65s, 70s

Daystrom, Inc., Weston Instrument Div., N.J., 20sc, 25sc

Daystrom Pacific, Div. of Daystrom, Inc., Calif., 10s, 20s, 25c, 35s, 70c

DeJur-Amsco Corp., Electronics Div., N.Y., 20sc, 25sc, 40sc

Diehl Mfg. Co., N.J., 25s

Dmeter Mfg. Co., Inc., N.Y., 70sc

Du-Co Ceramics Co., Pa., 10c

Dwyer Engineering Co., Inc., N.H., 35sc

Edcliff Instruments, Calif., 20, 25

**Electra Manufacturing Co., 4051 Broadway, Kansas City 11, Mo., 15sc, 30sc, 35sc, Tel: WEstport 1-6864**


See ad on page 526


Electric Specialty Co., Conn., 45c

Electro-Chemical Engraving Co., Inc., N.Y., 35c

Electro-Flex Heat, Inc., Conn., 60c

Electro Instruments, Inc., Calif., 70s

**Electro-Mec Laboratory, Inc., 47-51 33rd St., Long Island City 1, N.Y., 25c, 60c, 65c, 70c, Tel: STillwell 6-3402**


See ad on page 264



CRCA **RESISTORS**

FIXED • ADJUSTABLE

PRECISION • ULTRA-PRECISION

Ultimate Reliability: Unparalleled "no rejects" record since 1953

Immediate Deliverability: .01%, resistors are made to order in 24 hrs

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| PRODUCTS | | CRCA BULLETIN # |
|---|---|---|
| Rotohmeters*: Minute, Ultra-Precision Adjustable Resistors |  | R-65 |
| Plug-Trims*: Plug-In Resistors & Socket Blocks for Divider, Decade or Trimmer assemblies |  | R-55 |
| Instruments: .002% Voltage Dividers .01% Wheatstone Bridges .01% Resistance Decades |  | R-50 |
| Banana-Plugs*: Resistors & Jacks |  | R-44 |
| R-Stacks*: Multi Tap, Fixed & Adjustable Resistors |  | R-40 |
| Series "200's": Standard design Lug & Wire Lead Resistors |  | R-28 |

*Patents Applied For

For abbreviated performance data see specs below or EEM, 1960 edition, page 1264

GENERAL RESISTOR SPECIFICATIONS

| | |
|---|---|
| Type: | Wire wound, also carbon & metal film. |
| Range: | .01 ohms thru 20 Megohms |
| Absolute accuracy: | 1% thru 0.5% (at 25°C) |
| Relative accuracy: | thru .001% |
| Long term stability: | thru .001% |
| Temperature coefficient: | thru 2 ppm °C. |
| Power dissipation: | thru 3 watts at 125°C. |
| MIL Specs: | MIL-R-93A & MIL-R-9444 (applicable sections). |
| DELIVERY: | 1 weeks regular, 1 week thru 24 hrs—Special |

CONSOLIDATED RESISTANCE COMPANY OF AMERICA, INC.

44 Prospect St., Yonkers, N.Y. YO 3-5900

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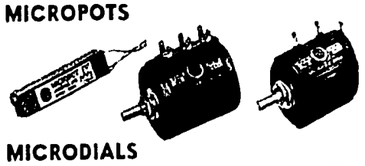

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RADIO DISTRIBUTING CO.
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South Bend, Indiana

RADIO ELECTRIC CO.
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RADIO ELECTRONIC PARTS CO.
3235 Prospect Ave.
Cleveland, Ohio

RADIO ELECTRONIC SUPPLY CO.
14405 Wyoming
Detroit, Michigan

RADIO SHACK CORP.
230 Crown St.
New Haven, Connecticut

RADIO SHACK CORP.
730 Commonwealth Ave.
Boston, Massachusetts

RADIO SUPPLY CO., INC.
115 Laura St.
Wichita, Kansas

SREPCO, INC.
314 Leo St.
Dayton, Ohio

STANDARD SUPPLY CO.
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STEWART SMITH
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UNITED RADIO, INC.
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***microwave resistors***

**FILMOHM Metal Film Resistors offer:** high stability • low temperature coefficient • tinned electrodes • micro-thin resistance film (even at highest frequencies) • quality-controlled dimensions, electrical and high temperature characteristics. Choose from a wide variety of shapes, sizes and base materials for a precision-engineered FILMOHM Microwave Resistor to suit your requirements.

•

**FILMCARD**
Metal film Fibreglass resistance card for all low power attenuators and terminations. Available in a wide range of resistivities. Easily fabricated. Ask about new FILMCARD KIT. Bulletin P-2.

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Metal resistance film fused to PYREX base, sealed with micro-thin quartz coating. From BNC to largest line size. Bulletin M-1-1.

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Standard plates available for L through K bands. Bulletin A-1.

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Ruggedized precision attenuator elements. Withstands severe shock and vibration. Bulletin FCA-1.
*Reg. T.M. Corning Glass Wks., Corning, N. Y.

**FILMOHM METALLIZED MICA**
For use as rotary and guillotine attenuator elements. Ideal for mm. frequencies. Available in large sheets or fabricated parts. From .001" to .005" thick. Bulletin C-1.

**COAXIAL TERMINATION RESISTORS**
Metal film, ceramic base resistors for ⅜" line coaxial terminations. Useable up to 10 KMC. Bulletin CT-1.

**CERAMIC DISC RESISTORS**
New, low cost, ruggedized disc resistors for coaxial terminations. Bulletin CD-1.

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Completely flexible thin plastic resistance card. May be laminated to cavities for use as mode suppressors. Bulletin FR-1.

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Metal film tubular glass resistors, non-inductive, for dummy loads and terminations. Standard and special sizes to 2' long. Bulletin HP-1.

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Mica-base resistors as thin as copper stripline. Cement directly into stripline circuits. Bulletin SL-1.

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Available on special order utilizing glass, ceramic or mica base. Custom-designed to suit your microminiature applications. Bulletin FRC-4.

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WA 4-6605 TWX NY 1-4892
For details, circle #516 on Reader Service Card




# Directory II. Components

## 69. Resistors.

Electro Radiation, Inc., Calif., 20c, 25c
Electro Scientific Industries, Ore., 60sc, 65sc, 70sc
Electromath Corp., N.Y., 20sc, 25sc, 65sc, 70sc
Electronic Applications, Inc., Conn., 15s
**Erie Resistor Corp., 644 West 12th St., Erie 6, Pa., 5s, 15s, 30s, Tel: GLendale 6-8592**
See ad on pages 40-41
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 60c, 70c
Fairchild Controls Corp., Components Div., N.Y., 20sc, 25sc, 30sc
**Fenwal Electronics, Inc., 33G Mellen St., Framingham, Mass., 45sc, Tel: TRinity 2-5110**
See ad on page 530
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 45s, Tel: CHerry 6-2811**
See ads on pages 267, 354, 423, 457, 525, 620
Film Resistors, Inc., N.J., 30 Microwave & coaxial types
**Filmohm Corp., 48 W. 25th St., New York 10, N.Y., 30sc, 35sc, Tel: WAtkins 4-6605**
See ad on this page
Franklin Engineering, Calif., 55c, 60c
Fugle-Miller Labs., Inc., N.J., 60c, 70c
G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5s, 15s, Tel: WOodland 8-9661
See ad on page 640
Gamewell Co., The, Mass., 20c, 25sc, 65c
General Circuits, Inc., N.Y., 35c
General Controls Co., Calif., 20s, 25s, 60s, 65s, 70s
General Electric Co., Apparatus Sales Div., N.Y., 40s, 60s, 65s
General Electric Co., Magnetic Materials Sect., Mich., 45sc
**General Radio Co., 22 Baker Ave., West Concord, Mass., 20s, 25s, 40s, 60s, 65s, 70s, Tel: EMerson 9-4400**
See ad on Cover 4
General Resistance, Inc., N.Y., 60sc, 70sc, Networks sc
General Transistor Corp., N.Y., 70s
Giannini Controls Corp., Calif., 20sc, 25sc, 40c
Globe Electrical Mfg. Co., Calif., 20c
Gray Instrument Co., Pa., 60s, 70s
Great Eastern Mfg. Co., N.Y., 45s
**Guidance Controls Corp., 110 Duffy Ave., Hicksville, L.I., N.Y., 25c, 65c, 70c, Tel: WElls 8-9500**
See ad on page 342


**PRECISION RESISTORS**

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General purpose, steatite forms
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Encapsulated resistor assemblies
High voltage to 1000 kv
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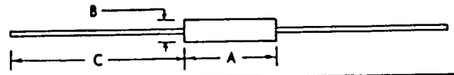

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# now, one source ELECTRA offers you all of these precision resistors

All Electra resistors are designed to meet or exceed Mil-R-10509C. Your request will bring complete specifications and characteristics on any or all types by return mail. For complete details, see your local representative, or write for catalog and price schedules.



## DEPOSITED CARBON




| Electra Part No. | Mil Style | Wattage | Mil Resistance Range | Manufactured Resistance Range | Maximum Rated Voltage | Length A ±1/32 | Dia. B ±1/32 | Leads Dia. | Lead Length C ±1/8 |
|---|---|---|---|---|---|---|---|---|---|
| DC 1/10 | | 1/10 | | 10 ohms to 300 K | 250 | 1/4 | 3/32 | #22 | 1-1/2 |
| DC 1/8 | | 1/8 | | 5 ohms 800 K | 250 | 5/16 | 3/32 | #26 | 1-1/2 |
| DC 1/8X | | 1/8 | | 100 ohms 1 meg | 250 | 5/16 | 3/32 | #22 capless | 1-1/2 |
| DC 1/4A | RN10X | 1/4 | 5 ohms 1 meg | 5 ohms 2 meg | 300 | 15/32 | 3/32 | #22 | 1-1/2 |
| DC 1/4X | | 1/4 | | 100 ohms 2 meg | 300 | 7/16 | 1/8 | #22 capless | 1-1/2 |
| DC 1/2C | | 1/2 | | 3 ohms 4 meg | 350 | 1/2 | 11/64 | #20 | 1-1/2 |
| DC 1/2A | RN20X | 1/2 | 10 ohms 2.0 meg | 4 ohms 5 meg | 350 | 5/8 | 11/64 | #20 | 1-1/2 |
| DC 1/2B | | 1/2 | | 10 ohms 5 meg | 350 | 23/32 | 7/32 | #20 | 1-1/2 |
| DC 1/2 | | 1/2 | | 10 ohms 5 meg | 500 | 13/16 | 11/64 | #20 | 1-1/2 |
| DC 1 | RN25X | 1 | 10 ohms 4.99 meg | 8 ohms 26 meg | 500 | *15/16 | 19/64 | #20 | 1-1/2 |
| DC 2 | RN30X | 2 | 30 ohms 10 meg | 15 ohms 90 meg | 750 | *2-1/16 | 19/64 | #20 | 1-1/2 |
| | | | | *Tol. ± 1/16 | | | | | |



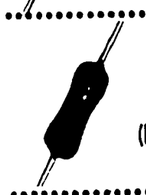
## DEPOSITED CARBON PLASTIC ENCAPSULATED

| | | | | | | ±.001 | ±.010 | | ±1/8 |
|---|---|---|---|---|---|---|---|---|---|
| DCM 1/10 | | 1/10 | | 10 ohms to 300 K | 250 | .260 | .125 | #22 | 1-1/2 |
| DCM 1/8 | RN60B | 1/8 | 10 ohms 1 meg | 4 ohms 3 meg | 250 | .410 | .142 | #22 | 1-1/2 |
| DCM 1/4 | RN65B | 1/4 | 10 ohms 2 meg | 5 ohms 7 meg | 300 | .600 | .225 | #22 | 1-1/2 |
| DCM 1/2 | RN70B | 1/2 | 10 ohms 2.5 meg | 4 ohms 8 meg | 350 | .755 | .270 | #20 | 1-1/2 |
| DCM 1 | RN75B | 1 | 10 ohms 5.11 meg | 5 ohms 28 meg | 500 | 1.115 | .400 | #20 | 1-1/2 |
| DCM 2 | RN80B | 2 | 30 ohms 10 meg | 10 ohms 100 meg | 750 | *2.240 | .400 | #20 | 1-1/2 |
| | | | | *Tol. ± .030 | | | | | |



## DEPOSITED CARBON HERMETICALLY SEALED

| | | | | | | ±.001 | ±.010 | | ±1/8 |
|---|---|---|---|---|---|---|---|---|---|
| HC 40 | | 1/8 | | 8 ohms 1 meg | 150 | *.281 | .160 | #22 | 1-1/2 |
| HC 10 | RN60B | 1/8 | 10 ohms 1 meg | 8 ohms 1 meg | 250 | .427 | .155 | #22 | 1-1/2 |
| HC 8 | RN65B | 1/4 | 10 ohms 2 meg | 8 ohms 5 meg | 300 | **.640 | .240 | #22 | 1-1/2 |
| HC 12 | RN70B | 1/2 | 10 ohms 2.5 meg | 10 ohms 10 meg | 350 | .833 | .250 | #20 | 1-1/2 |
| HC 6 | RN75B | 1 | 10 ohms 5.11 meg | 8 ohms 25 meg | 500 | 1.115 | .400 | #20 | 1-1/2 |
| HC 7 | RN80B | 2 | 30 ohms 10 meg | 20 ohms 50 meg | 750 | *2.240 | .400 | #20 | 1-1/2 |
| | | | | *Tol. ± 1/32 | ** ± .015 | | | | |



## PRECISION CARBON FILM (HIGH TEMPERATURE)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CF 1/8 | RN60B | 1/8 | 10 ohms 1 meg | 10 ohms 4 meg | 250 | .375 +1/16 −1/32 | .125 +.040 −.010 | #22 | 1-1/2 ±1/8 |
| CF 1/4 | RN65B | 1/4 | 10 ohms 2 meg | 5 ohms 12 meg | 300 | .625 +1/32 −1/16 | .1875 +1/16 −1/32 | #22 | 1-1/2 ±1/8 |
| CF 1/2 | RN70B | 1/2 | 10 ohms 2.5 meg | 5 ohms 12 meg | 350 | .750 +3/32 −1/16 | .250 +1/32 −1/32 | #20 | 1-1/2 ±1/8 |



## PRECISION MOLDED METAL FILM

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MF 1/8 | RN60C | 1/8 | 100 ohms 301 K | 30 ohms 500 K | 250 | .406 ±.015 | .135 ±.010 | #22 | 1-1/2 ±1/8 |
| MF 1/4 | RN65C | 1/4 | 100 ohms 499 K | 50 ohms 1 meg | 300 | .594 ±.015 | .210 ±.015 | #22 | 1-1/2 ±1/8 |
| MF 1/2 | RN70C | 1/2 | 100 ohms 1 meg | 50 ohms 1.5 meg | 350 | .750 ±.020 | .265 ±.015 | #20 | 1-1/2 ±1/8 |
| MF 1 | RN75C | 1 | 100 ohms 2 meg | 50 ohms 4 meg | 500 | 1.105 ±.020 | .395 ±.020 | #20 | 1-1/2 ±1/8 |
| MF 2 | | 2 | | 100 ohms 10 meg | 750 | 2.239 ±.020 | .400 ±.020 | #20 | 1-1/2 ±1/8 |

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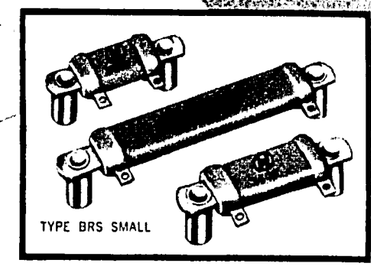


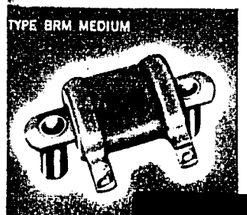


Space Problem?

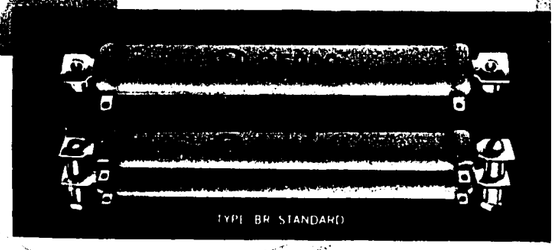
SPECIFY Blue Ribbon PRECISION SPACE-SAVER RESISTORS

...the Complete Line of Flat and Stack Mounting Wire Wound, Power Resistors




Available in Wattage Ratings from 10 to 75 W
Resistance Range from .10 to 100,000 Ohms




These High Reliability Space-savers feature matched coefficient of expansion with gray vitreous enamel covering for complete protection from overloads and environmental conditions. Aluminum thru-bracket improves heat dissipation, minimizes hot spots, allows a higher wattage rating per unit of space. Bracket construction facilitates stacking and saves additional space.




For Complete Specifications and illustrated bulletin on H-H Blue Ribbon Resistors, call or write, today!

'Gray Line' RHEOSTATS

Complete range from 25 to 1000 watts. Shock resistant construction. High temperature enamel bonding withstands greater overload.



'Gray Line' RESISTORS

Fixed, adjustable, ferrule and axial lead types for all commercial and military applications. Super-ruggedized for complete reliability.



The Mark of Quality since 1924

HARDWICK, HINDLE · INC
40 HERMON ST., NEWARK 5, NEW JERSEY

For details, circle #520 on Reader Service Card




# Directory II. Components

## 69. Resistors.

Gulton Industries, Inc., N.J., 45sc

Hamilton Standard Div., United Aircraft Corp., Conn., 35c

Handley, Inc., Calif., 65s, 70s

**Hardwick, Hindle, Inc.,** 40 Hermon St., Newark 5, N.J., 20s, 40s, 60s, 65s, 70c, Tel: MArket 2-8200
See ad on this page

Howell Instrument Co., Tex., 25s

Humphrey, Inc., Calif., 25c

Industrial Instruments, Inc., N.J., 70s

Instrument Resistors Co., N.J., 70sc, 70sc

Intelex Systems, Inc., N.Y., 15s, 30s, 45s

International Powder Metallurgy Co., Pa., 20c

International Resistance Co., Pa., 5s, 10s, 15s, 20s, 25s, 30s, 60s, 65s, 70s

International Telephone & Telegraph Corp., ITT Laboratories, N.J., 35c

Jones Electronics Co., Inc., M. C., Subsid. The Bendix Corp., Conn., RF Loads

Julie Research Laboratories, Inc., N.Y., 70sc, Networks sc

**K-F Development Co.,** 2606 Spring St., Redwood City 1, Calif., 20, 25, 55, 70, High voltage, Tel: EMerson 8-5670
See ad on page 525

Kelvin Electric Co., Calif., 35c, 60c, 70c, Networks c

Kendick Mfg. Co., Ind., 25sc, 70sc

Key Resistor Corp., Calif., 15c, 35c, 50c, 60c, 70c

**Keystone Carbon Company,** 1935 State St., St. Marys, Pa., 45, Tel: 4-1591
See ad on page 109

Kidco, Inc., N.J., 15sc, 20c, 25c, 30sc

Kidde & Co., Inc., Walter, N.J., 45c

Kintronic Div., Chicago Aerial Industries, Ill., 20c, 25c, 40c, 65c, 70c

Kirkland Co., The H. R., N.J., 60s

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 25c

Lectrohm, Inc., Ill., 35c, 60s, 65s

Leeds & Northrup Co., Pa., 70s

Litton Industries, Potentiometer Div., N.Y., 25sc

Litton Industries, U. S. Engineering Co. Div., Calif., 35c

Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Div., Calif., 20s, 25s, 30s, 35s, 60s, 65s, 70s

Mallory & Co., Inc., P. R., Ind., 10sc, 20sc, 35c, 40sc, 60sc, 65sc

Markite Corp., N.Y., 20sc, 25sc

Marstan Electronics Corp., N.Y., 70s

Maurey Instrument Corp., Ill., 20c, 25c, 35c, 40c, 65c, 70c

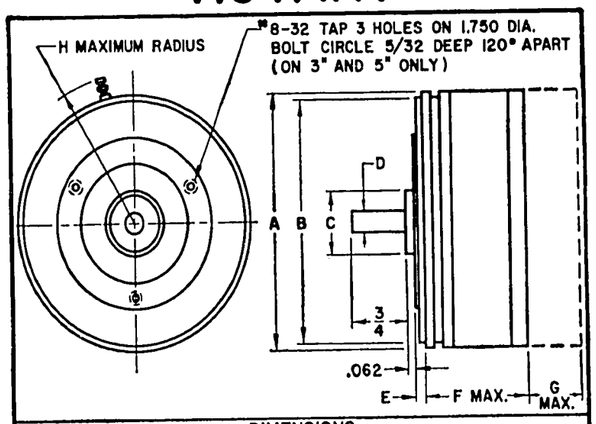
**Measurements, A McGraw-Edison Div.,** P.O. Box 180, Boonton, N.J., 60c, 70c, Tel: DEerfield 4-2131
See ad on page 335

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# CIC PRECISION CARBON FILM POTENTIOMETERS

Infinite Resolution • Long Life • High Accuracy • Low Noise • Low Torque

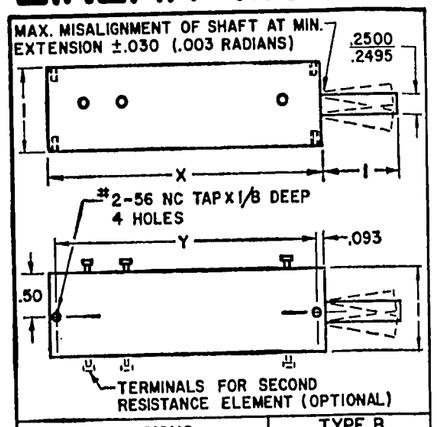
## ROTARY




| DIMENSIONS | | | | | | |
|---|---|---|---|---|---|---|
| MODEL | 50 | 78 | 105 E 106 | 205 E 206 | 305 E 306 | 505 E 506 |
| A | 1/2 | 7/8 | 1 3/32 | 2 | 3 | 5 |
| B | .4375 | .7500 | 1.0300 | 1.8750 | 2.8750 | 4.8750 |
| C | — | — | — | — | .7500 | .7500 |
| D | .1250 | .1250 | .1250 | .2500 | .2500 | .2500 |
| E | .060 | .040 | .040 | .060 | .060 | .060 |
| F | 3/4 | .635 | .635 | .985 | 1.350 | 1.870 |
| G | — | .635 | .635 | .985 | 1.350 | 1.870 |
| H | 1/2 | .570 | .670 | 1.125 | 1.800 | 2.800 |

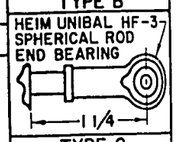
| SPECIFICATIONS | | |
|---|---|---|
| MODEL | LINEAR | SINE-COSINE |
| MECHANICAL ROTATION | 360° CONTINUOUS | |
| ELECTRICAL FUNCTION ANGLE | 350° NOMINAL | 360° |
| RESISTANCE RANGE | 1K-250K | 500Ω-50K QUAD |
| BEST LINEARITY OR CONFORMITY | .1% ÷ INCH OF DIA. | .3% P-P ÷ INCH OF DIA |
| VIRTUAL RESOLUTION | 1/75,000 ÷ INCH OF DIAMETER | |
| WATTAGE | DIAMETER x 2 | |
| TEMPERATURE RANGE | -55°C TO 150°C | |
| TAPS, MAXIMUM NO. | DIAMETER x 6 | |
| STARTING TORQUE (.IN.-OZ.) | DIAMETER X .15 | DIAMETER X .2 |
| GUARANTEED LIFE (AT 100 R.P.M.) | TO 30 MILLION CYCLES | |

## LINEAR MOTION

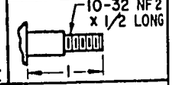



| DIMENSIONS | | |
|---|---|---|
| STROKE | X | Y |
| 1/4" TO 1" | 2.125 | 1.937 |
| 1" TO 2" | 3.125 | 2.937 |
| 2" TO 3" | 4.125 | 3.937 |
| 3" TO 4" | 5.125 | 4.937 |
| 4" TO 5" | 6.125 | 5.937 |
| OVER 5" | 1.125 +STROKE | .937 +STROKE |

TYPE B



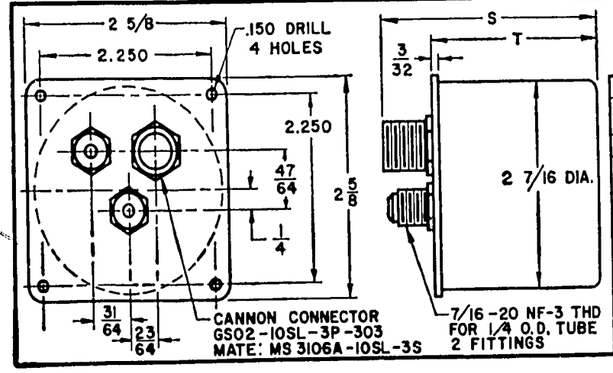

TYPE C




| SPECIFICATIONS | |
|---|---|
| RESISTANCE RANGE | 250 MIN. TO 125K MAX. PER INCH OF STROKE |
| BEST LINEARITY | .2% ÷ LENGTH OF STROKE |
| VIRTUAL RESOLUTION | 1/35,000 ÷ INCH OF STROKE |
| WATTAGE | 1 WATT PER INCH OF STROKE |
| TEMPERATURE RANGE | -55°C TO 150°C |
| TAPS, MAXIMUM NO. | 4 PER INCH OF STROKE |
| STARTING FORCE | .5 LB. MAX. AT 25° C |
| LIFE | TO 30x10⁶ STROKES DEPENDING ON CIRCUITRY |

## PRESSURE

SERIES 6000




| | |
|---|---|
| 1 | INFINITE RESOLUTION POTENTIOMETER OUTPUT |
| 2 | PRESSURE RANGE 0-5 TO 0-4000 P.S.I. GAGE, DIFFERENTIAL, ABSOLUTE |
| 3 | LINEARITY ±0.3% (0-100 PSI) ±.5% (0-4000 PSI) |
| 4 | DIRECT COUPLED PRESSURE CAPSULE ELIMINATES BACKLASH, FRICTION AND REPEATABILITY ERRORS |
| 5 | TEMPERATURE SENSITIVITY LESS THAN .005% °C |
| 6 | HIGH OUTPUT VOLTAGE (50 VOLTS MAX. AC OR DC) |
| 7 | RUGGEDIZED FOR WORST ENVIRONMENTAL CONDITIONS |

| DIMENSIONS | 0-100 PSI | 100-4000 PSI |
|---|---|---|
| S | 3 3/8 | 2 3/8 |
| T | 2 19/32 | 1 19/32 |

**FIRST IN FILM POTS**

WRITE FOR COMPLETE CATALOG

**COMPUTER INSTRUMENT CORPORATION**

90 Madison Avenue, Hempstead, L. I., N. Y.

For details, circle #521 on Reader Service Card





# CIC PRECISION FILM POTS

**AVAILABLE FROM STOCK!**

**You can have any of these precision film pots on their way to you within hours. No need to wait for "custom" pots.**

### LINEAR SINGLE TURN FILM POTENTIOMETERS

| Diameter | Resistance | Linearity |
|---|---|---|
| 1/2" | 1K | ± .5% |
| | 10K | ± .5% |
| | 50K | ± .5% |
| 7/8" | 1K | ± .5% |
| | 10K | ± .5% |
| | 50K | ± .5% |
| | 1K | ± .25% |
| | 10K | ± .25% |
| | 50K | ± .25% |
| 1-3/32" | 1K | ± .5% |
| | 10K | ± .5% |
| | 50K | ± .5% |
| | 1K | ± .25% |
| | 10K | ± .25% |
| | 50K | ± .25% |
| 2" | 5K | ± .25% |
| | 20K | ± .25% |
| | 50K | ± .25% |
| | 5K | ± .1% |
| | 20K | ± .1% |
| | 50K | ± .1% |
| 3" | 5K | ± .1% |
| | 20K | ± .1% |
| | 50K | ± .1% |
| | 5K | ± .05% |
| | 20K | ± .05% |
| | 50K | ± .05% |

### SINE-COSINE SINGLE TURN FILM POTENTIOMETERS

| Diameter | Resistance | Conformity |
|---|---|---|
| 1-3/32" | 10K | ± .75% |
| | 20K | ± .75% |
| 2" | 10K | ± .25% |
| | 20K | ± .25% |
| 3" | 10K | ± .15% |
| | 20K | ± .15% |

### LINEAR MOTION FILM POTENTIOMETERS

| Size | Resistance | Stroke | Linearity |
|---|---|---|---|
| 1" Sq. | 10K | 1" Stroke | ± .5% |
| | 20K | 1" Stroke | ± .5% |
| | 10K | 2" Stroke | ± .25% |
| | 20K | 2" Stroke | ± .25% |
| | 10K | 3" Stroke | ± .1% |
| | 20K | 3" Stroke | ± .1% |

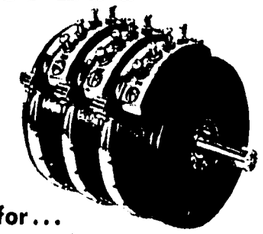
**Write or call in your order! Potentiometers will be in your plant within 24 hours.**

COMPUTER INSTRUMENTS CORPORATION

90 MADISON AVE, HEMPSTEAD, L. I., N.Y.

For details, circle #522 on Reader Service Card

# PRODUCTION POTS WITH CUSTOM SPECS*



**for...**

- * sine-cosine
- * secant
- * square law
- * empirical functions

Designed for exacting requirements in analog computations, Micro-Lectric's Series C-550 servo mount potentiometers provide exceptional conformity to specified mathematical functions—eliminate the need for cams, padding, or other shaping devices.

Single units, or stacked assemblies, in a wide range of resistance values to meet your specific needs.

**Typical Sine-Cosine Characteristics**

| | |
|---|---|
| size | 2 inches |
| resistance range | 200 ohms to 70K per quadrant |
| conformity | 0.25% peak to peak |
| temperature range | —55° to +85° C. |
| noise | less than 100 ohms |
| starting torque | 0.6 oz. in. max. |
| running torque | 0.35 oz. in. |
| life | 1,000,000 rev. |

When the job calls for custom performance plus prompt availability, it will pay you to contact Micro-Lectric. Write today for complete data in Bulletin 550-1.

MICRO® LECTRIC

**Division of Micro Machine Works**

**Roosevelt, L. I., New York**

For details, circle #523 on Reader Service Card



# Directory II. Components

## 69. Resistors.

Mechatrol, Div. Servomechanisms, Inc., N.Y., 25c, 30c

Mel-Rain Corp., Ind., 20sc, 40sc, 65sc

Mepco, Inc., 35-37 Abbett Ave., Morristown, N.J., 15sc, 30c, 60c, 70c, Networks sc, Tel: JEfferson 9-2000

See ad on page 210

Metavac, Inc., N.Y., 30, 55, Coaxial

Micro-Lectric Div., Micro Machine Works Inc., 19 Debevoise Ave., Roosevelt, L.I., N.Y., 20s, 25sc, Tel: FReeport 8-3222

See ad on this page

Milwaukee Resistor Co., Wis., 60sc, 65sc

Minco Products, Inc., Minn., 25c

Miniature Electronic Components Corp., Mass., 20sc, 35sc, 60sc, 65sc

Model Rectifier Corp., N.Y., 40sc

Montek Associates, Inc., Utah, 20sc, 25sc, 60sc, 70sc

Muirhead & Co., Ltd., England, 60s, 70s

Muirhead Instruments, Inc., N.Y., 60s, 70s

Munzig International, Inc., Calif., 5s, 10s, 20s, 40s, 45s, 60s, 65s, 70s

Muter Division, The Muter Co., Ill., 20c, 25c, 40c, 60c, 65c

Neptune Electronics Co., N.Y., 10c, 20c

New England Instrument Co., Mass., 20sc, 25sc, 65c

Non-Linear Systems, Inc., Calif., 70s

Nucleonic Products Co., Inc., Calif., 45c

Ohio Carbon Co., The, Ohio, 5sc, 60c

Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 5s, 20s, 30sc, 40sc, 60sc, 65sc, 70sc, Modular Resistance Elements sc, Tel: ORchard 5-2600

See ad on pages 78-79

Ohmwave Co., Inc., The, Conn., Wovens

Pacific Resistor Co., Calif., 35c, 60sc, 70sc

Painton & Co., Ltd., England, 15sc, 20s, 25c, 35s, 40s, 60s, 65s, 70s

Paktron Division, Illinois Tool Works, Va., 35c

Pendar, Inc., Calif., 55sc, 60sc

Penn Resistor Corp., Pa., 15s, 30s

Perkin-Elmer Corp., Vernistat Div., Conn., 5s, 60s, 70s

Phaostron Instrument & Electronic Co., Calif., 15c

Philips Electronics Industries Ltd., Canada, 5s, 45s

Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 35c, Tel: ORiole 6-8000

See ad on page 500

Physics Research Laboratories, Inc., P.O. Box 555, Hempstead, L.I., N.Y., Decade sc, Tel: IVanhoe 3-8299

See ad on page 288

Potter Aeronautical Corp., N.J., 70c

Precision, Inc., Minn., 60c, 65c, 70c

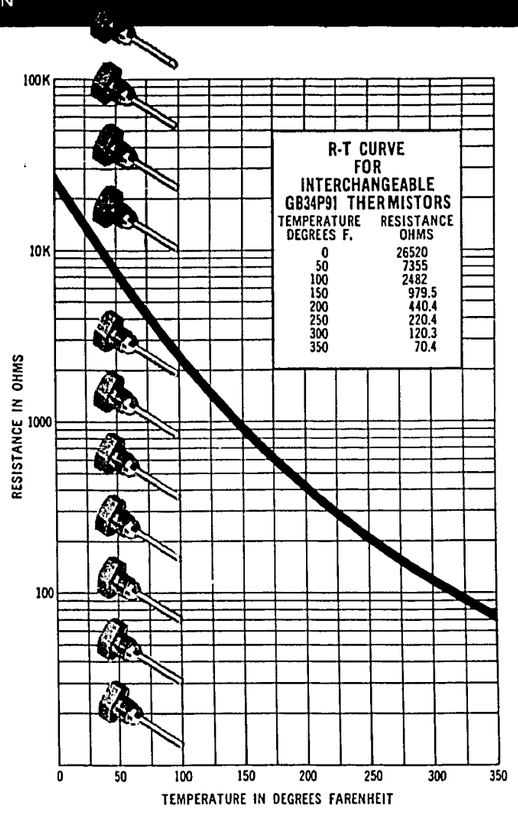
Precision Line, Inc., Mass., 20sc, 25sc, 35sc, 40c, 60c, 65c, 70c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**BREAKTHROUGH!** IN THERMISTOR DESIGN

**Fenwal Electronics' new "identical" thermistors permit complete interchangeability!** What do you need from a thermistor in the way of performance? Reliability? Extreme stability? High shock resistance? Long life? Fenwal Electronics can supply it. But Fenwal Electronics' thermistors provide an additional important characteristic all their own: **they can be supplied with identical resistance temperature curves.**

That means that now, for the first time, you can have complete interchangeability. It means you can rely absolutely on consistently accurate resistance changes versus temperature of Fenwal Electronics' thermistors. It means also you can now achieve accurate, multi-point temperature indication or control through a single system without having to calibrate out each individual sensor.



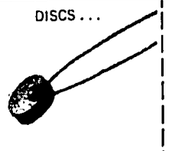

**FROM FENWAL ELECTRONICS** ... THE MOST COMPLETE LINE OF PRECISION THERMISTORS

GLASS PROBES & BEADS



— 0.006" to 0.100" diameter. Resistance values: 500 ohms to 100 megohms

DISCS ...



— 0.1" to 1" diameter. Resistance values: 5 ohms to 1,000 ohms

WASHERS ...



— .75" diameter. Resistance values: 5 ohms to 3000 ohms

RODS ...



— 0.053" to 0.173" diameter varying lengths. Resistance values: 500 ohms to 500,000 ohms

PROBE Assemblies ...



— Built to your specific requirements,* enclosed and mounted in individual housings or "packages" and ready to install

E-I Matched pairs



— Thermistor beads matched to voltage current characteristics and mounted on special hermetically sealed stems, designed for use in thermal conductivity gas analysis instruments.

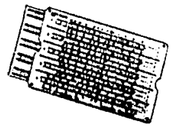
**FROM FENWAL ELECTRONICS** ... MORE HELP ON THERMISTOR PROBLEMS



• Complete thermistor engineering service backed by 20 years field experience



• Thermistor Experimental Kit — to help you expedite operations at the bread board stage. Just $19.95 at electronics jobbers



• New Thermistor "Computer" — 5" X 8" "computer" reduces lengthy computations to single "slide rule" setting. Yours for the asking



• New Thermistor Catalog EMC-3



• New Probe and Housing Brochure — Gives selection of probe designs

For complete information, or the name of the Fenwal Representative in your area, write:

Fenwal Electronics

336 MELLEN STREET, FRAMINGHAM, MASSACHUSETTS

*Probes can be supplied individually calibrated at all desired temperatures. When interchangeability is required, they can be supplied with identical resistance-temperature characteristics.

For details, circle #524 on Reader Service Card






# Directory II. Components

## 69. Resistors.

Precision Resistor Co., Inc., 121 U. S. Hwy. 22, Hillside, N.J., 60sc, 70sc, Tel: WAverly 6-3036
See ad on this page

Pyrocircuits Div., Microtron, Inc., 6 Manhasset Ave., Port Washington, L.I., N.Y., 35c, Tel: POrt Washington 7-3949
See ad on page 502

Pyrofilm Resistor Co., Inc., N.J., 5sc, 15sc, 30sc, 50sc

Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 25s, 70s, Tel: DEerfield 4-3100
See ad on page 290

Rattray & Co., George, Div. Hardwick, Hindle, Inc., N.Y., 25c

Reon Resistor Corp., N.Y., 10sc, 20sc, 35c, 40sc, 60c, 70c

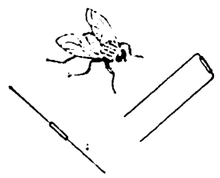
Resistance Products Co., Pa., 30c, 55c, 70c, Networks c, High Frequency c, High Voltage c

Resistors, Inc., Ill., 60sc, 65sc

Rex Rheostat Co., 149 Babylon Turnpike, Roosevelt, L.I., N.Y., 20sc, 40sc, 60sc, 65sc, Tel: FReeport 9-1030
See ad on this page

Rho Engineering Co., Calif., 35sc, 70sc


ACTUAL SIZE



**SUB-MINIATURE WIRE WOUND RESISTORS**

75 PHYSICAL SIZES

Precision's Type TX resistors are unsurpassed in uniformity of performance.

New winding techniques mass-produce resistors free from dangerous "cross-overs" and insulation breakdowns. Maximum reliability is assured . . . and . . . at mass-production prices.

According to your need, PRECISION'S Type TX Resistors may be had in the size and resistance value you want for your circuit. Terminals may be either axial or radial. Tolerances are standard from ±1% to ±1/20%. Where extreme accuracies are required, tolerances to ±1/100% may be obtained . . . inductively or non-inductively wound.

Military requirements are to PRECISION'S specifications.

**PHYSICAL SIZE:** Available in 75 sizes, ranging from diameters from 3/32" through 3/8" and lengths from 3/16" to 1-1/2".

**RESISTANCE RANGES:** From .01 ohm through 5.0 megohm — in any resistance value required or decimal part thereof.

**ACCURACY:** ±5% to ±1/20%. Tolerances ±1/50% to ±1/100% (absolute) available on specification.

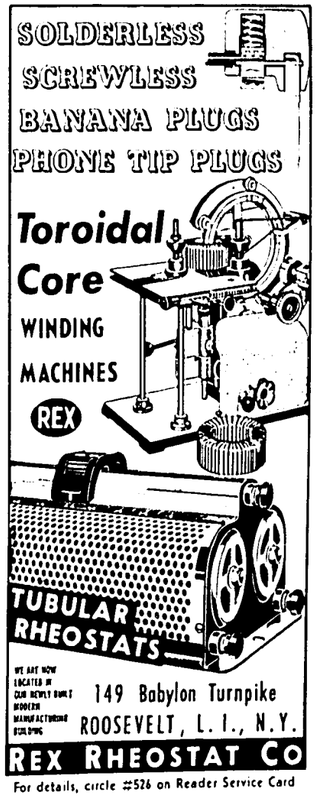
**TEMPERATURE COEFF. OF RESISTANCE:** Standard ±0.001%°C. throughout. Special temperature coefficient + 5000 ppm° to ±1 ppm°C.

For complete information about PRECISION'S Sub-Miniature Type TX Resistors, write to:

**PRECISION RESISTOR Co., Inc.**
MANUFACTURERS OF WIRE WOUND RESISTORS EXCLUSIVELY
121 U. S. Highway #22, Hillside, New Jersey

For details, circle #525 on Reader Service Card

SOLDERLESS
SCREWLESS
BANANA PLUGS
PHONE TIP PLUGS



Toroidal Core WINDING MACHINES
REX
TUBULAR RHEOSTATS
WE ARE NOW LOCATED IN OUR NEWLY BUILT MODERN MANUFACTURING BUILDING
149 Babylon Turnpike
ROOSEVELT, L. I., N.Y.
REX RHEOSTAT CO

For details, circle #526 on Reader Service Card




Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# DESIGN TO-DAY FOR RELIABLE PERFORMANCE THROUGH THE YEARS TO COME

Today's circuits must operate reliably and precisely over long periods of time and under a great variety of exacting conditions. The resistors you choose must match the high performance you project for the entire system.



**SAGE PRECISION WIREWOUND POWER RESISTORS give you:**

Close Tolerance .... to .05% Insulation ..... 1,000 V-rms Minimum
T.C. ..... ± 20 ppm/°C. Stability ..... .5% Maximum Lifetime Drift

Beyond these characteristics, however, SAGE skills and in-process testing methods developed through more than a decade of specialization assure you of maximum protection against catastrophic failure and give Sage Resistors the *Priceless Plus of Reliability* ... SAGE offers a variety of power ratings, from 1 Watt to 50, in three basic types, as detailed below, with resistances to 200,000 ohms. We shall be happy to send detailed specifications.

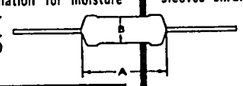
## Check your requirements against these SAGE "Silicohm" Resistors

### In 13 sizes from 1 to 10 Watt Ratings



### TYPE "S," SILICONE COATED POWER RESISTORS

Compact, light weight, single layer "Silicohm" type "S" units are made to MIL-R-26C Characteristic G. Exclusive high temperature insulation for moisture environment . . . minimum dielectric strength of 1000 V-rms . . . precision .05% . . . T.C. of 20 ppm/°C.



| MODEL | ratings, WATTS | dimensions, A* | B* | resistances Max. Ohms |
|---|---|---|---|---|
| SA1W | 1 | .500 | .125 | 12,000 |
| SB1W | 1 | .687 | .125 | 20,000 |
| SA2W | 2 | .500 | .187 | 15,000 |
| SB2W | 2 | .812 | .187 | 25,000 |
| S2W | 2 | .625 | .250 | 20,000 |
| S3W | 3 | .750 | .250 | 30,000 |
| SS5W | 5 | .875 | .312 | 50,000 |
| SR5W | 5 | 1.000 | .312 | 60,000 |
| SL5W | 5 | 1.125 | .312 | 70,000 |
| SS7W | 7 | 1.250 | .312 | 80,000 |
| SR7W | 8 | 1.375 | .375 | 125,000 |
| SS10W | 10 | 1.812 | .375 | 175,000 |
| S10W | 10 | 1.937 | .375 | 200,000 |

*nominal inches

### In 3, 5, 7, 8 and 10 WATT ratings



### TYPE "CS" CLIPPER METAL SHEATHED RESISTORS

The new standard in clip mounting, assembly protected units, Type "CS" Resistors feature metal sleeves shrunk by a Sage developed process to conform exactly to fully insulated type "S" resistors. Smallest in size and coolest in operation of comparable units. **Wattage Ratings double when CS is clip mounted on full heat sink.** Tolerance from .05 to 5% available.

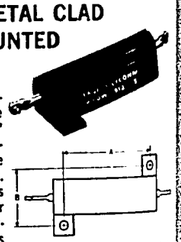
| MODEL | ratings, WATTS | dimensions, A* | B* | resistances Max. Ohms |
|---|---|---|---|---|
| CS3W | 3 | .750 | .250 | 30,000 |
| CSR5W | 5 | 1.000 | .312 | 60,000 |
| CSS7W | 7 | 1.250 | .312 | 80,000 |
| CSR7W | 8 | 1.375 | .375 | 125,000 |
| CS10W | 10 | 1.937 | .375 | 200,000 |

*nominal inches

*Write now for free samples and complete specifications.*

### In M10W, M25W, and M50W Sizes

### TYPE "M" METAL CLAD CHASSIS MOUNTED RESISTORS



Aluminum housed resistors for direct plate mounting, Type "M" units feature considerably less heat rise than similar units. Lower Hot Spot means long service life, near perfect stability (Average resistance shift is only 0.4% after 1000 cycled hours at recommended loads), and exceptional reliability under extreme conditions. MIL-R18546 Characteristic G models in 15 and 30 Watt Ratings. Dielectric strengths to 2500 V-rms.

| MODEL | ratings, WATTS | resistances MAX. OHMS |
|---|---|---|
| M10W | 10 | 25,000 |
| M25W | 20 | 50,000 |
| M50W | 40 | 175,000 |

| Nominal Mounting Dimensions, inches | | |
|---|---|---|
| MODEL | A | B |
| M10W | .562 | .625 |
| M25W | .719 | .781 |
| M50W | 1.562 | .844 |

**SAGE ELECTRONICS CORPORATION**
COUNTRY CLUB ROAD • EAST ROCHESTER, N. Y.




For details, circle #527 on Reader Service Card




# BIG and POWERFUL 1 WATT

## TRU-OHM'S NEW R-300 RHEOSTAT

**The rheostat you've wanted from Tru-Ohm!**

This wire-wound, vitreous enameled 300 watt rheostat is designed for smoother function, close control and longer life. Standard stock units are available in values from one ohm to 2500 ohms. Many special features can be incorporated to meet specific needs with higher resistance values up to 50,000 ohms.

Write for complete literature today!

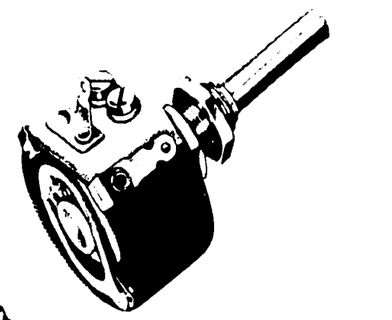


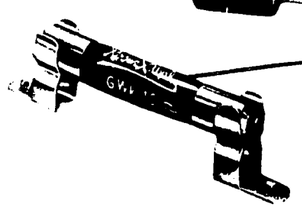
The 1960 complete catalog is FREE . . . write for yours NOW!

TRU-OHM PRODUCTS
Division of Model Eng. & Mfg., Inc.
2800 N. MILWAUKEE AVENUE
CHICAGO 18, ILLINOIS
Factory: Huntington, Indiana

For details, circle #528 on Reader Service Card

Newhall RIG





1. WIREWOUND RESISTORS: Vitreous Enamelled (Mil types up to 1000°F), Cement coated, Lacquered; Fixed, Adjustable and Spindle types; also, Precision types in Lacquered or Unlacquered design available.
2. DEPOSITED CARBON FILM RESISTORS: 1%, 2%, 5%, 10% tolerances
3. PRECISION CARBON FILM RESISTORS: 1%, .5%, .3%, .2% tolerances
4. WIREWOUND RHEOSTATS (Potentiometers): 1 to 500 Watts, 10%, 5%, 3% tolerances.

**UNITED MINERAL & CHEMICAL CORP.**

16 Hudson Street New York 13, N.Y.
Phone: BEekman 3-8870
U.S. & Canadian Representatives

Please send information to:
1. ..... 3. .....
2. ..... 4. .....
NAME .....
COMPANY .....
ADDRESS .....
.....

For details, circle #529 on Reader Service Card



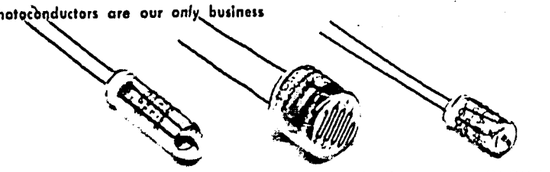

# Directory II. Components

## 69. Resistors.

Rinco, Inc., Ore., 20s, 25s, 40s, 65s
Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 70sc, Tel: LOckwood 5-4578
See ad on page 324
Ruckelshaus Laboratories, Inc., John G., N.J., 30c
Sage Electronics Corp., Country Club Rd., East Rochester, N.Y., 60c, 70c, Tel: LUdlow 6-8010
See ad on page 532
San Fernando Electric Mfg. Co., Calif., 20sc, 25sc
Sangamo Electric Co., Ill., 60c, 70c
Servonic Instruments, Inc., Calif., 25c, 65c
Shallcross Mfg. Co., 20 Preston St., Selma, N.C., 35s, 55s, 60s, Tel: WOodlawn 5-2341
See ad on page 258
Sightmaster Corp., R.I., 60c, 70c
Specialties, Inc., N.Y., 25c
Spectrol Electronics Corp., Calif., 20sc, 25sc, 65sc, 70sc
Speer Carbon Co., Onondaga Electronics Div., N.Y., 35c
Speer Carbon Co., Speer Resistor Div., Pa., 5c
Spicer Electronics Co., Calif., 60sc, 70sc
Sprague Electric Co., Mass., 5s, 15s, 30s, 55sc, 60s, 70s
Stackpole Carbon Co., Pa., 5s, 10c, 20c
Standard Telephones & Cables, Ltd., England, 15s
States Co., The, Conn., Woven sc
Subminiature Instruments Corp., Calif., 20sc, 25sc, 30s, 35sc, 65sc, 70sc
Sullivan, Ltd., H. W., N.Y., 70s
Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 40s, Tel: LUdlow 2-9561
See ads on pages 412, 468, 494, 572, 586
Supreme Electronics Corp., Subsid. Hickok Elect. Inst. Co., Miss., 60c, 70c
Tech-Ohm Resistor Corp., N.Y., 10c, 15c, 20c, 30c, 35c, 40c, 60sc, 65sc, 70sc
Technology Instrument Corp., Mass., 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 60sc, 65sc, 70sc
Technology Instrument Corp. of Calif., Calif., 25sc, 60sc, 70sc
Tel-Labs., Inc., N.H., 35c, 60c, 70c
Telewave Labs., Inc., N.Y., 15sc, RF sc
Tenatronics, Ltd., Ohio, 60c
Texas Instruments Incorporated, Semiconductor-Components Div., 13500 N. Central Expressway, Dallas, Tex., 5s, 15s, 30s, 35s, 55s, Tel: ADams 5-3111
See ad on page 394
Transformers, Inc., N.Y., 70c
Trionics Corp., P.O. Box 548, Madison 1, Wis., 35c, 45c, Molecular c, Tel: CEdar 8-2616
See ad on page 663
Tru-Ohm Products, Div. Model Engineering & Mfg., Inc., 2800 N. Milwaukee Ave., Chicago 18, Ill., 20sc, 35c, 40sc, 60sc, 65sc, 70sc, Tel: EVerglade 4-2646
See ad on this page

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Photoconductors are our only business



"400" "500" "600"

CLAIREX PHOTOCONDUCTIVE CELLS

3 SERIES IN GLASS . . . TO MEET MOST DESIGN NEEDS!

## Now, 25 standard types in glass!

| CL Cell # | Sensitive Material | Enclosure (inches) | Pk. Spectral Response, A | Light Resistance[1] | Voltage Rating (Max.) | Power[4] (MW) |
|---|---|---|---|---|---|---|
| CL402 | CdS | .265x1 | 5150 | 1M | 300 | 75 |
| CL402S[5] | CdS | .265x1 | 5150 | 1M | 300 | 75 |
| CL403 | CdSe | .265x1 | 7350 | 133K | 300 | 75 |
| CL403S[5] | CdSe | .265x1 | 7350 | 133K | 300 | 75 |
| CL403A | CdSe | .265x1 | 7350 | 75K | 300 | 75 |
| CL403AS[5] | CdSe | .265x1 | 7350 | 75K | 300 | 75 |
| CL403ASL[5] | CdSe | .265x1 | 7350 | 3.5K | 60 | 75 |
| CL404 | CdSe | .265x1 | 6900 | 30K | 300 | 75 |
| CL404S[5] | CdSe | .265x1 | 6900 | 30K | 300 | 75 |
| CL404SL[5] | CdSe | .265x1 | 6900 | 1.5K | 60 | 75 |
| CL407 | CdS | .265x1 | 6150 | 133K | 300 | 75 |
| CL407S[5] | CdS | .265x1 | 6150 | 133K | 300 | 75 |
| CL504 | CdSe | .5x.5 | 6900 | 1.5K | 250 | 500-250[2] |
| CL504L | CdSe | .5x.5 | 6900 | 0.25K | 60 | 500-250[2] |
| CL505 | CdS | .5x.5 | 5500 | 9K | 250 | 500-250[2] |
| CL505L | CdS | .5x.5 | 5500 | 1.5K | 60 | 500-250[2] |
| CL602[3] | CdS | .25x.5 | 5150 | 1M | 300 | 75 |
| CL603[3] | CdSe | .25x.5 | 7350 | 133K | 300 | 75 |
| CL603A[3] | CdSe | .25x.5 | 7350 | 75K | 300 | 75 |
| CL603AL | CdSe | .25x.5 | 7350 | 3.5K | 60 | 75 |
| CL604[3] | CdSe | .25x.5 | 6900 | 30K | 300 | 75 |
| CL604L | CdSe | .25x.5 | 6900 | 1.5K | 60 | 75 |
| CL605 | CdS | .25x.5 | 5500 | 166K | 300 | 75 |
| CL605L | CdS | .25x.5 | 5500 | 7.5K | 60 | 75 |
| CL607[3] | CdS | .25x.5 | 6150 | 133K | 300 | 75 |

Operating temperature, all types, −50 to +75° C.
[1]Average DC resistance measured at 2 foot-candles, 2870° K. and 25° C ambient.
[2]With and without heat sink.
[3]Designed to replace previous plastic types. [4]At 25° C ambient. [5]S denotes side view cell.

***Salient Characteristics:***

- Hermetically Sealed Glass Enclosures.
- A Variety of Spectral Response and Resistance.
- The High Sensitivity and Fast Response of Cadmium Selenide.
- Power Dissipation to ½ watt, continuous.
- High Ratio of Light to Dark Current at low light levels.
- Stable and closely controlled Parameters.
- NEW! Low Resistance "L" types for Transistor and other low voltage applications!

Are you on the mailing list for Clairex Technical Information? If not, contact our representative or write direct to Dept. A1.



Clairex Photoconductive Cells . . . variable resistors controlled by light . . . unique design components for automation and control.

Your local distributor may be able to supply Clairex Photoconductors from stock. If not call or write our New York office for direct and immediate service, or contact our technical representative in your area listed below.

Priced from $1.15 to $4.00 depending upon quantity for all types listed.

**IF YOU DESIGN IN THE FIELDS OF**

- photography
- computers, data processing
- medical electronics
- industrial control
- electronic instruments
- missiles and aircraft
- television
- automobiles

**CLAIREX CAN OPEN NEW HORIZONS . . .**

THE light TOUCH IN AUTOMATION AND CONTROL

CLAIREX CORPORATION 19 WEST 26 STREET, NEW YORK 10, N Y MU 4-0940 THE CLAIREX REPRESENTATIVE NEAREST YOU

NEW ENGLAND
Bardwell Engineering Sales Company
221 Grove Street
South Braintree Mass
Phone VICTOR 3-0845

PENNSYLVANIA AND EAST COAST
Norman Hardy, Associates
414 Gribbel Road
Wyncote Pennsylvania
Phone TURNER 7-3955

MID-WEST
The Heimann Company
1711 Hawthorne Avenue
Minneapolis 3 Minn
Phone FEDERAL 2-5357

CENTRAL
T B Hunter Associates
4431 W Irving Park Road
Chicago 41 Illinois
Phone SPRING 7-2500

CALIFORNIA AND SOUTH WEST
Mason Electronics Corp
489 So Robertson Blvd
Beverly Hills Calif
Phone BRADSHAW 2-9311

AUTOMOTIVE FIELD
Daniel J Clifford
623 Fisher Bldg
Detroit 2 Mich
Phone TRINITY 5-3544





VECO T.M. *Reliable*

## THERMISTORS and VARISTORS

VECO'S continued research and development in the field of solid state electronics guarantees that its thermistors and varistors will continue to exhibit the same stable characteristics from order to order and batch to batch . . . . year after year after year!

Manufactured to MIL-Q-5923 and other applicable MIL standards.

VECO glass enclosed thermistors are not adversely affected by radiation.

**VECO also manufactures electronic controls, gas analysis cells, combustion analyzers, electronic and thermal instruments, medical and biological instrumentation and temperature sensing devices.**

Write for the VECO Technical Catalog with data on more than 650 stock items—

Cataloged in EEM Sec. 4700 and Radio Master

VECO VICTORY ENGINEERING CORPORATION

114 Springfield Road, Union, N. J.
MUrdock 8-7150

For details, circle #531 on Reader Service Card




# Directory II. Components

69. Resistors.

Ultronix, Inc., Calif., 20c, 35c, 60c, 65c, 70c

United Aircraft Corp., Norden Div., Ketay Dept., N.Y., 25sc

United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 15sc, 30c, 60c, 70c, Tel: BEekman 3-8870

See ads on pages 533, 699


U. S. Controls, Inc., N.Y., 40s

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 15s, 55s, Tel: ENdicott 1-6200

See ads on pages 535, 578


Victory Engineering Corp., P.O. Box 373, 114 Springfield Rd., Union, N.J., 45s, Tel: MUrdock 8-7150

See ad on this page


Volta Mfg. Co., Ill., 60c

Ward Leonard Electric Co., N.Y., 40sc, 60sc, 65sc

Waters Mfg., Inc., Mass., 25sc, 70sc

Watlow Electric Mfg. Co., Mo., 40c

Wells Co., Inc., Gary, N.Y., 15sc

Wells Industries Corp., Basic Electronic Controls Div., Calif., 20sc, 25sc, 35sc

Welwyn International, Inc., Ohio, 5c, 15c, 20c, 30c, 35c, 60c, 65c, 70c


**THE VICTOREEN INSTRUMENT COMPANY**
5806 HOUGH AVENUE • CLEVELAND 3, OHIO

**GLASS-SEALED DEPOSITED CARBON RESISTORS**

DIMENSIONS




**RESISTOR DATA CHART**

| TYPE | RESISTANCE | TOLERANCE | VOLTAGE COEF. %/V | TEMP. COEF. %/°C | MAX W V | WATTAGE | MAX TEMP °C | DIMENSIONS A (MAX) | DIMENSIONS B (MAX) | DIMENSIONS C (MIN) |
|---|---|---|---|---|---|---|---|---|---|---|
| HR2 | 1 Meg to 50 Meg | 1,2,5,10,20 Note 1 | —.0002 | —0.08 | 3000 | 1 | 125 | 2 | .813 | 1½ |
| HR3 | 1 Meg to 200 Meg | 1,2,5,10,20 Note 2 | —.0002 | —0.08 | 10,000 | 3 | 125 | 3½ | .813 | 1½ |
| HR4 | 200 ohm to 50 Meg | 1,2,5 | —.0002 | —0.05 | 800 | 5 | 200 | 2 | .813 | 1½ |
| HR5 | 200 ohm to 200 Meg | 1,2,5 Note 3 | —.0002 | —0.05 | 2000 | 10 | 200 | 3½ | .813 | 1½ |
| HR8 | 100 ohm to 10 Meg | 1,2,5 | —.0002 | —0.05 | 750 | 2 | 200 | 1½ | .240 | 1½ |

NOTE: 1: 1% and 2% tolerance available only below 20 meg.
2: 1%, 2% and 5% tolerance available only below 100 meg.
3: 1% and 2% tolerance available only below 100 meg

**HI-MEG RESISTORS**




**GLASS SEAL:** HI-MEGS are vacuum sealed in a glass envelope which is treated with a special silicone varnish which keeps the resistor relatively free from the effects of moisture.

**RESISTANCE:** HI-MEG resistors are available in values from $10^8$ to $10^{13}$ ohms.

**TOLERANCE:** HI-MEG resistors can be supplied in the following tolerances: 1% below $10^{12}$ ohms, 2% and 5% below $10^{13}$ ohms, and 10% over the entire range.

**MAXIMUM WORKING VOLTAGE:** 1000 volts.

**MAXIMUM OPERATING AMBIENT TEMPERATURE:** 100°C.

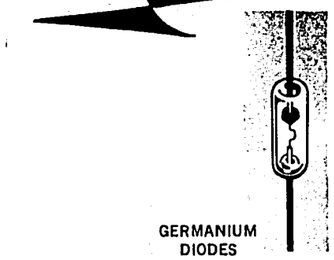
**POWER RATING:** The power rating for any HI-MEG resistor is equal to one divided by the resistance in megohms.

For details, circle #532 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# DIODES • RECTIFIERS • TRANSISTORS

CLEVITE



GERMANIUM DIODES

POWER TRANSISTORS

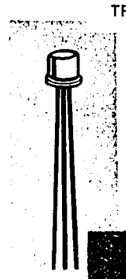




SILICON JUNCTION DIODES

SPACESAVER POWER TRANSISTORS





SWITCHING TRANSISTORS



SILICON RECTIFIERS

*Reliability in volume . . .*

CLEVITE TRANSISTOR

WALTHAM, MASS. TWinbrook 4-9330

**SUBMINIATURE GLASS DIODES**

**Germanium Gold Bonded in these types:**

**• COMPUTER • HIGH RESISTANCE**

**• HIGH CONDUCTANCE • GENERAL PURPOSE**

**• MILITARY TYPES:**

| | | |
|---|---|---|
| 1N128 | 1N270 | 1N277 |
| 1N198 | 1N276 | 1N281 |

Basic features include high forward conductance . . . recovery times in millimicroseconds . . . high inverse resistance . . . ruggedized mechanical construction . . . exceptional uniformity of characteristics.

**Silicon Junction in the following types:**

**• FAST SWITCHING (0.15 to 1.0$\mu$ Sec)**

**• GENERAL PURPOSE • MILITARY TYPES:**

| | | |
|---|---|---|
| 1N457 | 1N459 | 1N662 |
| 1N458 | 1N643 | 1N663 |
| | 1N658 | |

Designed to meet the most stringent commercial and military requirements, these diodes combine fast switching with high forward conductance, while protecting against thermal runaway at high voltages and temperatures up to 150°C.

**POWER TRANSISTORS**

**Germanium in the following types:**

**• SWITCHING 5 – 8 – 15 – 25 amperes**

*plus 3 ampere Spacesaver design*

**• AMPLIFIER 2 – 4 watts**

*plus 2 watt Spacesaver design*

**• MILITARY TYPES:**

2N297A 2N1011 2N1120

Excellent for applications involving power converters, audio amplifiers, voltage regulated power supplies and high current switching circuits.

Features include low thermal resistance, low base input voltage, low saturation voltage and superior current gain.

The 8 ampere switching series can replace the more costly ring emitter types in 3 to 8 ampere service. The 25 ampere series offers exceptionally low saturation voltage and is available with either pin type or solder lug terminals.

The Spacesaver design not only offers smaller size and lower mass but better frequency response and faster switching characteristics.

**PNP GERMANIUM SWITCHING TRANSISTORS**

These Clevite switching transistors are made to highest quality standards for maximum reliability in low level high speed service, available in the following types:

2N395 2N396 2N397 2N404

**DIFFUSED SILICON JUNCTION RECTIFIERS**

Designed for maximum reliability under the most severe military and commercial applications, Clevite rectifiers offer these advantages: High dissipation — 600 mw — High voltage — up to 600 volts — High temperature — up to 150 ma at 150°C.

*Write for latest data and prices*




For details, circle #533 on Reader Service Card





# Directory II. Components

## 69. Resistors.

Westinghouse Electric Corp., Semiconductor Dept., Pa., 45s

White Industrial Div., S. S., Dept. PR, 10 E. 40th St., New York 16, N.Y., 5s, 55s, Tel: MUrray Hill 3-3015
See ad on page 682

Wilrite Products, Inc., Ohio, 15c, 30c

Winslow Co., Inc., The, N.J., 25sc, 65c, 70sc

Workman TV Products, Inc., Fla., 45s, 60s

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Retaining rings:
See class 91

---

Rheostats:
See class 69

---

Rotary joints:
See class 83

---

Rotators:
See class 39

---

Saturable reactors:
See class 45

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Seals, hermetic:
See class 54

---

Seals, shaft:
See class 91

---

Selenium diodes & stacks:
See class 66

---

Semiconductor materials:
See class 101

---

Semiconductor rectifiers:
See class 66

---

Semiconductor testers:
See class 14

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Be sure to consult the advertisements in this issue for complete information on products. Directory listings cannot tell you everything you want to know about a company's products. For example, the Clairex Corporation advertisement on page 534 gives complete specifications on their entire line of photo conductive cells.

## 70. Semiconductors.

5. Germanium diodes
10. Photo conductors
15. Silicon diodes
20. Transistors, junction
25. Transistors, point contact
30. Transistors, alloy junction
35. Transistors, diffused base
40. Transistors, surface barrier
45. Tunnel diodes
50. Zener diodes

Advanced Research Associates, Inc., Md., 20s

American Elite, Inc., N.Y., 5s

Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 5s, 15s, 20s, 30s, 45s, 50s, Tel: WElls 1-6200
See ad on pages 42-45

Avnet Corp., Calif., 15s, 50s

Avnet Electronics Corp., N.Y., 5s, 15s, 20s, 30s, 45s, 50s

Bendix Corp., The, Red Bank Div., Semiconductor Products, 201 Westwood Ave., Long Branch, N.J., 15s, 20s, 30s, Tel: CApital 2-6220
See ad on page 504

Block Associates, Inc., Mass., 10c

Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 15sc, Tel: WAlker 2-6000
See ad on page 150

Britton Electronics Corp., N.Y., 15sc, 50sc

CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 5s, 15s, 20s, 30s, 35c

Clairex Corp., 19 W. 26th St., New York 10, N.Y., 10s, Tel: MUrray Hill 4-0940
See ad on page 534

Clevite Transistor Products, 241-257 Crescent St., Waltham 54, Mass., 5s, 15s, 30s, 45s, Tel: TWinbrook 4-9330
See ad on page 536

Columbus Electronics Corp., 1010 Saw Mill River Rd., Yonkers, N.Y., 15s, Tel: YOnkers 8-1221
See ad on page 505

Continental Device Corp., Calif., 15sc

Controls Company of America, Appliance, Automotive & Electron Divs., Ill., 15c, 50c

Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Dept. IRE-60, 333 Hamilton Blvd., South Plainfield, N.J., 5s, 25s, Tel: PLainfield 6-9000
See ad on Cover 3

Crystalonics, Inc., Mass., 15c, 20sc, 30sc

Delco Radio Division, General Motors Corp., Ind., 30s




ADELPHI HAS OFF-THE-SHELF DELIVERY AT

FACTORY PRICES ON

BOGUE
BRADLEY
TUNG-SOL
SYLVANIA

SEMICONDUCTORS

ADELPHI ELECTRONICS
where promises are kept
PI 7-5195
142 Mineola Blvd., Mineola, L.I., N.Y.

FAST SERVICE IS ADELPHI'S MOST IMPORTANT COMMODITY

For details, circle #534 on Reader Service Card

BTI

TRANSISTOR CLIPS



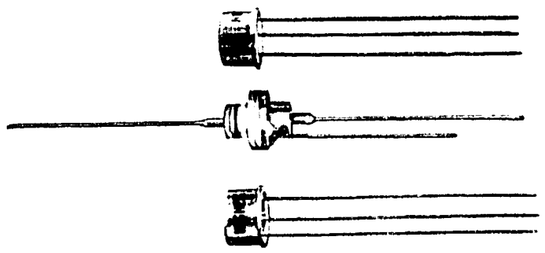
BTI Transistor Retainers and Clips feature many mechanical variations depending upon application. Available with no twist tabs, back holding plates, soldering lugs, or with tab mounted clips for special printed circuit applications.

Write for Bulletin #E-102.

BRAUN TOOL & INSTRUMENT Company, Inc.
141 Fifth Ave., Hawthorne, N. J.

For details, circle #535 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



# HUGHES TRANSISTORS

Hughes offers you a wide range of high-quality, dependable transistors, readily available from sales outlets all over the country. Included in the Hughes selection is the broadest line of p-n-p silicon transistors available anywhere. They are all precision-made, durable semiconductors, designed to meet your most stringent reliability requirements.

## for stability, uniformity, and long, long life

| Type |
|---|
| 2N327A |
| 2N328A |
| 2N329A |
| 2N1196 |
| 2N1197 |
| 2N1228 |
| 2N1229 |
| 2N1230 |
| 2N1231 |
| 2N1232 |
| 2N1233 |
| 2N1234 |
| 2N1238 |
| 2N1239 |
| 2N1240 |
| 2N1241 |
| 2N1242 |
| 2N1243 |
| 2N1244 |
| 2N1254 |
| 2N1255 |
| 2N1256 |
| 2N1257 |
| 2N1258 |
| 2N1259 |

The wide Hughes line gives you the choice of features you demand most. There are transistors for low-level and high-level amplification. There are transistors for high-voltage switching, as well as for medium and fast switching. You can order either the standard TO-5 package or the rugged coaxial package with its superior heat-dissipating properties. You have a wide choice of power ratings from 250mW to 1W.

All Hughes transistors are covered by the Hughes warranty of quality and reliability. And, you can get right-now delivery from Hughes sales offices and authorized distributors all over the country. Give them a call today. Or, if you prefer, write Hughes Semiconductor Division, Marketing Department, Newport Beach, California.

*For export write: Hughes International, Culver City 5, California.*

Creating a new world with ELECTRONICS

**HUGHES**

**SEMICONDUCTOR DIVISION**
HUGHES AIRCRAFT COMPANY



For details, circle #536 on Reader Service Card



# The IRE DIRECTORY is four directories in one

### *Alphabetical Complete Equipment*

**Information at high speed!** "Data the way an engineer thinks" is the key to IRE DIRECTORY classifications. All products are divided into three fundamental groups. The grouping plan makes this the fastest working directory you ever used! No components are mixed with test equipment—you turn right to a section where each item belongs.

**Yet good engineering detail** is maintained. 104 basic classes of products under these three sectional product directories keep listings from becoming cumbersome, but clearly define products. Overlapping listings are skillfully eliminated. Simplicity makes this book easy to work with—insures faster finding of facts when forgotten. Thus the faults of terminology listings are avoided.

**Completeness is insured!** Most firms make many products in a single classification. Wasteful, eye-confusing relisting of the same firms over and over is quite sensibly solved by using a system of codes under the 104 basic headings which actually provide 932 separate classifications. The result is a more complete picture of what each firm's full line, but you travel through fewer listings. The "Copp Principle" of directory indexing makes these lists wide, well marked highways to information—fast.

### *Components Materials and Services*

**Machol Edge Index** is just one more modern service to help the user find information fast.

**Ads positioned with reason!** In a DIRECTORY where ads play an important part in supplying information the user wants and needs, it makes good sense to cross-reference every advertiser in each listing so that the user can quickly find more detail. Ads are also placed facing company alphabetical listings, or in the product section in which they properly belong. No effort is spared to "organize" ad information.

**THE DIRECTORY**

**Advertising Dept., 72 W. 45th St., New York 36, N.Y.**
**Murray Hill 2-6606**



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.





# Directory II. Components

70. Semiconductors.

**Eastman Kodak Co.**, 343 State St., Rochester 4, N.Y., 10sc, Tel: LOcust 2-6000
See ad on page 300

Ebauches S.A., Dept. Oscillographe, c/o Freeport Engineering Co., N.Y., 5s, 20s, 25s, 30s, 35s, 40s

Ebauches S.A., Dept. Semiconducteurs, Switzerland, 30s

Electro Radiation, Inc., Calif., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s

Electron-Radar Products, Ill., 10sc

Electronic Transistors Corp., N.J., 5sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 50sc

Electronics Corp. of America, Mass., 10sc

**Erie Resistor Corp.**, 644 W. 12th St., Erie 6, Pa., 5s, 15s, Tel: GLendale 6-8592
See ad on pages 40-41

**Fairchild Semiconductor Corp.**, 545 Whisman Rd., Mountain View, Calif., 15s, 20s, 35s, Tel: YOrkshire 8-8161
See ads on pages 122-123

Fanon Electronic Industries, Inc., N.J., 35s

ENGINEERS
PHYSICISTS
MATHEMATICIANS

You are probably aware that indiscriminate wholesaling of a product invariably cheapens it. So it is with your talents—when you blanket the whole industry with your resume.

Our organization specializes in recruiting and representing talent in the electrical and electronics fields. One resume placed with us will insure your having intelligent and dignified representation with complete coverage for all positions in your particular sphere of interest.

We number among our clients most of the prominent names in the industry whose products run the gamut from Air Borne Equipment to Waveguides: such as Electron Tubes, Semi-Conductors, Thermo Electronics, Nucleonics etc. Whether you are in Pure Research, Design, Applications, Sales, Production or any other phase of Engineering, we can assist you in selecting a position that matches your talents. Present positions range from $7,000.00 to $30,000.00.

Send your resume to Mr. Daniel Cudney in strictest confidence, together with your locale preference and your salary requirements.

*Our Client Companies Pay Our Fee*

**NATIONAL**
EMPLOYMENT AGENCY
17 Academy Street Newark, N.J.
MArket 3-3030

For details, circle #537 on Reader Service Card

# Shockley TRANSISTOR

UNIT OF CLEVITE TRANSISTOR

The Shockley 4-layer diode is a diffused silicon PNPN device that operates as a semiconductor switch. Before switching voltage is applied, the device is an "open" or high resistance state. After switching, the device is in an "on" or low resistance state.

**TYPE D — 4-LAYER DIODES FOR 2 AMP. PULSE CURRENTS**

| STANDARD | | | MIL-LINE (for military requirements) | | |
|---|---|---|---|---|---|
| TYPE | $V_s$ (volts) | $I_h$ (milliamperes) | TYPE | $V_s$ (volts) | $I_h$ (milliamperes) |
| 4D20-3 | 20 ± 4 | 1-6 | 4D20M-3 | 20 ± 4 | 1-6 |
| 4D20-12 | 20 ± 4 | 5-20 | 4D20M-12 | 20 ± 4 | 5-20 |
| 4D20-30 | 20 ± 4 | 19-45 | 4D20M-30 | 20 ± 4 | 19-45 |
| 4D30-3 | 30 ± 4 | 1-6 | 4D30M-3 | 30 ± 4 | 1-6 |
| 4D30-12 | 30 ± 4 | 5-20 | 4D30M-12 | 30 ± 4 | 5-20 |
| 4D30-30 | 30 ± 4 | 19-45 | 4D30M-30 | 30 ± 4 | 19-45 |
| 4D40-3 | 40 ± 4 | 1-6 | 4D40M-3 | 40 ± 4 | 1-6 |
| 4D40-12 | 40 ± 4 | 5-20 | 4D40M-12 | 40 ± 4 | 5-20 |
| 4D40-30 | 40 ± 4 | 19-45 | 4D40M-30 | 40 ± 4 | 19-45 |
| 4D50-3 | 50 ± 4 | 1-6 | 4D50M-3 | 50 ± 4 | 1-6 |
| 4D50-12 | 50 ± 4 | 5-20 | 4D50M-12 | 50 ± 4 | 5-20 |
| 4D50-30 | 50 ± 4 | 19-45 | 4D50M-30 | 50 ± 4 | 19-45 |
| 4D80-3 | 80 ± 8 | 1-6 | 4D80M-3 | 80 ± 8 | 1-6 |
| 4D80-7 | 80 ± 8 | 5-10 | 4D80M-7 | 80 ± 8 | 5-10 |
| 4D120-3 | 120 ± 12 | 1-6 | 4D120M-3 | 120 ± 12 | 1-6 |
| 4D200-3 | 200 ± 20 | 1-6 | 4D200M-3 | 200 ± 20 | 1-6 |

**TYPE AD AND J — 4-LAYER DIODES FOR 20 AMP. PULSE CURRENTS**

| STANDARD | | | MIL-LINE (for military requirements) | | |
|---|---|---|---|---|---|
| TYPE | $V_s$ (volts) | $I_h$ (milliamperes) | TYPE | $V_s$ (volts) | $I_h$ (milliamperes) |
| 4AD20-5 | 20 ± 4 | 1-10 | 4AD20M-5 | 20 ± 4 | 1-10 |
| 4AD20-20 | 20 ± 4 | 10-30 | 4AD20M-20 | 20 ± 4 | 10-30 |
| 4AD30-5 | 30 ± 4 | 1-10 | 4AD30M-5 | 30 ± 4 | 1-10 |
| 4AD30-20 | 30 ± 4 | 10-30 | 4AD30M-20 | 30 ± 4 | 10-30 |
| 4AD40-5 | 40 ± 4 | 1-10 | 4AD40M-5 | 40 ± 4 | 1-10 |
| 4AD40-20 | 40 ± 4 | 10-30 | 4AD40M-20 | 40 ± 4 | 10-30 |
| 4AD50-5 | 50 ± 4 | 1-10 | 4AD50M-5 | 50 ± 4 | 1-10 |
| 4AD50-20 | 50 ± 4 | 10-30 | 4AD50M-20 | 50 ± 4 | 10-30 |
| 4J200-5 | 200 ± 20 | 1-10 | 4J200M-5 | 200 ± 20 | 1-10 |

**TYPE G — 4-LAYER DIODES FOR 100 AMP. PULSE CURRENTS**

| | STANDARD | |
|---|---|---|
| TYPE | $V_s$ (volts) | $I_h$ (milliamperes) |
| 4G50 | 50 ± 4 | 1-50 |
| 4G100 | 100 ± 10 | 1-50 |
| 4G200 | 200 ± 20 | 1-50 |

*Other Characteristics for Type D, AD and J*

**Switching Current ($I_s$)**

$<200$ μa

**Holding Voltage ($V_h$)**

0.5 to 1.0 volt

**ON Time Constant**

0.1 μs (circuit will determine specific switching time)

**OFF Time Constant**

0.2 μs (circuit will determine specific switching time)

**Resistance Off**

$R_{off}$ >1 megohm (measured at 75% $V_s$)

**Dynamic Resistance On**

$R_{on}$ <7 ohms at $I_h$ + 25 ma and <2 ohms at 2 amps (for Type D) and <1 ohm at 20 amps (for Type AD and J)

**Capacitance**

<100 μμf (Type D)
<150 μμf (Type AD and J)

**Ambient Temperature Operating Range**

−40° to 65°C. (Type D)
−60° to 105°C. (Type D MIL-LINE)

*Ratings above apply at 25°C.*

Are you interested in how 4-layer diodes can solve circuit problems in counters, flip-flops, alarm circuits, magnetic memory driving, d-c to a-c inverters, oscillators, detonators, pulse amplifiers, or just plain switching? If so, call or write your local Shockley field representative, or write . . .

Shockley TRANSISTOR
UNIT OF CLEVITE TRANSISTOR
STANFORD INDUSTRIAL PARK, PALO ALTO, CALIF.

For details, circle #538 on Reader Service Card






# Directory II. Components

## 70. Semiconductors.

**Fansteel Metallurgical Corp., North Chicago, Ill., 15s, Tel: DExter 6-4900**
See ad on pages 130-131
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 10s, Tel: CHerry 6-2811**
See ads on pages 267, 354, 423, 457, 525, 620
Gahagan, Inc., R.I., 5c
General Electric Co., Semiconductor Products Dept., N.Y., 20s, 30s, 35s, 45s
General Electric Co., Ltd. of England, N.Y., 5s, 15s, 50s
General Instrument Corp., Semiconductor Div., N.J., 5sc, 15sc, 50sc
General Transistor Corp., N.Y., 5s, 10s, 20s, 30s, 35s, 45s
Great Eastern Mfg. Co., N.Y., 5s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s
Hoffman Electronics Corp., Calif., 15s, 20s, 35s, 45s, 50s
Hoffman Electronics Corp., Semiconductor Div., Calif., 15sc, 35sc, 45sc, 50sc
**Hughes Aircraft Co., Hughes Semiconductor Div., P.O. Box 278, Newport Beach, Calif., 5s, 15s, 20s, 30s, 35s, 45c, 50s, Tel: LIberty 8-0671**
See ads on pages 188, 538
Industro Transistor Corp., N.Y., 20s, 30s, 35s, 45s
Intelex Systems, Inc., N.Y., 50s
International Electronics Corp., Mullard Products, N.Y., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 50s
**International Rectifier Corp., 233 Kansas St., El Segundo, Calif., 10s, 15s, 50s, Tel: ORegon 8-6281**
See ad on pages 118-119
International Telephone & Telegraph Corp., ITT Components Div., N.J., 15sc, 50sc
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c, 15c, 45c, 50c
Itek Corp., Mass., 10c
JEM Electronics Corp., Ill., 10sc
Kentron Electron Products, Inc., Mass., 5sc, 15sc, 50c
Kulite Semiconductor Products, Inc., N.J., 35c, 45c
Lignes Telegraphiques et Telephoniques, France, 5s, 15s, 20s, 50s
Mallory & Co., Inc., P. R., Ind., 15c
Micro Systems, Inc., Calif., 10c
Microwave Associates, Inc., Mass., 15s
Minneapolis-Honeywell Regulator Co., Semiconductor Prods. Div., Minn., 20s, 30s, Transistors, Power Tetrodes
**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 45sc, Tel: WAverly 6-2250**
See ad on page 452
Motorola, Inc., Ill., 5s, 15s, 20s, 25s, 30s, 35s, 40s, 50s
Motorola, Inc., Military Electronics Div., Ariz., 20sc, 25sc, 30sc, 35sc, 40sc, 50c
**Motorola Semiconductor Products, Inc., 5005 E. McDowell Rd., Phoenix, Ariz., 15s, 20s, 30s, 35s, 50s, Tel: BRidge 5-4411**
See ad on page 192
Munzig International, Inc., Calif., 5s, 15s, 20s, 25s, 45s, 50s
National Semiconductors, Ltd., Canada, 10s
Nippon Electric Co., Ltd., Japan, 5s, 10s, 15s, 20s, 30s, 50s
North American Electronics, Inc., Mass., 15sc, 50sc
Nucleonic Products Co., Inc., Calif., 5s, 10s, 15s, 20c, 25c, 30c, 35c
**Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 5sc, Tel: ORchard 5-2600**
See ad on pages 78-79
Pacific Semiconductors, Inc., Calif., 15sc, 20sc, 30sc, 35sc, 50sc
Philco Corporation, Pa., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50c
Philco Corporation, Govt. & Industrial Group, Pa., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc
**Philco Corporation, Lansdale Div., Dept. 504, Church Rd., Lansdale, Pa., 5sc, 15sc, 20s, 30s, 35sc, 40s, 45sc, Tel: ULysses 5-4681**
See ad on pages 31-34
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 15s, 20s, 30s, 35s, 50s
Photo-Crystals, Inc., Ill., 10sc
Plastics & Electronics Corp., N.Y., 10sc
RCA Victor Co., Ltd., Canada, 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc
Radiation Electronics Co., Ill., 10s
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 10s, 15s, 20s, 30s, 35s, 45s, Tel: HUmboldt 5-3900**
See ad on pages 54-55
**Radio Corporation of America, Semiconductor & Materials Div., Section I-22-NN, Route 202, Somerville, N.J., 5sc, 10sc, 15sc, 20sc, 30sc, 35sc, 45sc, Tel: RAndolph 2-3200**
See ad on pages 56-57
Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 15sc, 20sc
Rank Cintel, Ltd., England, 5s, 10s, 15s
Rauland Corp., The, Ill., 20s, 30s
Raytheon Co., Semiconductor Div., Mass., 5s, 15s, 20s, 25s, 30s, 35s, 45s
**Rheem Semiconductor Corp., Dept. C1, 350 Ellis St., P.O. Box 1327, Mountain View, Calif., 15s, 35s, Tel: YOrkshire 8-9211**
See ad on pages 94-95
Semi-Elements, Inc., Pa., 5s, 10c, 15s, 45c, 50c




**Silicon Junction Diodes**

**All vacuum alloyed and soldered**

In addition to offering such standard features as:

- **hermetically sealed**
- **subminiature package**
- **rugged construction**
- **high temperature operation**
- **efficient rectification**

United is using exclusively high vacuum for all operations where metallic parts are joined, to prevent the remotest possibility of contamination.

Inquire About
UNITED's Unique low leakage—
fast recovery Diode "1N931"

**UNITED** *Components*
INCORPORATED
105 Lincoln Ave. Orange, N.J.
ORange 3-6422

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**DIRECT FACTORY SOURCE FOR**

Fairchild Semiconductors

Westinghouse Semiconductors

SAME-DAY SHIPMENT ASSURED

Schweber ELECTRONICS

60 HERRICKS ROAD, MINEOLA, L.I., N.Y. PIONEER 6-6520. TWX G-CY-NY-580U

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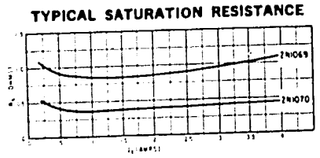


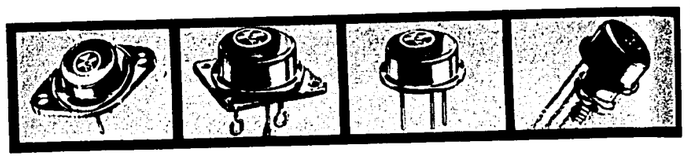

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# SEMICONDUCTORS

## HIGH POWER NPN SILICON TRANSISTORS

TYPICAL SATURATION RESISTANCE

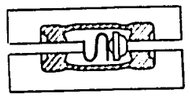


| | 60 WATT | 85 WATT | 15 WATT | 40 WATT |
|---|---|---|---|---|
| | 2N1069 | 2N389 | 2N1067 | 2N1047 |
| | 2N1070 | 2N424 | 2N1068 | 2N1048 |
| | 2N1487 | | 2N1483 | 2N1049 |
| | 2N1488 | | 2N1484 | 2N1050 |
| | 2N1489 | | 2N1485 | |
| | 2N1490 | | 2N1486 | |

## HIGH RELIABILITY SILICON GLASS DIODES

| JAN TYPES | SIG. C. TYPES 1N643 | MIL E-1 1171 |
|---|---|---|
| 1N457 | 1N658 | MIL E-1 1160 |
| 1N458 | 1N662 | MIL E-1 1138 |
| 1N459 | 1N663 | MIL E-1 1139 |



SILICON DIODES—FAST SWITCHING TYPES

| TYPE | MAX. FORWARD D.C. VOLT. V @ mA | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLT. μA @ 25°C | μA @ 100°C | MAX. REV. WKG. VOLT. | MIN. REV. VOLT. @ 100 μA & 25°C | REVERSE RECOVERY |
|---|---|---|---|---|---|---|
| 1N625 | 1.5 @ 4 | 1.0 | 30 | 20 | 30 | 400k Ω min. in 1 μ sec.† |
| 1N626 | 1.5 @ 4 | 1.0 | 30 | 35 | 50 | 400k Ω min. in 1 μ sec.† |
| 1N627 | 1.5 @ 4 | 1.0 | 30 | 75 | 100 | 400k Ω min. in 1 μ sec.† |
| 1N628 | 1.5 @ 4 | 1.0 | 30 | 125 | 150 | 400k Ω min. in 1 μ sec.† |
| 1N629 | 1.5 @ 4 | 1.0 | 30 | 175 | 200 | 400k Ω min. in 1 μ sec.† |
| 1N658** | 1.0 @ 100 | 0.05 @ 50V | 25 @ 50V+150°C | 100 | 120 | 80k Ω min. in 0.3 μ sec. ‡ |

†Switching from 30 mA to 35 volts. Modified IBM "Y" circuit.
‡Switching from 5 mA to 40 volts. JAN 256 Circuit.
Operating temperature range —80°C to +150°C. Maximum power dissipation: 200 mW @ 25° C. Derate at 1.6 mW/°C above 25° C.

SILICON DIODES—GENERAL PURPOSE TYPES

| TYPE | MAX. FORWARD D.C. VOLT. V @ mA | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLT. μA @ 25°C | μA @ 150°C | MAX. REV. WKG. VOLT. | MIN. REV. VOLT @ 100 μA & 25°C | MAX. AV. FORWARD CURR. @ 25°C mA | @ 150°C mA |
|---|---|---|---|---|---|---|---|
| 1N456 | 1.0 @ 40 | 0.025 | 5 | 25 | 30 | 90 | |
| 1N457 | 1.0 @ 20 | 0.025 | 5 | 60 | 70 | 75 | |
| 1N458 | 1.0 @ 7 | 0.025 | 5 | 125 | 150 | 55 | |
| 1N459 | 1.0 @ 3 | 0.025 | 5 | 175 | 200 | 40 | |
| 1N461 | 1.0 @ 15 | 0.5 | 30 | 25 | 30 | 60 | |
| 1N462 | 1.0 @ 5 | 0.5 | 30 | 60 | 70 | 50 | |
| 1N463 | 1.0 @ 1 | 0.5 | 30 | 175 | 200 | 30 | |
| 1N464 | 1.0 @ 3 | 0.5 | 30 | 125 | 150 | 40 | |
| 1N482 | 1.1 @ 100 | 0.25 | 30 | 36 | 40 | 100 | 25 |
| 1N482A | 1.0 @ 100 | 0.025 | 15 | 36 | 40 | 200 | 50 |
| 1N482B | 1.0 @ 100 | 0.025 | 5 | 36 | 40 | 200 | 50 |
| 1N483 | 1.1 @ 100 | 0.25 | 30 | 70 | 80 | 100 | 25 |
| 1N483A | 1.0 @ 100 | 0.025 | 15 | 70 | 80 | 200 | 50 |
| 1N483B | 1.0 @ 100 | 0.025 | 5 | 70 | 80 | 200 | 50 |
| 1N484 | 1.1 @ 100 | 0.25 | 30 | 130 | 150 | 100 | 25 |
| 1N484A | 1.0 @ 100 | 0.025 | 15 | 130 | 150 | 200 | 50 |
| 1N484B | 1.0 @ 100 | 0.025 | 5 | 130 | 150 | 200 | 50 |
| 1N485 | 1.1 @ 100 | 0.25 | 30 | 180 | 200 | 100 | 25 |
| 1N485A | 1.0 @ 100 | 0.025 | 15 | 180 | 200 | 200 | 50 |
| 1N485B | 1.0 @ 100 | 0.025 | 5 | 180 | 200 | 200 | 50 |
| 1N486 | 1.1 @ 100 | 0.25 | 50 | 225 | 250 | 100 | 25 |
| 1N486A | 1.0 @ 100 | 0.05 | 25 | 225 | 250 | 200 | 50 |
| 1N487 | 1.1 @ 100 | 0.25 | 50 | 300 | 330 | 100 | 25 |
| 1N487A | 1.0 @ 100 | 0.1 | 25 | 300 | 330 | 200 | 50 |

Operating Temperature Range —80°C to 200° C. Maximum power dissipation 750 mW @ 25° C

SILICON DIODES—CONTROLLED FORWARD TYPES

| TYPE | FORWARD VOLT DROP @ 10 mA VOLTS | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLTS μA @ 25°C | μA @ 150°C | MAX. WKG. VOLT | MIN. REV. V. @ 100 μA & 25°C | MAX. AV. FORWARD CURR. @ 25 C mA | @ 150°C mA |
|---|---|---|---|---|---|---|---|
| STC 101 | .7 to .74 | 0.025 | 15 | 35 | 40 | 200 | 50 |
| STC 102 | .7 to .74 | 0.025 | 5 | 35 | 40 | 200 | 50 |
| STC 103 | .7 to .74 | 0.025 | 15 | 70 | 80 | 200 | 50 |
| STC 104 | .7 to .74 | 0.025 | 5 | 70 | 80 | 200 | 50 |
| STC 105 | .7 to .74 | 0.025 | 15 | 130 | 150 | 200 | 50 |
| STC 106 | .7 to .74 | 0.025 | 5 | 130 | 150 | 200 | 50 |
| STC 107 | .7 to .74 | 0.025 | 15 | 180 | 200 | 200 | 50 |
| STC 108 | .7 to .74 | 0.025 | 5 | 180 | 200 | 200 | 50 |

Operating Temperature Range—80°C to 200°C. Maximum power dissipation 750 mW @ 25°C

HIGH POWER DIODES

| 1N645 | 1N646 | 1N647 | 1N648 | 1N649 |
|---|---|---|---|---|

## SILICON TRANSISTOR CORPORATION

CARLE PLACE LONG ISLAND NEW YORK • PIONEER 2-[illegible]

For details, circle #541 on Reader Service Card

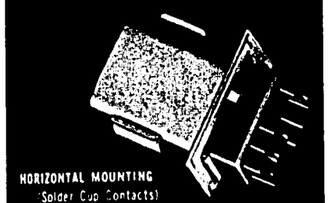




# AUGAT

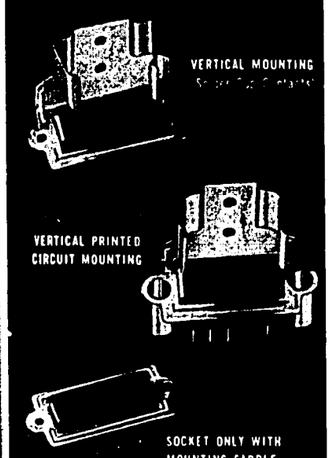
COMPLETE LINE OF SOCKET ASSEMBLIES FOR MICRO-MINIATURE RELAYS

*Combining Holding Clip And Built-In Socket For Unmatched Reliability Under Severe Conditions Of Shock And Vibration.*










Patent Pending

These assemblies will accomodate Micro-Miniature relays as manufactured by G. E., Elgin, Sigma, Allied, Potter & Brumfield, Clare, Iron Fireman, Babcock and many others.

*For additional information write for catalog RS-160*

## AUGAT BROS., INC.

31 Perry Avenue
Attleboro, Massachusetts

For details, circle #542 on Reader Service Card




# Directory II. Components

## 70. Semiconductors.

Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 10c, 15sc, 45sc, Tel: CRestview 4-8542
See ad on page 507

Shockley Transistor, Unit of Clevite Transistor, Stanford Industrial Park, Palo Alto, Calif., 15 four-layer c, Tel: DAvenport 1-2121
See ad on page 540

Silicon Transistor Corp., 150 Glen Cove Rd., Carle Place, L.I., N.Y., 15s, 30s, Tel: PIoneer 2-4100
See ad on page 542

Solar Systems, Inc., Ill., 10c

Solid State Products, Inc., 1 Pingree St., Salem, Mass., 35s, Tel: PIoneer 5-2900
See ad on page 506

Solitron Devices, Inc., 67 S. Lexington Ave., White Plains, N.Y., 15sc, 50sc, Tel: WHite Plains 6-7591
See ad on page 506

Sony Corp., N.Y., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s

Sperry Gyroscope Co. of Canada, Ltd., Canada, 15c, 25c

Sperry Semiconductor Div., Conn., 15sc, 30sc, 35sc, 40sc, Microcircuitry sc

Sprague Electric Co., Mass., 30s, 35s, 40s

Standard Telephones & Cables, Ltd., England, 5s, 15s, 20s, 30s, 35s, 40s, 50s

Sylvania Electric Products Inc., N.Y., 5sc, 10sc, 15sc, 20sc, 30sc, 35sc, 45c, 50sc

Sylvania Electric Products Inc., Semiconductor Div., Mass., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc

Syntron Co., Semiconductor Div., 83 Lexington Ave., Homer City, Pa., 15sc, Tel: GRidley 9-8011
See ad on page 506

Texas Instruments Incorporated, Semiconductor-Components Div., 13500 N. Central Expressway, Dallas, Texas, 10s, 15s, 20s, 30s, 35s, 45s, 50s, Tel: ADams 5-3111
See ad on page 394

Thompson Ramo Wooldridge Inc., Calif., 5sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc

Trans-Sil Corp., N.J., 15sc

Transitron Electronic Corp., Mass., 5s, 15s, 20s, 30s, 35s, 50s

Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 30, Tel: HUmboldt 2-4200
See ad on pages 74-75

United Components, Inc., 105 Lincoln Ave., Orange, N.J., 15sc, Tel: ORange 3-6422
See ads on pages 453, 541

U. S. Semiconductor Products, Ariz., 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc

U. S. Transistor Corp., N.Y., 25

Vickers, Inc., Mo., 15s

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 50sc, Tel: ENdicott 1-6200
See ads on pages 535, 578

Wells Electronics Co., Ind., 5s, 25s, 50s

Western Semiconductors, Inc., Calif., 5sc, 15sc, 45sc, 50sc

Westinghouse Electric Corp., Semiconductor Dept., Pa., 5sc, 15s, 30sc, 45sc, Hall Generators sc

**Servo-mechanisms:**
See class 30

**Servo motors & generators:**
See classes 30 & 60

**Shaft seals:**
See class 91

**Shift registers:**
See class 9

**Shock mounts:**
See class 81

**Shunts:**
See class 58

**Signal generators:**
See Directory I

**Silicon crystals:**
See class 49

**Silicon diodes:**
See class 70

**Silicon rectifiers:**
See class 66

**Silicon stacks:**
See class 66

**Slides:**
See class 87

**Slip rings:**
See class 46

**Slotted lines:**
See class 21

## 71. Sockets.

5. Capacitor, plug-in
10. Crystal
15. Diode
20. Pilot light
25. Printed circuit
30. Receiving tube
35. Transistor
40. Transmitting tube
45. UL approved industrial types

AMP Incorporated, Pa., 5s

Accurate Electronics Corp., Ohio, 20c, 25c

Aerolite Electronics Corp., N.J., 20sc

Aeronautical Electric Co., 5656 Northwest Hwy., Chicago 46, Ill., 20sc, Tel: SPring 4-5200
See ad on page 471

Aerovox Corp., Mass., Miniature s

Air-O-Tronics Engineering Co., Calif., Test adapters sc

Alcon Metal Products, Inc., Ill., 25c, 30c, 35c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Special Sockets and Connectors

by jettron®

...FROM DESIGN TO PRODUCTION

Jettron is fully-equipped to design and manufacture your precision electronic components including connectors, sockets and cable assemblies. Call or write Jettron for quotations on "specials" for all commercial and military applications.



**CD-7140** — Printboard Application Socket for R.C.A. Micromodule. Measures only .400 maximum square by .094 high. Insulation resistance greater than 50,000 megohms. Employs silver plated beryllium copper contacts and DIALL FS-5 insulating material.



**CAT. 8550**—Ultra High Frequency Socket for the G.E. GL-6299 Triode is sold in kit form containing all the necessary parts for mounting by the customer on a chassis barrier. It provides excellent isolation of the input from the output.



**CAT. 8715**—Ultra-High Temperature Socket for G.E. 7296 Triode can be soldered to printboard or mounted above or below a chassis. High Alumina insulating material; contacts gold plated Inconel-X. For continuous operation at 1000° F (538° C).

## JETTRON PRODUCTS • INC

56 Route 10, Hanover, New Jersey
Telephones: TUcker 7-0571-0572

*Sales Engineers in Principal Cities*

For details, circle #543 on Reader Service Card




Alden Products Co., 140 N. Main St., Brockton 64, Mass., 5s, 20s, 30s, 45s, Tel: JUniper 3-0160
See ad on page 496

Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., Relay sc, Tel: BUtterfield 8-7403
See ad on page 508

Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 30s, 45s, Tel: BIshop 2-1000
See ad on page 146

Argonne Electronics Mfg. Corp., N.Y., 15s, 35s

Armel Electronics, Inc., N.Y., Relay sc

Auburn Plastics, Inc., N.Y., 20c

Augat Brothers, Inc., 31 Perry Ave., Attleboro, Mass., 10s, Relay s, Tel: CAstle 2-2202
See ad on page 543

Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 10c, 25c, Adapters c, Tel: EVergreen 8-6057
See ad on page 409

Barnes Development Co., Pa., Test s

Bellandi Co., Inc., M., Ill., 25c

Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 25s, Tel: ENfield 3322
See ad on page 411

Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 40s, Tel: WOrth 6-5611
See ad on page 607

Bulova Watch Co., Inc., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 10c, Tel: NEwtown 9-5760
See ad on page 426

Burndy Corp., H. H. Buggie Div., Olea 25

Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, 15s, 25s, 30s, 35s, Tel: NEvada 2-2000
See ad on pages 46-47

Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 15s, 20s, 25s, Tel: WOodland 7-1113
See ad on page 471

Clark Crystal Co., Inc., 2 Farm Rd., Marlboro, Mass., 10s, Tel: HUntley 5-1411
See ad on page 429

Cleveland Metal Specialties Co., Ohio, 45c

Component Mfg. Service, Inc., Mass., 10, 45

Control Dynamics Corp., Calif., 15s, 3[illegible] 35s, Relay s

Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 30sc, 40sc, 45sc, Tel: SWarthmore 1-0100
See ad on page 510

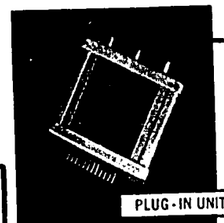
D.K.E. Electronic Bases, Inc., N.J., 40c

Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 20s, 45s, Tel: HYacinth 7-7600
See ad on page 472

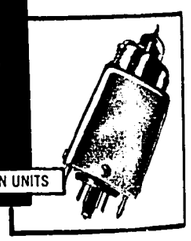

Vector Electronics manufactures a complete line of structures for mounting circuitry easily, compactly and with good accessibility.

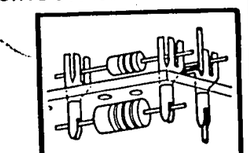
Vector experience and facilities guarantee delivery, performance and economical prices.

Vector STRUCTURES FOR CIRCUITRY

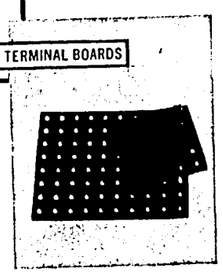


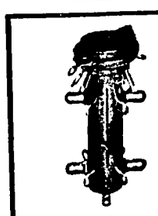
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TERMINALS AND TERMINAL BOARDS





SOCKET TURRETS, TERMINAL TURRETS, TRANSISTOR TURRETS.



SOCKET TEST ADAPTOR. CHANGE ADAPTORS, EXTENDERS, ROTOPROBES AND TUBE BASE PLUGS.

*Write for catalog to:*

VECTOR ELECTRONIC COMPANY
1100 FLOWER STREET, GLENDALE 1, CALIFORNIA
TELEPHONE: CHAPMAN 5-1076

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# Directory II. Components

## 71. Sockets.

Eagle Electric Mfg. Co., Inc., N.Y., 20s, 45s

Ebauches S.A., Dept. Semiconducteurs, Switzerland, 35s

Ely Co., Hugh H., Pa., 10sc, 25sc, 35sc, 40c, 45c

Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., 40s, Tel: LYtell 1-1451
See ad on pages 80-81

Elco Corporation, Pa., 10s, 25s, 30s, 35s, 40s

Electro-Chemical Engraving Co., Inc., N.Y., 25c

Electronic Mechanics, Inc., N.J., 10sc, 15c, 35c, 40c, 45c

Electronica Industrial, Ltda., Brazil, 40s

Federal Manufacturing & Engineering Corp., N.Y., 5c

Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 20s, Tel: IRving 8-5744
See ad on page 642

Franklin Fibre-Lamitex Corp., N.Y., 25c

Garlock Electronic Products, Garlock, Inc., N.J., 10s, 30s, 35s

General Circuits, Inc., N.Y., 25c

Grayhill, Inc., Ill., 35s

Hallicrafters Co., The, Ill., 40c

Industrial Electronic Hardware Corp., N.Y., 10c, 15c, 20sc, 25sc, 30s, 35s

Instruments For Industry, Inc., N.Y., UHF-VHF sc

International Crystal Mfg. Co., Inc., Okla., 10s

International Electronic Research Corp., IERC Div., 135 W. Magnolia Blvd., Burbank, Calif., 25s, Tel: VIctoria 9-2481
See ad on page 702

Jettron Products, Inc., 56 Route 10, Hanover, N.J., 15s, 25sc, 30s, 35c, 40sc, Tel: TUcker 7-0571
See ads on pages 413, 544

Johnson Co., E. F., Minn., 10s, 20s, 40s

Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, 15s, 25s, 30s, 35s, Tel: NEvada 2-2000
See ad on pages 46-47

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 20s

Kenra Company, The, N.J., 45sc

Keystone Electronics Corp., N.Y., 10c, 15s

Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 20s, 45s, Tel: MOunt Vernon 4-4024
See ads on pages 551, 558

LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 30s, Tel: AMityville 4-2200
See ad on page 365

Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 30s, Adapters s, Tel: GRaceland 7-7900
See ad on page 454

Lacy Engineering & Mfg. Co., Ill., 25c

Leecraft Mfg. Co., Inc., N.Y., 20c

Leviton Mfg. Co., Inc., N.Y., 20s, 45s

Mandex Manufacturing Co., Inc., Ill., 25s, 45s

Materials For Electronics, Inc., N.Y., 5s, 10s, 15s, 30s, 35s, 40s

Methode Manufacturing Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 10s, 15s, 25s, 30s, 35s, Tel: UNderhill 7-9600
See ad on page 415

Micarta Fabricators, Inc., Ill., 20c

Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 10s, Tel: WYman 2-5700
See ad on page 380

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 10s, 30s, 35c, 45sc, Tel: DAvenport 4-4108
See ad on page 402

Molex Products Co., Ill., 30c

Morse Co., Frank W., Mass., 20sc, Miniature sc

Mosley Electronics, Inc., Mo., 10sc

Motorola, Inc., Military Electronics Div., Ariz., 25c

Mycalex Tube Socket Corp., N.J., 25s, 30c, 35c

Mykroy, Inc., Ill., 10sc, 40sc

National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 10, 30, 40, 45, Tel: NOrmandie 5-4800
See ad on page 614

Nippon Electric Co., Ltd., Japan, 40s

Norwich Plastics Corp., N.Y., 5c, 30c, 45c

Nugent Electronics Co., Inc., Ind., 10s, 15s, 25s, 35s

Painton & Co., Limited, England, 25s

Permonite Mfg. Co., Ill., 10s, 20sc, 25c, 30sc, 40sc, 45sc

Philips Electronics Industries, Ltd., Canada, 25s, 30s, 40s

Philmore Mfg. Co., Inc., N.Y., 20s, 30s

Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 25c, Tel: ORIole 6-8000
See ad on page 500

Plasteck, Inc., Okla., 25c

Pomona Electronics Co., Inc., Calif., Adapters s

Rodale Mfg. Co., Inc., Pa., 45s

Sanders Associates, Inc., N.H., 10sc, 15sc

Sealectro Corp., N.Y., 35s

Signal Indicator Corp., N.Y., 20s, 45s

Sloan Company, The, Calif., 20sc

Smith, Inc., Herman H., N.Y., 30s

Sunbank Electronics, Inc., Calif., Adapters sc

Sylvania Electric Products Inc., Parts Div., Pa., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s

United International Dynamics Corp., Mass., 15c, 25s, 30s

United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 30s, 35c, Tel: BEekman 3-8870
See ads on pages 533, 699

Van Norman Industries, Inc., Electronics Div., N.H., Test adapters c

Vector Electronic Co., Inc., 1100 Flower St., Glendale 1, Calif., 15s, 30s, 35s, Tel: CHapman 5-1076
See ad on page 544

Viking Industries, Inc., Calif., Subminiature s

Waldom Electronics, Inc., Ill., 10s, 15s, 25s, 30s

Winchester Electronics, Inc., Conn., 25s, 30sc, 40sc, Relay sc


Solenoid coils:
See class 45

Solenoid switches:
See class 72

Solid state relays:
See class 68

Spacers & insulators, vacuum tube:
See class 104

Special purpose tubes:
See class 78

Spectrometers:
See class 14

Springs:
See class 91

Stacks, selenium & silicon:
See class 66

Stands, microphone:
See class 59

Storage batteries:
See class 41

Storage devices for computers:
See class 9

Storage mechanisms, data; telemetering:
See class 36

Strain reliefs:
See class 91

Stroboscopes:
See class 14


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## ROTARY SWITCHES

J-B-T



MS-14 Molded



SS-14 Laminated

For dependable performance in quality test equipment, instruments, inspection setups, and avionics, J-B-T makes 4 space-saving types — *14 positions:* 2 3/32" dia. MS-14 molded series, and 2" dia. SS-14 laminated series; *20-positions:* 2 5/8" dia. MS-20 molded series, and 2 23/32" dia. SS-20 laminated. 1 to 6 decks (more on special order), shorting or non-shorting. Conservatively rated 1 amp., 125 volts AC, inductive load; maximum momentary, (not make and break) 5 amp. Maximum voltage between contacts, 1500 volts R.M.S.; between decks and ground, 2000 volts R.M.S. Average contact resistance is 0.007 ohms or less.

## LEVER ACTION SWITCHES

J-B-T Lever Switches use the same high quality parts as the J-B-T Rotary Switches above. 2-6 positions, 2 circuits per deck, 2-10 decks.

Purchase of standard items through authorized electronic distributors is strongly recommended.

ASK FOR CATALOG 558-E

J-B-T INSTRUMENTS, INC.
NEW HAVEN 8, CONN.

For details, circle #545 on Reader Service Card


**Styli, cutting:**
See class 65

**Styli, playback:**
See class 61

**Switch seals:**
See class 91

## 72. Switches & Contacts.

2. Band
4. Circuit breakers
6. Coaxial
8. Commutator
10. Contacts
12. Control
14. Crossbar
16. Electronic
18. Ferrite
20. Foot
22. Key
24. Limit
26. Mercury
28. Momentary contact
30. Power
32. Precision snap-acting
34. Push button
36. Rotary
38. Semiconductor
40. Slide
42. Solenoids
44. Spring-return
46. Tap
48. Thermal
50. Time
52. Toggle
54. Transfer

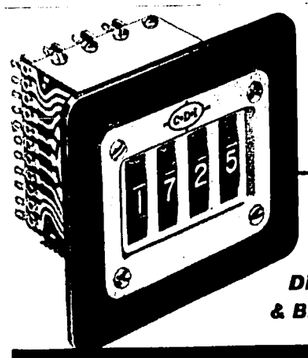
AMP Incorporated, Pa., 10s, 14s, 16s, 18s
A.P.W. Co., N.J., 42c
A-1 Precision Products, Calif., 8c, 36c
Accurate Spring Mfg. Co., Ill., 44c
Acro Div., Robertshaw-Fulton Controls Co., Ohio, 10sc, 12s, 24s, 28sc, 32sc, 34s, 52s
Advanced Electronics, Inc., Conn., 42c
**Aemco, Inc.,** 12 State St., Mankato, Minn., 50c, Tel: 5153
See ad on page 509
**Airflyte Electronics Co.,** 537 Avenue A, Bayonne, N.J., 8c, 36c, Tel: HEmlock 6-2230
See ad on page 408
Airmec Limited, England, Capacity s
**Airpax Electronics, Incorporated,** Cambridge Div., Jacktown Rd., Cambridge, Md., 4s, Tel: AC 8-4600
See ad on pages 82-83
**Airpax Electronics, Incorporated,** Seminole Div., Fort Lauderdale, Fla., 4s, Tel: LUdlow 3-6160
See ad on pages 82-83
**Airtec, Inc.,** 139 E. 1st Ave., Roselle, N.J., 6sc, 18sc, Tel: CHestnut 5-2993
See ad on page 589
Airtron, Inc., Div. Litton Industries, Inc., N.J., 6c, 18c, 36c
**Alden Products Co.,** 140 N. Main St., Brockton 64, Mass., 10s, 16s, 28s, Tel: JUniper 3-0160
See ad on page 496
**Alford Mfg. Co.,** 299 Atlantic Ave., Boston 10, Mass., 6s, Tel: HAncock 6-2150
See ad on page 590
Allen-Bradley Co., Wis., 20s, 24s, 34-42s, 54s
Allen Electric & Equip. Co., Mich., 30c, 34c, 36c, 46c
**Allied Control Co., Inc.,** 2 East End Ave., New York 21, N.Y., 28sc, 34sc, 52sc, Tel: BUtterfield 8-7403
See ad on page 508
Allis-Chalmers Mfg. Co., Wis., 12c, 20sc, 24sc, 30sc, 34sc
Alloys Unlimited, Inc., N.Y., 10c
American Brass Co., The, Fabricated Metal Goods Div., N.Y., 10c



# Directory II. Components

## 72. Switches & Contacts.

**American Electronic Laboratories, Inc.,** 121 N. 7th St., Philadelphia 6, Pa., 16s, Tel: WAlnut 5-8780
See ad on page 369
American Electronics Co., N.Y., 40s
Analogue Controls, Inc., N.Y., 30c
Andrew Antenna Corp., Ltd., Canada, 6s, 54s
**Andrew Corp.,** 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 6sc, Tel: TRiangle 4-4400
See ad on page 371
Applied Electro Mechanics, Inc., Va., 36sc
**Applied Electronics Corp. of New Jersey,** 22 Center St., P.O. Box 43, Metuchen, N.J., 8sc, 16sc, Tel: LIberty 9-1500
See ad on page 353
Applied Technology Corp., N.Y., 30c
Arch Gear Works, Inc., Mass., 24c
Ardente Acoustic Labs., Ltd., England, 36sc
Argonne Electronics Mfg. Corp., N.Y., 34s, 36s, 38s, 40s, 52s
Arkay Products Mfg. Co., Calif., 34s, 36s, 40s, 44s
Armour Corp., Calif., 8s, 10s
Arrow-Hart & Hegeman Electric Co., The, Conn., 12sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36sc, 40sc, 46sc, 52sc, 54sc
Artisan Electronics Corp., N.J., 42s
Audiosears Corp., N.Y., 28sc, 32sc
**Automatic Metal Products Corp.,** 323 Berry St., Brooklyn 11, N.Y., 6c, 34c, Tel: EVergreen 8-6057
See ad on page 409
Automatic Switch Co., N.J., 42c, 54sc
Automatic Timing & Controls, Inc., Pa., 16sc, 24sc, 26sc, 28sc, 50sc
Aviel Electronics, Inc., Calif., 6c
Avnet Electronics Corp., N.Y., 52s
**Baker Contact Div., Engelhard Industries, Inc.,** 207 Grant Ave., East Newark, Harrison P.O., N.J., 10, Tel: BIgelow 3-0300
See ad on page 170
**Barber-Colman Co., Dept. J,** 1256 Rock St., Rockford, Ill., 48sc, Tel: WOodland 8-6833
See ad on page 465
Barker & Williamson, Inc., Pa., 6sc, 16c
Barwood Electronics, Inc., Calif., 20s
**Bead Chain Mfg. Co.,** 6 Mountain Grove St., Bridgeport 5, Conn., 10s, Tel: EDison 4-4124
See ad on page 453
Beck's, Inc., Minn., 8c
**Belling & Lee, Ltd.,** Great Cambridge Rd., Enfield, Middlesex, England, 48sc, Tel: ENfield 3322
See ad on page 411
**Bendix Corp., The, Eclipse-Pioneer Div.,** Teterboro, N.J., 52c, Tel: ATlas 8-2000
See ad on pages 103-106
Bendix Corp., The, Montrose Div., Pa., Pressure sc
Benco Engineering Corp., Ind., 24s
**Bird Electronic Corp.,** 30303 Aurora Rd., Cleveland 39, Ohio, 6s, Tel: CHurchill 8-1200
See ad on page 506
**Birnbach Radio Co., Inc.,** 145 Hudson St., New York 13, N.Y., 4s, 22s, 28s, 30s, 34s, 36s, 40s, 52s, Tel: WOrth 6-5611
See ad on page 607
Bleeker-Tongue Laboratories, Inc., N.J., 48s
Bogart Mfg. Co., N.Y., 6c, 16sc
Bramm Corp., L. S., N.Y., 10c
**Braun Tool & Instrument Co., Inc.,** 141 Fifth Ave., Hawthorne, N.J., grounding & contact strips, Tel: HAwthorne 7-1773
See ads on pages 449, 537, 547
Bristol Co., Conn., 36c, 48c
Bristol Motors, Div. Vocaline Co. of America, Conn., 50sc
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 10s
CGS Laboratories, Inc., Conn., 14c

C·D·I

*Digital (Series TSD)*
*& Binary (Series TSB)*

## NEW HIGHLY RELIABLE THUMBWHEEL SWITCHES

Available in permanent or removable wafers in 8, 10 or 12 positions up to 16 switches per modular assembly. Occupies only ½" panel space per module. Variations available to special order.

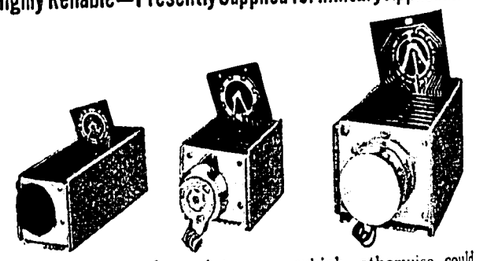
Instant, easy numerical readout—only selected numbers are visible thru openings in the bezel plate. Thumbwheel is black molded nylon with ¼" engraved figures. Other colors available.

Construction is printed circuit wafers with silver, rhodium or gold laminate, precious metal alloy contacts and corrosion protected aluminum frame. Switch can be positioned horizontally or vertically.

***Write for detailed specs today.***

## UNIQUE DESIGN ROTARY SWITCH— 5-SECOND WAFER REPLACEMENT

**No Unsoldering or Disassembling ... No Wire Removing ... Simply Lift out Any Wafer & Replace Instantly ... Highly Reliable—Presently Supplied for Military Applications**



Reduces to seconds maintenance which otherwise could take a full day or more, saving valuable time. New design obsoletes old switches.

Switches are available in sizes approx. 2" x 2", 3" x 3" and 4" x 4" with lengths to accommodate up to 36 wafers. Virtually unlimited choice of switch circuit configurations. All connections are to a single bank of receptacles and are conveniently accessible from one side of the aluminum housing. Contacts are silver, gold or rhodium plated on a copper base. Wafers can be made to include printed circuitry and components in addition to their normal switching function.

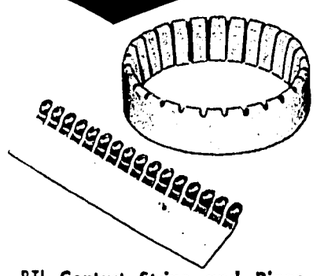
Switches may be manually, motor or solenoid operated for use in any rotary selector switch application. Manufactured under Tabet U. S. Patent No. 2,841,660. Other U. S. and foreign patents pending. Write for details today.

C·D·I CHICAGO DYNAMIC INDUSTRIES, INC. C·D·I
PRECISION PRODUCTS DIVISION • 1725 Diversey Blvd., Chicago 14, Ill.

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BTI

## GROUNDING AND CONTACT STRIPS



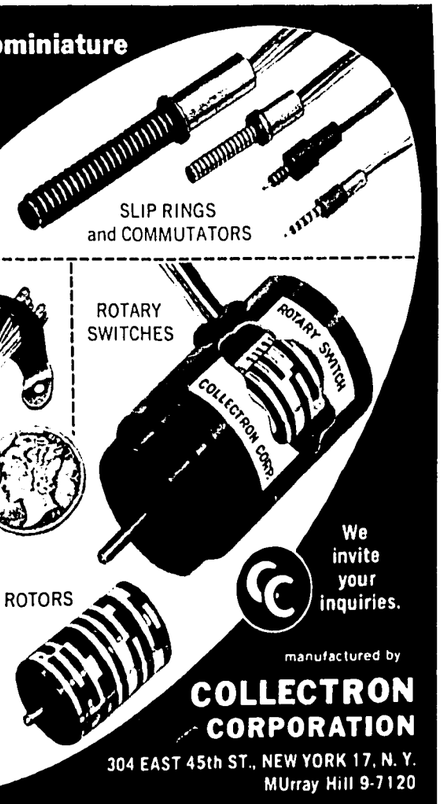
**BTI Contact Strips and Rings** are mostly used for grounding and shielding in high frequency equipment. Large variety of finger width, shape, and contours available from stock. Can be used for making contact rings. Special cut-outs, slots, and holes available to specification. Fixture heat treated.

Write for Bulletin #E-106.

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141 Fifth Ave., Hawthorne, N. J.

For details, circle #547 on Reader Service Card

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## PRECISION ASSEMBLIES
... and other rotating components




We invite your inquiries.

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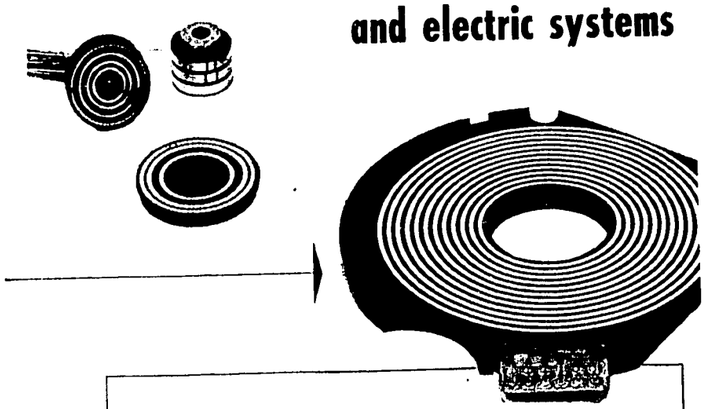
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# SLIP-RING ASSEMBLIES
## for electronic and electric systems

•

# ROTARY SWITCHES
## for electronic and electric systems

Your needs for slip-ring, brush-holder, and rotary-switch assemblies designed, manufactured, and tested to your performance specifications can now be met by the enlarged facilities available through the ELECTRO CONTACTS Division of Electro Switch Corp.

Bulletin 60-01 shows typical products and contains a check list to help you specify. This bulletin is available *through all Electro Switch sales representatives* or on request to

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DIVISION ELECTRO SWITCH CORP
OSTERVILLE, MASSACHUSETTS Tel GArden 8 6986 (thru Hyannis)

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**CTS Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 20c, 28c, 30c, 34c, 36c, 44c, Tel: ELkhart 3-0310**
See ad on page 2

C.W.S. Waveguide Corp., N.Y., 10c
California Computer Products, Inc., Calif., 16c, 38sc
Canadian Westinghouse Co., Ltd., Canada 6s
**Cannon Electric Co., Dept. 425, 3209 Humboldt St., Los Angeles 31, Calif., 42s, Tel: CApitol 5-1251**
See ad on page 410

Capitol Machine Co., Conn., 22, 25, 32
Carling Electric, Inc., Conn., 12c, 20c, 22c, 28c, 34c, 36c, 40sc, 44c, 46c, 52c
Carroll Pressed Metal, Inc., Mass., 16c
Carson Mfg. Co., Inc., Ind., 30c, 45c
Carter Parts Co., Ill., 24c, 32c, 34c, Lever c
**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 2sc, 34sc, 36sc, 40c, 44sc, 46sc, Tel: WOodruff 2-9200**
See ad on page 152

Century Electronics & Instruments Inc., Okla., Pressure s
Cherry Electrical Products Corp., Ill., 24sc, 28sc, 32sc, 34sc
**Chicago Dynamic Industries, Inc., Precision Products Div., 1725 W. Diversey Blvd., Chicago 14, Ill., 36s, Binary and Digital Types s, Tel: WEllington 5-4600**
See ad on page 546

Chicago Electronic Div., Land-Air, Inc., 16c, 36c, 50c
Chicago Telephone of California, Inc., Calif., 20s, 36c, 44c
Clare & Co., C. P., Ill., 22c, 24c, 26c, 38c
Clark Controller Co., The, Ohio, 12s, 20s, 22s, 24s, 30s, 32s, 34s, 44s, 48s, 50s, 52s
Clarostat Mfg. Co., Inc., N.H., 12s, 30sc, 36sc
Cleveland Metal Specialties Co., Ohio, 8c
Co Engineering Co., N.J., 36c
Cole Electric Co., Calif., 36c, 52c
**Collectron Corp., 304 E. 45th St., New York 17, N.Y., 36sc, Tel: MUrray Hill 9-7120**
See ad on page 547

Columbus Electric Mfg. Co., Ohio, 24c, 32sc
**Comar Electric Co., 3349 Addison St., Chicago 18, Ill., 28c, Tel: JUniper 8-2410**
See ad on page 166

Composite Industrial Metals, Inc., R.I., 10c
**Computer Instruments Corp., 90 Madson Ave., Hempstead, L.I., N.Y., 8s, 12sc, 36sc, Tel: IVanhoe 3-8200**
See ad on pages 528-529

Consolidated Controls Corp., Conn., 24sc, Pressure sc
Continental Electronics Corp., N.Y., 8s
Continental-Wirt Electronics Corp., Pa., 40s
Control Products, Inc., N.J., 24c, 28c, 32c, 34c, 48c, 52c
Control Switch Div., Controls Co. of America, Ill., 12sc, 20sc, 24sc, 28sc, 32sc, 34sc, 36sc, 42sc, 44sc, 52sc





# Directory II. Components



Controls Company of America, Appliance, Automotive & Electron Divs., Ill., 12c, 32c, 36c, 38c, 42c
Cook Electric Co., Ill., 10sc, 16sc, 48sc, 50sc
Couch Ordnance, Inc., Mass., 30c, 36c
Cramer Controls Corp., Conn., 50c
Crosby-Teletronics Corp., N.Y., 10s
Cunningham Son & Co., Inc., N.Y., 8s, 14s
**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 16c, 32sc, 42sc, 44c, 48sc, 50sc, Tel: SWarthmore 1-0100**
See ad on page 510

Cutler-Hammer, Inc., Wis., 4s, 12s, 20s, 22s, 24s, 28s, 30s, 32s, 34s, 36s, 40s, 52s
Daco Instrument Co., N.Y., 42sc
Daven Co., The, N.J., 2s, 6c, 8c, 12s, 24s, 32s, 36s, 44s, 46s
Decker Corporation, The, Pa., 16s
**Del Electronics Corp., Dept. RE, 521 Homestead Ave., Mount Vernon, N.Y., High Voltage sc, Tel: OWens 9-2000**
See ads on pages 282, 481, 567

Deltron Co., Calif., 50c
Deutsch Co., The, Electronic Components Div., Calif., 10sc
**Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 28c, Tel: HYacinth 7-7600**
See ad on page 472

Diamond Antenna & Microwave Corp., Mass., 6c
Dicon Corporation, N.Y., 38c
Dielectric Products Engineering Co., Inc., Me., 6c
Dietz Co., Inc., N.J., 36sc
Dietzgen Co., The, Div. Endevco Corp., Calif., 8s, 12s, 36s, 54s
**Dimco-Gray Co., 212 E. 6th St., Dayton 2, Ohio, 50s, Tel: BAldwin 2-6703**
See ad on page 641

Djordjevic Engineering Co., Djeco Div., Ill., 38c
**Douglas Microwave Co., 252 E. Third St., Mount Vernon, N.Y., 16sc, 18sc, Tel: MOunt Vernon 8-6900**
See ad on pages 90-91

Dow-Key Co., Inc., Minn., 6s
Drakool, Inc., Ind., 26sc
Dynamics Instrumentation Co., Calif., Photo-Electric s
E I V Products Co. of America, Ill., 4s, 12s, 48s, 50s
Eagle Electric Mfg. Co., Inc., N.Y., 26s, 34s, 36s, 46s, 52s
Eagle Signal Co., Ill., 50s
Eastern Technical Associates, Inc., Mass., Acceleration s
Ecco Electronic Components Corp., N.Y., 6c
Eckel Valve Co., Calif., 42c
Edison Industries, Thomas A., Instrument Div., N.J., 48s, 50s
Elco Division, The Scranton Corp., Ill., 36c
**Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., Vacuum s, Tel: LYtell 1-1451**
See ad on pages 80-81

**Elastic Stop Nut Corp. of America, Agastat Timing Instruments Div., Dept. A37-76, 1027 Newark Ave., Elizabeth 3, N.J., 50s, Tel: ELizabeth 2-2900**
See ad on page 513

Electric Autolite Co., The, Ohio, 42s
Electric Regulator Corp., Conn., 12sc, 36sc
Electric Specialty Co., Conn., 30c
Electrical Service Co., Calif., 28c
**Electro Contacts Div., Electro Switch Corp., Osterville, Mass., 8c, 36sc, Tel: (Hyannis) GArden 8-6986**
See ad on page 548

Electro Development Co., Calif., 30s
Electro-Mechanical Specialties Co., Inc., Calif., 10c, 42c
Electro-Miniatures Corp., N.J., 8sc, 36sc
Electro Tec Corp., N.J., 8c, 36sc
Electrocraft Component Div., G-C Electronics Co., Ill., 28s, 34s
Electron-Radar Products, Ill., 4sc, 10sc, 12sc, 20sc, 30sc, 48sc
Electronic Specialty Co., Calif., 6sc, 10c, 36c, 38c
Electronic Systems Development Corp., Calif., 38 c
Electronic Transistors Corp., N.J., 38sc
Ellison Draft Gage Co., Inc., Ill., 10c, 12c, Vacuum c, Pressure c
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 10sc, 14sc, 38sc, 40sc, 48sc, Tel: BIgelow 2-2700**
See ad on page 170

Engineered Electronics Co., Calif., 10sc, 38sc
Essex Wire Corp., RBM Controls Div., Ind., 10s, 14s, 30s, 42s, 48s
Etelco, Ltd., England, 22c
Fairchild Controls Corp., Components Div., N.Y., 12sc, 24sc, 32sc, 36sc, 40sc, 42sc, 44sc, 46sc, 48sc, 50sc
Fairfield Engineering Corp., Conn., 10c, 30c, 38c, 54c
**Fansteel Metallurgical Corp., North Chicago, Ill., 10s, Tel: DExter 6-4900**
See ad on pages 130-131

Farmer Electric Products Co., Inc., Mass., 24s
Farwest Mfg. Div., Inc., Wash., 6s, 16s, 24s, 26s, 28s, 30s, 32s, 34s, 36s, 52s
Fasco Industries, Inc., N.Y., 4sc, 40c, 42c, 48c
Federal Anti-Capacity Switch Co., N.Y., Anti-Capacity sc
**Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 40s, 52s, Tel: IRving 8-5744**
See ad on page 642

**Ferrotec, Inc., 217 California St., Newton 58, Mass., 18c, Tel: DEcatur 2-7600**
See ad on page 591

**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 16s, Tel: CEnter 9-6100**
See ad on page 480

Furnas Electric Co., Ill., 10s, 12s, 20s, 24s, 34s, 36s, 42s, 46s
G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 34s, 40s, 52s, Tel: WOodland 8-9661
See ad on page 640

Gables Engineering, Inc., Fla., 30s
Genisco Electric Co., Mich., 24s, 36s
**General Communication Co., 677 Beacon St., Boston 15, Mass., 6sc, Tel: COpley 7-6030**
See ad on page 631

General Control Company, Mass., 2s, 22s, 23s, 28s, 34s, Lever s
General Controls Co., Calif., 2s, 23s, 24s, 48s, 50s
General Devices, Inc., N.J., 2s, 4s, 6s, 8sc, 10sc, 12sc, 14sc, 16sc, 22s, 24s, 25s, 28s, 30s, 32s, 34sc, 38s, 40s, 42s, 44s, 46s, 48s, 50s, 52s, 54
General Electric Co., Apparatus Sales Div., N.Y., 12s, 24s, 24c, 28s, 30s, 32s, 34s, 36s, 42s, 48s, 50s
General Electric Co., Wiring Devices Dept., R.I., 22s, 24s, 34s, 52
General Electric Co., Ltd., of England, England, 22s, 34s, 36s
General Findings & Supply Co., Industrial Div., Mass., 10s, 38c
**General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 52, Tel: VAlley Stream 5-6363**
See ad on page 284

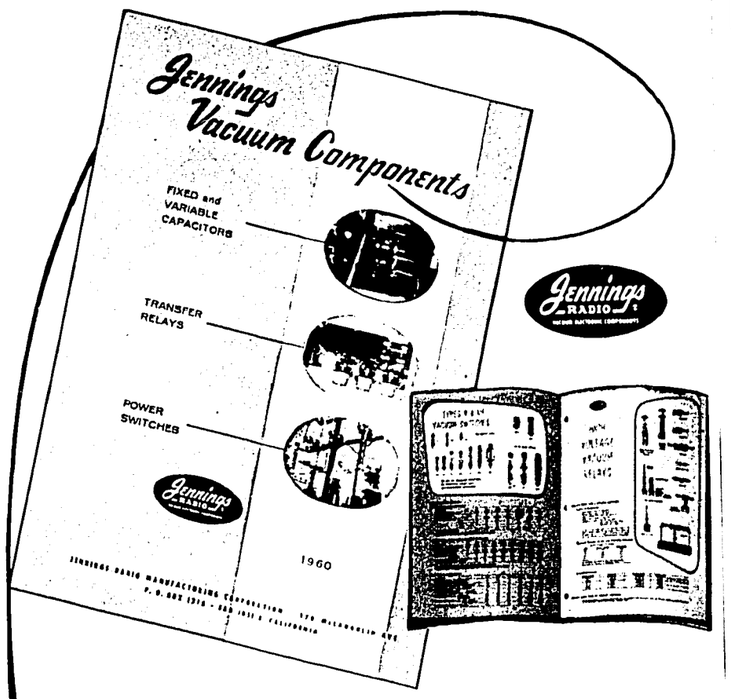
Gertsch Products, Inc., Calif., 6s
Giannini Controls Corp., Calif., 8sc, Acceleration sc, Pressure sc
Gibson Electric Co., Pa., 10sc
Glass-Tite Industries, Inc., R.I., 26sc
Gordos Corp., N.J., 26sc
Graphik-Circuits, Div. Cinch Mfg. Co., Calif., 8c, 10sc, 36sc, 40sc, 46sc
**Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 8c, 10sc, 36sc, Tel: YOnkers 8-8400**
See ad on page 416

Grayhill, Inc., Ill., 28s, 30c, 36sc, 44sc
Great Eastern Mfg. Co., N.Y., 38s
Grigsby Co., Inc., Ill., 16c, 20c, 22c, 28c, 30c, 32c, 34c, 36c, 40c, 44c, 46c, 54c
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 4c, 10c, 12c, 16c, 32c, 34c, 40c, 42sc, Tel: CHesapeake 3-1100**
See ad on page 512

Hallicrafters Co., The, Ill., 6c, 18c
Hamlin, Inc., Wis., 26s, Electrolytic s
Harman-Kardon, Inc., N.Y., 16c, 38sc
**Hart Manufacturing Co., 265 Bartholomew Ave., Hartford 1, Conn., 16c, 28sc, 32sc, 36sc, 40c, 52sc, Tel: JAckson 5-3491**
See ad on page 515

Hathaway Instruments, Inc., Colo., 30s
Haydon Co., A. W., Conn., 10c, 50c
Haydon Switch, Inc., Conn., 24sc, 28sc, 32sc, 34sc, 52sc, Acceleration sc, Inertia sc, Pressure sc
Heinemann Electric Co., N.J., 4s
**Hughes Aircraft Co., Hughes Semiconductor Div., P.O. Box 278, Newport Beach, Calif., 38sc, Tel: LIberty 8-0671**
See ads on pages 188, 538

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.




# NEW CATALOG SUMMARY

presenting . . . Jennings Vacuum Components, inherently qualified by their unique use of a vacuum dielectric, to help you solve many difficult design problems of high voltage in limited spaces.

A few minutes inspection of the wide range of vacuum components in this new product bulletin will reveal many design possibilities that ordinary electronic components cannot achieve. The bulletin contains valuable data and specifications on the latest types of Jennings Fixed and Variable Capacitors, Power Switches, Coaxial Relays, Triggered Spark Gaps, Transfer Relays and High Voltage Measuring Equipment.

The following examples illustrate some of the unusual capabilities of Jennings vacuum components:



**R6G Vacuum Switch with Model E Switch mount**

Recommended max. load voltages for max. operating recovery voltage @ 50 amps-rms . . . . . 27 kv
Thermal current (for 30° C rise) . . . . . 250 amps rms
Max. interrupting current (10 times) . . . . . 1500 amps rms @ 9 kv
Withstand voltage (60 cycle 1 min. dry) . . . . . 36 kv rms



**RE6B Vacuum Transfer Relay**

Overall length . . . . . 3¼ in.
Rated operating voltage (cyc) . . . . . 25 kv
DC interrupting rating . . . . . 20 kw (not to exceed 5 amp or 10 kv)
Continuous current . . . . . 25 amps rms



**Type USLS Vacuum Variable Capacitor**

Capacity range . . . . . 5-465 mmfd
Overall length . . . . . 5⅜"
Peak voltage (max. capacity) . . . . 5 kv
Peak voltage (min. capacity) . . . . 10 kv
Continuous current . . . . . 40 amps rms

Send for your Jennings' catalog today. There will be no sales follow-up unless you outline a specific application.

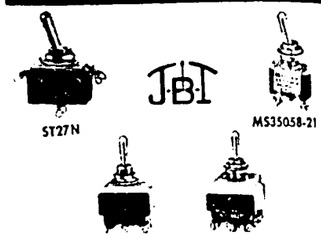
JENNINGS RADIO MANUFACTURING CORPORATION
970 McLAUGHLIN AVE.
P. O. BOX 1278
SAN JOSE 8, CALIFORNIA

*Jennings*
VACUUM ELECTRONIC COMPONENTS

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## TOGGLE SWITCHES AN, JAN, or MIL




J-B-T now manufactures more than 140 models of exceptional quality toggle switches, all designed to new Government specifications such as: Jan-S-23, MIL-S-21195 (Ships), Ordnance Standards DDAX, Mil-S-6745, and Mil-S-3950A (the latest and most comprehensive specification—ultimately expected to supplant most of the other specifications).

The heavy-duty models feature solid coin-silver contacts, unique to J-B-T, which add overload protection and keep contact resistance under .005 ohms. Now-rated ratings are 20 amp. at 125 VAC, 10 amp. at 250 VAC.

Included are: ST40, 42, 50, 52 Series, solder and screw terminals; MS35058, 35059 Series, lever seal for sand, dust, and 15 ft. water submersion tests, solderable screw terminals; MS25068 Series, new 4-pole with lever seal and solderable screw terminals; and AN3021, 3022 Series, aircraft types, with lever seal and screw terminals.

Medium duty types feature double-grip, self-cleaning contacts with current carrying parts heavily silver plated. Nominal rating 6 amp. at 125 VAC, 3 amp. at 250 VAC. Models include ST12, 13, 16, 17, 22, 23, 26, 27 Series with solder lugs, and MS25098, 25100 Series with lever seal for sand, dust, and 15 ft. water submersion tests and solder lugs.

For further technical information please request Bulletin TS-6B.

Purchase of standard items through authorized electronic distributors is strongly recommended.

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**J-B-T INSTRUMENTS, INC**
**NEW HAVEN 8, CONN.**

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SWITCHES & CONTROLS

- long life
- high dependability
- exacting performance

**STANDARD SWITCHES**

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22 Million actuations by test
¼" thick—25/32" wide
Rated 10 amps. 250 V.A.C.



TYPE 10
10 Million actuations by test
15 or 20 amp. 125, 250, or 460 V.A.C.



TYPE 11
20 Million actuations by test
10 amp. 250 V.A.C or 30 V.D.C.



TYPE 30
10 Million actuations by test
15 amp. 125, 250, 460 V.A.C
½ amp. 115 V.D.C.



**ENGINEERED SPECIALS**

Need special switches for specific jobs? LICON can meet your requirements including hermetic sealing and control assemblies.

*for descriptive literature, write:*

**Licon** itw
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# KULKA

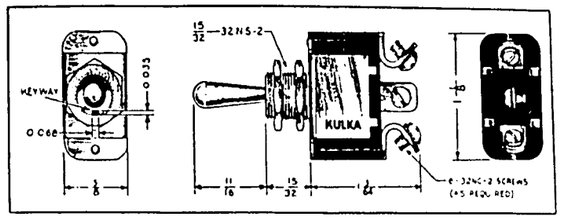
## ELECTRONIC SWITCHES

Made to Joint Army-Navy specifications—JAN-S-23, MIL-S-21195, MIL-S-6745 and MIL-S-3950A, for electronic, aircraft and communication uses. Designed for quick, easy, one-hole mounting. Ruggedly built for long, trouble-free service. Operating cycles are above minimum required by specifications.

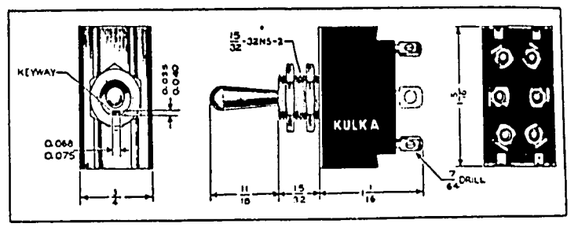
All metal parts treated against corrosion. Switches come with mounting nuts and sleeve lock-washer. All switches made to MIL-S-3950A and MIL-S-6745 are supplied with toggle seal. Units are tested regularly by quality control in production procedure, insuring top performance.

**Write for Free Catalog**

Single-Pole Switches: Series ST4[illegible] with screw terminals shown at right. Widest [illegible] in [illegible] tabular form [illegible] in [illegible] literature [illegible]



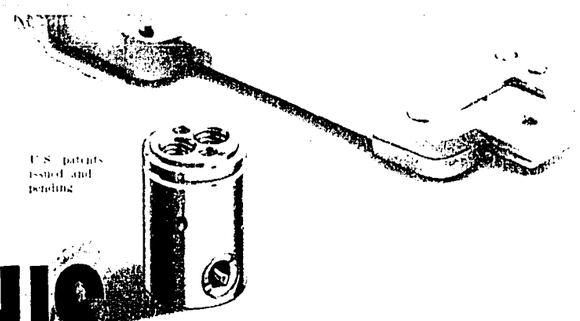

Double-Pole Switches: Series ST[illegible] with solder [illegible] at right. Wide [illegible] in [illegible] literature [illegible]




# KULKA ELECTRIC CORP.

633-643 SO. FULTON AVENUE • MOUNT VERNON, N. Y.
Telephone: MOunt Vernon 4-4024 — 4025 — 4026 — 4027

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# THIS is the actual size of the world's simplest acceleration switch.

It represents a totally new concept in acceleration sensing devices. Weight: about one ounce. Only one moving part: a precision ground ball held by an alnico magnet. The ball is released to close or open an electric circuit when the force of acceleration exceeds the magnet's pull.

It's as simple as that. Yet this versatile I-S design makes possible switches that respond axially, radially, or omnidirectionally, from 0.01 g to 500 gs. With adjustable g settings, if you desire. Automatic reset is optional. Closure time is variable. Accurate within 0.1%. Meets all applicable Mil specs.



But more than an ingenious design, the I-S switch represents an important attitude . . . an attitude that produces only equipment of sound and simple design and reliable performance, of uses limited only by your needs.

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INERTIA SWITCH, INC. 311 West 43rd St., New York 36 • JUdson 6-5880
Inertia Switch invites research and development inquiries in the acceleration sensitive field.

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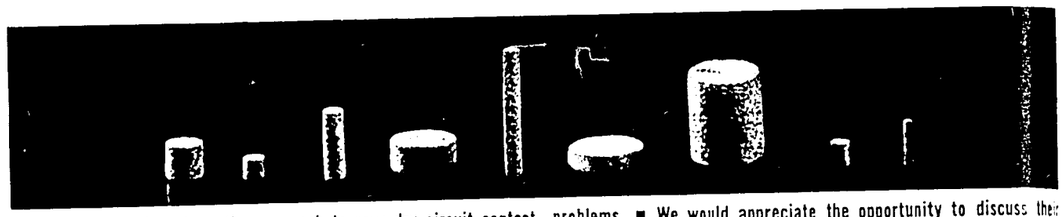


# Directory II. Components

## 72. Switches & Contacts.

Hughes Aircraft Co., Vacuum Tube Products Div., Calif., Vacuum s
IMC Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 42sc, Tel: EDgewood 4-7070
See ad on page 464
Induction Motors of California Div. IMC Magnetics Corp., Calif., 36s, 42s
Industrial Components, Inc., Ore., 12s, 20s, 24s, 30s
Industrial Devices, Inc., N.J., 23s, 24s
Industrial Electronic Hardware Corp., N.Y., 30sc, 44sc
Industrial Instruments, Inc., N.J., 3s
Industrial Products-Danbury Knudsen, Div. Amphenol-Borg Electronics Corp., 33 E. Franklin St., Danbury, Conn., 6s, 16s, Tel: PIoneer 3-9272
See ad on page 160
Industrial Timer Corp., N.J., 48s, 50s
Inertia Switch, Inc., 311 W. 43rd St., New York 36, N.Y., Acceleration s, Inertia s, Tel: JUdson 6-5880
See ad on this page
Instrument Development Laboratories, Inc., Mass., 8sc, 36sc
International Register Co., Ill., 30sc
Interstate Electronics Corp., Calif., 42s
J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 36, 52, Tel: STate 7-5825
See ads on pages 460, 546, 550
J-V-M Microwave Co., Ill., 6c
Jaidinger Mfg. Co., Inc., Ill., 28s, 36s, 48s
Janco Corp., Calif., 24c, 28c, 32c, 36c, 48c
Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 4s, 6s, 30s, 54s, Tel: CYpress 2-4025
See ad on page 550
Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 6s, Tel: BAldwin 6-3456
See ad on pages 114-115
Jordan Electronics, Div. Victoreen Instrument Co., Calif., 10sc, 50sc
Joy Mfg. Co., Electrical Products Div., Mo., 32s, 34s, 52sc
Kearfott Div., General Precision, Inc., Little Falls, N.J., 36s, Tel: CLifford 6-4000
See ad on pages 120-121
Kearfott Div., General Precision, Inc., Microwave Products, Calif., 18c
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 14s, 22s
Kinetics Corp., Calif., 8c, 24c, 30sc, 40sc, 54sc
Kintronic Div., Chicago Aerial Industries, Ill., 8c, 36c
Knight Corp., Ewen, Mass., 18c
Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 24sc, Tel: TWining 9-5600
See ad on page 268
Kuhnke Elektrotechnische Fabrik, H., Germany, 22sc, 34sc, 36sc, 42sc

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-260



We at Metex feel we have the approach to your dry circuit contact problems... the Metact... a resilient, gold plated mesh contact. Its self-wiping and anti-bounce characteristics, combined with multiple contact areas, insure a greater degree of contact. These Metex engineered units, now available down to 1/32" in diameter, have possible applications on relay, switch, chopper and computer design contact problems. ■ We would appreciate the opportunity to discuss their broad range of contact applications with you. Metex also manufactures a complete line of electronic weather stripping, RF and combination gaskets, and heat dissipating tube shields. There's no obligation, why not give us a call. Metal Textile Corporation, Electronics Division, Roselle, New Jersey. Phone Chestnut 5-3000. TWX Roselle, N. J. 760.

# CONTACT RELIABILITY PROBLEMS SOLVED HERE!



THE WORLD'S LARGEST & OLDEST PRODUCER OF KNITTED WIRE PRODUCTS • A DIVISION OF GENERAL CABLE CORPORATION

METEX METAL TEXTILE CORPORATION

For details, circle #555 on Reader Service Card





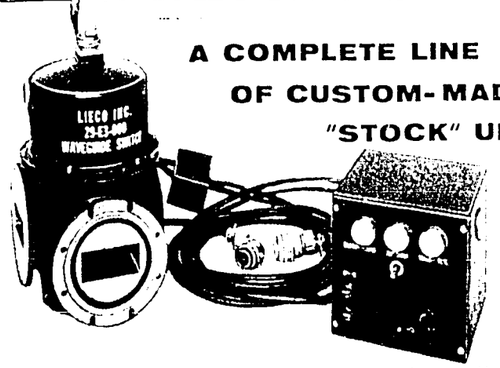
# Directory II. Components

## 72. Switches & Contacts.

... Semiconductor Products, Inc., ...
... Instrument Co., N.J., 16c
Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 16s, 28s, 52s, Tel: MOunt Vernon 4-4024
See ads on pages 551, 558
... Inc., Subsid California Eastern Aviation, Inc., Ill., 36c
... Inc., Stepper Motors Div., ... 36, 42c
... Industries, Inc., Cedar ... 36c
... 32, 34, 36c
... Instrument Co., Div. of ... 42c
... Mfg. Co., Inc., N.Y., Inc., 24c, ... 32c, 34c, 36c, 40c, 44c, 52c
... Corp., Cedar Grove, ... 36c
Leach Corp., Relay Div. of Illinois Tool Works, 6900 W. Oakin St., Chicago 34, Ill., 24sc, 28sc, 32sc, 34sc, 36c, 52sc, Tel: AVenue 2-4040
See ad on page 550
... Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 6c, Tel: WAlnut 1-6300
See ad on this page
... Instruments, Inc., N.J., 28c
... Corp., N.J., 26c
... Incorporated, Ill., 34c
... Aircraft Corp., Electronics ... & Industrial Products Div., ... 32c
... Electronics, Inc., Calif., 22c
... Products, Inc., Ohio, 26c, 34c, 38, 52c
... Metal Products Co., Ill., 16c
... Research Laboratories, ...
Magnetic Amplifiers Div., Siegler Corp., ... Linton Ave., New York 55, N.Y., ... Tel: CYpress 2-6010
See ads on pages 252, 304, 418
... & Co., Inc., P.R., Ind., 2c, 30c, 31, 28c, 32c, 34, 36c, 46c, 50c
... Electronics Co., Calif., 28sc, 38c
... Wireless Telegraph Co., Ltd., ...
... Electronics, Inc., 12c, 42c
... Electronics Corp., N.Y., Inc., 50c
... Dot Electronics, Inc., N.Y., ...
... Corp., The W. L. Gilman Div., Conn., 24c, 28c, 32c, 34c
... Corp., The W. L. Instruments Specialties, Incorporated, ... Electronics Co., Calif., 26c
... Co., Inc., Electrical Div., ... 34c, 52c
... Products, Inc., Mich., 48c
... Corp., Ind., 48sc
... Calif., 05c
Metcom Corp., Pa., 22c
Meteorex Corp., N.J., ...
Metal Textile Corp., Div. of General Cable Corp., 647 E. First Ave., Roselle, N.J., 16, Tel: CHestnut 5-3000
See ad on page 552
Micro Lectric Div., Micro Machine Works, Inc., 29 Debevoise Ave., Roosevelt, N.Y., 28c, 40c, Tel: FRee port 5-3222
See ad on page 524
Micro Switch, Inc., ...
... Corp., ...
... 32, 34, ... 42, 52
Microdot, Inc., ...
Microwave Associates, Inc., ...
Microwave Associates, Inc., ... 32c, ... 50c
Midwest Hamilton Corp., ... 38c
Miller Dynamics Co., ...
Missile Electronics & Controls, Inc., ...
Monitor Products Co., Inc., ...
Motorola, Inc., Defense Electronics Div., N.Y., 22c, 34
Mountain Instrument Co., Inc., N.J., 22c
Multi-Amp Electronics Corp., N.J., 42c
Nashua Laboratories, Inc., ... Main Office: Box 1, P.O., Nashua, N.H., Tel: PO ...
See ad on page ...
Nay Company, J. M., Magnetic Amplifier Div., Bloomfield, Conn., ... Tel: CHapel 2-2651, Hartford ...
See ad on page ...

LIECO WAVEGUIDE SWITCHES

A COMPLETE LINE OF CUSTOM-MADE "STOCK" UNITS




- Position indicator light switches integral to the waveguide switch.
- Automatic interlock switches available.
- Operates with or without a holding current.
- Any desired voltage.
- Engineered to suit your package problem at prices competitive with "shelf" units.
- Switching available in either plane, SPDT, DPDT, or Single Pole Multithrow.
- Fully meets MIL-T-5422.
- Covers entire waveguide band.
- Handles full waveguide power.
- Maximum VSWR 1.1:1.
- Extremely high isolation.
- Rapid switch return.
- Extremely low insertion loss.
- Continuous duty operation.
- Pressurized.
- All sizes from RG96 thru WR 2100 Waveguide.

*Special Power Supplies also available—designed to your needs.*

Submit your problems for our solution.

LIECO INC. EILEEN WAY • SYOSSET, L.I., N.Y. Phone WAlnut 1-6300

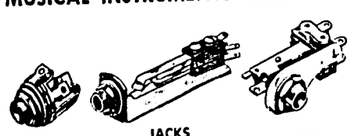
For details, circle #556 on Reader Service Card

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# SWITCHCRAFT INC.

## "SETS the STANDARD" in electronic components

**FOR RADIO—TELEVISION—HI-FI—STEREO—TAPE RECORDERS MUSICAL INSTRUMENTS—ELECTRONIC CONTROLS AND COMPUTERS**



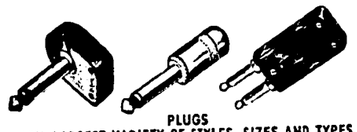
**JACKS**

**FOR MILITARY AND INDUSTRIAL EQUIPMENT—MOST COMPLETE LINE**

Available in all common and many special circuits.
"LITTEL-JAX"—require minimum panel space.
"TINI-JAX"—Similar to "Littel-Jax"—subminiature in design.
"SF-JAX"—short frame design—innumerable circuits.
"LF-JAX"—long frame design—all circuits.
"EXTENSION JAX"—for cable extensions.
"SHIELDED JAX"—shield assembled into and made a part of Jack.
"LAMP JAX"—Switchboard panel type. Ideal for mounting on Jack Panel.

**TELEPHONE & MILITARY JACKS**

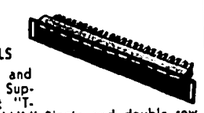
"T-JAX"—a conventional telephone switchboard design—all standard circuits and military specifications.
"M-JAX"—a heavy duty design used in heavy industrial equipment.



**PLUGS**

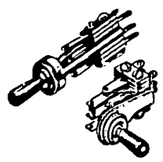
**THE LARGEST VARIETY OF STYLES, SIZES AND TYPES**

"LITTEL-PLUG"—small—fits standard Jacks—(also MIL type).
"TINI-PLUGS"—sub-miniature 2 conductor Phone Plug for use with "Tini-Jax".
"LUG-PLUG"—small—low cost.
"STANDARD"—conventional size, heavy terminals—rugged design. 2 and 3 conductor types.
"FLAT-PLUG"—removable cover permits use with screw or solder lug terminals. 2 or 3 conductor types.
"TWIN-PLUG"—two electrically independent 2-conductor plugs on 5/8" C.C. MILITARY TYPE



**JACK PANELS**

Black phenolic and aluminum types. Support Switchcraft "T-JAX" and "MT-JAX." Single and double row panels. Accommodate up to 52 Jacks.



**"LEV-R SWITCHES"**

Unusually compact. Many circuits. Locking and non-locking. Series 3000 and 13000—single hole mounting. Series 12000 requires only about 1/4 of depth behind panel of conventional "Key" switches.



**"FF-SWITCH"**

Flat frame support spring "pile-up" in various circuits and contact combinations. "Easy" action of colored push buttons.



**"HOOK SWITCH"**

Switch actuated by hanging accessory on hook. 2 different methods of mounting. Standard circuits. Soft easy action. Require minimum of depth behind panel.



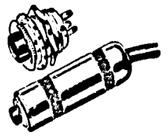
**"TELEVER SWITCHES"**

Rugged telephone type. Locking and non-locking types. Series 6000 mounts by screws or to escutcheon plate. Series 16000 features single hole mounting.



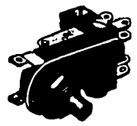
**"LITTEL & TINY-SWITCHES"**

"Littel-Switch" — rugged yet small, a Push Button switch available in simple circuits; contacts to suit. Various colors of Buttons.
"Tiny-Switch" — similar to "Littel-Switch", except sub-miniature design.



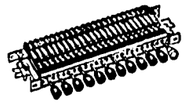
**BUTTON AND CORD SWITCHES**

"Button-Switches"— unusually small push button switch, completely enclosed.
"Cord-Switches" — cord mounted or pendant switch. Ideal for "hold" in hand operation.



**"RS-SWITCH"**

Rotary switch, rugged frame supports spring "pile-ups"; minimum panel depth. 2 or 3 position; locking or non-locking action.



**"MULTI-SWITCH"**

Features choice of switching functions. 1 to 37 stations possible. Single frame or ganged assemblies. Illuminated or non-illuminated buttons.

**MOLDED CABLE ASSEMBLIES**

(Audio Jumpers) Plugs molded directly to various cable combinations. Shielded and unshielded. Various lengths.

**COMPLETE LINE OF AUDIO ACCESSORIES—ADAPTERS, COUPLERS, CONNECTORS WITH PHONE OR PHONO CONNECTIONS, AUDIO MIXERS, SPEAKER CONTROLS. WRITE FOR CATALOGS S-590, A-403 AND C-501.**

When writing for catalog, list products in which you are interested. Inquiries on custom-made components handled promptly.

**5561 N. Elston Avenue, Chicago 30, Illinois**

*Canadian Representative:*
**Atlas Radio Corporation, Ltd.**
**50 Wingold Avenue, Toronto, Canada**

SWITCHCRAFT INC.

AVAILABLE AT ALL LEADING RADIO PARTS JOBBERS •

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SPECIAL AND STANDARD

# POLLAK

**RELAYS, SOLENOIDS & SWITCHES**

Whether your application demands a special or standard design, our engineering experience and production facilities are geared to meet your demands.

*Write for Technical Bulletin EM.*



**Printed Circuit Short Frame Telephone Type D-C Relay, RL-1500 Series — exceptionally small size and long life.**
Size: 25/32"x1 1/32"x 1 3/16"



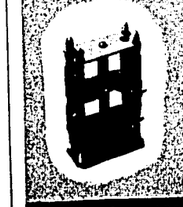
**High Voltage Switching Relay, RL-904 Series, Bu-ships rated Discharge Switch.**
Size: 4 13/16"x6 1/16" x4 11/32"



**A-C Power Relay, RL-1200 Series, for Long Life, Industrial Control Applications up to 30 amperes.**
Size: 2 7/16"x2 1/16"x 2 3/16"



**D-C Miniature Solenoid, SO-2100 Series, High magnetic efficiency for improved power-to-size ratio.**
Size: 1 1/16"x1 1/32"x 3/4"



**High Voltage Switching Relay, RL-906 Series, for Radar, Sonar and Missiles applications.**
Size: 3 1/16"x4 1/16" x1 1/16"

Since 1909
**JOSEPH POLLAK CORP.**
75-95 Freeport Street
Boston 22, Mass.

For details, circle #558 on Reader Service Card





SWITCH TO

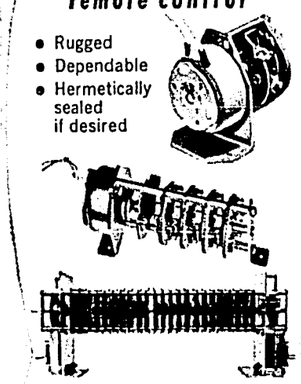
# TECH LABS

*for Precision Electrical Resistance Instruments*

**STEPPING SWITCHES**

*for automation, telemetering, remote control*

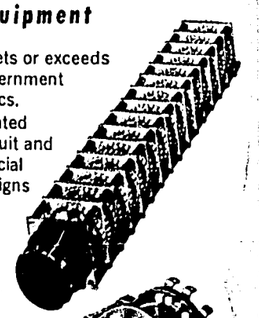
- Rugged
- Dependable
- Hermetically sealed if desired



**ROTARY SWITCHES**

*for all electronic equipment*

- Meets or exceeds government specs.
- Printed circuit and special designs

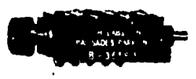


- Quick deliveries
- Long life
- All sizes

**CAM SWITCHES**

*for counting and control*

- Decade switch
- Control switch
- Decimal to binary converter



TECH LABORATORIES, INC.

**PALISADES PARK, NEW JERSEY**

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# Directory II. Components

## 72. Switches & Contacts.

**Oak Manufacturing Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 2c, 12c, 28c, 32c, 34c, 36sc, 40c, 42c, 44c, 46c, 50c, Tel: MOhawk 4-2222**
See ad on pages 86-87

Ohio Carbon Co., The, Ohio, 10c

**Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 30sc, 36sc, 46sc, Tel: ORchard 5-2600**
See ad on pages 78-79

Ovitron Corp., N.Y., 12sc, 18sc, 30sc

PIC Automation Controls, Div. General Controls Co., Ill., 20s, 26s, 28s, 32s, 40s, 42s

PSP Engineering Co., Div. IMC Magnetics Corp., Calif., 36c, 42c

Painton & Co., Limited, England, 32s, 34s, 36s, 52s

Palomar Scientific Corp., Calif., Acceleration c

Parkway Specialties Co., Mich., 12s, 40s

Pascol, Div. Illinois Tool Works, Calif., 42

Pee Wee Molding Corp., N.Y., 40c

Pendar, Inc., Calif., 16sc, 22sc, 28sc, 30sc, 32sc, 34sc, 36sc, 40sc, 42sc, 44sc

Penn Keystone Corp., Conn., 38c

Permonite Mfg. Co., Ill., 10sc

Philadelphia Scientific Glass Co., Pa., 10s, 12s, 26s

Philips Electronics Industries Ltd., Canada, 12s, 16s, 24s, 44s, 48s, 50s

Philmore Mfg. Co., Inc., N.Y., 2s, 12s, 34s, 36s, 40s, 52s

Photo-Crystals, Inc., Ill., 26s, 48s

Pickering & Co., Inc., N.Y., 42c

Plastics & Electronics Corp., N.Y., 38sc

**Pollak Corp., Joseph, 75-95 Freeport St., Boston 22, Mass., 12c, 16c, 22c, 28c, 30c, 32c, 34c, 36c, 42c, 44c, 52c, Tel: AVenue 2-9550**
See ad on page 554

Poly-Scientific Corp., Va., 8c, 36c

**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 6c, Tel: WEstmore 9-4092**
See ad on page 592

Precision Mechanisms Corp., N.Y., 24s

**Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 6c, Tel: WEstmore 9-8900**
See ad on page 383

**Pyrocircuits Div., Microtron Inc., 6 Manhasset Ave., Port Washington, L.I., N.Y., 8c, 36c, Tel: POrt Washington 7-3949**
See ad on page 502

**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 6, Tel: OVerbrook 1-5600**
See ad on page 314

Radar Relay, Inc., Calif., 42c

Radio Corp. of America, N.J., 6s

Radio Engineering Products, Canada, 22s

Rantec Corporation, Calif., 18sc

Raytheon Co., Microwave & Power Tube Div., Mass., 18sc

Raytheon Co., Special Microwave Devices Operations, Mass., 18sc

Revere Corp. of America, Subsid. Neptune Meter Co., Conn., 32c

Rhodes, Inc., M. H., Conn., 50s

Rodale Mfg. Co., Inc., Pa., 26s, 34s, 36s, 46s, 52s

Rosemount Engineering Co., Minn., 48c

Rotary Devices Corp., N.J., 8sc, 10sc, 36sc

Rotron Mfg. Co., Inc., N.Y., Air Velocity Interlock s

Rowan Controller Co., The, Md., 4s, 34c, 48s, 50s

Royal Electric Corp., Div. ITT, R.I., 34s, 36s

San Diego Scientific Corp., Calif., 8sc

Sangamo Electric Co., Ill., 4s, 48s, 50s

Sargent Electric Corp., N.Y., 16sc, 28sc, 34sc, 44sc, 52sc, Trigger sc

Scaico Controls, Inc., N.J., 10s, 48sc, 50c

Scientific Electronic Labs., N.J., 26sc

**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 38c, Tel: CRestview 4-8542**
See ad on page 507

**Shallcross Mfg. Co., 20 Preston St., Selma N.C., 12s, 28s, 34s, 36s, 44s, Tel: WOodlawn 5-2341**
See ad on page 258

Shepard Laboratories, Inc., N.J., 16c

Sightmaster Corp., R.I., 4s

Sigma Electronics Research Corp., Wash., 6c

**Sigma Instruments, Inc., 31 Pearl St., South Braintree 85, Mass., 36c, Tel: VIctor 3-5000**
See ad on page 518

Singer Mfg. Co., The, Conn., 36

Sivers Lab., Sweden, 6s

Slip Ring Co. of America, Calif., 8c, 36c

Sloan Company, The, Calif., 16sc, 28sc, 34sc, 50sc

Smith, Inc., Herman H., N.Y., 22s, 28s, 30s, 32s, 34s, 36s, 40s, 44s, 52s

Smith Mfg. Co., J. & H., N.Y., 12s, 36s, 44s

Solar Systems, Inc., Ill., 38c

Spectrol Electronics Corp., Calif., 36c, 44c

**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 18c, Tel: REdwood 6-4161**
See ad on pages 100-101

Stackpole Carbon Co., Pa., 36sc, 40sc, 44sc

Standard Electrical Products Co., Ohio, 30c, 32c, 34c, 36c, 50c, 52c, 54c

Stelma, Inc., Conn., 16sc, 38c

**Stevens Mfg. Co., Inc., P.O. Box 1007, Mansfield, Ohio, 48c, Tel: TUxedo 4-1311**
See ad on page 224

Strand Engineering Co., Mich., 6c

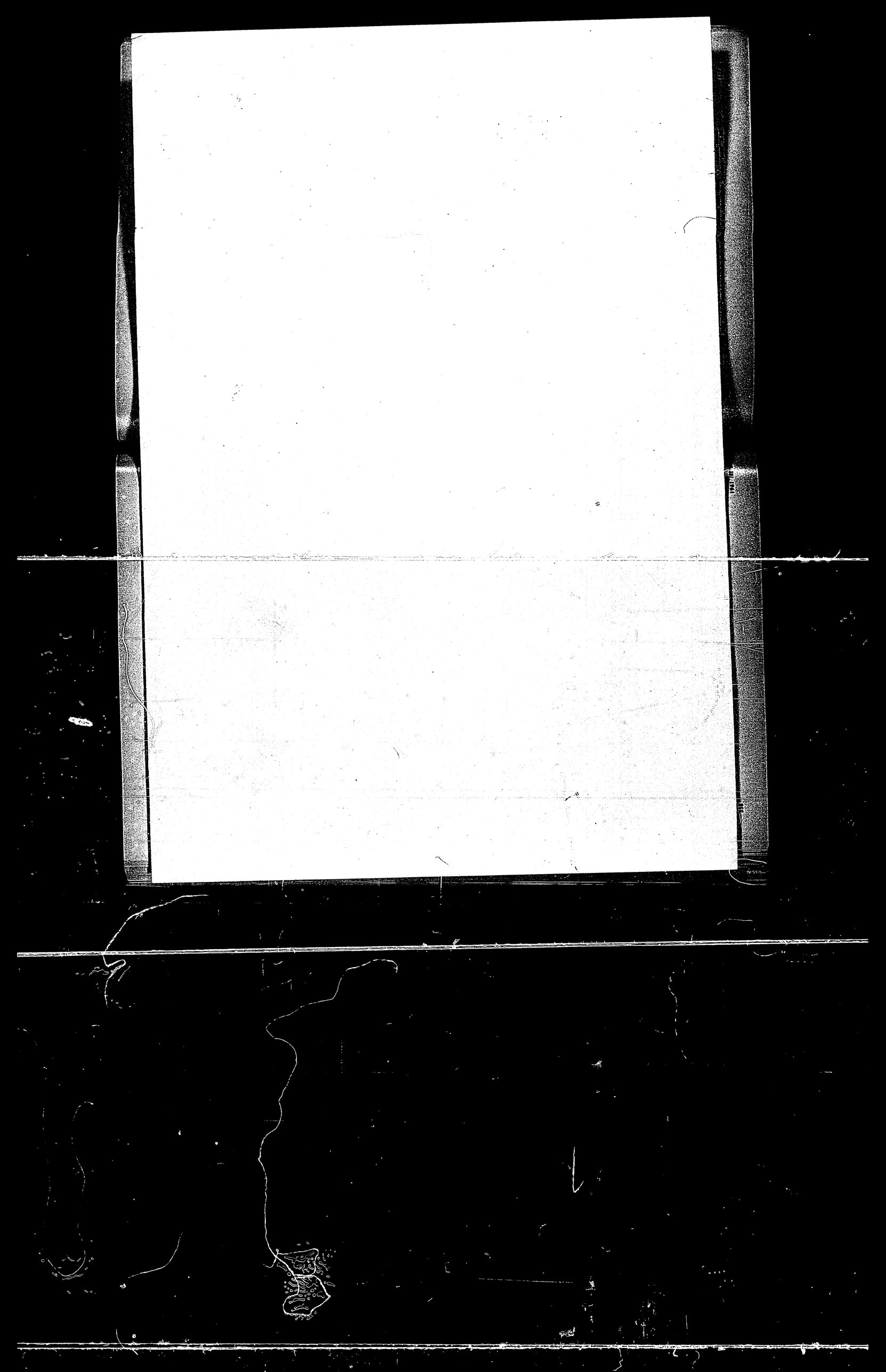
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 22s, 34s

Subminiature Instruments Corp., Calif., 36c

**Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 22sc, 28sc, 34sc, 36s, 44sc, Tel: SPring 4-1515**
See ad on page 554

Sylvania Electric Products Inc., N.Y., 18sc, 38sc

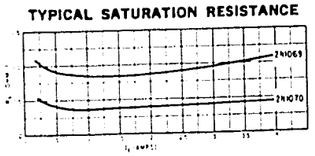
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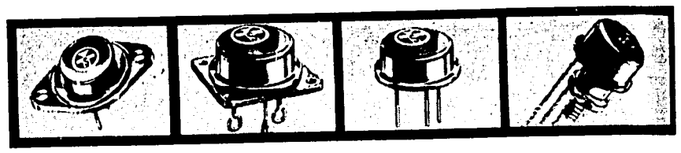


# SEMICONDUCTORS

## HIGH POWER NPN SILICON TRANSISTORS

TYPICAL SATURATION RESISTANCE

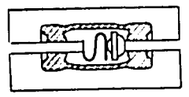


| 60 WATT | 85 WATT | 15 WATT | 40 WATT |
|---|---|---|---|
| 2N1069 | 2N389 | 2N1067 | 2N1047 |
| 2N1070 | 2N424 | 2N1068 | 2N1048 |
| 2N1487 | | 2N1483 | 2N1049 |
| 2N1488 | | 2N1484 | 2N1050 |
| 2N1489 | | 2N1485 | |
| 2N1490 | | 2N1486 | |

## HIGH RELIABILITY SILICON GLASS DIODES

| JAN TYPES | SIG. C. TYPES 1N643 | MIL-E-1 1171 |
|---|---|---|
| 1N457 | 1N658 | MIL-E-1 1160 |
| 1N458 | 1N662 | MIL-E-1 1138 |
| 1N459 | 1N663 | MIL-E-1 1139 |



### SILICON DIODES—GENERAL PURPOSE TYPES

| TYPE | MAX. FORWARD D.C. VOLT. V @ mA | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLT. μA @ 25°C | μA @ 150°C | MAX. REV. WKG. VOLT. | MIN. REV. VOLT @ 100 μA & 25°C | MAX. AV. FORWARD CURR. @ 25°C mA | @ 150°C mA |
|---|---|---|---|---|---|---|---|
| 1N456 | 1.0 @ 40 | 0.025 | 5 | 25 | 30 | 90 | |
| 1N457 | 1.0 @ 20 | 0.025 | 5 | 60 | 70 | 75 | |
| 1N458 | 1.0 @ 7 | 0.025 | 5 | 125 | 150 | 55 | |
| 1N459 | 1.0 @ 3 | 0.025 | 5 | 175 | 200 | 40 | |
| 1N461 | 1.0 @ 15 | 0.5 | 30 | 25 | 30 | 60 | |
| 1N462 | 1.0 @ 5 | 0.5 | 30 | 60 | 70 | 50 | |
| 1N463 | 1.0 @ 1 | 0.5 | 30 | 175 | 200 | 30 | |
| 1N464 | 1.0 @ 3 | 0.5 | 30 | 125 | 150 | 40 | |
| 1N482 | 1.1 @ 100 | 0.25 | 30 | 36 | 40 | 100 | 25 |
| 1N482A | 1.0 @ 100 | 0.025 | 15 | 36 | 40 | 200 | 50 |
| 1N482B | 1.0 @ 100 | 0.025 | 5 | 36 | 40 | 200 | 50 |
| 1N483 | 1.1 @ 100 | 0.25 | 30 | 70 | 80 | 100 | 25 |
| 1N483A | 1.0 @ 100 | 0.025 | 15 | 70 | 80 | 200 | 50 |
| 1N483B | 1.0 @ 100 | 0.025 | 5 | 70 | 80 | 200 | 50 |
| 1N484 | 1.1 @ 100 | 0.25 | 30 | 130 | 150 | 100 | 25 |
| 1N484A | 1.0 @ 100 | 0.025 | 15 | 130 | 150 | 200 | 50 |
| 1N484B | 1.0 @ 100 | 0.025 | 5 | 130 | 150 | 200 | 50 |
| 1N485 | 1.1 @ 100 | 0.25 | 30 | 180 | 200 | 100 | 25 |
| 1N485A | 1.0 @ 100 | 0.025 | 15 | 180 | 200 | 200 | 50 |
| 1N485B | 1.0 @ 100 | 0.025 | 5 | 180 | 200 | 200 | 50 |
| 1N486 | 1.1 @ 100 | 0.25 | 50 | 225 | 250 | 100 | 25 |
| 1N486A | 1.0 @ 100 | 0.05 | 25 | 225 | 250 | 200 | 50 |
| 1N487 | 1.1 @ 100 | 0.25 | 50 | 300 | 330 | 100 | 25 |
| 1N487A | 1.0 @ 100 | 0.1 | 25 | 300 | 330 | 200 | 50 |

Operating Temperature Range —80°C to 200° C  Maximum power dissipation 750 mW @ 25° C

### SILICON DIODES—FAST SWITCHING TYPES

| TYPE | MAX. FORWARD D.C. VOLT. V @ mA | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLT. μA @ 25°C | μA @ 100°C | MAX. REV. WKG. VOLT. | MIN. REV. VOLT. @ 100μA & 25 C | REVERSE RECOVERY |
|---|---|---|---|---|---|---|
| 1N625 | 1.5 @ 4 | 1.0 | 30 | 20 | 30 | 400k Ω min. in 1 μ sec † |
| 1N626 | 1.5 @ 4 | 1.0 | 30 | 35 | 50 | 400k Ω min. in 1 μ sec † |
| 1N627 | 1.5 @ 4 | 1.0 | 30 | 75 | 100 | 400k Ω min. in 1 μ sec † |
| 1N628 | 1.5 @ 4 | 1.0 | 30 | 125 | 150 | 400k Ω min. in 1 μ sec † |
| 1N629 | 1.5 @ 4 | 1.0 | 30 | 175 | 200 | 400k Ω min. in 1 μ sec † |
| 1N658** | 1.0 @ 100 | 0.05 @ 50V | 25 @ 50V+150°C | 100 | 120 | 80k Ω min. in 0.3 μ sec. ‡ |

†Switching from 30 mA to 35 volts. Modified IBM "Y" circuit.
‡Switching from 5 mA to 40 volts. JAN 256 Circuit.
Operating temperature range —80°C to +150°C. Maximum power dissipation: 200 mW @ 25° C. Derate at 1.6 mW, °C above 25° C.

### SILICON DIODES—CONTROLLED FORWARD TYPES

| TYPE | FORWARD VOLT DROP @ 10 mA VOLTS | MAX. REV. D.C. CURR. @ MAX. REV. WKG. VOLTS μA @ 25°C | μA @ 150°C | MAX. WKG. VOLT | MIN. REV. V. @ 100 μA & 25°C | MAX. AV. FORWARD CURR. @ 25 C mA | @ 150°C mA |
|---|---|---|---|---|---|---|---|
| STC 101 | .7 to .74 | 0.025 | 15 | 35 | 40 | 200 | 50 |
| STC 102 | .7 to .74 | 0.025 | 5 | 35 | 40 | 200 | 50 |
| STC 103 | .7 to .74 | 0.025 | 15 | 70 | 80 | 200 | 50 |
| STC 104 | .7 to .74 | 0.025 | 5 | 70 | 80 | 200 | 50 |
| STC 105 | .7 to .74 | 0.025 | 15 | 130 | 150 | 200 | 50 |
| STC 106 | .7 to .74 | 0.025 | 5 | 130 | 150 | 200 | 50 |
| STC 107 | .7 to .74 | 0.025 | 15 | 180 | 200 | 200 | 50 |
| STC 108 | .7 to .74 | 0.025 | 5 | 180 | 200 | 200 | 50 |

Operating Temperature Range—80°C to 200°C  Maximum power dissipation 750 mW @ 25°C

### HIGH POWER DIODES

| 1N645 | 1N646 | 1N647 | 1N648 | 1N649 |
|---|---|---|---|---|

## SILICON TRANSISTOR CORPORATION

CARLE PLACE, LONG ISLAND, NEW YORK • PIONEER 2-4100



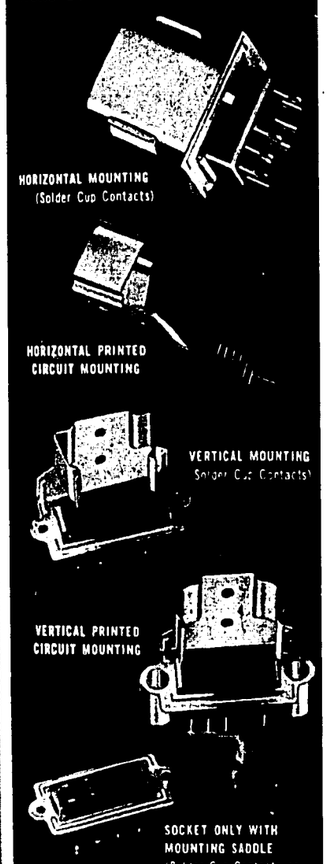
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# AUGAT

COMPLETE LINE OF SOCKET ASSEMBLIES FOR MICRO-MINIATURE RELAYS

*Combining Holding Clip And Built-In Socket For Unmatched Reliability Under Severe Conditions Of Shock And Vibration.*




Patent Pending

These assemblies will accomodate Micro-Miniature relays as manufactured by G. E., Elgin, Sigma, Allied, Potter & Brumfield, Clare, Iron Fireman, Babcock and many others.

*For additional information write for catalog RS-160*

## AUGAT BROS., INC.

31 Perry Avenue
Attleboro, Massachusetts

For details, circle #542 on Reader Service Card




# Directory II. Components

## 70. Semiconductors.

Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 10c, 15sc, 45sc, Tel: CRestview 4-8542
See ad on page 507

Shockley Transistor, Unit of Clevite Transistor, Stanford Industrial Park, Palo Alto, Calif., 15 four-layer c, Tel: DAvenport 1-2121
See ad on page 540

Silicon Transistor Corp., 150 Glen Cove Rd., Carle Place, L.I., N.Y., 15s, 30s, Tel: PIoneer 2-4100
See ad on page 542

Solar Systems, Inc., Ill., 10c

Solid State Products, Inc., 1 Pingree St., Salem, Mass., 35s, Tel: PIoneer 5-2900
See ad on page 506

Solitron Devices, Inc., 67 S. Lexington Ave., White Plains, N.Y., 15sc, 50sc, Tel: WHite Plains 6-7591
See ad on page 506

Sony Corp., N.Y., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s, 50s

Sperry Gyroscope Co. of Canada, Ltd., Canada, 15c, 25c

Sperry Semiconductor Div., Conn., 15sc, 30sc, 35sc, 40sc, Microcircuitry sc

Sprague Electric Co., Mass., 30s, 35s, 40s

Standard Telephones & Cables, Ltd., England, 5s, 15s, 20s, 30s, 35s, 40s, 50s

Sylvania Electric Products Inc., N.Y., 5sc, 10sc, 15sc, 20sc, 30sc, 35sc, 45c, 50sc

Sylvania Electric Products Inc., Semiconductor Div., Mass., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc

Syntron Co., Semiconductor Div., 83 Lexington Ave., Homer City, Pa., 15sc, Tel: GRidley 9-8011
See ad on page 506

Texas Instruments Incorporated, Semiconductor-Components Div., 13500 N. Central Expressway, Dallas, Texas, 10s, 15s, 20s, 30s, 35s, 45s, 50s, Tel: ADams 5-3111
See ad on page 394

Thompson Ramo Wooldridge Inc., Calif., 5sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc

Trans-Sil Corp., N.J., 15sc

Transitron Electronic Corp., Mass., 5s, 15s, 20s, 30s, 35s, 50s

Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 30, Tel: HUmboldt 2-4200
See ad on pages 74-75

United Components, Inc., 105 Lincoln Ave., Orange, N.J., 15sc, Tel: ORange 3-6422
See ads on pages 453, 541

U. S. Semiconductor Products, Ariz., 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc

U. S. Transistor Corp., N.Y., 25

Vickers, Inc., Mo., 15s

Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 50sc, Tel: ENdicott 1-6200
See ads on pages 535, 578

Wells Electronics Co., Ind., 5s, 25s, 50s

Western Semiconductors, Inc., Calif., 5sc, 15sc, 45sc, 50sc

Westinghouse Electric Corp., Semiconductor Dept., Pa., 5sc, 15s, 30sc, 45sc, Hall Generators sc

**Servo-mechanisms:**
See class 30

**Servo motors & generators:**
See classes 30 & 60

**Shaft seals:**
See class 91

**Shift registers:**
See class 9

**Shock mounts:**
See class 81

**Shunts:**
See class 58

**Signal generators:**
See Directory I

**Silicon crystals:**
See class 49

**Silicon diodes:**
See class 70

**Silicon rectifiers:**
See class 66

**Silicon stacks:**
See class 66

**Slides:**
See class 87

**Slip rings:**
See class 46

**Slotted lines:**
See class 21

## 71. Sockets.

5. Capacitor, plug-in
10. Crystal
15. Diode
20. Pilot light
25. Printed circuit
30. Receiving tube
35. Transistor
40. Transmitting tube
45. UL approved industrial types

AMP Incorporated, Pa., 5s

Accurate Electronics Corp., Ohio, 20c, 25c

Aerolite Electronics Corp., N.J., 20sc

Aeronautical Electric Co., 5656 Northwest Hwy., Chicago 46, Ill., 20sc, Tel: SPring 4-5200
See ad on page 471

Aerovox Corp., Mass., Miniature s

Air-O-Tronics Engineering Co., Calif., Test adapters sc

Alcon Metal Products, Inc., Ill., 25c, 30c, 35c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Special Sockets and Connectors

by jettron®

...FROM DESIGN TO PRODUCTION

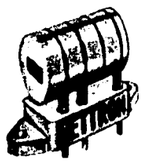
Jettron is fully-equipped to design and manufacture your precision electronic components including connectors, sockets and cable assemblies. Call or write Jettron for quotations on "specials" for all commercial and military applications.



CD-7140 — Printboard Application Socket for R.C.A. Micromodule. Measures only .400 maximum square by .094 high. Insulation resistance greater than 50,000 megohms. Employs silver plated beryllium copper contacts and DIALL FS-5 insulating material.



CAT. 8550—Ultra High Frequency Socket for the G.E. GL-6299 Triode is sold in kit form containing all the necessary parts for mounting by the customer on a chassis barrier. It provides excellent isolation of the input from the output.



CAT. 8715—Ultra-High Temperature Socket for G.E. 7296 Triode can be soldered to printboard or mounted above or below a chassis. High Alumina insulating material; contacts gold plated Inconel-X. For continuous operation at 1000° F (538° C).

**JETTRON PRODUCTS • INC**

56 Route 10, Hanover, New Jersey
Telephones: TUcker 7-0571-0572

*Sales Engineers in Principal Cities*

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**Alden Products Co.**, 140 N. Main St., Brockton 64, Mass., 5s, 20s, 30s, 45s, Tel: JUniper 3-0160
See ad on page 496

**Allied Control Co., Inc.**, 2 East End Ave., New York 21, N.Y., Relay sc, Tel: BUtterfield 8-7403
See ad on page 508

**Amphenol-Borg Electronics Corp., Amphenol Connector Div.**, 1830 S. 54th Ave., Chicago 50, Ill., 30s, 45s, Tel: BIshop 2-1000
See ad on page 146

Argonne Electronics Mfg. Corp., N.Y., 15s, 35s

Armel Electronics, Inc., N.Y., Relay sc

Auburn Plastics, Inc., N.Y., 20c

**Augat Brothers, Inc.**, 31 Perry Ave., Attleboro, Mass., 10s, Relay s, Tel: CAstle 2-2202
See ad on page 543

**Automatic Metal Products Corp.**, 323 Berry St., Brooklyn 11, N.Y., 10c, 25c, Adapters c, Tel: EVergreen 8-6057
See ad on page 409

Barnes Development Co., Pa., Test s

Bellandi Co., Inc., M., Ill., 25c

**Belling & Lee, Ltd.**, Great Cambridge Rd., Enfield, Middlesex, England, 25s, Tel: ENfield 3322
See ad on page 411

**Birnbach Radio Co., Inc.**, 145 Hudson St., New York 13, N.Y., 40s, Tel: WOrth 6-5611
See ad on page 607

**Bulova Watch Co., Inc., Dept. A-1376**, 61-10 Woodside Ave., Woodside 77, N.Y., 10c, Tel: NEwtown 9-5700
See ad on page 426

Burndy Corp., H. H. Buggie Div., Ohio, 25

**Cinch Mfg. Co.**, 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, 15s, 25s, 30s, 35s, Tel: NEvada 2-2000
See ad on pages 46-47

**Circon Component Corp.**, Santa Barbara Municipal Airport, Goleta, Calif., 15s, 20s, 25s, Tel: WOodland 7-1113
See ad on page 471

**Clark Crystal Co., Inc.**, 2 Farm Rd., Marlboro, Mass., 10s, Tel: HUntley 5-1411
See ad on page 429

Cleveland Metal Specialties Co., Ohio, 45c

Component Mfg. Service, Inc., Mass., 10, 45

Control Dynamics Corp., Calif., 15s, 30s, 35s, Relay s

**Curtiss-Wright Corp., Electronics Div.**, 35 Market St., East Paterson, N.J. 30sc, 40sc, 45sc, Tel: SWarthmore 1-0100
See ad on page 510

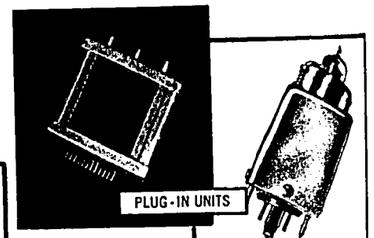
D.K.E. Electronic Bases, Inc., N.J., 40s

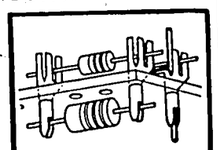
**Dialight Corp.**, 60 Stewart Ave., Brooklyn 37, N.Y., 20s, 45s, Tel: HYacinth 7-7600
See ad on page 472

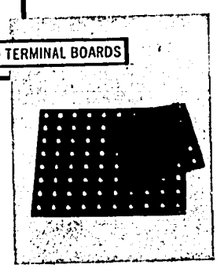

Vector Electronics manufactures a complete line of structures for mounting circuitry easily, compactly and with good accessibility.

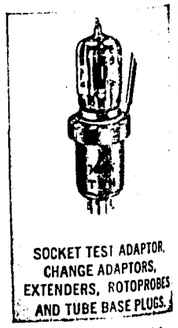
Vector experience and facilities guarantee delivery, performance and economical prices.

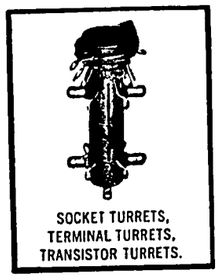
Vector STRUCTURES FOR CIRCUITRY






*Write for catalog to:*

**VECTOR ELECTRONIC COMPANY**
1100 FLOWER STREET, GLENDALE 1, CALIFORNIA
TELEPHONE: CHAPMAN 5-1076

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# Directory II. Components

## 71. Sockets.

Eagle Electric Mfg. Co., Inc., N.Y., 20s, 45s

Ebauches S.A., Dept. Semiconducteurs, Switzerland, 35s

Eby Co., Hugh H., Pa., 10sc, 25sc, 35sc, 40sc, 45c

**Eitel-McCullough, Inc.**, 301 Industrial Way, San Carlos, Calif., 40s, Tel: LYtell 1-1451
See ad on pages 80-81

Elco Corporation, Pa., 10s, 25s, 30s, 35s, 40s

Electro-Chemical Engraving Co., Inc., N.Y., 25c

Electronic Mechanics, Inc., N.J., 10sc, 15c, 35c, 40c, 45c

Electronica Industrial, Ltda., Brazil, 40s

Federal Manufacturing & Engineering Corp., N.Y., 5c

**Federal Screw Products, Inc.**, 3917 N. Kedzie Ave., Chicago 18, Ill., 20s, Tel: IRving 8-5744
See ad on page 642

Franklin Fibre-Lamitex Corp., N.Y., 25c

Garlock Electronic Products, Garlock, Inc., N.J., 10s, 30s, 35s

General Circuits, Inc., N.Y., 25c

Grayhill, Inc., Ill., 35s

Hallicrafters Co., The, Ill., 40c

Industrial Electronic Hardware Corp., N.Y., 10c, 15c, 20sc, 25sc, 30s, 35s

Instruments For Industry, Inc., N.Y., UHF-VHF sc

International Crystal Mfg. Co., Inc., Okla., 10s

International Electronic Research Corp., IERC Div., 135 W. Magnolia Blvd., Burbank, Calif., 25s, Tel: VIctoria 9-2481
See ad on page 702

Jettron Products, Inc., 56 Route 10, Hanover, N.J., 15s, 25sc, 30s, 35c, 40sc, Tel: TUcker 7-0571
See ads on pages 413, 544

Johnson Co., E. F., Minn., 10s, 20s, 40s

Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, 15s, 25s, 30s, 35s, Tel: NEvada 2-2000
See ad on pages 46-47

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 20s

Kenrn Company, The, N.J., 45sc

Keystone Electronics Corp., N.Y., 10c, 15s

Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 20s, 45s, Tel: MOunt Vernon 4-4024
See ads on pages 551, 558

LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 30s, Tel: AMityville 4-2200
See ad on page 365

Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 30s, Adapters s, Tel: GRaceland 7-7900
See ad on page 454

Lacey Engineering & Mfg. Co., Ill., 25c

Leecraft Mfg. Co., Inc., N.Y., 20c

Leviton Mfg. Co., Inc., N.Y., 20s, 45s

Mandex Manufacturing Co., Inc., Ill., 25s, 45s

Materials For Electronics, Inc., N.Y., 5s, 10s, 15s, 30s, 35s, 40s

**Methode Manufacturing Corp.**, 7447 W. Wilson Ave., Chicago 31, Ill., 10s, 15s, 25s, 30s, 35s, Tel: UNderhill 7-9600
See ad on page 415

Micarta Fabricators, Inc., Ill., 20c

**Microlab**, 570 W. Mt. Pleasant Ave., Livingston, N.J., 10s, Tel: WYman 2-5700
See ad on page 380

**Millen Mfg. Co., Inc., James**, 150 Exchange St., Malden 48, Mass., 10s, 30s, 35c, 45sc, Tel: DAvenport 4-4108
See ad on page 402

Molex Products Co., Ill., 30c

Morse Co., Frank W., Mass., 20sc, Miniature sc

Mosley Electronics, Inc., Mo., 10sc

Motorola, Inc., Military Electronics Div., Ariz., 25c

Mycalex Tube Socket Corp., N.J., 25s, 30c, 35c

Mykroy, Inc., Ill., 10sc, 40sc

**National Radio Company, Inc.**, 37 Washington St., Melrose 76, Mass., 10, 30, 40, 45, Tel: NOrmandie 5-4800
See ad on page 614

Nippon Electric Co., Ltd., Japan, 40s

Norrich Plastics Corp., N.Y., 5c, 30c, 45c

Nugent Electronics Co., Inc., Ind., 10s, 15s, 25s, 35s

Painton & Co., Limited, England, 25s

Permonite Mfg. Co., Ill., 10s, 20sc, 25c, 30sc, 40sc, 45sc

Philips Electronics Industries, Ltd., Canada, 25s, 30s, 40s

Philmore Mfg. Co., Inc., N.Y., 20s, 30s

**Photocircuits Corp.**, 31 Sea Cliff Ave., Glen Cove, N.Y., 25c, Tel: ORIole 6-8000
See ad on page 500

Plasteek, Inc., Okla., 25c

Pomona Electronics Co., Inc., Calif., Adapters s

Rodale Mfg. Co., Inc., Pa., 45s

Sanders Associates, Inc., N.H., 10sc, 15sc

Sealectro Corp., N.Y., 35s

Signal Indicator Corp., N.Y., 20s, 45s

Sloan Company, The, Calif., 20sc

Smith, Inc., Herman H., N.Y., 30s

Sunbank Electronics, Inc., Calif., Adapters sc

Sylvania Electric Products Inc., Parts Div., Pa., 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s, 45s

United International Dynamics Corp., Mass., 15c, 25s, 30s

**United Mineral & Chemical Corp.**, 16 Hudson St., New York 13, N.Y., 30s, 35c, Tel: BEekman 3-8870
See ads on pages 533, 699

Van Norman Industries, Inc., Electronics Div., N.H., Test adapters c

**Vector Electronic Co., Inc.**, 1100 Flower St., Glendale 1, Calif., 15s, 30s, 35s, Tel: CHapman 5-1076
See ad on page 544

Viking Industries, Inc., Calif., Subminiature s

Waldom Electronics, Inc., Ill., 10s, 15s, 25s, 30s

Winchester Electronics, Inc., Conn., 25s, 30sc, 40sc, Relay sc

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Solenoid coils:
See class 45

Solenoid switches:
See class 72

Solid state relays:
See class 68

Spacers & insulators, vacuum tube:
See class 104

Special purpose tubes:
See class 78

Spectrometers:
See class 14

Springs:
See class 91

Stacks, selenium & silicon:
See class 66

Stands, microphone:
See class 59

Storage batteries:
See class 41

Storage devices for computers:
See class 9

Storage mechanisms, data; telemetering:
See class 36

Strain reliefs:
See class 91

Stroboscopes:
See class 14



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## ROTARY SWITCHES

JBT



MS-14 Molded



SS-14 Laminated

For dependable performance in quality test equipment, instruments, inspection setups, and avionics, J-B-T makes 4 space-saving types — 14 positions: 2 7/32" dia. MS-14 molded series, and 2" dia. SS-14 laminated series; 20-positions: 2 5/8" dia. MS-20 molded series, and 2 23/32" dia. SS-20 laminated. 1 to 6 decks (more on special order), shorting or non-shorting. Conservatively rated 1 amp., 125 volts AC, inductive load; maximum momentary, (not make and break) 5 amp. Maximum voltage between contacts, 1500 volts R.M.S.; between decks and ground, 2000 volts R.M.S. Average contact resistance is 0.007 ohms or less.

## LEVER ACTION SWITCHES

J-B-T Lever Switches use the same high quality parts as the J-B-T Rotary Switches above. 2-6 positions, 2 circuits per deck, 2-10 decks.

Purchase of standard items through authorized electronic distributors is strongly recommended.

ASK FOR CATALOG 558-E

J-B-T INSTRUMENTS INC
NEW HAVEN 8, CONN

For details, circle #545 on Reader Service Card


**Styli, cutting:**
See class 65

**Styli, playback:**
See class 61

**Switch seals:**
See class 91

## 72. Switches & Contacts.

2. Band
4. Circuit breakers
6. Coaxial
8. Commutator
10. Contacts
12. Control
14. Crossbar
16. Electronic
18. Ferrite
20. Foot
22. Key
24. Limit
26. Mercury
28. Momentary contact
30. Power
32. Precision snap-acting
34. Push button
36. Rotary
38. Semiconductor
40. Slide
42. Solenoids
44. Spring-return
46. Tap
48. Thermal
50. Time
52. Toggle
54. Transfer

AMP Incorporated, Pa., 10s, 14s, 16s, 18s
A.P.W. Co., N.J., 42c
A-1 Precision Products, Calif., 8c, 36c
Accurate Spring Mfg. Co., Ill., 44c
Acro Div., Robertshaw-Fulton Controls Co., Ohio, 10sc, 12s, 24s, 28sc, 32sc, 34s, 52s
Advanced Electronics, Inc., Conn., 42c
**Aemco, Inc., 12 State St., Mankato, Minn., 50c, Tel: 5153**
See ad on page 509
**Airflyte Electronics Co., 537 Avenue A, Bayonne, N.J., 8c, 36c, Tel: HEmlock 6-2230**
See ad on page 408

## 72. Switches & Contacts.

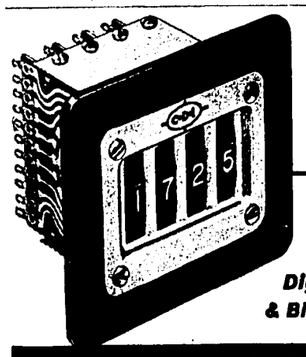
Airmec Limited, England, Capacity s
**Airpax Electronics, Incorporated, Cambridge Div., Jacktown Rd., Cambridge, Md., 4s, Tel: AC 8-4600**
See ad on pages 82-83
**Airpax Electronics, Incorporated, Seminole Div., Fort Lauderdale, Fla., 4s, Tel: LUdlow 3-6160**
See ad on pages 82-83
**Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 6sc, 18sc, Tel: CHestnut 5-2990**
See ad on page 589
Airtron, Inc., Div. Litton Industries, Inc., N.J., 6c, 18c, 36c
**Alden Products Co., 140 N. Main St, Brockton 64, Mass., 10s, 16s, 28s, Tel: JUniper 3-0160**
See ad on page 496
**Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 6s, Tel: HAncock 6-2150**
See ad on page 590
Allen-Bradley Co., Wis., 20s, 24s, 34s, 42s, 54s
Allen Electric & Equip. Co., Mich., 30c, 34c, 36c, 46c
**Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., 28sc, 34sc, 52sc, Tel: BUtterfield 8-7403**
See ad on page 508
Allis-Chalmers Mfg. Co., Wis., 12sc, 20sc, 24sc, 30sc, 34sc
Alloys Unlimited, Inc., N.Y., 10c
American Brass Co., The, Fabricated Metal Goods Div., N.Y., 10c



# Directory II. Components

## 72. Switches & Contacts.

**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 16s, Tel: WAlnut 5-8780**
See ad on page 369
American Electronics Co., N.Y., 40s
Analogue Controls, Inc., N.Y., 36c
Andrew Antenna Corp., Ltd., Canada, 6s, 54s
**Andrew Corp., 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 6sc, Tel: TRiangle 4-4400**
See ad on page 371
Applied Electro Mechanics, Inc., Va., 36sc
**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 8sc, 16sc, Tel: LIberty 9-1500**
See ad on page 353
Applied Technology Corp., N.Y., 36c
Arch Gear Works, Inc., Mass., 24c
Ardente Acoustic Labs., Ltd., England, 36sc
Argonne Electronics Mfg. Corp., N.Y., 34s, 36s, 38s, 40s, 52s
Arkay Products Mfg. Co., Calif., 34s, 36s, 40s, 44s
Arnoux Corp., Calif., 8s, 16s
Arrow-Hart & Hegeman Electric Co., The, Conn., 12sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36sc, 40sc, 46sc, 52sc, 54sc
Artisan Electronics Corp., N.J., 42s
Audiosears Corp., N.Y., 28sc, 32sc
**Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 6c, 34c, Tel: EVergreen 8-6057**
See ad on page 409
Automatic Switch Co., N.J., 42c, 54sc
Automatic Timing & Controls, Inc., Pa., 16sc, 24sc, 26sc, 28sc, 50sc
Aviel Electronics, Inc., Calif., 6c
Avnet Electronics Corp., N.Y., 52s
**Baker Contact Div., Engelhard Industries, Inc., 207 Grant Ave., East Newark, Harrison P.O., N.J., 10, Tel: BIgelow 3-0300**
See ad on page 170
**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 48sc, Tel: WOodland 8-6833**
See ad on page 465
Barker & Williamson, Inc., Pa., 6sc, 16c
Barwood Electronics, Inc., Calif., 20s
**Bead Chain Mfg. Co., 6 Mountain Grove St., Bridgeport 5, Conn., 10s, Tel: EDison 4-4124**
See ad on page 453
Beck's, Inc., Minn., 8c
**Belling & Lee, Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 48sc, Tel: ENfield 3322**
See ad on page 411
**Bendix Corp., The, Eclipse-Pioneer Div., Teterboro, N.J., 52c, Tel: ATlas 8-2000**
See ad on pages 103-106
Bendix Corp., The, Montrose Div., Pa., Pressure sc
Berneo Engineering Corp., Ind., 26s
**Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 6s, Tel: CHurchill 8-1200**
See ad on page 306
**Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 4s, 22s, 28s, 30s, 34s, 36s, 40s, 52s, Tel: WOrth 6-5611**
See ad on page 607
Blonder-Tongue Laboratories, Inc., N.J., 48s
Bogart Mfg. Co., N.Y., 6c, 16sc
Brainin Corp., C. S., N.Y., 10c
**Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., grounding & contact strips, Tel: HAwthorne 7-1773**
See ads on pages 449, 537, 547
Bristol Co., Conn., 36c, 48c
Bristol Motors, Div. Vocaline Co. of America, Conn., 30sc
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 16s
CGS Laboratories, Inc., Conn., 16c

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## NEW HIGHLY RELIABLE THUMBWHEEL SWITCHES

Available in permanent or removable wafers in 8, 10 or 12 positions up to 16 switches per modular assembly. Occupies only ½" panel space per module. Variations available to special order.

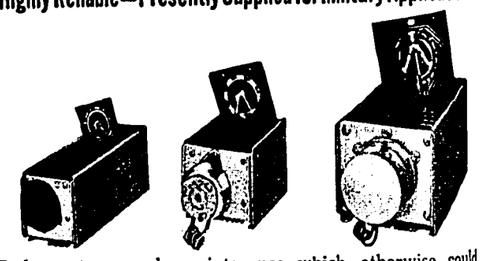
Instant, easy numerical readout—only selected numbers are visible thru openings in the bezel plate. Thumbwheel is black molded nylon with ¼" engraved figures. Other colors available.

Construction is printed circuit wafers with silver, rhodium or gold laminate, precious metal alloy contacts and corrosion protected aluminum frame. Switch can be positioned horizontally or vertically.

***Write for detailed specs today.***

## UNIQUE DESIGN ROTARY SWITCH— 5-SECOND WAFER REPLACEMENT

**No Unsoldering or Disassembling... No Wire Removing... Simply Lift out Any Wafer & Replace Instantly... Highly Reliable—Presently Supplied for Military Applications**



Reduces to seconds maintenance which otherwise could take a full day or more, saving valuable time. New design obsoletes old switches.

Switches are available in sizes approx. 2" x 2", 3" x 3" and 4" x 4" with lengths to accommodate up to 36 wafers. Virtually unlimited choice of switch circuit configurations. All connections are to a single bank of receptacles and are conveniently accessible from one side of the aluminum housing. Contacts are silver, gold or rhodium plated on a copper base. Wafers can be made to include printed circuitry and components in addition to their normal switching function.

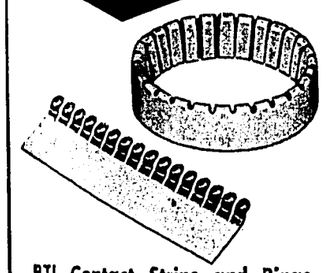
Switches may be manually, motor or solenoid operated for use in any rotary selector switch application. Manufactured under Tabet U. S. Patent No. 2,841,660. Other U. S. and foreign patents pending. Write for details today.

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PRECISION PRODUCTS DIVISION • 1725 Diversey Blvd., Chicago 14, Ill.

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BTI

## GROUNDING AND CONTACT STRIPS



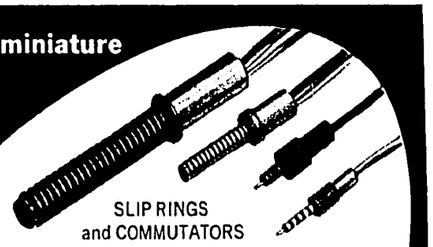
**BTI Contact Strips and Rings** are mostly used for grounding and shielding in high frequency equipment. Large variety of finger width, shape, and contours available from stock. Can be used for making contact rings. Special cut-outs, slots, and holes available to specification. Fixture heat treated.

Write for Bulletin #E-106.

BRAUN TOOL & INSTRUMENT Company, Inc. 141 Fifth Ave., Hawthorne, N. J.

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## PRECISION ASSEMBLIES
... and other rotating components

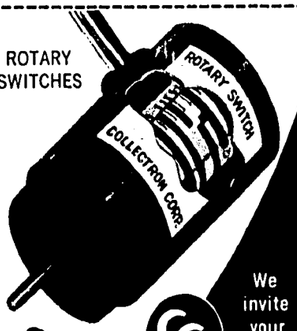


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BRUSH BLOCKS



ROTARY SWITCHES




ROTORS



INSERT MOULDINGS



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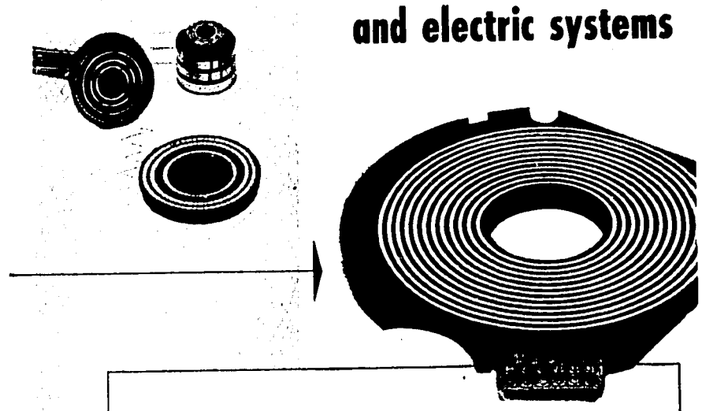
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## for electronic and electric systems

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# ROTARY SWITCHES
## for electronic and electric systems



Your needs for slip-ring, brush-holder, and rotary-switch assemblies designed, manufactured, and tested to your performance specifications can now be met by the enlarged facilities available through the ELECTRO CONTACTS Division of Electro Switch Corp.

Bulletin 60-01 shows typical products and contains a check list to help you specify. This bulletin is available *through all Electro Switch sales representatives* or on request to

ELECTRO CONTACTS

DIVISION ELECTRO SWITCH CORP.

OSTERVILLE, MASSACHUSETTS

For details, circle #549 on Reader Service Card



## 72. Switches & Contacts.

**CTS Corp., 1142 W. Beardsley Ave., Elkhart, Ind., 20c, 28c, 30c, 34c, 36c, 44c, Tel: ELkhart 3-0310**
**See ad on page 2**

C.W.S. Waveguide Corp., N.Y., 6c
California Computer Products, Inc., Calif., 16c, 38sc
Canadian Westinghouse Co., Ltd., Canada 6s
**Cannon Electric Co., Dept. 425, 3208 Humboldt St., Los Angeles 31, Calif., 42s, Tel: CApitol 5-1251**
**See ad on page 410**

Capitol Machine Co., Conn., 22, 28, 52
Carling Electric, Inc., Conn., 12c, 20c, 22c, 28c, 34c, 36c, 40sc, 44c, 46c, 52c
Carroll Pressed Metal, Inc., Mass., 10sc
Carson Mfg. Co., Inc., Ind., 30c, 46c
Carter Parts Co., Ill., 24c, 32c, 34sc, Lever c
**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 2sc, 34sc, 36sc, 40c, 44sc, 46sc, Tel: WOodruff 2-9200**
**See ad on page 152**

Century Electronics & Instruments, Inc., Okla., Pressure s
Cherry Electrical Products Corp., Ill., 24sc, 28sc, 32sc, 34sc
**Chicago Dynamic Industries, Inc., Precision Products Div., 1725 W. Diversey Blvd., Chicago 14, Ill., 36s, Binary and Digital Types s, Tel: WEllington 5-4600**
**See ad on page 546**

Chicago Electronic Div., Land-Air, Inc., 16c, 36c, 50c
Chicago Telephone of California, Inc., Calif., 20s, 36c, 44c
Clare & Co., C. P., Ill., 22c, 24c, 26c, 34c
Clark Controller Co., The, Ohio, 12s, 20s, 22s, 24s, 30s, 32s, 34s, 44s, 48s, 50s, 52s
Clarostat Mfg. Co., Inc., N.H., 12sc, 30sc, 36sc
Cleveland Metal Specialties Co., Ohio, 8c
Co Engineering Co., N.J., 36c
Cole Electric Co., Calif., 36c, 52c
**Collectron Corp., 304 E. 45th St., New York 17, N.Y., 36sc, Tel: MUrray Hill 9-7120**
**See ad on page 547**

Columbus Electric Mfg. Co., Ohio, 24sc, 32sc
**Comar Electric Co., 3349 Addison St., Chicago 18, Ill., 28c, Tel: JUniper 8-2410**
**See ad on page 166**

Composite Industrial Metals, Inc., R.I., 10c
**Computer Instruments Corp., 90 Madison Ave., Hempstead, L.I., N.Y., 8sc, 12sc, 36sc, Tel: IVanhoe 3-8200**
**See ad on pages 528-529**

Consolidated Controls Corp., Conn., 24sc, Pressure sc
Continental Electronics Corp., N.Y., 6c
Continental-Wirt Electronics Corp., Pa., 40s
Control Products, Inc., N.J., 24c, 28c, 32c, 34c, 48c, 52c
Control Switch Div., Controls Co. of America, Ill., 12sc, 20sc, 24sc, 28sc, 32sc, 34sc, 36sc, 42sc, 44sc, 52sc





# Directory II. Components

## 72. Switches & Contacts.

Controls Company of America, Appliance, Automotive & Electron Divs., Ill., 12c, 32c, 36c, 38c, 42c
Cook Electric Co., Ill., 10sc, 16sc, 48sc, 50sc
Couch Ordnance, Inc., Mass., 30c, 36c
Cramer Controls Corp., Conn., 50c
Crosby-Teletronics Corp., N.Y., 16s
Cunningham Son & Co., Inc., N.Y., 8s, 14s
**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 16c, 32sc, 42sc, 44c, 48sc, 50sc, Tel: SWarthmore 1-0100**
**See ad on page 510**

Cutler-Hammer, Inc., Wis., 4s, 12s, 20s, 22s, 24s, 28s, 30s, 32s, 34s, 36s, 40s, 52s
Daco Instrument Co., N.Y., 42sc
Daven Co., The, N.J., 2s, 6c, 8c, 12s, 24s, 32s, 36s, 44s, 46s
Decker Corporation, The, Pa., 16s
**Del Electronics Corp., Dept. RE, 521 Homestead Ave., Mount Vernon, N.Y., High Voltage sc, Tel: OWens 9-2000**
**See ads on pages 282, 481, 567**

Destron Co., Calif., 50c
Deutsch Co., The, Electronic Components Div., Calif., 10sc
**Dialight Corp., 60 Stewart Ave., Brooklyn 37, N.Y., 28c, Tel: HYacinth 7-7600**
**See ad on page 472**

Diamond Antenna & Microwave Corp., Mass., 6c
Dicon Corporation, N.Y., 38c
Dielectric Products Engineering Co., Inc., Me., 6c
Dietz Co., Inc., N.J., 36sc
Digitran Co., The, Div. Endevco Corp., Calif., 8s, 12s, 36s, 54s
**Dimco-Gray Co., 212 E. 6th St., Dayton 2, Ohio, 50s, Tel: BAldwin 2-6703**
**See ad on page 641**

Djordjevic Engineering Co., Djeco Div., Ill., 38c
**Douglas Microwave Co., 252 E. Third St., Mount Vernon, N.Y., 16sc, 18sc, Tel: MOunt Vernon 8-6900**
**See ad on pages 90-91**

Dow-Key Co., Inc., Minn., 6s
Durakool, Inc., Ind., 26sc
Dynamics Instrumentation Co., Calif., Photo-Electric s
E-T-A Products Co. of America, Ill., 4s, 12s, 48s, 50s
Eagle Electric Mfg. Co., Inc., N.Y., 26s, 34s, 36s, 46s, 52s
Eagle Signal Co., Ill., 50s
Eastern Technical Associates, Inc., Mass., Acceleration s
Ecco Electronic Components Corp., N.Y., 6c
Eckel Valve Co., Calif., 42c
Edison Industries, Thomas A., Instrument Div., N.J., 48s, 50s
Eicor Division, The Scranton Corp., Ill., 36c
**Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., Vacuum s, Tel: LYtell 1-1451**
**See ad on pages 80-81**

**Elastic Stop Nut Corp. of America, Agastat Timing Instruments Div., Dept. A37-76, 1027 Newark Ave., Elizabeth 3, N.J., 50s, Tel: ELizabeth 2-2900**
**See ad on page 513**

Electric Autolite Co., The, Ohio, 42s
Electric Regulator Corp., Conn., 12sc, 36sc
Electric Specialty Co., Conn., 30c
Electrical Service Co., Calif., 28c
**Electro Contacts Div., Electro Switch Corp., Osterville, Mass., 8c, 36sc, Tel: (Hyannis) GArden 8-6986**
**See ad on page 548**

Electro Development Co., Calif., 36s
Electro-Mechanical Specialties Co., Inc., Calif., 16c, 42c
Electro-Miniatures Corp., N.J., 8sc, 36sc
Electro Tec Corp., N.J., 8c, 36sc
Electrocraft Component Div., G-C Electronics Co., Ill., 28s, 34s
Electron-Radar Products, Ill., 4sc, 10sc, 12sc, 26sc, 30sc, 48sc
Electronic Specialty Co., Calif., 6sc, 16c, 36c, 38c
Electronic Systems Development Corp., Calif., 38sc
Electronic Transistors Corp., N.J., 38sc
Ellison Draft Gage Co., Inc., Ill., 10c, 12c, Vacuum c, Pressure c
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 10sc, 14sc, 38sc, 40sc, 48sc, Tel: BIgelow 2-2700**
**See ad on page 170**

Engineered Electronics Co., Calif., 16sc, 38sc
Essex Wire Corp., RBM Controls Div., Ind., 10s, 14s, 30s, 42s, 48s
Etelco, Ltd., England, 22c
Fairchild Controls Corp., Components Div., N.Y., 12sc, 24sc, 32sc, 36sc, 40sc, 42sc, 44sc, 46sc, 48sc, 50sc
Fairfield Engineering Corp., Conn., 16c, 30c, 38c, 54c
**Fansteel Metallurgical Corp., North Chicago, Ill., 10s, Tel: DExter 6-4900**
**See ad on pages 130-131**

Farmer Electric Products Co., Inc., Mass., 24s
Farwest Mfg. Div., Inc., Wash., 6s, 16s, 24s, 26s, 28s, 30s, 32s, 34s, 36s, 52s
Fasco Industries, Inc., N.Y., 4sc, 40c, 42c, 48c
Federal Anti-Capacity Switch Co., N.Y., Anti-Capacity sc
**Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 40s, 52s, Tel: IRving 8-5744**
**See ad on page 642**

**Ferrotec, Inc., 217 California St., Newton 58, Mass., 18c, Tel: DEcatur 2-7600**
**See ad on page 591**

**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 16s, Tel: CEnter 9-6100**
**See ad on page 480**

Furnas Electric Co., Ill., 10s, 12s, 20s, 24s, 34s, 36s, 42s, 46s
**G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 34s, 40s, 52s, Tel: WOodland 8-9661**
**See ad on page 640**

Gables Engineering, Inc., Fla., 36c
Gemco Electric Co., Mich., 24s, 36s
**General Communication Co., 677 Beacon St., Boston 15, Mass., 6sc, Tel: COpley 7-6030**
**See ad on page 331**

General Control Company, Mass., 20s, 22s, 24s, 28s, 34s, Lever s
General Controls Co., Calif., 20s, 24s, 26s, 48s, 50s
General Devices, Inc., N.J., 2c, 4c, 6c, 8sc, 10sc, 12sc, 16sc, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 36sc, 38c, 40c, 42c, 44c, 46c, 48c, 50c, 52c, 54c
General Electric Co., Apparatus Sales Div., N.Y., 12s, 20s, 24s, 28s, 30s, 32s, 34s, 36s, 42s, 48s, 50s
General Electric Co., Wiring Devices Dept., R.I., 22s, 26s, 34s, 52s
General Electric Co., Ltd. of England, England, 22s, 34s, 36s
General Findings & Supply Co., Industrial Div., Mass., 10c, 38c
**General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 52, Tel: VAlley Stream 5-6363**
**See ad on page 284**

Gertsch Products, Inc., Calif., 6s
Giannini Controls Corp., Calif., 8sc, Acceleration sc, Pressure sc
Gibson Electric Co., Pa., 10sc
Glass-Tite Industries, Inc., R.I., 26sc
Gordos Corp., N.J., 26sc
Graphik-Circuits, Div. Cinch Mfg. Co., Calif., 8c, 16sc, 36sc, 40sc, 46sc
**Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 8c, 10sc, 36sc, Tel: YOnkers 8-8400**
**See ad on page 416**

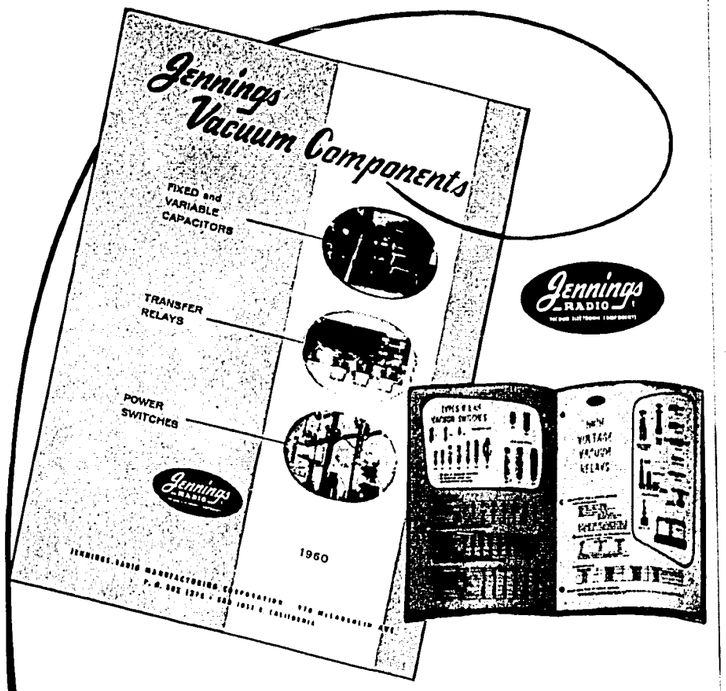
Grayhill, Inc., Ill., 28s, 30c, 36sc, 44sc
Great Eastern Mfg. Co., N.Y., 38s
Grigsby Co., Inc., Ill., 16c, 20c, 22c, 28c, 30c, 32c, 34c, 36c, 40c, 44c, 46c, 54c
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 4c, 10c, 12c, 16c, 32c, 34c, 40c, 42sc, Tel: CHesapeake 3-1100**
**See ad on page 512**

Hallicrafters Co., The, Ill., 6c, 18c
Hamlin, Inc., Wis., 20s, Electrolytic s
Harman-Kardon, Inc., N.Y., 16c, 38sc
**Hart Manufacturing Co., 265 Bartholomew Ave., Hartford 1, Conn., 16c, 28sc, 32sc, 36sc, 40c, 52sc, Tel: JAckson 5-3491**
**See ad on page 515**

Hathaway Instruments, Inc., Colo., 36s
Haydon Co., A. W., Conn., 16c, 50c
Haydon Switch, Inc., Conn., 24sc, 28sc, 32sc, 34sc, 52sc, Acceleration sc, Inertia sc, Pressure sc
Heinemann Electric Co., N.J., 4s
**Hughes Aircraft Co., Hughes Semiconductor Div., P.O. Box 278, Newport Beach, Calif., 38sc, Tel: LIberty 8-0671**
**See ads on pages 188, 538**



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.




# NEW CATALOG SUMMARY

presenting . . . Jennings Vacuum Components, inherently qualified by their unique use of a vacuum dielectric, to help you solve many difficult design problems of high voltage in limited spaces.

A few minutes inspection of the wide range of vacuum components in this new product bulletin will reveal many design possibilities that ordinary electronic components cannot achieve. The bulletin contains valuable data and specifications on the latest types of Jennings Fixed and Variable Capacitors, Power Switches, Coaxial Relays, Triggered Spark Gaps, Transfer Relays and High Voltage Measuring Equipment.

The following examples illustrate some of the unusual capabilities of Jennings vacuum components:



**R6G Vacuum Switch with Model E Switch mount**

Recommended max. load voltages for max. operating recovery voltage @ 50 amps-rms . . . . . 27 kv
Thermal current (for 30° C rise) . . . . . 250 amps rms
Max. interrupting current (10 times) . . . . . 1500 amps rms @ 9 kv
Withstand voltage (60 cycle 1 min. dry) . . . . . 36 kv rms



**RE6B Vacuum Transfer Relay**

Overall length . . . . . 3¼ in.
Rated operating voltage (cyc) . . . . . 25 kv
DC interrupting rating . . . . . 20 kw (not to exceed 5 amp or 10 kv)
Continuous current . . . . . 25 amps rms



**Type USLS Vacuum Variable Capacitor**

Capacity range . . . . . 5-465 mmfd
Overall length . . . . . 5⅝"
Peak voltage (max. capacity) . . . . 5 kv
Peak voltage (min. capacity) . . . . 10 kv
Continuous current . . . . . 40 amps rms

Send for your Jennings' catalog today. There will be no sales follow-up unless you outline a specific application.

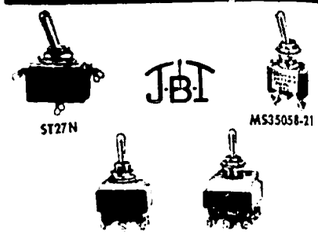
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VACUUM ELECTRONIC COMPONENTS

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## TOGGLE SWITCHES AN, JAN, or MIL




J-B-T now manufactures more than 140 models of exceptional quality toggle switches, all designed to meet Government specifications such as: Jan-S-23, Mil-S-21195 (Ships), Ordnance Standards DDAX, Mil-S-6745, and Mil-S-3950A (the latest and most comprehensive specification—ultimately expected to supplant most of the other specifications).

The heavy-duty models feature solid coin-silver contacts, unique to J-B-T, which add overload protection and keep contact resistance under .005 ohms. Nominal ratings are 20 amp. at 125 VAC, 10 amp. at 250 VAC.

Included are: ST40, 42, 50, 52 Series, solder and screw terminals; MS35058, 35059 Series, lever seal for sand, dust, and 15 ft. water submersion tests, solderable screw terminals; MS25068 Series, new 4-pole with lever seal and solderable screw terminals; and AN3021, 3027 Series, aircraft types, with lever seal and screw terminals.

Medium duty types feature double-grip, self-cleaning contacts with current carrying parts heavily silver plated. Nominal rating 6 amp. at 125 VAC, 3 amp. at 250 VAC. Models include ST12, 13, 16, 17, 22, 23, 26, 27 Series with solder lugs; and MS25098, 25100 Series with lever seal for sand, dust, and 15 ft. water submersion tests and solder lugs.

For further technical information please request Bulletin TS-6B.

Purchase of standard items through authorized electronic distributors is strongly recommended.

**ASK FOR CATALOG 558-E**

**J-B-T INSTRUMENTS, INC**
**NEW HAVEN 8, CONN**

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SWITCHES & CONTROLS

- long life
- high dependability
- exacting performance

STANDARD SWITCHES

SUBMINIATURE TYPE 16
22 Million actuations by test
¼" thick—25/32" wide
Rated 10 amps. 250 V.A.C.

TYPE 10
10 Million actuations by test
15 or 20 amp. 125, 250, or 460 V.A.C.

TYPE 11
20 Million actuations by test
10 amp. 250 V.A.C or 30 V.D.C.

TYPE 30
10 Million actuations by test
15 amp. 125, 250, 460 V.A.C
½ amp. 115 V.D.C.

ENGINEERED SPECIALS

Need special switches for specific jobs? LICON can meet your requirements including hermetic sealing and control assemblies.

*for descriptive literature, write:*

**LICON** Division of Illinois Tool Works
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# KULKA

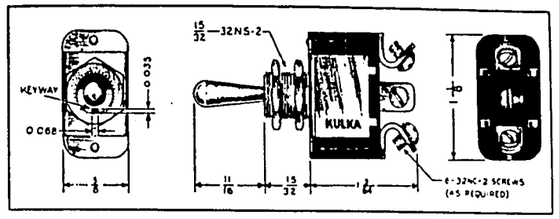
## ELECTRONIC SWITCHES

Made to Joint Army-Navy specifications—JAN-S-23, MIL-S-21195, MIL-S-6745 and MIL-S-3950A, for electronic, aircraft and communication uses. Designed for quick, easy, one-hole mounting. Ruggedly built for long, trouble-free service. Operating cycles are above minimum required by specifications.

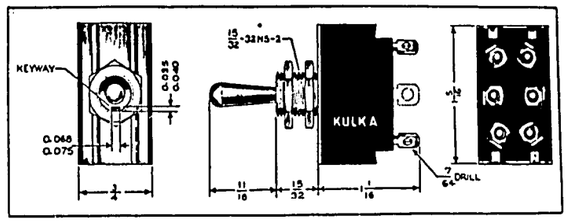
All metal parts treated against corrosion. Switches come with mounting nuts and sleeve lock-washer. All switches made to MIL-S-3950A and MIL-S-6745 are supplied with toggle seal. Units are tested regularly by quality control in production procedure, insuring top performance.

**Write for Free Catalog**

Single-Pole Switches: Series ST 40, with screw terminals, shown at right. Widest choice of types in concise tabular form presented in Kulka literature available on request.



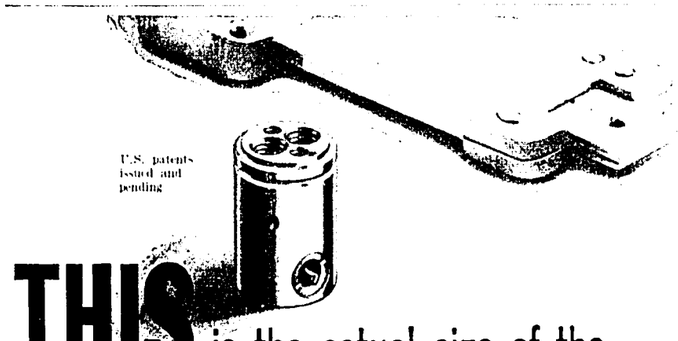

Double-Pole Switches: Series ST 52 with solder lugs shown at right. Wide choice of types in concise tabular form presented in Kulka literature available on request.




# KULKA ELECTRIC CORP.

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# THIS is the actual size of the world's simplest acceleration switch.

It represents a totally new concept in acceleration sensing devices. Weight: about one ounce. Only one moving part: a precision ground ball held by an alnico magnet. The ball is released to close or open an electric circuit when the force of acceleration exceeds the magnet's pull.

It's as simple as that. Yet this versatile I-S design makes possible switches that respond axially, radially, or omnidirectionally, from 0.01 g to 500 gs. With adjustable g settings, if you desire. Automatic reset is optional. Closure time is variable. Accurate within 0.1%. Meets all applicable Mil specs.

But more than an ingenious design, the I-S switch represents an important attitude . . . an attitude that produces only equipment of sound and simple design and reliable performance, of uses limited only by your needs.

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**INERTIA SWITCH, INC.** 311 West 43rd St., New York 36 • JUdson 6-5880
Inertia Switch invites research and development inquiries in the acceleration sensitive field.

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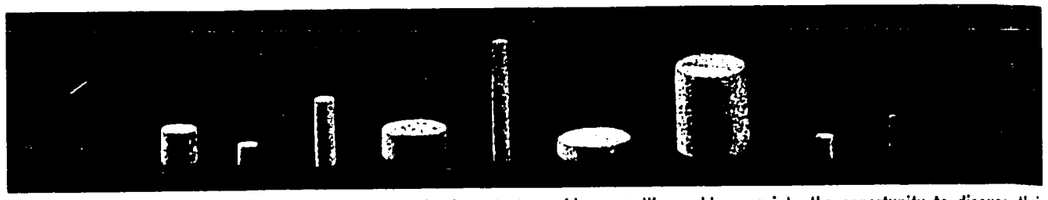
Switches & Contacts—Class 72

# Directory II. Components

## 72. Switches & Contacts.

Hughes Aircraft Co., Vacuum Tube Products Div., Calif., Vacuum s
IMC Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 42sc, Tel: EDgewood 4-7070
See ad on page 464
Induction Motors of California, Div. IMC Magnetics Corp., Calif., 36c, 42sc
Industrial Components, Inc., Ore., 12c, 20c, 24c, 30c
Industrial Devices, Inc., N.J., 34c, 36sc
Industrial Electronic Hardware Corp., N.Y., 40sc, 44sc
Industrial Instruments, Inc., N.J., 36s
Industrial Products-Danbury Knudsen, Div. Amphenol-Borg Electronics Corp., 33 E. Franklin St., Danbury, Conn., 6s, 16s, Tel: PIoneer 3-9272
See ad on page 160
Industrial Timer Corp., N.J., 48s, 50s
Inertia Switch, Inc., 311 W. 43rd St., New York 36, N.Y., Acceleration s, Inertia s, Tel: JUdson 6-5880
See ad on this page
Instrument Development Laboratories, Inc., Mass., 8sc, 36sc
International Register Co., Ill., 50sc
Interstate Electronics Corp., Calif., 42s
J-B-T Instruments, Inc., 133 Hamilton St., New Haven 8, Conn., 36, 52, Tel: STate 7-5825
See ads on pages 460, 546, 550
J-V-M Microwave Co., Ill., 6c
Jaidinger Mfg. Co., Inc., Ill., 28c, 34c, 48c
Janco Corp., Calif., 24c, 28c, 32c, 36c, 48c
Jennings Radio Mfg. Corp., 970 McLaughlin Ave., P.O. Box 1278, San Jose 8, Calif., 4s, 6s, 30s, 54s, Tel: CYpress 2-4025
See ad on page 550
Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 6s, Tel: BAldwin 6-3456
See ad on pages 114-115
Jordan Electronics, Div. Victoreen Instrument Co., Calif., 16sc, 50sc
Joy Mfg. Co., Electrical Products Div., Mo., 32s, 34s, 52sc
Kearfott Div., General Precision, Inc., Little Falls, N.J., 36s, Tel: CLifford 6-4000
See ad on pages 120-121
Kearfott Div., General Precision, Inc., Microwave Products, Calif., 18c
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 14s, 22s
Kinetics Corp., Calif., 8c, 24c, 30sc, 40sc, 54sc
Kintronic Div., Chicago Aerial Industries, Ill., 8c, 36c
Knight Corp., Ewen, Mass., 18c
Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 24sc, Tel: TWining 9-5600
See ad on page 268
Kuhnke Elektrotechnische Fabrik, H., Germany, 22sc, 34sc, 36sc, 42sc

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We at Metex feel we have the approach to your dry circuit contact problems... the Metact... a resilient, gold plated mesh contact. Its self-wiping and anti-bounce characteristics, combined with multiple contact areas, insure a greater degree of contact. These Metex engineered units, now available down to 1/32" in diameter, have possible applications on relay, switch, chopper and computer design contact problems. ■ We would appreciate the opportunity to discuss their broad range of contact applications with you. Metex also manufactures a complete line of electronic weather stripping, RF and combination gaskets, and heat dissipating tube shields. There's no obligation; why not give us a call. Metal Textile Corporation, Electronics Division, Roselle, New Jersey. Phone Chestnut 5-3000. TWX Roselle, N. J. 760.

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METEX METAL TEXTILE CORPORATION



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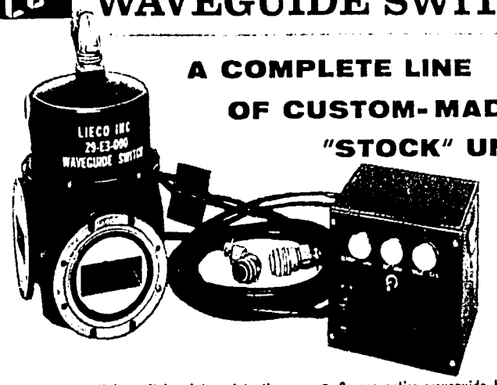
# Directory II. Components

## 72. Switches & Contacts.

Kulite Semiconductor Products, Inc., N.J., 38c
Kulite Tungsten Co., N.J., 10c
**Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 16s, 28s, 30s, 52s, Tel: MOunt Vernon 4-4024**
See ads on pages 551, 558
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 36sc
Land-Air, Inc., Stepper Motors Div., Calif., 36c, 42c
La Pointe Industries, Inc., Conn., 8sc, 16sc, 36sc
Lear, Inc., Calif., 26sc
Ledex, Incorporated, Ohio, 30s, 42s
Lee Electric, Inc., N.J., 34c
Leeds & Northrup Co., Pa., 22s, 34s, 36s, 40s, 52s
Leviton Mfg. Co., Inc., N.Y., 10s, 16s, 22s, 26s, 28s, 30s, 34s, 36s, 40s, 44s, 52s
Lewis Engineering Co., Conn., 36sc
**Licon Div. of Illinois Tool Works, 6606 W. Dakin St., Chicago 34, Ill., 24sc, 28sc, 32sc, 34sc, 36c, 52sc, Tel: AVenue 2-4040**
See ad on page 550
**Lieco, Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 6c, Tel: WAlnut 1-6300**
See ad on this page
Lind Instruments, Inc., N.J., 8s
Line Electric Co., N.J., 20s
Littelfuse, Incorporated, Ill., 4sc
Lockheed Aircraft Corp., Electronics, Avionics & Industrial Products Divs., Calif., 18s
Love Electronics, Inc., Calif., 22c
Lucerne Products, Inc., Ohio, 20c, 34c, 40c, 44c, 52c
M & G Metal Products Co., Ill., 10sc
Magnavox Research Laboratories, Calif., 8sc
**Magnetic Amplifiers Div., Siegler Corp., 632 Tinton Ave., New York 55, N.Y., 12sc, Tel: CYpress 2-6610**
See ads on pages 252, 364, 418
Mallory & Co., Inc., P. R., Ind., 2s, 10c, 16sc, 24c, 28sc, 32sc, 34s, 36s, 40sc, 50c, 52c
Marco Industries Co., Calif., 28sc, 34sc
Marconi's Wireless Telegraph Co., Ltd., N.Y., 6s
Marion View Electronics, Inc., 12c, 42c, 52c
Marotta Electronics Corp., N.Y., 16s, 32s, 38s, 50s
Materials For Electronics, Inc., N.Y., 40c
Maxson Corp., The W. L., Unimax Switch Div., Conn., 24s, 28s, 32s, 34s, 52s
Maxson Corp., The W. L., Instruments Div., Accelerations, Inertias
Mayberry Electronics Co., Calif., 16c, 28sc, 30c
McGill Mfg. Co., Inc., Electrical Div., Ind., 28s, 34s, 52s
Mechanical Products, Inc., Mich., 4sc, 48sc
Mel Elgin Corp., Ind., 48sc
Melabs, Inc., Calif., 6s
Mercoid Corp., The, Ill., 26s
Mercury Contacts, Inc., Ohio, 2oc
**Metal Textile Corp., Div. of General Cable Corp., 647 E. First Ave., Roselle, N.J., 10, Tel: CHestnut 5-3000**
See ad on page 552
**Micro-Lectric Div., Micro Machine Works, Inc., 19 Debevoise Ave., Roosevelt, N.Y., 8c, 36sc, 46c, Tel: FReeport 8-3222**
See ad on page 529
Micro-Switch, Div. Minneapolis-Honeywell Regulator Co., Ill., 16sc, 20sc, 24sc, 26sc, 28sc, 32sc, 34sc, 36sc, 40sc, 44sc, 48c, 52sc
Microdot, Inc., Calif., 6s
Micromega Corp., Calif., 18c
Microwave Associates, Inc., Mass., 24s, 38s
Miller-Harris Instrument Co., Wis., 50sc
Minneapolis-Honeywell, Military Products Group, Minn., 38c, 44c, 48c
Modelectric Products Corp., N.J., 42s
Molex Products Co., Ill., 4c, 28sc, 34sc, 52sc
Mossman, Inc., Donald P., N.Y., 22c, 28sc, 34c
Muirhead Instruments, Inc., N.Y., 22s, 30s
Multi-Amp Electronic Corp., N.J., 4s
Munzig International, Inc., Calif., 26s, 36s
Murray Mfg. Corp., N.Y., 4s
Muter Division, The Muter Co., Ill., 4c, 28c, 40c, 44c, 48c
Mycalex Electronics Corp., N.J., 30c
Mytron, Inc., Mass., 30c
National Moldite Co., Inc., N.J., 18s
**Naybor Laboratories, Inc., E. V., 26 Manorhaven Blvd., Port Washington, N.Y., 42c, Tel: POrt Washington 7-4300**
See ad on page 517
Neptune Electronics Co., N.Y., 32c, 34c, 52c
Network Industries, Inc., N.J., 52c
Newark Controls Co., N.J., 26s, Pressures, Density s
Newcomb Spring Corp., N.Y., 38c
Newton Co., The, Conn., 16c
**Ney Company, J. M., Maplewood Ave., Bloomfield, Conn., 8c, 10sc, 16s, Tel: CHapel 2-2281 (Hartford)**
See ad on page 687
Nippon Electric Co., Ltd., Japan, 14c, 16c
North American Electronics, Inc., Mass., 38sc
North Electric Co., Ohio, 14sc, 16sc, 22sc, 34sc, 36sc


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**A COMPLETE LINE OF CUSTOM-MADE "STOCK" UNITS**

- Position indicator light switches integral to the waveguide switch.
- Automatic interlock switches available.
- Operates with or without a holding current.
- Any desired voltage.
- Engineered to suit your package problem at prices competitive with "shelf" units.
- Switching available in either plane, SPDT, DPDT, or Single Pole Multithrow.
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- Extremely low insertion loss.
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- All sizes from RG96 thru WR-2100 Waveguide.

*Special Power Supplies also available—designed to your needs.*
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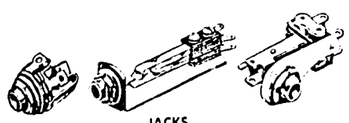
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# SWITCHCRAFT INC.

## "SETS the STANDARD" in electronic components

FOR RADIO—TELEVISION—HI-FI—STEREO—TAPE RECORDERS
MUSICAL INSTRUMENTS—ELECTRONIC CONTROLS AND COMPUTERS



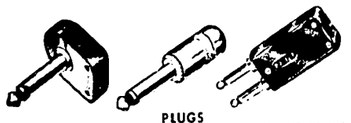
**JACKS**

**FOR MILITARY AND INDUSTRIAL EQUIPMENT—MOST COMPLETE LINE**

Available in all common and many special circuits.
"LITTEL-JAX"—require minimum panel space.
"TINI-JAX"—Similar to "Littel-Jax"—subminiature in design.
"SF-JAX"—short frame design—innumerable circuits.
"LF-JAX"—long frame design—all circuits.
"EXTENSION JAX"—for cable extensions.
"SHIELDED JAX"—shield assembled into and made a part of Jack.
"LAMP JAX"—Switchboard panel type. Ideal for mounting on Jack Panel.

**TELEPHONE & MILITARY JACKS**

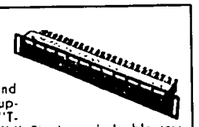
"T-JAX"—a conventional telephone switchboard design all standard circuits and military specifications.
"M-JAX"—a heavy duty design used in heavy industrial equipment.



**PLUGS**

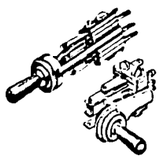
**THE LARGEST VARIETY OF STYLES, SIZES AND TYPES**

"LITTEL-PLUG"—small—fits standard Jacks—(also MIL type).
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"LUG-PLUG"—small—low cost.
"STANDARD"—conventional size, heavy terminals—rugged design. 2 and 3 conductor types.
"FLAT-PLUG"—removable cover permits use with screw or solder lug terminals. 2 or 3 conductor types.
"TWIN-PLUG"—two electrically independent 2-conductor plugs on 5/8" C.C. MILITARY TYPE



**JACK PANELS**

Black phenolic and aluminum types. Support Switchcraft "T-JAX" and "MT-JAX." Single and double row panels. Accommodate up to 52 Jacks.



**"LEV-R SWITCHES"**

Unusually compact. Many circuits. Locking and non-locking. Series 3000 and 13000 single hole mounting. Series 12000 requires only about 1/4 of depth behind panel of conventional "Key" switches.



**"FF-SWITCH"**

Flat frame support spring "pile-up" in various circuits and contact combinations. "Easy" action of colored push buttons.



**"HOOK SWITCH"**

Switch actuated by hanging accessory on hook. 2 different methods of mounting. Standard circuits. Soft easy action. Require minimum of depth behind panel.



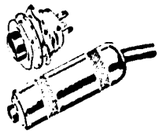
**"TELEVER SWITCHES"**

Rugged telephone type. Locking and non-locking types. Series 6000 mounts by screws or to escutcheon plate. Series 16000 features single hole mounting.



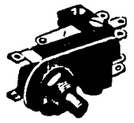
**"LITTEL & TINY-SWITCHES"**

"Littel-Switch"—rugged, yet small, a Push Button switch available in multiple circuits, contacts to suit. Various colors of Buttons.
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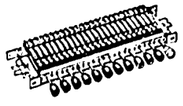
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"Button-Switches"—unusually small push button switch, completely enclosed.
"Cord-Switches"—cord mounted or pendant switch. Ideal for "hold" in hand operation.



**"RS-SWITCH"**

Rotary switch, rugged frame supports spring "pile-ups"; minimum panel depth, 2 or 3 position; locking or non-locking action.



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(Audio Jumpers) Plugs molded directly to various cable combinations. Shielded and unshielded. Various lengths.

**COMPLETE LINE OF AUDIO ACCESSORIES—ADAPTERS, COUPLERS, CONNECTORS WITH PHONE OR PHONO CONNECTIONS, AUDIO MIXERS, SPEAKER CONTROLS. WRITE FOR CATALOGS S-590, A-403 AND C-501.**

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Printed Circuit Short Frame Telephone Type D-C Relay, RL-1500 Series — exceptionally small size and long life.
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High Voltage Switching Relay, RL-904 Series. Bu-ships rated Discharge Switch.
Size: 4 13/16"x6 15/16" x4 11/32"



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High Voltage Switching Relay, RL-906 Series, for Radar, Sonar and Missiles applications.
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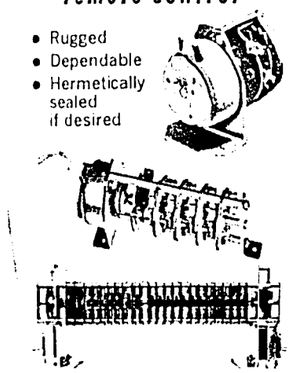
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*for*
*Precision Electrical Resistance Instruments*

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*for automation, telemetering, remote control*

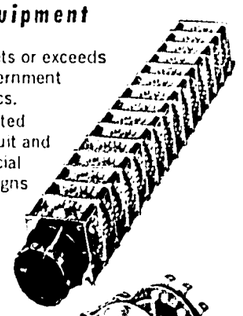
- Rugged
- Dependable
- Hermetically sealed if desired



**ROTARY SWITCHES**

*for all electronic equipment*

- Meets or exceeds government specs.
- Printed circuit and special designs



- Quick deliveries
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**CAM SWITCHES**

*for counting and control*

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- Control switch
- Decimal to binary converter




TECH LABORATORIES, INC.

**PALISADES PARK, NEW JERSEY**

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# Directory II. Components

## 72. Switches & Contacts.

Oak Manufacturing Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 2c, 12c, 28c, 32c, 34c, 36sc, 40c, 42c, 44c, 46c, 50c, Tel: MOhawk 4-2222
See ad on pages 86-87

Ohio Carbon Co., The, Ohio, 10c

Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 30sc, 36sc, 46sc, Tel: ORchard 5-2600
See ad on pages 78-79

Ovitron Corp., N.Y., 12sc, 18sc, 30sc

PIC Automation Controls, Div. General Controls Co., Ill., 20s, 26s, 28s, 32s, 40s, 42s

PSP Engineering Co., Div. IMC Magnetics Corp., Calif., 34c, 42c

Painton & Co., Limited, England, 32s, 34s, 36s, 52s

Palomar Scientific Corp., Calif., Accelerometer

Parkway Specialties Co., Mich., 12s, 40s

Pascol, Div. Illinois Tool Works, Calif., 42

Pee Wee Molding Corp., N.Y., 40c

Pendar, Inc., Calif., 10sc, 22sc, 28sc, 30sc, 32sc, 34sc, 36sc, 40sc, 42sc, 44sc

Penn Keystone Corp., Conn., 38c

Permonite Mfg. Co., Ill., 10sc

Philadelphia Scientific Glass Co., Pa., 10s, 12s, 26s

Philips Electronics Industries Ltd., Canada, 12s, 16s, 24s, 44s, 48s, 50s

Philmore Mfg. Co., Inc., N.Y., 2s, 12s, 34s, 36s, 40s, 52s

Photo-Crystals, Inc., Ill., 26s, 48s

Pickering & Co., Inc., N.Y., 42c

Plastics & Electronics Corp., N.Y., 38sc

Pollak Corp., Joseph, 75-95 Freeport St., Boston 22, Mass., 12c, 16c, 22c, 28c, 30c, 32c, 34c, 36c, 42c, 44c, 52c, Tel: AVenue 2-0550
See ad on page 554

Poly-Scientific Corp., Va., 8c, 30c

Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 6c, Tel: WEstmore 9-4092
See ad on page 592

Precision Mechanisms Corp., N.Y., 24s

Premier Instrument Corp., 33 New Broad St., Port Chester, N.Y., 6c, Tel: WEstmore 9-8900
See ad on page 383

Pyrocircuits Div., Microtron Inc., 6 Manhasset Ave., Port Washington, L.I., N.Y., 8c, 36c, Tel: POrt Washington 7-3949
See ad on page 502

Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 6, Tel: OVerbrook 1-5600
See ad on page 314

Radar Relay, Inc., Calif., 42c

Radio Corp. of America, N.J., 6s

Radio Engineering Products, Canada, 22s

Rantec Corporation, Calif., 18sc

Raytheon Co., Microwave & Power Tube Div., Mass., 18sc

Raytheon Co., Special Microwave Devices Operations, Mass., 18sc

Revere Corp. of America, Subsid. Neptune Meter Co., Conn., 32c

Rhodes, Inc., M. H., Conn., 8c

Rodale Mfg. Co., Inc., Pa., 2s, 34s, 36s, 46s, 52s

Rosemount Engineering Co., Minn., 4s

Rotary Devices Corp., N.Y., 8sc, 12sc, 36sc

Rotron Mfg. Co., Inc., N.Y., Assembly Interlocks

Rowan Controller Co., Elec. Mfg., 4s, 34s, 48s, 50s

Royal Electric Corp., Div. TIF, R.I., 34s, 36s

San Diego Scientific Corp., Calif., 36c

Sanborn Electric Co., Ill., 4s, 8s, 36s

Satterlee Electric Corp., N.Y., 16sc, 24sc, 34sc, 44sc, 52sc, Inverters

Scaico Controls, Inc., N.J., 16sc, 36c

Scientific Electronic Labs., N.J., 26sc

Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 36c, Tel: CRestview 4-8542
See ad on page 507

Shalleross Mfg. Co., 20 Preston St., Selma N.C., 12s, 28s, 34s, 36s, 44s, Tel: WOodlawn 5-2341
See ad on page 258

Shepard Laboratories, Inc., N.J., 8c

Sigletmaster Corp., R.I., 4s

Sigma Electronics Research Corp., Wash., 6c

Sigma Instruments, Inc., 41 Pearl St., South Braintree 85, Mass., 36c, Tel: VIctor 3-5000
See ad on page 518

Singer Mfg. Co., Elec. Comp., 36c

Sivers Lab., Sweden, 6s

Slip Ring Co. of America, Calif., 8c, 36c

Sloan Company, The, Calif., 12sc, 28sc, 34sc, 50sc

Smith, Inc., Herman H., N.Y., 22s, 28s, 30s, 32s, 34s, 36s, 40s, 44s, 52s

Smith Mfg. Co., J. & H., N.Y., 12s, 36s, 44s

Solar Systems, Inc., Ill., 38c

Spectrol Electronics Corp., Calif., 36c, 44c

Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 18c, Tel: REdwood 6-4161
See ad on pages 100-101

Stackpole Carbon Co., Pa., 36sc, 40sc, 44sc

Standard Electrical Products Co., Ohio, 30c, 32c, 34c, 36c, 50c, 52c, 54c

Stelma, Inc., Conn., 16sc, 38c

Stevens Mfg. Co., Inc., P.O. Box 1007, Mansfield, Ohio, 48c, Tel: TUxedo 4-1311
See ad on page 224

Strand Engineering Co., Mich., 6c

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 22s, 34s

Subminiature Instruments Corp., Calif., 36c

Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 22sc, 28sc, 34sc, 36s, 44sc, Tel: SPring 4-1515
See ad on page 554

Sylvania Electric Products Inc., N.Y., 18sc, 38sc

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 18, Tel: YOrkshire 8-6211
See ad on pages 48-49
TRG, Incorporated, N.Y., 18c
Tally Register Corp., Wash., Logic sc
Tapeswitch Corp. of America, N.Y., 10sc, 12sc, 20sc, 24sc, 28sc, 44sc, 46sc
Taurus Corporation, 8 Coryell St., Lambertville, N.J., 12c, Tel: EXport 7-1571
See ad on page 558
Tech Laboratories, Inc., Bergen & Edsall Blvds., Palisades Park, N.J., 6c, 16sc, 32c, 34c, 36sc, 42c, 44c, 46c, 48c, 50c, 52c, 54c, Tel: WIndsor 4-2221
See ad on page 555
Technical Wire Products, Inc., N.J., 10c
Technology Instrument Corp., Mass., 8c, 12c
Telechrome Mfg. Corp., N.Y., 8c, 16c
Telecomputing Corp., Calif., 42s
Telex, Inc., Dept. SP-101, 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 34sc, Tel: MIdway 6-7211
See ads on pages 456, 556
Texas Instruments Incorporated, Metals & Controls Div., Mass., 4c, 10c, 16c, 24c, 28c, 32c, 48c
Thermal Controls, Inc., 41 River Rd., North Arlington, N.J., 48sc, 50sc, Tel: NOrth 1-1000
See ad on page 450
ThermoCal, Inc., Calif., 16, 26, 32, 36, 44, 48
Thermo Electric Co., Inc., N.J., 22sc, 34sc, 36sc
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 6sc, 8c, 16c
Thomson Mfg. Co., Judson L., Mass., 10sc, 36sc, 40sc, 46sc
Torsion Balance Co., The, N.J., 52sc
Transco Products, Inc., Calif., 6sc
Transistor Electronics Corp., 3358 Republic Ave., Minneapolis 26, Minn., 16sc, 28sc, 34sc, Tel: WEst 9-6754
See ad on page 472
Transitron Electronic Corp., Mass., 38s
Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 16, 50, Tel: LOwell 7-3810
See ad on page 520
Tricon Mfg. Co., Ill., 10sc, 14sc
Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 6sc, 22sc, Tel: EMpire 2-3700
See ad on page 454
Tubular Rivet & Stud Co., Mass., 10c
Ucinite Co., Div. United-Carr Fastener Corp., Mass., 32, 36
Ulanet Co., George, 416 Market St., Newark 5, N.J., 12c, 48sc, 50sc, Tel: MArket 2-4876
See ad on page 560
United Components, Inc., 105 Lincoln Ave., Orange, N.J., 38sc, Tel: ORange 3-6422
See ads on pages 453, 541
United Control Corp., Wash., 36sc, 48sc, 54sc
United Electric Controls Co., Mass., 12sc, 24sc, 32sc, 48sc
United International Dynamics Corp., Mass., 40s
United States Instrument Corp., Va., 34c, 36c, 48c
U. S. Relay-Electronics, Calif., 42c
Universal Circuit Controls, Ill., 16c, 20c, 22c, 24c, 28c, 34c, 36c, 44c
Valverde Labs., N.Y., 48c
Vap-Air Div., Vapor Heating Corp., Ill., 48c
Vemaline Products Co., N.J., 20sc, 34sc
Virginia Electronics Co., Inc., D.C., 20c, 54c
Waage Electric, Inc., N.J., 50c
Walsco Electronics Mfg. Co., Div. of G-C Textron Electronics, Inc., 400 S. Wyman St., Rockford, Ill., 22s, 34s, 52s, Tel: WOodland 8-9661
See ad on page 640
Wang Laboratories, Inc., Mass., 8c
Ward Leonard Electric Co., N.Y., 34s
Westinghouse Electric Corp., Semiconductor Dept., Pa., 38sc
Wheaton Engineering Corp., Ill., 50c
Wheelock Signals, Inc., N.J., 42sc
Wilson Div., H. A., Engelhard Industries, Inc., U. S. Highway 22, Union, N.J., 10, 12, 14, 32, 48, Tel: MUrdock 6-6600
See ad on page 170
Winchester Electronics, Inc., Conn., 10sc
Winslow Co., Inc., The, N.J., 34s, 36s, 46s
Wood Electric Co., Inc., Mass., 4sc
Zenith Electric Co., Ill., 50sc, 54c




**TELEX**

*miniaturized pushbutton switches*

For lower cost with increased reliability, TELEX General Purpose and Binary-Encoding switches completely avoid the multiplicity of parts necessary in a conventional switch array to perform the functions of stacking switch contacts, latching and releasing buttons.

**GENERAL PURPOSE SWITCH**—10 button array, up to 8 form type A or B contacts for each button. Overall dimensions: 6¾" x ¾" x 1½" depth.

**BINARY-ENCODING SWITCH**—10 button array, binary coded output of the decimal digits. Overall dimensions: 8¾" x ⅜" x ¾" depth.

**Other important features are:**

POSITIVE interlock against actuation of more than one button in any desired array of buttons • HIGH contact pressure • THOROUGH wiping action between contact elements • RUGGED design to withstand shock vibration • ENCLOSURE of all moving parts (except buttons) protect against dirt • EXTREMELY high reliability and long life • SMALL—approximately one inch of depth required behind panel for mounting • LIGHTWEIGHT • INDICATORS optional • VARIATIONS can be designed to your specifications.

*Detailed specifications are available on request. Write:*

**TELEX, INC.**

*Special Products Division*

Telex Park, St. Paul 1, Minnesota—SP-101

For details, circle #560 on Reader Service Card


**TR tubes:**
See class 79

**Tachometers:**
See class 60

**Tape & wire recorders:**
See class 29

**Tape & wire, recording:**
See class 65

**Tape recording equipment, computer:**
See class 9

**Tape splicing equipment:**
See class 65

**Tees:**
See class 83

**Telephone relays:**
See class 68

**Television picture tubes:**
See class 77

## 73. Terminals.

5. Blocks & strips
10. Printed circuit
15. Rivet or stud
20. Wire end

ADC Incorporated, 2863 13th Ave. S., Minneapolis 7, Minn., 5c, Tel: PArkway 1-5551
See ad on page 564
AMP Incorporated, Pa., 5s, 10s, 20s
A-1 Precision Products, Calif., 5c
Accurate Electronics Corp., Ohio, 5sc
Acrolite Electronics Corp., N.J., 5sc
Aeronautical Electric Co., 5656 Northwest Highway, Chicago 46, Ill., 5c, Tel: SPring 4-5200
See ad on page 471
Airdesign Corp., Pa., 20c
Alac, Incorporated, Calif., 5s, 10s, 15s
Alcon Metal Products, Inc., Ill., 5c, 10c, 15c, 20c
Alden Products Co., 140 N. Main St., Brockton 64, Mass., 5s, 10s, 15s, Tel: JUniper 3-0160
See ad on page 496
Allen-Bradley Co., Wis., 5s
Allied Allergri Co., Inc., N.J., 5c
Amatom Electronic Hardware Co., Inc., N.Y., 5sc, 10c
American Brass Co., The, Fabricated Metal Goods Div., N.Y., 20c
Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 5s, 10s, Tel: BIshop 2-1000
See ad on page 146
Argonne Electronics Mfg. Corp., N.Y., 5s
Armel Electronics, Inc., N.Y., 5sc, 15sc
Associated Spring Corp., Conn., 20c
Auto-Swage Products, Inc., Conn., 10c, 15c, 20c

**Synchros:**
See class 60





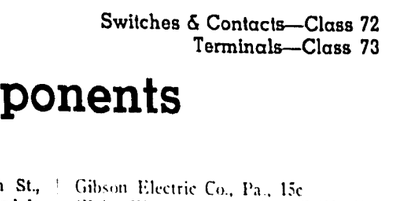


# Directory II. Components

## 73. Terminals.

Automatic Coil Co., Inc., 195 Sackett St., Brooklyn 31, N.Y., 5c, Tel: ULster 2-5454
See ad on page 399
Autotron, Inc., Calif., 5c
Bellandi Co., Inc., M., Ill., 5c, 10c, 15c, 20c
Belling & Lee Ltd., Great Cambridge Rd., Enfield, Middlesex, England, 5s, 10s, Tel: ENfield 3322
See ad on page 411
Berg Mfg. Corp., Pa., 5sc, 10sc, 20sc
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 5sc, 20s, Tel: WOrth 6-5611
See ad on page 607
Buchanan Electrical Products Corp., 607 U. S. Highway 22, Hillside, N.J., 5s, 20s, Tel: WAverly 3-7474
See ad on this page
Burndy Corp., H. H. Buggie Div., Ohio, 5
Burndy Corp., Omaton Div., Richards Ave., Norwalk, Conn., 5s, 20s, Tel: TEmple 8-4444
See ad on page 411
Camblock Corp., Div. Willor Mfg., N.Y., 5
Cambridge Thermionic Corp., Mass., 5sc, 10sc, 15sc
Chester-Morton Electronics Corp., Pa., 5c
Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, Tel: NEvada 2-2000
See ad on pages 46-47
Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 10s, 15s, Tel: WOodland 7-1113
See ad on page 471
Cleveland Metal Specialties Co., Ohio, 10sc
Coil Winders, Inc., N.Y., 5c
Cole Electric Co., Calif., 10c
Comco Plastics, Inc., N.Y., 5c
Continental Connector Corp., N.Y., 5c
Cook Electric Co., Ill., 5sc
Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 10c, Tel: FOrest 2-5571
See ads on pages 390, 523
Curtis Development & Mfg. Co., Wis., 5s
Dante Electric Mfg. Co., Conn., Solderless s
Davies Molding Co., Harry, Ill., 5c
Davis Electronics, Inc., Calif., 5s
Duralith Corp., Pa., 5c
Eby Co., Hugh H., Pa., 5c
Electric Terminal Corp., R.I., 5s, 10s, 15s, 20s
Electrical Industries, Div. Philips Electronics & Pharmaceutical Industries Corp., 691 Central Ave., Murray Hill, N.J., Hermetically Sealed s, Tel: CRest-view 7-4300
See ad on page 180
Electro-Chemical Engraving Co., Inc., N.Y., 10c
Electronet Div., Rue Prods., Calif., 5c, 10c
Electronic Mechanics, Inc., N.J., 5c, 15c
Electronic Plastics Corp., Mass., 5c, 10s, 15s
Enflo Corporation, N.J., 10sc
Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5s, 10s, Tel: GLendale 6-8592
See ad on pages 40-41
Excellex Electronics, Inc., N.Y., 5sc
Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 5s, Tel: IRving 8-5744
See ad on page 642
Fidelity Amplifier Co., Ill., 5c
Fisher & Crome, Pa., 5c
Franklin Fibre-Lamitex Corp., N.Y., 5c, 10c
G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5s, Tel: WOodland 8-9661
See ad on page 640
GOE Engineering Company, Calif., 5sc, 15sc
Galaxy Engineering Corp., Calif., 5sc, 10sc, 15sc, 20sc
Garde Mfg. Co., R.I., 5s, 10s
Garlock Electronic Products, Garlock, Inc., N.J., 15sc
Gemco Electric Co., Mich., 5s
General Circuits, Inc., N.Y., 10c
General Electric Co., Apparatus Sales Div., N.Y., 5s
General Products Corp., N.Y., 5sc
Gibson Electric Co., Pa., 15c
Globe Electrical Mfg. Co., Calif., 15sc
Godfrey Mfg. Co., Ill., 5c
Goodrich Aviation Products, B. F., Ohio, 5sc
Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 15c, Tel: YOnkers 8-8400
See ad on page 416
Hallett Mfg. Co., Calif., 20s
Hamilton Standard, Conn., 10c
Hassall, Inc., John, N.Y., 15c
Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 5sc, 20sc, Tel: WYman 8-8080
See ad on page 450
Hobson Bros., Inc., Ill., 5c
Hollingsworth Company, Pa., 20s
Hunter Tool Co., Calif., 20s
IE Manufacturing, Ill., 20s
Industrial Electronic Hardware Corp., N.Y., 5sc, 10c
Intercontinental Electronics Corp., N.Y., 5c
Janco Corp., Calif., 5c
Jones Div., Howard B., Cinch Mfg. Co., 1026 S. Homan Ave., Chicago 24, Ill., 5s, 10s, Tel: NEvada 2-2000
See ad on pages 46-47


**No other terminal block — sectional or one-piece gives you all the advantages of**



**BUCHANAN**
**MD sectional pres-SURE-blocks**

**NO WASTE CIRCUITS**—Reduce material costs, save space. Supplied assembled in 20 snap-fit section lengths. Pull off or add groups for any length block.

**SMALLER INVENTORY**—Only 2 different parts (contact and end sections). No running out of needed items.

**MORE CIRCUITS IN AVAILABLE SPACE**—Increase contact capacity, decrease jumpering. Group common wires (equivalent to 1 #22 thru 1 #8) in tubular contacts. Contacts on 7/16" centers. 10 circuits 4 7/16", plus 2 1/32" for each complete block.

**NO TERMINALS OR LUGS**—Eliminate lugging costs. Tubular contacts provide secure, efficient connections.

**NO HIDDEN CIRCUIT MARKINGS**—Unobscured top marking area minimizes errors. Integral or separable strips.

**QUICKER TO INSTALL AND CHANGE**—Hand assembled, no fixtures or hardware. Mount only every 12 sections. Add circuits without removing mounting screws.

**LOW INSTALLED COST**—Competitive with conventional blocks of similar rating.

Separate Sections or Factory-Assembled Blocks
Flat Base or Channel Mounting • Tubular or Strap-Screw Contacts
Fanning Strips • Conservative 750-volt A.I.E.E. rating

Tubular contacts fully approved by U.L. Blocks fully approved for 600 V by C.S.A.

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BUCHANAN ELECTRICAL PRODUCTS CORPORATION, 607 U.S. 22 HILLSIDE, NEW JERSEY

In Canada: ESNA CANADA LIMITED
12 GOWER ST., TORONTO 16, ONT.

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100 E. 42nd St., NEW YORK, N. Y.

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# Directory II. Components

## 73. Terminals.

Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5sc, Tel: DAvenport 4-4108
See ad on page 402

Miller Co., J. W., Calif., 5sc

Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 10 Metallized Ceramic, Tel: WAverly 6-2250
See ad on page 452

Molding Corporation of America, R.I., 5c, 10c, 15c, 20c

Molex Products Co., Ill., 5sc, 10sc, 20sc

Murdock Corp., The, Mass., 5sc

Mykroy, Inc., Ill., 5sc

National Multi-Products Co., Ill., 5c

National Tel-Tronics Corp., 53 St. Casimir Ave., Yonkers, N.Y., 5sc, 10sc, 15sc, 20sc, Tel: YOnkers 8-6400
See ads on this page

Noesting Pin Ticket Co., Inc., 732 E. 136th St., New York 54, N.Y., 20c, Tel: MO 9-6465
See ads on pages 559, 647, 705

North Electric Co., Ohio, 5sc

PIC Design Corp., N.Y., 5s

Pacific Automation Products, Inc., Calif., 10c

Permonite Mfg. Co., Ill., 5sc

Philips Electronics Industries Ltd., Canada, 10s

Photo Chemical Products Co., 999 Stewart Ave., Garden City, L.I., N.Y., 5, Tel: PIoneer 1-6500
See ad on page 636

Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N.Y., 10c, Tel: ORiole 6-8000
See ad on page 500

Precision Metal Products Co. of Malden, Inc., Mass., 5sc, 10c, 15sc

Radio Engineering Products, Canada, 5s

Rimak, Inc., Calif., 15c, 20sc

Rogers Mfg. Co., Dayton, Minn., 5c, 10c

Rowan Controller Co., The, Md., 5s

Sangamo Electric Co., Ill., 5s

Shakeproof Div., Illinois Tool Works, Ill., 20sc

Slip Ring Co. of America, Calif., 5c

Smith, Inc., Herman H., N.Y., 5s

Sphere Co., Inc., The, N.J., 15sc

States Company, The, Conn., 5sc

Stewart Stamping Co., N.Y., 20sc

Stimpson Co., Inc., Edwin B., 77 Franklin Ave., Brooklyn 5, N.Y., 15c, 20c, Tel: ULster 5-3131
See ad on page 652

Strat-O-Seal Mfg. Co., Ill., 15c

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5s

Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 15s, Tel: LUdlow 2-9561
See ads on pages 412, 468, 494, 572, 586

Taurus Corporation, 8 Coryell St., Lambertville, N.J., 5s, 15s, 20s, Tel: EXport 7-1571
See ad on page 558

Tech-Art Plastics Co., N.J., 5c

Tektronix, Inc., Ore., 5s

Thomas & Betts Co., Inc., The, 36 Butler St., Elizabeth 1, N.J., 5sc, 20sc, Tel: ELizabeth 4-4321
See ad on page 414

Thompson-Bremer & Co., Div. American Machine & Foundry Co., Ill., 20s

Thomson Mfg. Co., Judson L., Mass., 15sc

Three Point One Four Corporation, 24 Woodworth Ave., Yonkers, N.Y., 5sc, 15sc, Tel: GReenleaf 6-4440
See ad on page 387

Torrington Co., The, Conn., 20c

Tri-Dex Co., Calif., 5c

Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 5sc, Tel: EMpire 2-3700
See ad on page 454

Tubular Rivet & Stud Co., Mass., 15c

Twin Lock, Inc., Calif., 5s

United International Dynamics Corp., Mass., 10c


**TERMINAL LEADS**
for
- resistors
- capacitors
- transistors
- diodes

*and other applications*

**WIRE FORMS** *all types*

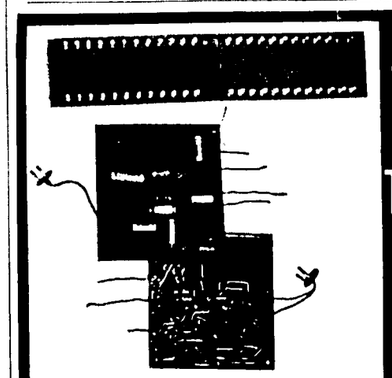
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all in a wide variety of metals and alloys to your specifications

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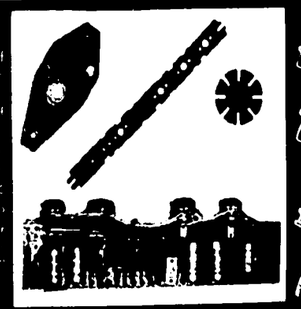
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TERMINALS and SUB-ASSEMBLIES

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New 36 page catalog of standard and custom-made Electronic Component Parts.

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## 73. Terminals.

Keystone Electronics Corp., N.Y., 5sc, 15sc, 20sc

Kolton Electric Mfg. Co., N.J., 5sc

Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 5s, 10s, 15s, Tel: MOunt Vernon 4-4024
See ads on pages 551, 558

Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 5s, 20s, Tel: GRaceland 7-7900
See ad on page 454

Lacey Engineering & Mfg. Co., Ill., 10c

Laminated Sheet Products Corp., Mass., 5c

La Pointe Industries, Inc., Conn., 10sc

Lerco Electronics, Inc., Calif., 5sc, 10sc, 15sc, 20sc

Litton Industries, U. S. Engineering Co. Div., Calif., 5sc, 10sc, 15sc

Lytle Corporation, 1404 San Mateo Blvd. S.E., Albuquerque, N.M., 10sc, Tel: ALpine 5-8169
See ad on page 201

Malco Manufacturing Co., Ill., 5s, 10s, 15s, 20s

Mandex Manufacturing Co., Inc., Ill., 5s

Marathon Electric Mfg. Corp., Wis., 5s

Marine View Electronics, Inc., N.Y., 5c, 15c

Mechanical Engraving Co., Inc., N.Y., 5c

Micarta Fabricators, Inc., Ill., 5c, 10c


# KULKA TERMINAL BLOCKS

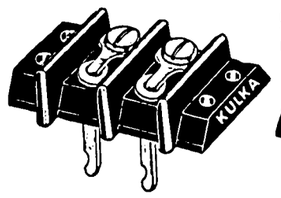
## MOLDED BARRIER CONSTRUCTION

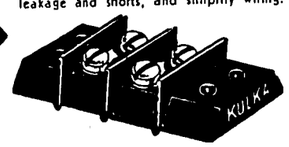
Kulka terminal blocks, used extensively in electrical and electronic assemblies, eliminate splicing, increase insulation, stop leakages and shorts, and generally simplify wiring work.

Molded of high tensile strength bakelite for general commercial use, they are available in other materials made in full compliance with latest military specifications, MIL-M-14E, covering CFG, MFE, MME, MDG, MAI-60, GDI-30, PM14, and other types of special plastics.

Kulka terminal blocks are made in many styles and sizes for varied applications. With 1 to 26 terminals, depending on size. Supplied with or without marker strips which may be printed or plain, or blocks can be engraved.

### WIDEST SELECTION OF TYPES AND SIZES





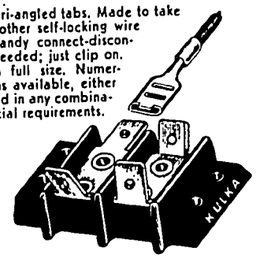
Used extensively in electronic and electrical assemblies, Kulka Terminal Blocks eliminate splicing, increase insulation, stop leakage and shorts, and simplify wiring. In widest range of types, sizes, insulating materials, terminals, etc. Here shown are two types of popular 600 Series. There's a Kulka Terminal Block for every need!

### "KLIPTITE" BLOCKS

Available with vari-angled tabs. Made to take AMP, Burndy or other self-locking wire lugs. Fast and handy connect-disconnect; no screws needed; just clip on. 800 Series shown full size. Numerous tab variations available, either flat or angled, and in any combination to meet special requirements.

SERIES 800

Shown full size

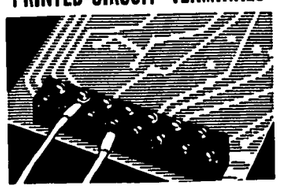


### MINIATURE BLOCKS



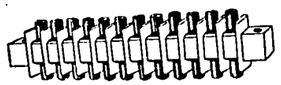
409 Series is ideal for miniaturization. Shown full size. Only 4¾" long for 21 terminals. 5/16" wide with barriers. Also available with one-sided and two-sided soldering lug. Also with threaded holes taking 4-40 screws for mounting through chassis, if desired.

### PRINTED-CIRCUIT TERMINALS



Simplify those external connections to printed-circuit boards, no matter how jammed up. Kulka 520 Series miniature terminal blocks mount on board. Terminal pins below slip into standard mounting holes for dip-soldering. Screw terminals. Readily connected or disconnected. 2 to 24 terminals. Entire assembly can be encapsulated.

### NAVY BOARDS



Heavy-duty terminal blocks in the widest range of types, materials, sizes. Here shown one-quarter size is a Navy Terminal Board made to drawing 9000, Series S6505 B, 73214, Rev. H. Supplied in MAI-60 glass-filled Alkyd as per MIL-M-14 with latest revision. Threaded studs of manganese-bronze, molded in plastic. Slotted brass nuts. Typical of the "specials" developed and produced by Kulka.

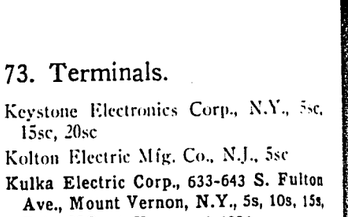
*Write for latest KULKA Terminal Block Catalog!*

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Telephone: MOunt Vernon 4-4024 — 4025 — 4026 — 4027

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Taurus Terminals are accepted and approved by major users. Taurus is a completely integrated, experienced and quality minded manufacturer of terminals.

Taurus also produces Punched Card Sensors.

* *Trademark of E. I. Dupont de Nemours Co.*

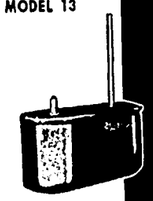
TAURUS CORPORATION
8 Coryell Street
Lambertville, N.J.



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MODEL 13


MODEL 24


MODEL 11

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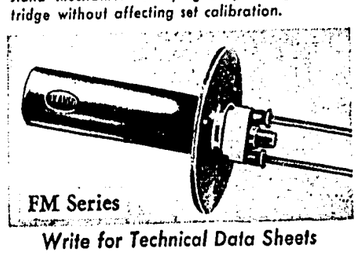


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## 73. Terminals.

U. S. Dielectric Products, Inc., Mass., 5c
United States Electronics Corp., N.J., 5c
Vaco Products Co., Ill., 20s
**Vector Electronic Co., Inc., 1100 Flower St., Glendale 1, Calif., 5s, 15s, 20s, Tel: CHapman 5-1076**
See ad on page 544
Waldom Electronics, Inc., Ill., 5s, 20s
Warren Components Div., El-Tronics, Inc., Pa., 5c
Western Union Telegraph Co., The, N.Y., 5s
Whitso, Inc., Ill., 5c, 15s, 20s
Winchester Electronics, Inc., Conn., Inc., 10sc, 15sc, 20sc
Zierick Mfg. Corp., N.Y., 20s

**Terminations, waveguide:**
See class 83

**Test clips, jacks & leads:**
See class 55

**Test equipment:**
See Directory I

**Thermal switches:**
See class 72

**Thermistors:**
See class 69

## 74. Thermostats.

5. Bellows
10. Bimetal
15. Hermetically sealed

Advanced Electronics, Inc., Conn., Thermocouples c
American Instrument Co., Inc., Md., 10s
American Thermo Electric Co., Calif., Thermocouples sc
Anthony & Co., J. L., R.I., 10c
Associated Electrical Industries Ltd., Instrumentation Div., England, 10s
**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 10sc, Tel: WOodland 8-6833**
See ad on page 465
Bristol Co., Conn., 10c
Burling Instrument Co., N.J., 10sc
**Clark Crystal Co., Inc., 2 Farm Rd., Marlboro, Mass., 15s, Tel: HUntley 5-1411**
See ad on page 429
Cox & Co., Inc., N.Y., 10c, 15c
Dictograph Products, Inc., N.Y., 10s
Du-Co Ceramics Co., Pa., Thermocouples c
Edison Industries, Thomas A., Instrument Div., N.J., 10s, 15s
Electro-Seal Corp., Ill., 15c
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 10sc, 15sc, Tel: BIgelow 2-2700**
See ad on page 170
Fasco Industries, Inc., N.Y., 10sc, 15sc
Fire Control Co., Inc., Del., 10s, 15s
Flexonics Corporation, Ill., 5c, 15c
G-V Controls, Inc., N.J., 10sc, 15sc
General Controls Co., Calif., 10s
Goodrich Aviation Products, B. F., Ohio, 5c
**Hart Manufacturing Co., 265 Bartholomew Ave., Hartford 1, Conn., 5sc, Tel: JAckson 5-3491**
See ad on page 515
Kanthal Corp., The, Conn., Thermocouples sc
Mercoid Corp., The, Ill., 5s, 10s
Minneapolis-Honeywell Regulator Co., Twin Cities, Minn., 5s, 10s
Minnesota Rubber Co., Minn., 5c
Modern Laboratory Equipment Co., N.Y., 5c, 10c, 15c
Pace Engineering Co., Calif., Thermocouple Reference sc
Partlow Corp., N.Y., 15s
Philadelphia Scientific Glass Co., Pa., 15s
Pyro-Electric, Inc., Ill., Thermocouples sc
Richards Co., Inc., Arklay S., Mass., Thermocouples s
Robertshaw-Fulton Controls Co., Fulton Sylphon Div., Tenn., 5c
Scaico Controls, Inc., N.J., 5c, 10sc, 15c
Smith Mfg. Co., Inc., E. C., Pa., Thermocouples sc
Staver Co., Inc., The, N.Y., 10c
**Stevens Mfg. Co., Inc., P.O. Box 1007, Mansfield, Ohio, 10c, 15c, Tel: TUxedo 4-1311**
See ad on page 224
Temperature Engineering Corp., N.J., 5sc, 10sc, 15sc
Texas Instruments Incorporated, Metals & Controls Div., Mass., 10c, 15c, Snap-Acting c
**Thermal Controls, Inc., 41 River Rd., North Arlington, N.J., 15sc, Tel: NOrth 1-1000**
See ad on page 450
ThermoCal, Inc., Calif., 5, 10, 15
Trinity Equipment Corp., N.Y., Thermocouples sc
**Ulanet Co., George, 416 Market St., Newark 5, N.J., 10sc, 15sc, Tel: MArket 2-4876**
See ad on this page
United Control Corp., Wash., 10sc, 15c
United Electric Controls Co., Mass., 5sc, 15sc
Valverde Labs., N.Y., 10c, 15c
Vap-Air Div., Vapor Heating Corp., Ill., 15c
Waage Electric, Inc., N.J., 10c
Wilcolator Co., N.J., 5c, 10c, 15c
**Wilson Div., H. A., Engelhard Industries, Inc., U. S. Highway 22, Union, N.J., 10, Tel: MUrdock 6-6900**
See ad on page 170

**Thyratrons:**
See class 78

**Time delay generators:**
See class 21

**Time delay relays:**
See class 68





# Directory II. Components

**Timers:**
See class 58

**Timing motors:**
See class 60

**Toggle switches:**
See class 72

**Toroidal coils:**
See class 45

**Toroidal cores:**
See class 48

**Toroidal transformers:**
See class 76

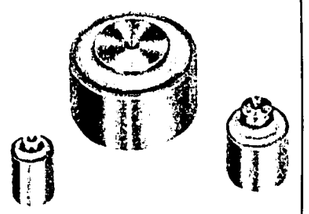
**Towers:**
See class 39

## 75. Transducers.

5. Electro-mechanical
10. Photo electric
15. Thermo electric

Aero Mechanism, Inc., Calif., 5sc
Aero Research Instrument Co., Inc., Ill., 15s
Allegany Instrument Co., Inc., Md., 5s
Altec Lansing Corp., Calif., 5s
Ansco Division, General Aniline & Film Corp., N.Y., 5sc
**Applied Electronics Corp. of New Jersey, 22 Center St., P.O. Box 43, Metuchen, N.J., 5sc, Tel: LIberty 9-1500**
See ad on page 353
Armour Corp., Calif., 5s, 15s
Atlantic Research Corp., Va., 5sc
Avdom Electronics, Calif., 5c
Automatic Timing & Controls, Inc., Pa., 5sc
Automation Dynamics Corp., N.J., 5c, 15c
B & F Instruments, Inc., Pa., 5s
BJ Electronics, Borg-Warner Controls, Calif., 5sc, 15sc
Baldwin-Lima-Hamilton Corp., Electronics & Instrumentation Div., Mass., 5s
**Barber-Colman Co., Dept. J, 1256 Rock St., Rockford, Ill., 15sc, Tel: WOodland 8-6833**
See ad on page 465
Barnes & Reinecke, Ill., 5c
Beckman Instruments, Inc., Berkeley Div., Calif., 5s, 10s
Bell & Whitley, Inc., Calif., 15s
Bell Aircraft Corp., Avionics Div., N.Y., 5c
Bendix Corp., The, Montrose Div., Pa., 5sc
Beverly Scientific Co., Calif., 5sc
Biophysical Electronics, Inc., Pa., 5s, 10c
Bourns, Inc., Calif., 5sc
Branson Ultrasonic Corp., Conn., 5s
Bristol Co., Conn., 5c, 10c, 15c
Bruel & Kjaer, A/S, Denmark, 5s
Brush Instruments, Div. Clevite Corp., Ohio, 5sc
Bytrex Corp., Mass., 5c
CBS Labs., Div. Columbia Broadcasting System, Inc., Conn., 5c
Canadian Aviation Electronics Ltd., Canada, 5c
Cathodeon, Ltd., Meadowcroft Labs., England, 10c
Cetron Electronic Corp., Ill., 10sc
Chesapeake Instrument Corp., Md., 5sc
Chicago Aerial Industries, Inc., Ill., 5c, 10c
Cinandagraph, Inc., Ill., 5sc
Clark Co., Inc., Mass., 5c
**Clark Electronic Laboratories, Box 165, Palm Springs, Calif., 5s, 10s, Tel: FAirview 8-2210**
See ad on this page
Clevite Electronic Components, Div. Clevite Corp., Ohio., 5sc, Depth Sounders sc
Collins Corp., G. L., Calif., 5sc
Colvin Laboratories, Inc., N.J., 5c
**Computer Instruments Corp., 90 Madison Ave., Hempstead, L.I., N.Y., 5sc, Tel: IVanhoe 3-8200**
See ad on pages 528-529
Consolidated Controls Corp., Conn., 5c
Consolidated Electrodynamics Corp., Calif., 5s
Corbett Science Laboratories, F. W., Calif., 5c
**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 5c, Tel: FOrest 2-5571**
See ads on pages 390, 523
Crescent Engineering & Research Co., Calif., 5sc
Dayton Electronic Products Co., Ohio, 5sc
Daytronic Corp., Ohio, 5s
Decker Corporation, The, Pa., 5s
Dietz Co., Inc., N.J., 10sc
Designers for Industry, Inc., Ohio, 5c
Dicon Corporation, N.Y., 5c, 10c, 15c
Dietz Co., Inc., Henry G., N.Y., 5s
Dmeter Mfg. Co., Inc., N.Y., 10sc, 15sc
Donner Scientific Co., Subsid. Systron-Donner Corp., Calif., 5c
Dychro Corp., Mass., 10c
Dymec, Div. Hewlett-Packard Co., Calif., 10s
Dyna Magnetic Devices, Inc., N.Y., 5sc
Dynapar Corporation, Ill., 5s, 10s
Dynisco, Inc., Mass., 5sc
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 15c, Tel: HAlifax 6-7491**
See ad on page 400
E.M.I.-Cossor Electronics, Ltd., Canada, 5sc
Ebauches, S. A., Dept. Semiconducteurs, Switzerland, 10s
Edcliff Instruments, Calif., 5
Edison Industries, Thomas A., Instrument Div., N.J., 5s, 15s
Edo Corp., N.Y., 5c
Electric Regulator Corp., Conn., 5sc
Electric Specialty Co., Conn., 5c
Electro-Mechanical Research, Inc., Fla., 5s
Electro Products Laboratories, Inc., Ill., 5sc
Electro-Sonic Laboratories, Inc., N.Y., 5c
Electronic Assistance Corp., N.J., 5sc
Endevco Corp., Calif., 5sc
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5s, Tel: BIgelow 2-2700**
See ad on page 170
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5sc, Tel: GLendale 6-8592**
See ad on pages 40-41
Erwood, Inc., Ill., 5c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c
Fairchild Controls Corp., Components Div., N.Y., 5sc
Fischer & Porter Co., Pa., 5c, 15c
Flexonics Corporation, Ill., 5c, 15c
Flow Corporation, Mass., 15sc
Garrett Corp., The, Calif., 5c
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 5c, Tel: GRanite 6-4411**
See ads on pages 263, 267, 435, 437, 501, 621


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## 75. Transducers.

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Electro Products Laboratories, Inc., Ill., 5sc
Electro-Sonic Laboratories, Inc., N.Y., 5c
Electronic Assistance Corp., N.J., 5sc
Endevco Corp., Calif., 5sc
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5s, Tel: BIgelow 2-2700**
See ad on page 170
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5sc, Tel: GLendale 6-8592**
See ad on pages 40-41
Erwood, Inc., Ill., 5c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c
Fairchild Controls Corp., Components Div., N.Y., 5sc
Fischer & Porter Co., Pa., 5c, 15c
Flexonics Corporation, Ill., 5c, 15c
Flow Corporation, Mass., 15sc
Garrett Corp., The, Calif., 5c
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 5c, Tel: GRanite 6-4411**
See ads on pages 263, 267, 435, 437, 501, 621

**Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.**

General-Electro Mechanical Corp., N.Y., 5sc
General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c
Genisco, Incorporated, Calif., 5s
Geotechnical Corporation, The, Tex., 5s
Geotronic Labs., Tex., 5c
Giannini Controls Corp., Calif., 5sc, 10c
Gjadny Corp., Richard, N.Y., 5c
Goodmans Industries, Ltd., Axiom Works, England, 5sc
Greenleaf Mfg. Div., Mandrel Industries, Inc., Mo., 5s
**Guardian Electric Mfg. Co., 1672 W. Carroll Ave., Chicago 7, Ill., 5c, Tel: CHesapeake 3-1100**
**See ad on page 512**
Gulton Industries, Inc., N.J., 5sc
Gyrex Corp., The, Calif., 5c
Hallicrafters Co., The, Ill., 5c
Hamilton Standard, Div. United Aircraft Corp., Conn., 5c
Harris Transducer Corp., The, Conn., 5sc, 15c
Harrison Electrosonics, Inc., B. M., Mass., 5c
Hehn, Lester, C., N.Y., 10c
Hoffman Electronics Corp., Calif., 5sc
Humphrey, Inc., Calif., 5c
**Inertia Switch, Inc., 311 W. 43rd St., New York 36, N.Y., 5s, Tel: JUdson 6-5880**
**See ad on page 551**
Instrument Development Laboratories, Inc., Mass., 5c, 10c
International Resistance Co., Pa., 5s
Isomet Corp., N.J., 10c
JEM Electronics Corp., Ill., 10c
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 5sc, Tel: CLifford 6-4000**
**See ad on pages 120-121**
Kistler Instrument Corp., N.Y., 5s
**Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst 73, N.Y., 5sc, 10sc, Tel: TWining 9-5600**
**See ad on page 268**
**Korfund Co., Inc., 22D Cantiague Rd., Westbury, L.I., N.Y., 5s, Tel: RAvenswood 9-7580**
**See ad on page 587**
Kulite Semiconductor Products, Inc., N.J., 5s
Lansing Sound, Inc., James B., Calif., 5s
**Leesona Corp., P.O. Box 1605, Providence 1, R.I., 15c, Tel: WIlliams 1-5200**
**See ad on page 674**
Lewis Engineering Co., The, Conn., 15s
Life Instrument Co., Inc., Mass., 5c, 10c
Lind Instruments, Inc., N.J., 5s
Link Division, General Precision, Inc., Palo Alto Lab., Calif., 5c, 15c
Lockheed Aircraft Corp., Electronics, Avionics & Industrial Products Divs., Calif., 5s, 10s
MacLaren & Co., Inc., F. B., N.Y., 10c
Mandrel Industries, Inc., Tex., 5s
Martin Co., The, Md., 15c
Massa Division, Cohu Electronics, Inc., Mass., 5sc
Maurey Instrument Corp., Ill., 5c
Maxson Corp., The W. L., Instruments Div., N.Y., 5s
Melpar, Inc., Special Products Dept., Va., 5c, 10sc, 15c
Micro Systems, Inc., Calif., 5c, 10c, 15c
Minatron Corp., N.J., 5sc
Minco Products, Inc., Minn., 15sc
Minneapolis-Honeywell Regulator Co., Boston Div., Mass., 5sc
Minneapolis-Honeywell Regulator Co., Ceramics Laboratory, Minn., 5c
Minneapolis-Honeywell Regulator Co., Fall River Div., Mass., 5s, 15s
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 5sc
Minneapolis-Honeywell Regulator Co., Twin Cities, Minn., 5s
Montek Associates, Inc., Utah, 5sc
Mullenbach Div., Electro Machinery Mfg. Co., Electronic Dept., Calif., 5c
Munzig International, Inc., Calif., 5s
N.R.K. Mfg. & Engineering Co., Ill., 5c
Nacimco Products, Calif., 5s, 15s
Naniloa Corporation, Ohio, 5c, 10c
Nilsen Mfg. Co., Ill., 5sc
**Northern Engineering Laboratories, Inc., 372 Wilmot Ave., Burlington, Wis., 5c, Tel: ROckwell 3-3591**
**See ad on page 433**
Ohio Semiconductors, Inc., Ohio, 5c
Pace Engineering Co., Calif., 5sc
Packard Bell Electronics Corp., Calif., 5sc, 15sc
Palomar Scientific Corp., Calif., 5c
Pam Associates, Inc., Md., 5c
Patterson Moos Research, Div. Leesona Corp., N.Y., 15c
Pearce-Simpson, Inc., Fla., 5sc
Philips Electronics Industries Ltd., Canada, 5s, 10s, 15s
Photo-Crystals, Inc., Ill., 10s
Photobell Co., Inc., N.Y., 10sc
Photocon Research Products, Calif., 5c
Photomation, Inc., N.J., 10s
Pickering & Co., Inc., N.Y., 5c
Plastics & Electronics Corp., N.Y., 10sc
Polyphase Instrument Co., Pa., 5sc
Potter Aeronautical Corp., N.J., 5c
Powertron Ultrasonics Corp., N.Y., 5c
**Presin Co., 2014 Broadway, Santa Monica, Calif., 10s, Tel: EXbrook 3-9728**
**See ad on page 519**
Pyro-Electric, Inc., Ill., 15sc
Radiation Electronics Co., Ill., 10s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 5s, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 5c
Ram Meter, Inc., Mich., 5c, 10c, 15c
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 5s
Raytheon Co., Equipment Div., Mass., 5s
Reeves Instrument Corp., N.Y., 5s
Rek-O-Kut, Inc., N.Y., 5c
Republic Electronic Industries Corp., N.Y., 5c, 10c, 15c
Research, Inc., Minn., 5c
Revere Corp. of America, Subsid. Neptune Meter Co., Conn., 5c, 15c
Richards Co., Inc., Arklay S., Mass., 15s
Rosemount Engineering Co., Minn., 5sc, 15sc
Ruge Associates, Inc., Arthur C., N.H., 15sc
**Sanborn Co., 175 Wyman St., Waltham 54, Mass., 5s, Tel: TWinbrook 4-6300**
**See ad on pages 64-65**
Sanders Associates, Inc., N.H., 5s
Sangamo Electric Co., Ill., 5c
Schaevitz Engineering, N.J., 5s
Servo Corp. of America, N.Y., 5c
Servomechanisms, Inc., Calif., 5c, 15c
Servonic Instruments, Inc., Calif., 5sc
Sheffield Corp., The, Subsid. The Bendix Corp., Ohio, 5sc, 15sc
Smith Mfg. Co. Inc., E. C., Pa., 15sc
Solartron Electronic Group Ltd., England, 5s
Solartron Inc., Calif., 5s
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 5c, Tel: EMpire 4-2271**
**See ad on page 420**
Southwestern Industrial Electronics Co., Texas, 5sc
Specialties, Inc., N.Y., 5c
Spectrol Electronics Corp., Calif., 5c
Sperry Gyroscope Co. of Canada Ltd, Canada, 5c
Standard Controls, Inc., Wash., 5sc
Stephens Trusonic Inc., Calif., 5sc
Stromberg-Carlson Div., General Dynamics Corp., N.Y., 5c, 15c
Subminiature Instruments Corp., Calif., 5sc
Taber Instrument Corp., N.Y., 5s
Technical Industries Corp., Calif., 5sc, 15sc
Technology Instrument Corp. of Calif., Calif., 5sc
Technology Instrument Corp., Mass., 5sc
Telechrome Mfg. Corp., N.Y., 5c
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 5c, Tel: YE 2-8600**
**See ad on page 338**
Telegraph Condenser Co. Ltd., The, England, 5s, 15s
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 5c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**
Thermo Electric Co., Inc., N.J., 15sc
Trans-Sonics, Inc., Mass., 5s
Transval Electronics Corp., Calif., 5c
**Trionics Corp., P.O. Box 548, Madison 1, Wis., 5c, Tel: CEdar 8-2616**
**See ad on page 663**
Ultradyne Inc., N.M., 5sc
Union Ultra-Sonics Corp., Mass., 5sc
United Aircraft Corp., Norden Div, Conn., 5s
United Control Corp., Wash., 15c
U. S. Science Corp., Calif., 5c, 15c
U. S. Sonics Corp., Mass., 15c, Depth Sounders c
Uniwave, Inc., N.Y., 5c, 10c
Valpey Crystal Corp., Mass., 5sc
Varo Mfg. Co., Inc., Texas, 5sc
Vickers Inc., Electric Products Div, Mo., 10sc
Vinson Mfg. Co., Inc., Calif., 5sc
West Instrument Corp., Ill., 15s
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5sc, 10sc, Tel: JUdson 2-3030**
**See ad on page 704**
Whittaker Gyro Div., Telecomputing Corp., Calif., 5s
Wiancko Engineering Co., Calif., 5c
Winslow Co. Inc., The, N.J., 15sc
Yellow Springs Instrument Co., Ohio, 15s





# Directory II. Components

**Transistor testers:**
**See class 14**

**Transistors:**
**See class 70**

**Transmitters:**
**See Directory I**

**Transmitting tubes:**
**See class 79**

**Traveling wave tubes:**
**See class 79**

**Trimmers:**
**See class 44**

**Tube machinery:**
**See class 96**

**Tube parts:**
**See class 104**

**Tubes: metal tubing:**
**See class 91**

**Tubes, paper:**
**See class 91**

**Tubes, plastic:**
**See class 99**

## 76. Transformers.

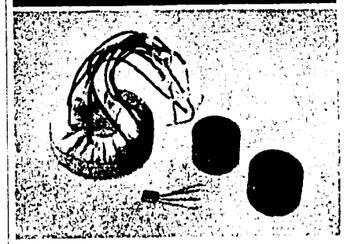
2. Audio
4. Current limiting
6. 400 cps
8. Hermetically sealed
10. High voltage
12. Horizontal output & flyback
14. Intermediate frequency
16. Isolation
18. Low frequency
20. Microwave
22. Power
24. Precision matched
26. Precision voltage dividing
28. Pulse
30. Radio frequency
32. Saturable
34. TV deflection
36. TV impedance matching
38. Toroidal
40. Ultrasonic
42. Vibrator
44. Variable
46. Voltage regulating

A C Electronics Inc., Calif., 2c, 4c, 6sc, 8sc, 10c, 14sc, 16c, 18c, 22c, 24c, 26c, 30sc, 32sc, 38sc
A. C. Transformer Corp., N.J., 2c, 10c, 16c, 22c, 46c
**ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 24c, 28c, 30c, 32c, 38c, 42c, Tel: VIctoria 9-2414**
**See ad on page 474**
**ADC Incorporated, 2863 13th Ave. S., Minneapolis 7, Minn., 2sc, 4c, 6sc, 8sc, 10c, 12c, 14c, 16c, 18c, 22sc, 24c, 26c, 28c, 32c, 38sc, 40c, 42c, 46c, Tel: PArkway 1-5551**
**See ad on page 564**

## 76. Transformers.

AMP Incorporated, Pa., 4c, 6c, 8c, 10c, 14c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 46c
A R & T Electronics Inc., Ark., 2c
Ace Coil & Electronics Co., N.J., 14c, 28c, 30c
**Acme Electric Corp., 44 Water St., Cuba, N.Y., 2c, 4c, 6c, 8c, 10c, 16sc, 18sc, 20c, 22sc, 28c, 32sc, 40c, 44sc, 46sc, Tel: CUba 4**
**See ad on page 476**
Acromag, Incorporated, Mich., 38c
Adams-Russell Co., Inc., Mass., 20c, 22c, 24c, 26c, 30sc
Advanced Electronics Inc., Conn., 6c
Aeroflex Corp., The, Aeroflex Laboratories Div., N.Y., 2s, 4s, 6s, 8s, 18s, 22s
**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 20s, Tel: COpley 7-9115**
**See ad on page 309**
Aircraft Electronics, Ariz., 38c
Airdesign Corp., Pa., 2c, 6c, 8sc, 10c, 16c, 18c, 22sc, 28c, 32c
**Airpax Electronics, Inc., Cambridge Div., Jacktown Rd., Cambridge, Md., 2sc, 6sc, 8sc, 22sc, 28sc, 32sc, 38sc, 42sc, 44sc, 46c, Tel: AC 8-4600**
**See ad on pages 82-83**
**Airpax Electronics, Inc., Seminole Div., Fort Lauderdale, Fla., 2c, 6c, 8c, 16c, 18c, 22c, 24c, 28c, 32c, 38c, 42c, 44c, Tel: LUdlow 3-6160**
**See ad on pages 82-83**
**Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 20sc, Tel: CHestnut 5-2990**
**See ad on page 589**
Airtron Inc., Div. Litton Industries, Inc., N.J., 20c
Aladdin Electronics, Div. Aladdin Industries, Inc., Tenn., 14sc, 20c, 28sc, 30c
Allen Electric & Equip. Co., Mich., 22c
Allis-Chalmers Mfg. Co., Wis., 32sc, 46sc
Altec Lansing Corp., Calif., 2s, 8s
American Machine & Foundry Co., D.C., 4c, 6c, 10c, 24c, 26c
American Research & Mfg. Corp., Md., 38s
Applied Radiation Corp., Calif., 28c
Ardente Acoustic Labs., Ltd., England, 2sc
Argonne Electronics Mfg. Corp., N.Y., 2s, 22s
Arnold Magnetics Corp., Calif., 2c, 6sc, 8c, 10c, 22c, 38c
Arnoux Corp., Calif., 44s
Artronic Instrument Co., The, Md., 8c, 28c, 32c, 38c
**Associated Research, Inc., 3792 W. Belmont Ave., Chicago 18, Ill., 4c, 10c, Tel: COrnelia 7-4040**
**See ad on page 279**
Atlas Engineering Co., Inc., Mass., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 30c, 32c, 38c, 40c, 42c, 46c
Auto-Test, Inc., Ill., 22c, 42c
**Automatic Coil Co., Inc., 195 Sackett St., Brooklyn 31, N.Y., 12c, 14c, 30c, 38c, Tel: ULster 2-5454**
**See ad on page 399**
Automatic Timing & Controls, Inc., Pa., 24s
Automation Industries, Inc., Magnetics Div., Calif., 16c, 22c
Avnet Electronics Corp., N.Y., 2s, 8s, 10s, 16s, 42s, 46s
Baldwin Piano Co., The, Industrial Products Div., Ohio, 2sc, 10c
Ballastran, Div. Telex, Inc., Ind., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 28c, 32c, 38c
Barker & Williamson Inc., Pa., 8c, 14c, 30c, 38sc
Barwood Electronics Inc., Calif., 2c, 6c, 8c, 16c, 22c
Bell Aircraft Corp., Avionics Div., N.Y., 20c, 22c, 28c
Bellaire Electronics, Inc., N.J., 30c
Belz Industries Inc., N.Y., 20sc
Berkshire Laboratories, N.H., 28s
Berkshire Transformer Corporation, Conn., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 20c, 22c, 24c, 32c, 40c, 42c
Bittermann Electric Co., Inc., Conn., 6c, 22c, 28c, 32c, 38c
Blonder-Tongue Laboratories, Inc., N.J., 30s
Bogen-Presto Co., N.J., 2s
Bright Radio Labs., Inc., N.Y., 42c

**TOROIDAL TRANSFORMERS**



All Forbes and Wagner Transformers are produced to meet specific circuit specifications. We can design to solve your problem or build to your own design. Our experience covers miniature, encapsulated, potted, molded, plug-in types. Let us show you what this experience can do for you.



**TOROID WINDING**

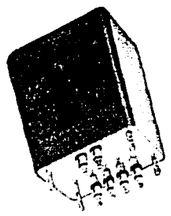
We are equipped with the most modern, precision type Toroidal Coil Winding Machines covering a wide range of core and wire sizes. Illustration shows miniature Toroidal Cores (partially potted) for use in magnetic amplifiers.

*forbes and wagner, inc.*
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**Silver Creek, N.Y. • Phone YE 4-2691**
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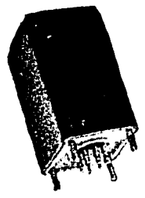


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

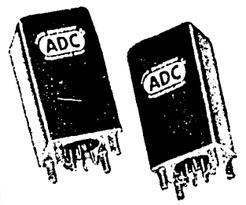
# ADC TRANSFORMERS · FILTERS · REACTORS JACKS & PLUGS · JACK PANELS



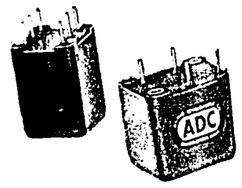
Military Standard POWER Transformers Types MS-90016 through MS-90036.



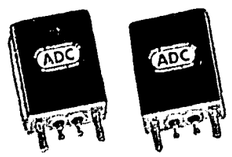
Military Standard AUDIO Transformers Types MS-90000 through MS-90008.



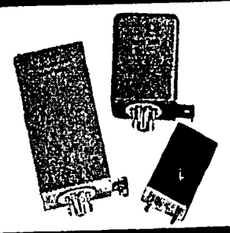
Sub-Miniature, hermetically sealed, low frequency inductors and transformers.



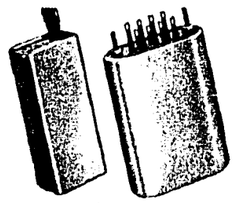
Transformers and filters for TRANSISTOR and PRINTED CIRCUIT applications to meet MIL-T-27A Grade 5, Class R or S.



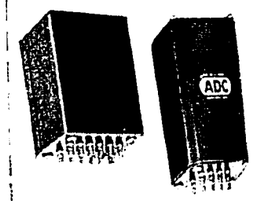
Toroids Hermetically sealed or open units for all frequency ranges.



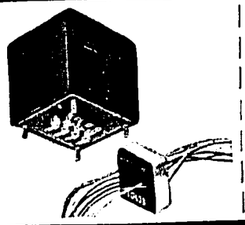
Filters Sub-Audio to 1.5 mcs.



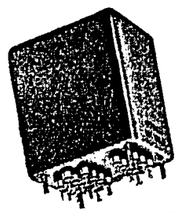
Telephone Coils Mechanically and electrically interchangeable with Western Electric.



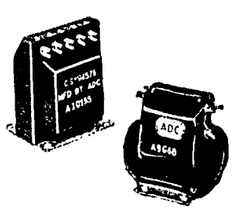
Broadcast Quality Transformers Standard of the Industry.



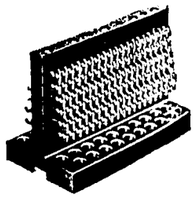
Magnetic Amplifiers and Saturable Transformers—For servo motor control; DC-DC Power Supplies, and switching silicon controlled rectifiers.



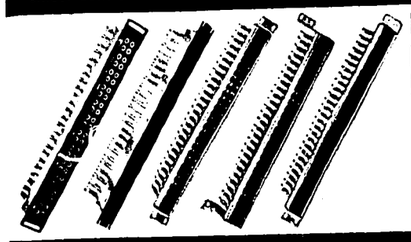
Balanced Modulators Designs over a wide range up to 500 kcs.



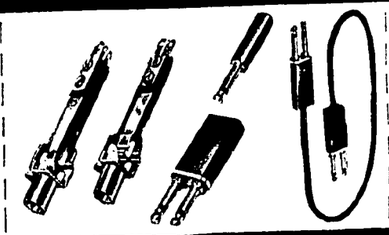
Encapsulated Transformers—Using custom epoxy compounds for military and commercial applications.



Terminal Blocks Molded to your specifications. Six popular sizes in stock.



Jack Panels Several size panels in stock.



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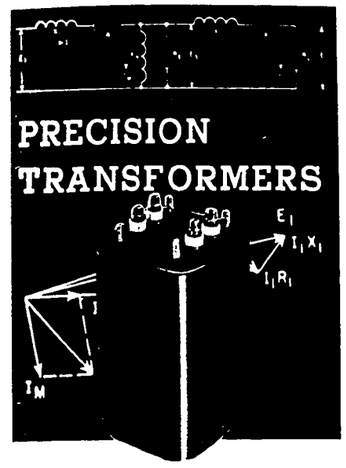
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PACIFIC BRANCH *North Hollywood, California*
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# Directory II. Components

## 76. Transformers.

Burmac Electronics Co., Inc., 142 S. Long Beach Rd., Rockville Centre, N.Y., 10c, 28c, Tel: ORiole 8-3070
See ad on page 479

Burroughs Corp., Electronic Instruments Div., Pa., 28c, 38c

CGS Lab., Inc., Conn., 8s, 32s, 38s, 44s

Caddell-Burns Mfg. Co., Inc., N.Y., 14c, 30c

Caledonia Electronics & Transformer Corp., N.Y., 2c, 4c, 8c, 10c, 22c, 24c, 26c, 28c, 38c

Campbell Co., Inc., Colin, Conn., 2c, 4c, 6c, 8c, 10c, 18c, 22c, 24c, 26c, 28c, 38c

Canadian Aviation Electronics Ltd., Canada, 28c

Canadian Marconi Co., Canada, 2c, 4c, 8c, 14c, 16c, 18c, 22c, 24c, 28c, 30c, 38c, 40c, 42c, 44s

Carad Corp., Calif., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 38c, 40c

Carson Mfg. Co., Inc., Ind., 44c, 46c

Celco—Constantine Engineering Labs., Inc., 70 Island Ave., Mahwah, N.J., 6sc, 8c, 10c, 12c, 14c, 16c, 18c, 24c, 26c, 28c, 32c, 34c, 36c, 38c, 40c, Tel: DAvis 7-1123
See ads on pages 60-61, 84-85

Central Transformer Co., Ill., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 20c, 22c, 24c, 26c, 32c, 42c, 44c, 46c

Chicago Electronic Engineering Co., 3223 W. Armitage Ave., Chicago 47, Ill., 2c, 6c, 8c, 10c, 18c, 22c, 24c, 42c, Tel: CApitol 7-8130
See ad on this page

Chicago Magnetic Control, 1616 N. Damen Ave., Chicago 47, Ill., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 38c, 42c, Tel: ARmitage 6-7401
See ad on this page

Chicago Standard Transformer Corp., 3504 W. Addison St., Chicago 18, Ill., 2sc, 6sc, 8sc, 12sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36s, 38sc, 42sc, 46sc, Tel: INdependence 3-7400
See ad on this page

Chicago Telephone of California, Inc., Calif., 2c, 8s, 22s

Cinaudagraph, Inc., Ill., 2

Clifton Precision Products Co., Inc., Pa., Linear s

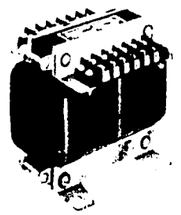
Coast Coil Co., Calif., 2c, 4c, 6c, 8c, 10c, 18c, 22c, 24c, 26c, 32c, 38c

Coil Co. of America, Inc., N.J., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 38c, 40c, 42c

Coil Engineering & Mfg. Co., Inc., Ind., 2c, 4c, 6c, 16c, 22c, 42c, 46c

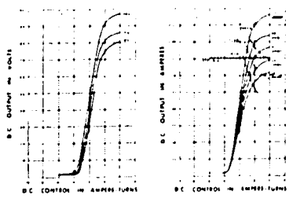
Coil Winders, Inc., N.Y., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18c, 22c, 24c, 26c, 30c, 32c, 38c, 40c, 46c


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performance, silicon diodes

The curves show the principle. For complete performance data, write for new manual, "A Look Inside Tomorrow's Engineering."

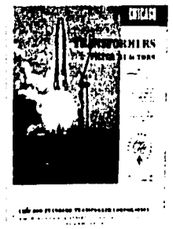


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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Directory II. Components

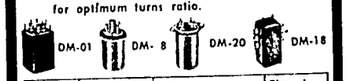
## 76. Transformers.

Coilcraft, Inc., Ill., 8c, 14c, 28c, 30c, 38c
Collins Corp., G. L., Calif., 20sc
Collins Radio Co., Texas Division, Texas, 20s
Columbus Process Co., Inc., Ind., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 32c, 34c, 42c, 46c
Communication Accessories Co., 5[illegible] Highway & 71 By-Pass, Lee's Summit, Mo., 2c, 6sc, 8sc, 16c, 24c, 26c, 32c, 38sc, Tel: BRoadway 1-1700 (Kansas City)
See ad on page 182
Components Corp., Ill., 6c, 28c, 32c, 3[illegible]
Components for Research, Inc., 975 Commercial St., Palo Alto 2, Calif., 10sc, 16sc, 18c, 22sc, 32c, Tel: DAvenport 1-5252
See ad on page 688
Cook Electric Co., Ill., 10c, 44sc, 4[illegible]
Cornwell Electronics Corp., Conn., 2c, 6c, 8c, 10c, 16c, 22c, 32c, 38c, 4[illegible]
Crest Transformer Corp., Ill., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 32c, 42c, 4[illegible]
Crown Engineering, N.M., 30c
Cycle Transformer Corp., N.J., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 2[illegible]c, 32c, 40c, 42c, 46c
D & R, Ltd., Calif., 4sc, 6sc, 8sc, 32c, 38sc, 46sc
Daystrom, Inc., Weston Instruments Div., N.J., 24c
Del Electronics Corp., Dept. RE2, 521 Homestead Ave., Mount Vernon, N.Y., 4sc, 6sc, 8sc, 10sc, 16sc, 22sc, 32sc, Tel: OWens 9-2000
See ads on pages 282, 481, 567
Delta Coils, Inc., N.J., 2c, 14c, 28c, 30c
Delta Radio Co., N.Y., 14c, 30c
Developmental Electronics Corp., Calif., 2c, 28sc, 38sc
Dexsonograph Products, Inc., N.Y., 2sc
Dielectric EV Replacements Ltd., England, 2c, 10s, 12s, 14c, 16s, 18c, 22c, 2[illegible]c, 30c, 34s, 36c
Diversified Engineering Co., Dieco Div., 2[illegible]c, 10c, 14c, 18c, 22sc, 24c, 28c, 2[illegible]c, 44sc
Dow & Margolin, Inc., N.Y., 20c
Douglas Microwave Co., 252 E. Third St., Mount Vernon, N.Y., 20sc, Tel: MOunt Vernon 8-6900
See ad on pages 90-91
Dynamic Engineering Co., Inc., N.H., 2[illegible]c, 24sc, 30sc
Dynamics Corp of America, N.Y., 10c, 2[illegible]c, 22c, 30c, 36c, 38c, 44c
E-I Research Laboratories, Calif., 28
E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 2c, 4c, 6c, 10c, 12c, 14c, 16c, 18c, 20c, 22c, 28c, 30c, 34c, 36c, Tel: HAlifax 6-7491
See ad on page 400
ESC Electronics Corporation, 534 Bergen Blvd., Palisades Park, N.J., 28sc, 38sc, Tel: WIndsor 7-0400
See ad on page 436
Eagle Electric Mfg. Co., Inc., N.Y., 4c
Edko Electronics Engineering Co., N.Y., 2c, 4c, 6c, 8c, 10c, 14c, 18c, 22c, 32c, 40c, 42c
Eisler Engineering Co., Inc., 753 S. 13th St., Newark 3, N.J., 16sc, 22sc, Tel: BIgelow 3-5310
See ad on page 669
El-Rad Mfg. Co., Ill., 12c, 14c, 2[illegible]c, 3[illegible]c, 38c, 40c
Elcor, Inc., Va., 20sc, 22sc
Electran Mfg. Co., 1901 N. Clybourn Ave., Chicago 14, Ill., 2c, 4c, 6c, 8c, 10c, 14c, 22c, 30c, 32c, 40c, Tel: BIshop 8-4596
See ad on page 566
Electric Specialty Co., Conn., 4c, 6c, 10c, 18c, 22c, 32c, 38c, 40c
Electrical Windings, Inc., Ill., 2c, 4c, 6c, 8c, 12c, 14c, 16c, 18c, 22c, 24c, 3[illegible]c, 32c, 42c
Electro Assemblies, Inc., Ill., 14c, 44c
Electro Development Corp., Wash., 2c, 6c, 10c, 38c
Electro Engineering Works, Calif., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 32c
Electro Networks, Inc., N.Y., 38c
Electro Scientific Industries, Ore., 2sc
Electro-Seal Corp., Ill., 8c
Electro-Sonic Laboratories, Inc., N.Y., 2sc
Electron Arc Division, Ionics Incorporated, 244 Broad St., Lynn, Mass., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 32c, 36c, 38c, 42c, 46c, Tel: LY [illegible]
See ad on page 4[illegible]
Electronic EV Replacements Ltd., England, 2c, 10s, 12s, 14c, 16s, 18c, 22c, 2[illegible]c, 30c, 34s, 36c
Electronic Transformer Co., Inc., 70 Washington St., Brooklyn 2, N.Y., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 2[illegible]c, 32c, 38c, 40c, 42c, Tel: MAin 5-6123
See ad on this page
Epco Products, Inc., P.O. Box 2[illegible], Wallkill, N.Y., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 32c, 38c, 40c, 42c, Tel: WAllkill 3-1104
See ad on page 5[illegible]
Erie Electric Corp., N.[illegible], 2c, 4c, 6c, 10c, 14, 16, 18, 24, 32, 38, 42, 46
Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 28sc, 38sc, Tel: GLendale 6-8592
See ad on pages 40-41


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HERMETICALLY SEALED, MIL-T-27A PULSE TRANSFORMERS

- Maximum power efficiency and optimum pulse performance.
- For use in blocking oscillator, interstage coupling and low level output circuits.
- Ruggedized construction — Grade 4.
- Series or parallel connection of windings for optimum turns ratio.




| Cat No | Mil Type | Pulse Voltage Kilovolts | Char. Imp Ohms |
|---|---|---|---|
| MPT- 1 | TF4RX35YY | 0.75-0.75-0.75 | 250 |
| MPT- 2 | TF4RX35YY | 0.75 0.75 | 250 |
| MPT- 3 | TF4RX35YY | 0.5 0.5 0.5 | 250 |
| MPT- 4 | TF4RX35YY | 0.5 0.5 | 250 |
| MPT- 5 | TF4RX35YY | 0.5 0.5 0.5 | 500 |
| MPT- 6 | TF4RX35YY | 0.5 0.5 | 500 |
| MPT- 7 | TF4RX35YY | 0.7 0.7 0.7 | 200 |
| MPT- 8 | TF4RX35YY | 0.7 0.7 | 200 |
| MPT- 9 | TF4RX35YY | 1.0 1.0 1.0 | 200 |
| MPT-10 | TF4RX35YY | 1.0 1.0 | 200 |
| MPT-11 | TF4RX35YY | 1.0 1.0 1.0 | 500 |
| MPT-12 | TF4RX35YY | 0.15 0.15 0.3 0.3 | 700 |


Ruggedized, MIL STANDARD POWER & FILAMENT TRANSFORMERS
Primary 105/115/125 V 50-60~

| Cat No. | Appl. | MIL Std. | MIL Type |
|---|---|---|---|
| MGP 1 | Plate & Fil. | 90026 | TF4RX03HA001 |
| MGP 2 | Plate & Fil. | 90027 | TF4RX03JB002 |
| MGP 3 | Plate & Fil. | 90028 | TF4RX03KB006 |
| MGP 4 | Plate & Fil. | 90029 | TF4RX03LB003 |
| MGP 5 | Plate & Fil. | 90030 | TF4RX03MB004 |
| MGP 6 | Plate | 90031 | TF4RX02KB001 |
| MGP 7 | Plate | 90032 | TF4RX02LB002 |
| MGP 8 | Plate | 90036 | TF4RX02NB003 |
| MGF 1 | Filament | 90016 | TF4RX01EB002 |
| MGF 2 | Filament | 90017 | TF4RX01GB003 |
| MGF 3 | Filament | 90018 | TF4RX01FB004 |
| MGF 4 | Filament | 90019 | TF4RX01HB005 |
| MGF 5 | Filament | 90020 | TF4RX01FB006 |
| MGF 6 | Filament | 90021 | TF4RX01GB007 |
| MGF 7 | Filament | 90022 | TF4RX01JB008 |
| MGF 8 | Filament | 90023 | TF4RX01KB009 |
| MGF 9 | Filament | 90024 | TF4RX01JB012 |
| MGF 10 | Filament | 90025 | TF4RX01KB013 |


Ruggedized, MIL STANDARD AUDIO TRANSFORMERS

| Cat No | Imped level-ohms | Appl. | MIL Std | MIL Type |
|---|---|---|---|---|
| MGA 1 | Pri. 10,000 C.T. Sec. 90,000 Split & C.T. | Interstage | 90000 | TF4RX15AJ001 |
| MGA 2 | Pri. 600 Split Sec. 4, 8, 16 | Matching | 90001 | TF4RX16AJ002 |
| MGA 3 | Pri. 600 Split Sec. 135,000 C.T. | Input | 90002 | TF4RX10AJ001 |
| MGA 4 | Pri. 600 Split Sec. 600 Split | Matching | 90003 | TF4RX16AJ001 |
| MGA 5 | Pri. 7,600 Tap @ 4,800 Sec. 600 Split | Output | 90004 | TF4RX13AJ001 |
| MGA 6 | Pri. 7,600 Tap @ 4,800 Sec. 4, 8, 16 | Output | 90005 | TF4RX13AJ002 |
| MGA 7 | Pri. 15,000 C.T. Sec. 600 Split | Output | 90006 | TF4RX13AJ003 |
| MGA 8 | Pri. 24,000 C.T. Sec. 600 Split | Output | 90007 | TF4RX13AJ004 |
| MGA 9 | Pri. 60,000 C.T. Sec. 600 Split | Output | 90008 | TF4RX13AJ005 |

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Transformers designed to your specifications to do the job that has to be done.
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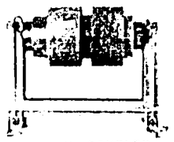
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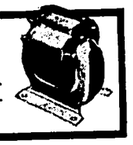

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240

# CUSTOM DESIGNED TRANSFORMERS *for* RELIABILITY



**HERMETIC**
Ceramic compression terminals. Stud type mounting. Schematic. Baked enamel finish, MIL-T-27A.

**ENCAPSULATED HIPERSIL**
Bracket mounting. Epoxy impregnation and coating. Resists environmental extremes.





**SUB-MINIATURE MIL CASE**
Hermetic. Ceramic compression terminals. ¾" x ¾" x 1⅛" H. Wt. 1⅛ oz. MIL-T-27A Grade 4, class R.

**MINIATURE MOLDED**
Epoxy cast. Resists environmental extremes. For plug-in printed circuits. .040 pins ⅛" x 1³⁄₃₂" x ⅞" H. Wt. 1¾ oz.





**ENCAPSULATED POWER**
Bracket mounting. Used in portable equipment where terminals must be brought out from Transformer.

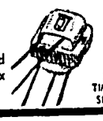
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For Airborne Applications, Teflon, Mylar, and Silicone insulations used. Flat bracket mounting.





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High compression glass bead terminals. Rectangular flange mounting. Full schematic information.

**ULTRA-MINIATURE (UM-F)**
Resin impregnated. 4" color coded leads for dip soldering. Size ⅜" x ⅜" x ⅜". Wt. .08 oz.




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Essex Electronics, Div. Nytronics, Inc., N.J., 2c, 8c, 12c, 14c, 28sc, 30c, 34c, 36c, 38c, 44c

Essex Wire Corp., Magnetic Windings Div., Pa., 2c, 4c, 8c, 10c, 16c, 18c, 22c, 24c, 32c, 34c, 36c, 42c

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 10c, 28c, Tel: RAvenswood 1-9000**
See ad on pages 125-128

Ferranti Electric, Inc., N.Y., 2sc, 6sc, 8sc, 22sc

Ferritronics Limited, Ontario, 28c, 30sc, 36c, 38c, 40c

Filtron Co., Inc., N.Y., 28c

Fisher Engineering, Inc., Ind., 2sc, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 40c, 42c

**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 8c, 12c, 14c, 28c, 30c, 32c, 38c, Tel: YEllowstone 4-2691**
See ads on pages 341, 399, 403, 437, 563, 569

Forest Electric Co., The, Ill., 2c, 4c, 6c, 8c, 16c, 18c, 22c, 32c, 42c

Foster Transformer Co., Ohio, 2c, 6c, 8c, 16c, 18c, 22c, 28c, 34c, 36c, 42c

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See ad on page 566

**Frequency Standards, Inc., P. O. Box 504, Asbury Park, N.J., 20c, Tel: PRospect 4-0500**
See ad on page 443

Fugle-Miller Labs., Inc., N.J., 10c, 14c, 20c, 24c, 30c, 32c, 38c, 40c

GPL Division, General Precision, Inc., N.Y., 8c

**Gabriel Electronics Div., Gabriel Co., Millis, Mass., 20, Tel: FR 6-2953**
See ad on page 372

**Gates Electronic Co., 1705-I Taylor Ave., New York 60, N.Y., 16s, Tel: TYrone 2-6490**
See ad on page 484

General Coil Products Corp., N.Y., 14sc, 30c, 36sc, 40c

General Electric Co., Apparatus Sales Div., N.Y., 4c, 10sc, 16c, 22sc, 32c, 46sc

General Electric Co. Specialty Transformer Dept., Ind., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 28c, 32c, 38c, 46sc

General Electric Co. Ltd. of England, The, Telephone Works, England, 2s

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See ad on page 363

**General Radio Co., 22 Baker Ave., West Concord, Mass., 2s, 38s, 44s, Tel: EMerson 9-4400**
See ad on Cover 4

Geotronic Labs., Inc., Texas, 2sc, 6sc, 8sc, 10sc, 16c, 18sc, 22sc, 24sc, 32sc, 38sc

Gertsch Products, Inc., Calif., 2s, 6s, 8s, 16s, 24s, 26s, 44s

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Green Rectifier Co., N.J., 4c, 6c, 10c, 16sc, 22sc, 32c, 44sc, 46sc

**Gudeman Co., 340 W. Huron St., Chicago 10, Ill., 28c, Tel: DElaware 7-7400**
See ad on page 393

Gudeman Co. of California, Inc., The, Calif., 8sc, 28sc, 38c

Gulton Industries, Inc., N.J., 38sc

Hallicrafters Co., The, Ill., 20c, 30c, 40c

Hamilton Watch Co., Precision Metals Div., Pa., 28c, 38c

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Harrel, Inc., N.Y., 32c, 38c

Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Texas, 2sc, 6sc, 8sc, 10c, 16sc, 18c, 22sc, 24c, 26c, 28c, 32c, 38c, 46c

Hi-G, Inc., Conn., 14s, 30s, 44s

High Voltage Engineering Corp., Mass. 20c

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Hindle Transformer Co., Inc., N.J., 6c, 8c, 10c, 16sc, 22sc, 28c, 32c, 40c

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Holiday Transformer Corp., Ill., 2sc, 4sc, 6sc, 10sc, 14s, 16sc, 18s, 20sc, 22c, 24c, 26sc, 32c, 40c, 46sc

**Hughey & Phillips, Inc., 3200 N. San Fernando Blvd., Burbank, Calif., 16s, Tel: VIctoria 9-1104**
See ad on page 374

Hydro-Aire Co., Calif., 6c, 8c, 22c, 38c

**IMC Magnetics Corp., 570 Main St., Westbury, L.I., N.Y., 28sc, Tel: EDgewood 4-7070**
See ad on page 464

**Illumitronic Engineering, 680 E. Taylor St., Sunnyvale, Calif., 30sc, Tel: REgent 9-2395**
See ads on pages 400, 692

Inductor Engineering, Inc., Del., 28c, 32c, 38c

Industrial Transformer Corp., Fla., 2c, 4c, 6c, 8c, 10c, 12c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 38c, 40c, 42c

Industron Corp., Mass., 22c

Intercontinental Electronics Corp., N.Y., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 24c, 32c, 38c, 46c

**Interelectronics Corp., 2432 Grand Concourse, New York 58, N.Y., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 24c, 26c, 32c, 38c, 40c, 46c, Tel: LUdlow 4-6200**
See ads on pages 355, 487

James Electronics, Inc., Ill., 2s, 6s, 8s, 24s

Jensen Mfg. Co., Div. The Muter Co., Ill., 2s, 30sc





# Directory II. Components



Jobbins Electronics, Calif., 4, 6, 8, 14, 26, 28, 30, 32, 44, 46

K. V. Transformer Corp., Conn., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 32c, 38c, 42c, 46c

Kessler Co., Inc., Frank, N.Y., 2sc, 6sc, 8sc, 16sc

Keystone Products Co., N.J., 2c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 38c, 40c, 42c

Knopp, Inc., Calif., 6c, 10c, 16c

**Kupfrian Manufacturing Corp., 157 Prospect Ave., Binghamton, N.Y., 22c, Tel: RAymond 3-6426**
See ad on page 489

Laboratory for Electronics, Inc., Mass., 2s, 4s, 6s, 8s, 10s, 14s, 16s, 18s, 22s, 24s, 26s, 28s, 30s, 32s, 38s, 40s, 42s, 44s, 46s

Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 46sc

Lee Electric, Inc., N.J., 18c

Levinthal Electronic Products, Inc., Calif., 10c, 16c, 22c, 28c

**Lieco, Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 20c, Tel: WAlnut 1-6300**
See ad on page 553

Light Electric Corp., N.J., 2c, 4c, 6c, 8c, 10c, 22c, 40c

Lindberg Engineering Co., Ill., 10, 18, 22, 32

Linell Engineering Corp., Ill., 14sc, 30sc, 44sc

Liquidometer Corp., The, N.Y., 6c, 8c, 20c

Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Divs., Calif., 4s, 6s, 8s, 10s, 14s, 16s, 18s, 24s, 26s, 28s, 32s, 38s, 40s, 46s

Lockheed Electronics Co., Stavid Division, N.J., 2c, 10c, 22c, 28c

Magnatran, Inc., N.J., 2c, 4c, 10c, 16c, 22c

Magnetic Circuit Elements, Inc., Calif., 2sc, 6sc, 14sc, 16sc, 18c, 22c, 24c, 26c, 32c, 38c

**Magnetico, Inc., 6 Richter Court, East Northport, L.I., N.Y., 26sc, 32sc, 38sc, Tel: ANdrew 1-4502**
See ad on page 366

Magnetics Research Co., Inc., N.Y., 32sc, 38c

Marconi's Wireless Telegraph Co., Ltd., N.Y., 46s

Marine Electric Corp., N.Y., 2c, 4c, 8c, 16c, 22c

Marstan Electronics Corp., N.Y., 38s

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**Merrimac Research & Development, Inc., 517 Lyons Ave., Irvington 11, N.J., 20c, Tel: ESsex 1-1616**
See ad on page 381

**Mico Instrument Co., 79 Trowbridge St., Cambridge 38, Mass., 38s, Tel: KIrkland 7-8560**
See ad on page 674

Microdot, Inc., Calif., 2sc, 4c, 6sc, 8sc, 10c, 16sc, 18c, 22sc, 24c, 26sc, 28sc, 32c, 38c

**Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 20s, Tel: WYman 2-5700**
See ad on page 380

Micromega Corp., Calif., 20c

**Microtran Co., Inc., 145 E. Mineola Ave., Valley Stream, L.I., N.Y., 2sc, 6sc, 8sc, 10c, 16c, 18c, 20c, 22c, 24sc, 26c, 28c, 32c, 36c, 38c, 42c, Tel: LOcust 1-6050**
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Miller Co., J. W., Calif., 10sc, 14sc, 30sc, 36sc, 44sc

Miller Company, Sanford, N.Y., 22sc

Milro Controls Co., Inc., N.J., 4c, 6c, 8c, 10c, 16c, 22c, 32c, 38c, 46c

Minatron Corp., N.J., Linear sc

Mitchell Electronics Corp., N.Y., 2c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 24c, 26c, 42c

**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 8s, 10sc, Tel: WAverly 6-2250**
See ad on page 452

Modelectric Products Corp., N.J., 10c

Mohawk Business Machines Corp., N.Y., 2c, 8c, 16c, 22c, 42c

Moloney Electric Co., Mo., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 28c, 46c

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New England Transformer Co., Inc., Mass., 2c, 4c, 6c, 8c, 16c, 18c, 22c, 28c, 38c, 42c

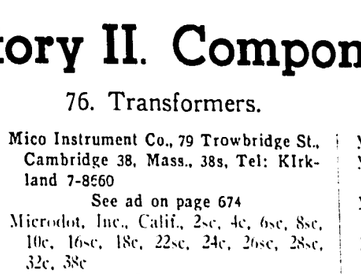
New York Coil Co., Pa., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 24c, 28c, 32c, 42c, 44c, 46c

New York Transformer Co., Inc., N.J., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 38c, 40c, 42c, 46c

Nilsen Mfg. Co., Ill., 28s

**North Atlantic Industries, Inc., Terminal Dr., Plainview, L.I., N.Y., 16s, 26s, Tel: OVerbrook 1-8600**
See ad on page 286

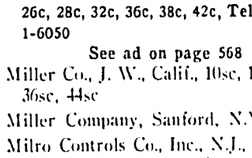

**PULSE TRANSFORMERS**



Pulse widths available from 50 millimicroseces to 25 microsecs in a variety of configurations.

Sub-Miniaturization at its very best. Encapsulated, potted, molded, and plug-in types. Let us quote on your specifications.

**FLYBACK, RF-IF, SATURABLE AND TOROIDAL TRANSFORMERS**



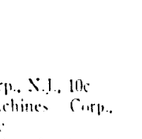
Up to five F & W sub-miniature pulse transformers are packaged in this single assembly measuring 1.80" X 1" X .312".

*forbes and wagner, inc.*
**350 Central Avenue**
**Silver Creek, N. Y. • Phone YE 4-2691**

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Subsidiary of Radiation Incorporated

*One of the largest of its type ever built, the Levinthal Model T318.1 Pulse Transformer is a 300KV, 25μsec design for incorporation into a special tube-development system*



Levinthal has a well-staffed and well-equipped transformer facility for the production of custom-designed large pulse transformers, as well as various specialty, isolation, and rectifier types. Your request for a proposal and quotation will be given immediate attention.

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BALTIMORE .....ENterprise 9-6400

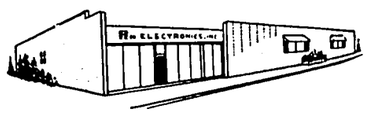
For details, circle #581 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

PCA

STAMP OF AUTHORITY IN PULSE TRANSFORMERS AND DELAY LINES!




PCA is the facility where Pulse Transformers and Delay Lines — in the hundreds of thousands — have been manufactured to meet or exceed the industry's most rigid mil specs for quality, reliability, performance. Similarly, we can satisfy you. If an "off-the-shelf" item will fill your needs — we'll recommend it. If a custom-designed component is more in order — we'll get the best engineering brains in the country working on it in double quick time. Either way — call PCA.

PCA ELECTRONICS, INC.
16799 Schoenborn Street, Sepulveda, California
EMpire 2-0761

For details, circle #582 on Reader Service Card






# Directory II. Components

## 76. Transformers.

North Hills Electronics, Inc., Alexander Pl., Glen Cove, L.I., N.Y., 14s, 28s, 30s, 38s, Tel: ORiole 1-5700
See ads on pages 405, 445, 588

Nothelfer Winding Labs., Inc., N.J., 4c, 10c, 12c, 14c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 38c, 42c, 44c, 46c

Ohmite Manufacturing Co., 3692 Howard St., Skokie, Ill., 44sc, Tel: ORchard 5-2600
See ad on pages 78-79

Omega Mfg., Inc., N.Y., 2sc, 44s, 46s

Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 6c, 8c, 10c, 15c, 22c, Tel: WOrth 6-0380
See ad on page 483

Ortho Filter Corp., 7 Paterson St., Paterson 1, N.J., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 24c, 28c, 32c, 38c, Tel: MUlberry 4-5858
See ad on page 444

Osborne Electronics Sales Corp., Oregon, 2s, 4s, 6s, 8s, 10s, 16s, 22s, 24s, 28s, 42c, 46c

Osborne Transformer Corp., Mich., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22sc, 32sc, 38c, 40c

Oxford Electric Corp., Ill., 2sc, 16c, 22c, 42c

PCA Electronics, Inc., 16799 Schoenborn St., Sepulveda, Calif., 28sc, 38sc, Tel: EMpire 2-0761
See ad on page 570

Pacific Instrument Co., Calif., 4c, 6c, 8c, 10c, 16c, 22c, 32c, 38c

Pacific Magnetic Corp., Calif., 2c, 4c, 6sc, 8sc, 18c, 22sc, 28c, 32c, 38sc

Packard Bell Electronics Corp., Calif., 28c, 38c

Partridge Transformers Ltd., England, 2s, 4c, 6c, 8sc, 10c, 12c, 16c, 22s, 28c, 42c

Pearson Electronics, Inc., 707 Urban Lane, Palo Alto, Calif., 10sc, 28sc, Tel: DAvenport 6-7285
See ad on this page

Peerless Electrical Products Div., Altec Lansing Corp., Calif., 2sc, 4c, 8c, 10c, 16c, 18c, 22sc, 24sc, 20sc, 28sc, 42sc

Penn-East Engineering Corp., Pa., 6c, 8c, 32c

Perkin-Elmer Corp., Vernistat Div., Conn., 44s

Perkin Engineering Corp., Calif., 6c, 22s, 38s

Permoflux Products Co., Calif., 2sc, 6sc, 16c, 18c, 22c

Peschel Electronics, Inc., Towners, R.F.D. #2, Patterson, N.Y., 10c, Tel: TRinity 8-3251
See ad on page 289

Philips Electronic Instruments, N.Y., 10s

Polydoroff & Assoc., W. J., D.C., 30c, 32c, 38c

Polyphase Instrument Co., Pa., 2c, 6c, 8sc, 14sc, 16c, 18c, 22c, 28sc, 32sc, 38sc

Powertron Ultrasonics Corp., N.Y., 40c

Precise Electronics & Development Corp., N.Y., 14c, 16c, 30c, 38c, 44c

Precise Measurements Co., Millbrook Lane, P.O. Box 172, Flemington, N.J., 10sc, 42sc, Tel: STate 2-3000
See ad on page 488

Precision Electronics, Inc., N.Y., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18c, 22c, 24c, 26c, 30c, 32c, 40c, 42c, 44c

Precision, Inc., Minn., 38c

Precision Microwave Corp., Mass., 20c

Prototype Transformer Corp., N.J., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 32c, 40c, 42c, 44c

Pulse Engineering Inc., Calif., 6c, 8s, 10c, 16c, 28s, 38s

Quam-Nichols Co., Ill., 2s

RCA Victor Co., Ltd., Canada, 2c, 8c, 10c, 12c, 16c, 18c, 22c, 34c, 36c, 42c

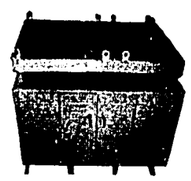
R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 10c, 14c, 20c, 28c, 30c, Tel: DAvenport 1-1130
See ad on page 243


VERY HIGH VOLTAGE...

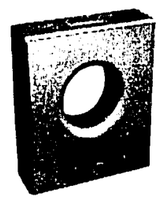
...HIGH RELIABILITY

PULSE PRODUCTS

BELOW ARE SEVERAL OF A LINE OF VERY HIGH VOLTAGE, HIGH RELIABILITY PULSE PRODUCTS MANUFACTURED BY PEARSON ELECTRONICS, INC. COMPLETE ENGINEERING SPECIFICATIONS ARE AVAILABLE UPON REQUEST.



Pulse transformer—Model PTA-177—250 KV, 6 μsec., 62 megawatts pulse, 350 kw average power. Compartmented tank complete with filament transformer, voltage divider, pulse current transformer, oil to water heat exchanger, oil circulating pump and filter, tube socket, all bushings, internal by-passing and connections, ready to accept klystron and external connections.



Pulse Current Transformer—Model PCT-325—Precision monitoring of pulse currents—both amplitude and waveform. Monitor pulse currents at very high voltages—300 kv pulse for oil immersion. 30 kv in air (dc, ac or pulse). Fast rise-time (20 mμsec.)—0.1% per μsec. droop, giving excellent waveform monitoring.



Filament Transformer—Model FT-300—Low capacitance, high voltage insulated. Voltage to ground—300 kv pulse in oil, 30 kv in air.



High Voltage Capacitance Type Pulse Voltage Dividers—Models VD-200, VD-300—Pulse voltage, 200 kv for VD-200, 300 kv for VD-300, oil immersed. Droop—0.01% per μsec. for 1 megohm cable termination.

PEARSON ELECTRONICS, INC.

707 URBAN LANE, PALO ALTO, CALIFORNIA DAvenport 6-7285

For details, circle #583 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

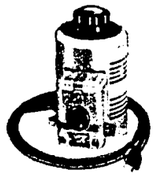
# POWERSTAT®

## *the most extensive line of* Variable Transformers

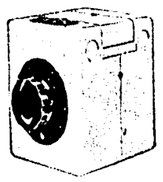
**POWERSTAT variable transformers deliver a continuously-adjustable output voltage from a-c power lines. They feature excellent regulation, zero waveform distortion, high efficiency and rugged construction. POWERSTAT is the quality variable transformer . . . designed, engineered and manufactured to user requirements for long, dependable service.**

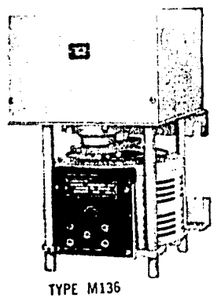

TYPE 10B

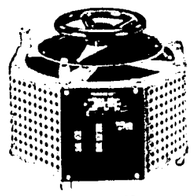

TYPE 20

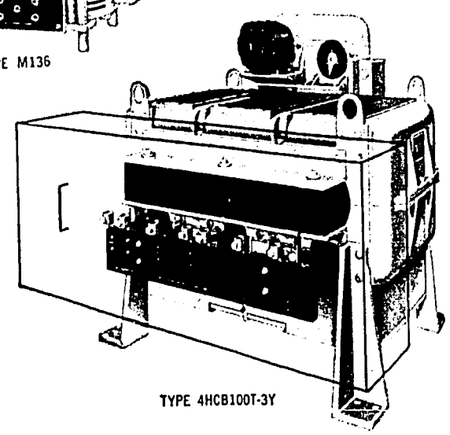

TYPE 116


TYPE 126


TYPE EN117


TYPE M136


TYPE 1156C


TYPE 4HCB100T-3Y

### 10B SERIES

Provide highest ratings and performance characteristics in their price and size range. New brush design for longer life, more efficient operation, easier replacement. Constant current load rating to 1.75 amps.; constant impedance load rating to 2.5 amps. For 120 and 240 volt duty.

### 20 SERIES

Of open construction for back-of-panel mounting. Ideal components for apparatus requiring a variable transformer with constant current load rating to 3.0 amps.; constant impedance load rating to 5.0 amps. For 120 and 240 volt duty.

### 116-216 AND 117-217 SERIES

Open, enclosed and/or fused cord-plug types; manually-operated and motor-driven types are available. On 120 or 240 volt lines, constant current load rating 7.5 amps. for 116 Series; 10 amps. for 117 Series. On 240 and 480 volt lines, constant current load rating 3 amps. for 216 Series; 4 amps. for 217 Series. Higher on constant impedance loads.

### EN116-EN216 AND EN117-EN217 SERIES

Housed in functionally formed and joined dust-tight enclosures. On 120 or 240 volt lines, constant current load rating 6.5 amps. for EN116 Series, 8.5 amps. for EN117 Series. On 240 or 480 volt lines, constant current load rating 2.6 amps. for EN216 Series, 3.5 amps. for EN217 Series. Higher on constant impedance loads.

### 126-226 SERIES

Small, compact, functional design in open, enclosed, fused, cord-plug, enclosed terminal models. On 120 or 240 volt lines, constant current load rating 12.5 amps. for 126 Series. On 240 or 480 volt lines, constant current load rating 6 amps. for 226 Series. Higher on constant impedance loads. Manually-operated and motor-driven types available.

### 136-236 SERIES

Manually-operated and motor-driven types available. On 120 or 240 volt lines, constant current load rating 20 amps. for 136 Series. On 240 or 480 volt lines, constant current load rating 9 amps. for 236 Series. Higher on constant impedance loads. Motor-driven standard speeds 5, 15, 30 or 60 seconds.

### 1156C-1256C SERIES

Heavy duty POWERSTATS. As many as 24 units can be ganged and mechanically and electrically interlocked for ratings up to 217 KVA. On 120 or 240 volt lines, current ratings up to 270 amps. for 1156C Series. On 240 or 480 volt lines, current ratings up to 224 amps. for 1256C Series. Manually-pperated or motor-driven.

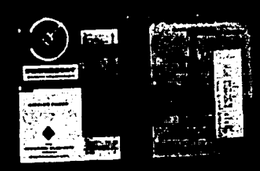
### H-C SERIES

Introduce an entirely new concept in variable transformer design. Have helical coils with motor-driven contact brushes rotating along outside edge of coil. Feature high KVA, cool and efficient operation. For 240 or 480 volt, 60 cycle, 3-phase duty with ratings up to 187 KVA.

*plus:* LINE CORRECTORS • EXPLOSION-PROOF • LIMITED RANGE • ISOLATED WINDING • OIL-COOLED • HIGH FREQUENCY . . *and other types*

THE SUPERIOR ELECTRIC COMPANY

600 Ames Avenue, Bristol, Connecticut



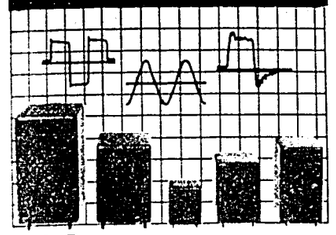
WRITE FOR LITERATURE

For details, circle #584 on Reader Service Card



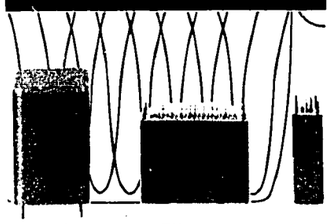


**TRANSFORMERS**



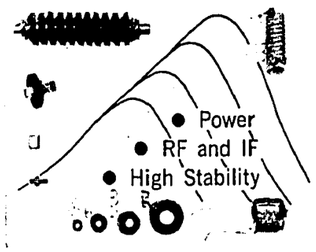
- Power
- Pulse
- Audio
- Converter
- Ultra-precise

**NETWORKS**



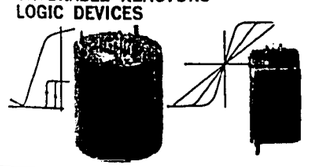
- Low Pass Filters
- High Pass Filters
- Band Pass Filters
- Delay Lines

**INDUCTORS**



- Power
- RF and IF
- High Stability

**SPECIALTY DEVICES**
**MAGNETIC AMPLIFIERS**
**MODULATORS**
**SATURABLE REACTORS**
**LOGIC DEVICES**



# Wilcox Magnetics

DIVISION OF

**wilcox Electric Company, Inc.**

14th & Chestnut, Kansas City 27, Missouri

For details, circle #585 on Reader Service Card




# Directory II. Components

## 76. Transformers.

Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 20, Tel: OVerbrook 1-5600
See ad on page 314

Radiation Electronics Co., Ill., 2s
Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 6c, 22c, 32c, 38c
Radio Engineering Laboratories, Inc., N.Y., 10sc, 22sc
Radio Industries, Inc., Ill., 14c, 30c
Railroad Electronic Labs. of Omaha, Inc., Neb., 38c
Railway Communications, Inc., Mo., 38c
Rank Cintel Ltd., England, 34s, 36s

Rapid Electric Co., Inc., 2881 Middletown Rd., New York 61, N.Y., 22sc, Tel: TAlmadge 8-2200
See ad on page 493

Raypar, Inc., Ill., 10c, 12c, 16c, 22c, 30c, 34c, 36c, 38c, 42c
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 2sc, 4sc, 6sc, 8sc, 10sc, 14s, 16sc, 18sc, 20sc, 22sc, 28sc, 30sc, 32sc, 38sc, 40sc, 46sc
Raytheon Co., Industrial Components Div., Mass., 34s
Redman Electronics Corp., Conn., 14c, 28c, 30c, 38c, 40c
Resitron Laboratories, Inc., Calif., 10c
Richmond Engineering Co., Inc., Conn., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 28c, 32c, 40c, 44c, 46c

Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 2c, 4c, 6c, 14c, 16c, 18c, 24c, 26c, 28c, 30c, 32c, 38c, Tel: LOckwood 5-4578
See ad on page 324

Rogers Electronic Corp., N.Y., 2sc, 4c, 6c, 10sc, 12sc, 16c, 18sc, 22c, 24c, 26c, 30c, 34sc, 36sc, 42c, 46c
Rola Co., The, Ohio, 2c, 8c, 12c, 16c, 28c, 34c, 36c, 42c
Rollan Electric Co., Ill., 14c
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 2c
Rytron Co., Inc., Calif., 2c, 6c, 8c, 14c, 16c, 18c, 22c, 24c, 26c, 28c, 30c, 38c, 46c
SNC Mfg. Co., Inc., Wis., 2c, 8c, 10c, 16c, 22c, 28c, 32c, 38c, 42c, 44c
Sag Harbor Industries, N.Y., 18c, 22c, 42c
Sanders Associates, Inc., N.H., 20sc
Sangamo Electric Co., Ill., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 24c, 28c, 32c, 38c, 40c, 46c
Sartron, Inc., Ore., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 38c, 42c, 46c
Schaevitz Engineering, N.J., 2s, 6s, 16sc, 18c, 24s, 32c, 34c, 44s
Sciaky Bros., Inc., Ill., 22c, 28c
Servodyne Corp., Mass., 10c, 22c
Servomechanisms, Inc., Calif., 2c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 32c, 38c
Sickles Div., F. W., General Instrument Corp., Mass., 2c, 8c, 12c, 14c, 34c, 38c
Sigma Electronics Research Corp., Wash., 20c
Signal Transformer Co., Inc., N.Y., 2c, 4c, 6c, 8c, 10c, 15c, 18c, 22c, 24c, 26c, 28c, 32c, 40c, 42c
Sinclair Radio Labs., Inc., N.Y., 20sc, 30sc
Sioux Radio Products, S.Dak., 14c, 30c, 38c
Sivers Lab., Sweden, 20s
Skysweeper, Inc., Ill., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 42c
Smallwood, Ltd., S. G., Canada, 12c, 14c, 30c
Sola Electric Co., Div. Basic Products Corp., Ill., 40sc
Southwestern Industrial Electronics Co., Texas, 8sc, 18sc, 22sc, 24sc, 38sc, 40sc

Spellman High Voltage Co., 3029 Webster Ave., New York 67, N.Y., 10sc, Tel: KIngsbridge 7-0306
See ad on page 493

Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 6c, 8c, 20c, 24c, 26c, 28c, 38c

Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 20sc, Tel: REdwood 6-4161
See ad on pages 100-101

Sprague Electric Co., Mass., 28sc
Standard Electrical Products Co., Ohio, 2c, 4c, 6c, 8c, 10c, 18c, 22c, 26c, 32c, 38c, 42c, 44sc, 46c
Standard Electronics Div., Reeves Instrument Corp., N.J., 10c, 20c, 22c, 30c, 36c, 38c, 44c
Standard Telephones & Cables, Ltd., England, 2sc, 4sc, 6sc, 8sc, 20sc, 22sc, 32sc, 46sc
Standard Winding Co., Inc., N.Y., 12c
Stanwyck Coil Co., E., N.Y., 14, 18, 30, 38, 44
Sterling Transformer Corp., N.Y., 2sc, 4c, 6sc, 8sc, 10sc, 16sc, 18sc, 22sc, 24c, 26c, 28c, 32c, 38c, 40sc, 42sc, 46c
Summit Coil Co., N.J., 10c, 14c, 30c
Superex Electronics Corp., N.Y., 2s, 30s

Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 44s, Tel: LUdlow 2-9561
See ads on pages 412, 468, 494, 572, 586

Sylvania Electric Products Inc., Special Products Div., N.Y., 2c, 4sc, 6c, 8c, 10c, 16c, 18c, 22sc, 24c, 26c, 32c, 38c
TMC (Canada) Ltd., Canada, 18sc, 24sc, 30sc
TRAK Electronics, Div. CGS Laboratories, Conn., 8s, 32s, 38s, 44s
T T Electronics, Inc., Calif., 2c, 6c, 18c, 38c

Technical Appliance Corp., 1 Taco St., Sherburne, N.Y., 20sc, 30c, 36sc, Tel: ORchard 4-2211
See ad on page 376

Technitrol Engineering Co., Inc., Pa., 28sc
Tele Coil Co., N.J., 2c, 8c, 12c, 14c, 16c, 18c, 24c, 26c, 28c, 34c, 36c, 38c, 42c, 44c, 46c
Telechrome Mfg. Corp., N.Y., 46c

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# BENDIX HAS THE ELECTRON TUBE YOU NEED

## GROUP I—RECEIVING TUBES

### HY-G-200®

| EIA Type No. | JAN Type No. | PROTO-TYPE | BENDIX Type No. | DESCRIPTION |
|---|---|---|---|---|
| 5838 | | 6X5 | TE-3 | RECTIFIER. Full-wave |
| 5839 | 5839 | 6X5 | TE-2 | RECTIFIER. Full-wave |
| 5852 | 5852 | 6X5 | TE-5 | RECTIFIER. Full-wave |
| 5992 | 5992 | 6V6 | TE-8 | AMPLIFIER. Beam power |
| 5993 | 5993 | 6X4 | TE-10 | RECTIFIER |
| 6106 | 6106 | 5Y3 | TE-22 | RECTIFIER |
| 6385 | | 2C51/ 5670 | TE-21 | MINIATURE TWIN TRIODE |

### HY-G-300®

(Reliable, hard glass, ceramic spacers, 300°C Bulb Temperature Rating)

| | | | | |
|---|---|---|---|---|
| 6080WB | | 6AS7 | TE-46 | TWIN TRIODE |
| 6082A | | 6082 | TE-55 | TWIN TRIODE |
| 6094 | 6094 | 6AQ5/ 6005/ 6095 | TE-18 | MINIATURE AMPLIFIER |
| 6384 | 6384 | 6AR6/ 6098 | TE-27 | AMPLIFIER. Beam power |
| 6754 | | 412A | TE-36 | RECTIFIER. Full-wave |
| 6851 | | 5751 | TE-42 | MINIATURE TWIN TRIODE |
| 6877 | | ½ 6080 | TE-48 | MINIATURE TRIODE |
| 6889 | | Top Cap 6384 | TE-52 | AMPLIFIER. Beam power |
| 6900 | | 5687 | TE-54 | MINIATURE TWIN TRIODE |
| 7403 | | 3D21B | TE-74 | PULSE MODULATOR |
| | 3D21 (U.S.A.F.) | 3D21WA | TE-56 | PULSE MODULATOR |

### COMPUTER TUBES

| | | | |
|---|---|---|---|
| 6888 | 7AK7 | TE-40 | GATE PENTODE |

Many other models of Bendix gas noise source and spark gap tubes besides those shown here are available. There is also a HY-G-500® line of metal ceramic receiving tubes. For a completely up-to-date list, write THE BENDIX CORPORATION, EATONTOWN, NEW JERSEY.

West Coast Sales & Service: 117 E. Providencia Ave., Burbank, Calif.
Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.
Canadian Distributor: Computing Devices of Canada, Ltd., P.O. Box 508, Ottawa 4, Ontario

ELECTRON TUBE PRODUCTS

Red Bank Division
EATONTOWN, N. J.

THE Bendix CORPORATION

## GROUP II—MICROWAVE TUBES

| EIA Type No. | JAN Type No. | BAND | BENDIX Type No. | DESCRIPTION |
|---|---|---|---|---|
| 2K50 | 2K50 | K | TE-4 | REFLEX KLYSTRON |
| 6116 | 6116 | X | TE-62 | REFLEX KLYSTRON |
| 6541 | | K | TE-30 | REFLEX KLYSTRON |
| 6584 | | C | TE-38 | REFLEX KLYSTRON |
| | | Ka | TE-37 | REFLEX KLYSTRON |
| | | Ka | TE-53 | REFLEX KLYSTRON (SRV-38) |
| 6845 | 6845 (US Navy) | X | TE-59 | REFLEX KLYSTRON |
| 6940 | | X | TE-58 | REFLEX KLYSTRON |
| | | K | TE-60 | REFLEX KLYSTRON |
| | | X | TE-61 | REFLEX KLYSTRON |
| 6584 | | C | TE-69 | REFLEX KLYSTRON |
| | | Ka | TE-78 | REFLEX KLYSTRON |
| | | C | TE-86 | REFLEX KLYSTRON |
| | | V | TE-67 | BACKWARD-WAVE OSCILLATOR |
| | | C | RXB-103401 | TRAVELLING-WAVE TUBE AMPLIFIER |
| | | V | TE-66 | BACKWARD-WAVE OSCILLLTOR |
| | | Q | TE-75 | BACKWARD-WAVE OSCILLATOR |
| | | E | TE-85 | BACKWARD-WAVE OSCILLATOR |

## GROUP III—GAS AND SPECIAL TUBES

### SPECIAL PURPOSE GAS TUBES

| EIA Type No. | JAN Type No. | BENDIX Type No. | DESCRIPTION |
|---|---|---|---|
| 5643 | 5643 | TD-17 | SUBMINIATURE XENON THYRATRON (MIL. SPEC.) |
| 5643 | | TD-37 | SUBMINIATURE XENON THYRATRON (COMMERCIAL SPEC) |
| 5947 | | TT-2 | TEMPERATURE-LIMITED DIODE |
| 5960 | | TD-1 | COLD CATHODE DISCHARGE |
| | | TD-45 | COLD CATHODE DISCHARGE |
| | | TD-28 | COLD CATHODE TETRODE THYRATRON |
| 6142 | | TD-9A | GAS DIODE VOLTAGE REGULATOR |
| | | TD-19 | GAS DIODE VOLTAGE REGULATOR |
| | | TD-70 | TIME TOTALIZER |
| 5787WA | | TD-61 | VOLTAGE REGULATOR |
| | 5787WA | TD-63 | VOLTAGE REGULATOR (MIL. SPEC.) |
| 6542 | | TD-68 | VOLTAGE REGULATOR |
| 6144 | | TT-1 | NOISE DIODE |
| 6352 | | TT-29 | SUBMINIATURE TEMP-LIMITED DUAL-DIODE |
| 6361 | | TT-25 | SINGLE CONVECTRON |
| 5845 | | TT-30 | MINIATURE TEMPERATURE-LIMITED DIODE |

## GROUP IV—GAS NOISE SOURCE TUBES

| Frequency Range KMC | Band | Waveguide Number | Bendix Type Number | EIA Type Number | Mount Type | Recommended Mode of Operation | Anode Current MA | Tube Drop Volts | Excess Noise Ratio DB |
|---|---|---|---|---|---|---|---|---|---|
| 1.12-1.70 | L | RG-69/U | TD-21 | 6881 | 90°H | D.C. | 250 | 65 | 15.2 |
| | | | TD-29 | 7101 | 90°H | A.C. & D.C. | 250 | 130 | 18.0 |
| 2.6-3.95 | S | RG-48/U | TD-12 | 6358 | 10°E | D.C. | 250 | 80 | 15.2 |
| | | | TD-22 | 6782 | 90°H | A.C. & D.C. | 250 | 45 | 15.2 |
| 3.30-4.90 | S | WR-229 | TD-24 | 6852 | 10°E | A.D. & D.C. | 250 | 65 | 15.2 |
| 3.95-5.85 | C | RG-49/U | TD-10 | 6356 | 10°E | D.C. | 250 | 70 | 15.2 |
| 5.85-8.20 | X | RG-50/U | TD-10 | 6356 | 10°E | D.C. | 250 | 70 | 15.2 |
| 8.20-12.40 | X | RG-52/U | TD-11 | 6357 | 10°E | D.C. | 200 | 75 | 15.2 |
| | | | TD-23 | 6882 | 10°E | D.C. | 200 | 115 | 18.0 |
| 12.4-18.00 | KU | RG-91/U | TD-18 | 6684 | 10°E | D.C. | 200 | 70 | 15.2 |
| 18.0-26.5 | K | RG-53/U | TD-13 | 6359 | 10°E | D.C. | 200 | 65 | 15.2 |

## GROUP V—SPARK GAPS

| Type No. | DC Breakdown KV | Initial Pulse Breakdown KV | Repetitive Pulse Breakdown KV | Watts Maximum Dissipation | Peak Discharge Watt-Second | Fault Surge Current Amps | Isotope Stabilization | Initial Equipment Usage | Configuration |
|---|---|---|---|---|---|---|---|---|---|
| TG-25 | 0.400 | | | 3 | 2 | | Yes | Safety | 1 |
| TG-26 | 0.75 | | | 5 | 2 | 1000 | Yes | Safety | 2 |
| TG-27 | 1.0 | | | 5 | 5 | 1000 | Yes | Safety | 2 |
| TG-30 | 2.0 | 3.0 | 2.7 | 5 | 14 | 2000 | Yes | Safety | 2 |
| TG-34 | 5.0 | 8.5 | 5.5 | 5 | 19 | 3000 | Yes | Safety | 2 |
| TG-37 | 10.0 | 20.0 | 15.0 | 5 | 22 | 4000 | Yes | Safety | 4 |
| TG-56 | 20.0 | 23.0 | | 7.5 | 30 | 5000 | Yes | Safety | 4 |
| TG-60 | 50.0 | | | 7.5 | 50 | 6000 | Yes | Safety | |






# Directory II. Components

## 76. Transformers.

Telecomputing Corp., Electronic Components Div., Calif., 2c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28sc, 32c, 38c

**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 8c, Tel: YE 2-8600**

See ad on page 338

Telectron, Div. Elliot & Evans, Fla., 34sc

**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 2sc, 4sc, 6c, 8c, 10c, 16c, 18c, 22c, 28c, 32c, 38c, 40c, 42c, 46c, Tel: MIdway 6-7211**

See ads on pages 456, 556

Tensor Electric Development Co., Inc., N.Y., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 28c, 30c, 32c, 38c, 46c

Thordarson-Meissner, Ill., 2sc, 4sc, 6sc, 8sc, 10sc, 12sc, 14sc, 16sc, 18sc, 20sc, 22sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36sc, 38c, 40c, 42sc, 44sc, 46sc

Todd Electric Co., Inc., N.Y., 2c, 4c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 28c, 32c, 36c, 40c, 42c

Topping Electronics, Ltd., F. V., Canada, 30c

Torocoil Company, Ill., 38c

Toroidal Components Co., Calif., 2c, 6c, 8c, 28c, 32c, 38c

Toroids Unlimited, Inc., Pa., 2c, 6c, 8c, 14c, 16c, 28c, 30c, 32c, 38c

**Torotel, Inc., 5512 E. 110th St., Kansas City 34, Mo., 2c, 4c, 6c, 8c, 14c, 16c, 18c, 22c, 24c, 26c, 32c, 38c, Tel: SOuth 1-6314**

See ad on page 405

Torwico Electronics, Inc., N.J., 2c, 6sc, 8c, 22c, 24c, 32c, 38c

Transformer Design, Inc. of Milwaukee, Wis., 2c, 4c, 6c, 8c, 10c, 12c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 36c, 38c, 40c, 42c

Transformer Specialty Co., Pa., 2c, 6c, 8c

Transformer Technicians, Inc., Ill., 2c, 4c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 38c, 40c, 42c, 44c, 46c

Transformers, Inc., N.Y., 2c, 6c, 8c, 10c, 16c, 18c, 22c, 24c, 26c, 28c, 32c, 38c, 40c, 42c

Trenton Transformer Corp., N.J., 6sc, 8sc, 10sc, 16c, 18c, 22c

Tresco, Inc., Pa., 2, 6, 8, 10, 14, 16, 18, 22, 28, 32, 42

Triad Transformer Corp., Div. Litton Industries, Calif., 2sc, 6sc, 8sc, 10s, 12s, 16s, 18s, 22sc, 24s, 26sc, 28sc, 32s, 34sc, 36s, 38sc, 42s, 44s, 46sc, Miniature sc

Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 20sc, Tel: ULysses 5-5131

See ad on page 438

Union Electric Products Co., N.J., 2c, 4c, 6c, 8c, 14c, 16c, 18c, 22c, 24c, 28c, 30c, 32c, 34c, 36c, 40c, 42c, 46c

United Shoe Machinery Corp., Mass., 20c

United States Electronics Corp., N.J., 2c, 10c, 14c, 16c, 18c, 22c, 30c, 32c, 40c, 42c

U. S. Science Corp., Calif., 38c

**United Transformer Corp., 150 Varick St., New York 13, N.Y., 2sc, 4sc, 6sc, 8sc, 10sc, 14sc, 16sc, 18sc, 22sc, 24sc, 26sc, 28sc, 32sc, 38sc, 40sc, 42sc, 44sc, 46sc, Tel: ALgonquin 5-3500**

See ad on Cover 2

**Universal Toroid Coil Winding, Inc., 171 Coit St., Irvington 11, N.J., 2c, 4c, 6c, 8c, 10c, 14s, 16c, 18c, 22c, 24c, 26c, 28c, 30s, 38sc, 40c, Tel: ESsex 4-9804**

See ad on page 407

Utrad Corporation, Ind., 2c, 6c, 8c, 16c, 18c, 22c, 28c, 32c, 36c, 38c, 42c

Valor Instruments, Inc., Calif., 8sc, 14sc, 16sc, 18sc, 20sc, 24sc, 28sc, 30sc, 32sc, 36sc, 38sc

Vanguard Electronics Co., Calif., 14c, 30sc

**Vari-L Company, Inc., 207 Greenwich Ave., Stamford, Conn., 32s, 38c, Tel: FIreside 8-0091**

See ad on page 406

Varo Mfg. Co., Inc., Tex., 2sc, 4c, 6sc, 8sc, 10c, 14c, 16sc, 18sc, 22sc, 24c, 28sc, 32sc, 38sc, 42sc, 46sc

Virginia Electronics Co., Inc., D.C., 2c, 4c, 6c, 8c, 10c, 14c, 18c, 22c, 24c, 26c, 30c, 38c

Wahlgren Magnetics, Div. Marshall Industries, Calif., 2c, 4c, 6c, 8c, 10c, 16c, 22c, 24c, 26c, 28c, 32c, 38c, 42c, 46c

Walsh Engineering Co., N.J., 2c, 6c, 8c, 10c, 22c, 28c

Waveline, Inc., N.J., 20s

**Wayne Kerr Corp., 1633 Race St., Philadelphia 3, Pa., 26s, Tel: LOcust 8-6820**

See ad on page 255

Wells Electronics Co., Ind., 14sc, 24sc, 28c, 30sc, 38c, 40c

Westinghouse Electric Corp., Specialty Transformers, Pa., 6sc, 8c, 22sc, 28c, 32sc

Wheeler Electronic Corp., Conn., 2c, 6c, 8c, 10c, 14c, 16c, 18c, 22c, 28c, 30c, 32c, 38c, 40c

**Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 20c, Tel: HUnter 2-7876**

See ad on page 664

**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 2c, 4c, 6c, 8c, 14c, 18c, 22c, 24c, 26c, 28c, 30c, 32c, 38c, Tel: BEnton 1-0700**

See ad on page 573

Wright-Zimmerman, Inc., Minn., 12c

## 77. Tubes, Receiving.

5. Cathode-ray
10. Ceramic
15. Miniature
20. Standard types, glass & metal
25. Sub-miniature
30. TV picture—color
35. TV picture—monochrome

American Elite, Inc., N.Y., 5s, 15s, 20s, 25s

American Radio Co., Inc., N.Y., 15s, 25s

**Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 5s, 10s, 15s, 20s, 25s, Tel: WEIls 1-6200**

See ad on pages 42-45

Autometric Corp., N.Y., 30c

Avnet Electronics Corp., N.Y., 15s, 20s, 25s

**Bendix Corp., The, Red Bank Div., Electron Tube Products, State Highway #35, Eatontown, N.J., 10sc, 15sc, 20sc, 25sc, Tel: LIberty 2-2000**

See ad on page 574

CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 5c, 15s, 20s

CBS Labs., Div. Columbia Broadcasting System, Inc., Conn., 5c

Canadian Marconi Co., Canada, 5c, 15s, 20s, 35sc

Canadian Westinghouse Co., Ltd., Canada, 5s, 15s, 20s, 25s, 35s

Channel Master Corp., N.Y., 5s, 20s, 35s

Collins Radio Co., Central Sales Office, Tex., 10s, 15s, 20s, 25s

D.K.E. Electronic Bases, Inc., N.J., 5sc, 10sc

Dimensions, Inc., N.Y., 5c

Du-Co Ceramics Co., Pa., 10c

Du Mont Laboratories, Inc., Allen B., Electronic Tube Div., N.J., 5sc, 30c


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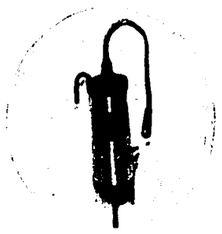
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DIV. OF METROPOLITAN OVERSEAS SUPPLY CORP.

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# NATIONAL ELECTRONICS, INC. GENEVA • ILLINOIS • U.S.A.

## ELECTRONIC TUBES FOR INDUSTRY



NL-1051A IGNITRON



NL-1052A IGNITRON



NL-3C23 THYRATRON



NL-740 THYRATRON



NL-635 RECTIFIER

WRITE FOR INDIVIDUAL TUBE DATA SHEETS FOR FULL DETAILS.

### IGNITRONS

| TYPE NUMBER | VOLTS | MAXIMUM RATINGS | | | | TYPE OF COOLING |
|---|---|---|---|---|---|---|
| | | Maximum Demand | Corresponding Current DC-Amps | Maximum Current DC-Amps | Corresponding Demand | |
| NL-1001 | 250-600 | 150 Kva | 4.9 | 9.0 | 50 Kva | Convection |
| NL-1005 | 250-600 | 600 Kva | 30.2 | 56 | 200 Kva | Forced air |
| NL-1011A | 250-600 | 600 Kva | 30.2 | 56 | 200 Kva | Water |
| NL-1012A | 250-600 | 1200 Kva | 75.6 | 140 | 400 Kva | Water |
| NL-1013A | 250-600 | 2400 Kva | 192. | 355 | 800 Kva | Water |
| NL-1014 | 250-600 | 4800 Kva | 486. | 900 | 1600 Kva | Water |
| NL-1022A | 1500 peak | 1200 peak | 16 | 56 | 336 peak | Water |
| NL-1051A | 250-600 | 600 Kva | 30.2 | 56 | 200 Kva | Water |
| NL-1052A | 250-600 | 1200 Kva | 75.6 | 140 | 400 Kva | Water |
| NL-1053A | 250-600 | 2400 Kva | 192 | 355 | 800 Kva | Water |
| NL-1054 | 250-600 | 4800 Kva | 486 | 900 | 1600 Kva | Water |
| NL-5550 | 250-600 | 300 Kva | 12.1 | 22.4 | 100 Kva | Water clamp |

### THYRATRONS

| TYPE NUMBER | GAS FILLING | MAX D.C. OUTPUT AMPS. | MAX PEAK RATING AMPS. | MAX PEAK INV. VOLTS | FILAMENT VOLTS | FILAMENT AMPS. | TYPE OF COOLING |
|---|---|---|---|---|---|---|---|
| 3C23 | Arg & Merc | 1.5 | 6 | 1250 | 2.5 | 7 | Convection |
| NL-710/6011 | Arg & Merc | 2.5 | 30 | 1500 | 2.5 | 9 | Convection |
| NL-710L/7518 | Arg & Merc | 2.5 | 30 | 1500 | 2.5 | 9 | Convection |
| NL-715/5557 | Mercury | 1 | 3 | 5000 | 2.5 | 5 | Convection |
| NL-716 | Arg & Merc | 1 | 8 | 1250 | 2.5 | 6.3 | Convection |
| NL-730 | Arg & Merc | 3.2 | 40 | 1500 | 2.5 | 12 | Convection |
| NL-732 | Arg & Merc | 30 | 225 | 1500 | 2.5 | 55 | Convection |
| NL-740,L,P | Arg & Merc | 4 | 50 | 1500 | 2.5 | 16 | Convection |
| NL-760,L,P | Arg & Merc | 6.4 | 77 | 1500 | 2.5 | 21 | Convection |
| NL-770L | Xenon & Merc | 10 | 120 | 1500 | 2.5 | 25 | Convection |
| NL-778 | Arg & Merc | 6.4 | 110 | 1500 | 2.5 | 21 | Convection |
| NL-5560/FG95 | Arg & Merc | 2.5 | 15 | 1000 | 5.0 | 4.6 | Convection |
| NL-5632/C3J | Xenon | 2.5 | 30 | 1250 | 2.5 | 9 | Convection |
| NL-5665/C16J | Xenon | 18.0 | 160 | 1250 | 2.5 | 31 | Convection |
| NL-5684/C3J/A | Xenon | 2.5 | 30 | 1250 | 2.5 | 9 | Convection |
| NL-6014/C1K | Xenon | 1 | 8 | 1250 | 2.5 | 6.3 | Convection |
| NL-C6J,L,P | Xenon | 6.4 | 80 | 1250 | 2.5 | 21 | Convection |
| NL-C6JK,L,P | Xenon | 6.4 | 80 | 1250 | 2.5 | 21 | Convection |

NOTE. Suffixes L and P indicate these tubes are also available with Lug Bases (L) and Panel Mounting (P).

### HALF WAVE RECTIFIERS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NL-610/7723 | Xenon | 2.5 | 30 | 920 | 2.5 | 9 | Convection |
| NL-615 | Merc | 2.5 | 10 | 2000 | 2.5 | 7 | Convection |
| NL-617 | Merc | 5 | 20 | 1000 | 2 | 12 | Convection |
| NL-619 | Merc | 6 | 20 | 300 | 2 | 12 | Convection |
| NL-623 | Merc | 15 | 45 | 500 | 2.5 | 20 | Convection |
| NL-635,L,P | Arg & Merc | 6.4 | 77 | 1000 | 2.5 | 18 | Convection |
| NL-643 | Merc | 15 | 90 | 700 | 2.5 | 23 | Convection |
| NL-649/5834 | Merc | 2 | 10 | 900 | 2.5 | 7 | Convection |
| NL-660,L/7786 | Xenon | 6.4 | 80 | 920 | 2.5 | 21 | Convection |
| NL-664L | Arg & Merc | 10 | 120 | 1000 | 2.5 | 25 | Convection |
| NL-5558/FG32 | Merc | 2.5 | 15 | 5000 | 5 | 4.5 | Convection |

### FULL WAVE RECTIFIERS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NL-604L | Arg & Merc | 2.5 | 10 | 900 | 2.5 | 11.5 | Convection |
| NL-606L | Arg & Merc | 6.4 | 25.6 | 900 | 2.5 | 17 | Convection |

For details, circle #508 on Reader Service Card








# Directory II. Components

## 77. Tubes, Receiving.

E.M.I.-Cossor Electronics, Ltd., Canada, 5s
E.M.I. Electronics, Ltd., England, 5s, 20s, 30s, 35s
Electronic Tube Corp., Pa., 5sc
Electronica Industrial, Ltda., Brazil, 35sc
**Ericsson Telephone Co., Ltd., L.M., 215 Park Ave. S., New York, 3, N.Y., 5, 15, 20, 25, 30, Tel: ORegon 7-8400**
**See ad on page 581**
Ferranti Electric, Inc., N.Y., 5sc
General Electric Co., Cathode Ray Tube Dept., N.Y., 5sc
General Electric Co., Receiving Tube Dept., Ky., 10s, 15s, 20s, 25s
General Electric Co., Ltd. of England, N.Y., 5s, 10s, 20s
General Electrodynamics Corp., Tex., 5sc
Hoffman Electron Tube Corp., N.Y., 5s
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 5sc, 20sc
Intelex Systems, Inc., N.Y., 15s, 20s
International Electronics Corp., Mullard Products, N.Y., 5s, 10s, 15s, 20s, 25s
International Telephone & Telegraph Corp., ITT Components Div., N.J., 5sc, 10sc
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 5c, 10c
**Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 10sc, Tel: MIllington 7-0385**
**See ad on page 620**
Kimble Glass Co., Subsid. Owens Illinois Glass Co., Ohio, 5s
Kip Electronics Corp., Conn., 15s, 25s
Kriss Electronics, Inc., N.J., 5c, 30c, 35s
Litton Industries, Electron Tube Div., Calif., 5c
MacKay Research Laboratories, Ariz., 5c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 20s
**Mitronics Inc., 1291 Central Ave., Hillside, N.J., 10c, Tel: WAverly 6-2250**
**See ad on page 452**
Munzig International, Inc., Calif., 15s, 20s
National Ceramic Co., N.J., 10c
National Union Electric Corp., Electronics Div., Ill., 5s
Nippon Electric Co., Ltd., Japan, 5s, 15s, 20s, 25s, 30c, 35s
Philco Corporation, Pa., 5sc, 15sc, 20sc, 25sc, 30sc, 35sc
Philco Corporation, Govt. & Industrial Group, Pa., 5sc, 15sc, 30c, 35sc
**Philco Corporation, Lansdale Div., Dept. 504, Church Rd., Lansdale, Pa., 5sc, 15s, 20s, 25s, 35s, Tel: ULysses 5-4681**
**See ad on pages 31-34**
Philips Electronics Industries, Ltd., Canada, 5s, 15s, 20s, 25s, 35s
Polaris Engineering Corp., Ill., 5sc, 35sc
RCA Victor Co., Ltd., Canada, 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc
**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 20, Tel: OVerbrook 1-5600**
**See ad on page 314**
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20s, 25s, 30s, 35s
**Radio Corp. of America, Electron Tube Div., Section 1-22-Q, 415 S. 5th St., Harrison, N.J., 5s, 10s, 15s, 20s, 30s, 35s, Nuvistors s, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Rank Cintel, Ltd., England, 5s, 30s, 35s
Rauland Corp., The, Ill., 5sc, 30sc, 35sc
Raytheon Co., Industrial Components Div., Mass., 5s, 10s, 15s, 20s, 25s, 35s
Rescon Electronics Corp., Mass., 15s, 20s, 25c
Resitron Laboratories, Inc., Calif., 5sc, 10sc, 20sc
Scopes Company, Inc., The, N.Y., 5s
Skiatron Electronics & Television Corp., N.Y., 5s
Sonotone Corp., N.Y., 15s, 20s, 25s
Standard Telephones & Cables, Ltd., England, 5s, 15s, 20s, 25s, 35s
Superior Porcelain Co., W.Va., 10sc
Sylvania Electric Products Inc., N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc
**Sylvania Electric Products Inc., Electronic Tubes Div., Dept. 4310, 1100 Main St., Buffalo, N.Y., 5s, 10s, 15s, 20s, 25s, 30s, Tel: ELmwood 7993**
**See ad on pages 50-51**
Technical Ceramics & Lava Corp., N.J., 10
Thermosen, Inc., Conn., 15s, 20s
Thomas Electronics, Inc., N.J., 5sc, 35s
Tucor, Inc., Conn., 25sc
**Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 5, 15, 20, 25, 35, Tel: HUmboldt 2-4200**
**See ad on pages 74-75**
**Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa., 5sc, Tel: GArfield 6-8600**
**See ad on page 322**
Wells Co., Inc., Gary, N.Y., 15s
**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 5s, 15s, 20s, 25s, Tel: REgent 9-3611**
**See ad on page 580**

## 78. Tubes, Special Purpose.

5. Decade counter
10. Electrometer
15. Geiger-Mueller
20. Noise sources
25. Photo multiplier
30. Thyratrons
35. Voltage regulators & ballasts
40. X-Ray

Aerolux Light Corp., N.Y., 5c, 15c, 35c
American Elite, Inc., N.Y., 10s, 30s, 35s
**Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill., Stroboscopic s, Tel: BUckingham 1-2727**
**See ads on pages 463, 577**


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**Grid Controlled Flashtubes**




- Used extensively for automotive timing, wheel balancing and other stroboscopic applications.
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- Can be used with electrolytic or oil capacitors, 1 to 2 Mfd at high flash rates, 2 to 4 Mfd at rates to 1800 per min.
- Non-polarized, may be accidentally or purposely (to increase life) reversed without harm.
- Special tubes of all kinds promptly made.

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*Pioneers in Flashtubes*
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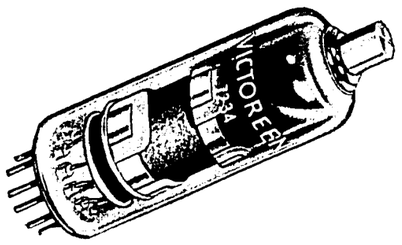
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## THE VICTOREEN INSTRUMENT COMPANY

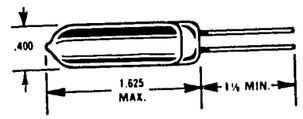
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### HIGH VOLTAGE PENTODES




| CHARACTERISTICS | 7734 PENTODE | 6847 PENTODE | 7683 PENTODE |
|---|---|---|---|
| $E_f$ | 6.3 V | 6.3 V | 6.3 V |
| $I_f$ | 150 ma | 150 ma | 150 ma |
| $E_b$ MAX | 10,000 V | 4,000 V | 1,000 V |
| $I_p$ MAX | 5 ma | 10 ma | 20 ma |
| $G_m$ | 3800 | 2500 | 5000 |
| $R_p$ | 1 Megohm | 930 Kohm | 30 Kohm |
| SIZE | T-6½ | T-5½ | T-6½ |

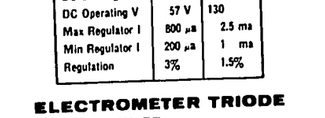
### GLOW TYPE VOLTAGE REGULATORS




| | VR-87 | VXR-130 |
|---|---|---|
| DC Starting V | 75 V | 180 |
| DC Operating V | 57 V | 130 |
| Max Regulator I | 800 μa | 2.5 ma |
| Min Regulator I | 200 μa | 1 ma |
| Regulation | 3% | 1.5% |

### ELECTROMETER TRIODE

**VX-55**




**TYPICAL OPERATION AND TEST CONDITIONS**

| | | | | | |
|---|---|---|---|---|---|
| $E_f$ | 1.25 | Volts | $I_p$ | 95 | μa |
| $I_f$ | 10.0 | ma | $G_m$ | 110 | μmho |
| $E_p$ | 7.5 | Volts | $I_g$ | $5 \times 10^{-14}$ | amp |
| $E_g$ | −2.2 | Volts | $M_u$ | 2.1 | |

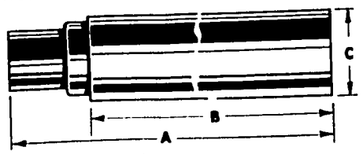
### ELECTROMETER TETRODE

**5800/VX-41A**

**AS A TETRODE ELECTROMETER**

| | | | | | |
|---|---|---|---|---|---|
| Plate Voltage | +4.5 | Volts | Transconductance | 15 | μmhos |
| Accelerator Grid Voltage ($g_1$) | +3.4 | Volts | Plate Current | 12 | μa |
| Control Grid Voltage ($g_1$) | −3 | Volts | Accelerator Grid Current | 300 | μa |
| Amplification Factor | 1 | | Control Grid Current | $10^{-15}$ | Amp |

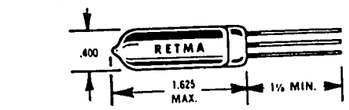
### CORONA TYPE VOLTAGE REGULATORS




**Commonly Used Metal Regulators***

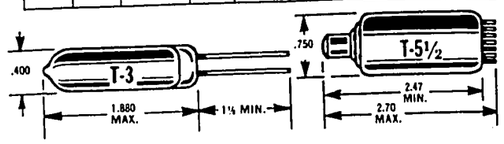
| TYPE | VOLTAGE RANGE | TOLERANCE | NOM. TEST POINT | CURRENT MAX. | CURRENT MIN. | REGULATION 100-1000μa | DIMENSIONS A | B | C |
|---|---|---|---|---|---|---|---|---|---|
| M105B | 6 KV-10 KV | ±500V | 500μa | 1000μa | 50μa | 7½% | 6½ | 5 | 1½ |
| M105 | 10 KV-20 KV | ±500V | 500μa | 1000μa | 100μa | 10% | 6½ | 5 | 1½ |
| M108 | 10 KV-20 KV | ±500V | 500μa | 1000μa | 100μa | 7% | 9½ | 8 | 1½ |
| M126 | 20 KV-25 KV | ±500V | 500μa | 1000μa | 100μa | 10% | 7½ | 6 | 1½ |
| M128 | 20 KV-27 KV | ±500V | 500μa | 1000μa | 100μa | 7% | 9½ | 8 | 1½ |

### CORONA TYPE VOLTAGE REGULATORS




**R. E. T. M. A. Types**

| TYPE | NOM. | TOLERANCE | NOM. TEST PT. | CURRENT IN μa MIN. | CURRENT IN μa MAX. | CURRENT IN μa PEAK | REGULATION VOLTS | REGULATION CURRENT RANGE |
|---|---|---|---|---|---|---|---|---|
| 5950 | 700V | ± 15V | 25μa | 5 | 100 | 150 | 14V | 5-100μa |
| 5841 | 900V | ± 18V | 25μa | 5 | 100 | 150 | 18V | 5-100μa |
| 6143 | 1200V | ± 24V | 25μa | 10 | 100 | 150 | 24V | 5-100μa |
| 6119 | 2000V | ±100V | 25μa | 15 | 100 | 150 | 40V | 5-100μa |

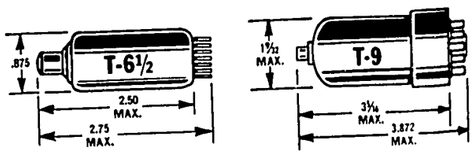



**Commonly Used Models in T-3 Size***

| TYPE | NOM. TEST PT. | TOLERANCE | NOM. | CURRENT IN μa MIN. | CURRENT IN μa MAX. | CURRENT IN μa PEAK | REGULATION VOLTS | REGULATION CURRENT RANGE |
|---|---|---|---|---|---|---|---|---|
| GV3B-400 | 50μa | ±10V | 400V | 5 | 150 | 300 | 15V | 5-150μa |
| GV3B-600 | 50μa | ±10V | 600V | 5 | 150 | 300 | 20V | 5-150μa |
| GV3A-900 | 50μa | ±15V | 900V | 10 | 250 | 350 | 25V | 10-250μa |
| GV3A-1200 | 50μa | ±30V | 1200V | 10 | 250 | 400 | 40V | 10-250μa |
| GV3A-1500 | 50μa | ±30V | 1500V | 15 | 300 | 500 | 50V | 15-300μa |
| GV3A-2000 | 50μa | ±50V | 2000V | 15 | 300 | 500 | 75V | 15-300μa |

**Commonly Used Models in T-5½ Size***

| TYPE | NOM. | TOLERANCE | NOM. TEST PT. | CURRENT IN μa MIN. | CURRENT IN μa MAX. | CURRENT IN μa PEAK | REGULATION VOLTS | REGULATION CURRENT RANGE |
|---|---|---|---|---|---|---|---|---|
| GV5B-700 | 700V | ±20V | 100μa | 10 | 250 | 350 | 25V | 10-250μa |
| GV5B-900 | 900V | ±25V | 100μa | 10 | 300 | 500 | 30V | 10-300μa |
| GV5B-1000 | 1000V | ±30V | 100μa | 10 | 300 | 500 | 35V | 10-300μa |
| GV5A-1200 | 1200V | ±36V | 100μa | 10 | 400 | 600 | 40V | 10-400μa |
| GV5A-2200 | 2200V | ±65V | 100μa | 20 | 800 | 1000 | 50V | 20-800μa |
| GV5A-3000 | 3000V | ±90V | 100μa | 30 | 1000 | 1200 | 75V | 30-1000μa |




**Commonly Used Models in T-6½ Size**

| TYPE | NOM. VOLTAGE | TOLERANCE | NOM. TEST PT. | CURRENT IN μa MIN. | CURRENT IN μa MAX. | CURRENT IN μa PEAK | REGULATION** |
|---|---|---|---|---|---|---|---|
| GV6A-450 | 450 | ±11V | 500μa | 20 | 1000 | 1300 | 30V |
| GV6A-1000 | 1000 | ±25V | 500μa | 30 | 1000 | 1500 | 42V |
| GV6A-2500 | 2500 | ±65V | 500μa | 50 | 1500 | 3500 | 100V |
| GV6A-3000 | 3000 | ±75V | 500μa | 50 | 1000 | 3500 | 70V |

**This regulation is the change in voltage over the useful range of current from MIN. to MAX.

**Commonly Used Models in T-9 Size**

| TYPE | NOM. VOLTAGE | TOLERANCE | NOM. TEST PT. | CURRENT IN μa MIN. | CURRENT IN μa MAX. | CURRENT IN μa PEAK | REGULATION** |
|---|---|---|---|---|---|---|---|
| GV9A-600 | 600 | ±15V | 1000μa | 50 | 1500 | 2000 | 25V |
| GV9A-1000 | 1000 | ±25V | 1000μa | 50 | 1750 | 2200 | 45V |
| GV9A-2000 | 2000 | ±50V | 1000μa | 50 | 3500 | 4200 | 80V |
| GV9A-3000 | 3000 | ±75V | 1000μa | 50 | 2700 | 7000 | 110V |

**This regulation is the change in voltage over the useful range of current from MIN. to MAX.

* T-3 size voltage regulators are available in any desired nominal voltage ±2% from 400 volts to 2000 volts at the customary test point of 50 ua. T-5½ size voltage regulators are available in any desired nominal voltage ±3% from 400 volts to 6000 volts at the nominal test point at 100 ua. Metal regulators are available in any desired voltage ±500 volts from 7½ KV. to 27½ KV. at the customary test point of 500 ua. All other characteristics such as maximum and minimum currents, regulation, etc., may be interpolated from the table.



For details, circle #591 on Reader Service Card

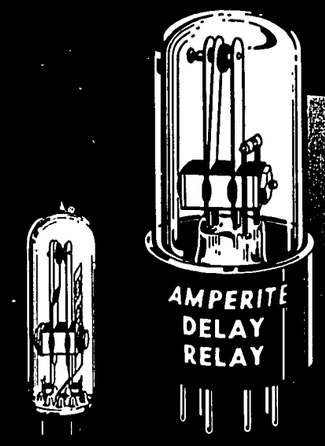



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**2 to 180 Seconds**

Actuated by a heater, they operate on A.C., D.C., or Pulsating Current.

Hermetically sealed. Not affected by altitude, moisture, or climate changes.

SPST only—normally open or closed.

Compensated for ambient temperature changes from —55 to +70 C. Heaters consume approximately 2 W and may be operated continuously. The units are rugged, explosion-proof, long-lived, and—inexpensive!

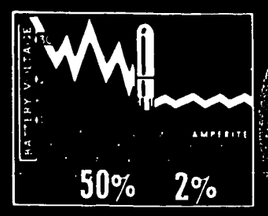
TYPES: Standard Radio Octal, and 9-Pin Miniature. List Price, $4.00. Standard Delays.

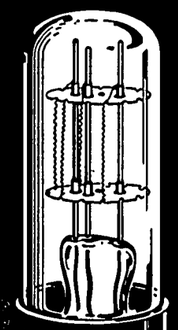
Also — Amperite Differential Relays: Used for automatic overload, under-voltage or under-current protection.

*PROBLEM? Send for Bulletin No. TR-81*

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# Directory II. Components

## 78. Tubes, Special Purpose.

Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 5s, 15s, 20s, 25s, 30s, 35s, 40s, Tel: WElls 1-6200
See ad on pages 42-45

Amperite Co., Inc., 561 Broadway, New York 12, N.Y., 35s, CAnal 6-1446
See ad on this page

Anton Electronic Laboratories, Inc., 1226 Flushing Ave., Brooklyn 37, N.Y., 15sc, 35sc, Tel: EVergreen 6-5715
See ads on pages 319, 409, 581

Beckman Instruments, Inc., Scientific & Process Instruments Div., Calif., 25s

Bendix Corp., The, Red Bank Div., Electron Tube Products, State Highway #35, Eatontown, N.J., 15c, 20s, 30sc, 35sc, Tel: LIberty 2-2000
See ad on page 574

Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 20sc, Tel: WAlker 2-6000
See ad on page 150

Braun-Knecht-Heimann Co., Industrial Div., Calif., 15c

Burroughs Corp., Electronic Tube Div., N.J., 5s

CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 5s, 35s

CBS Labs., Div. Columbia Broadcasting System, Inc., Conn., 25sc

Central Electronic Mfrs., Div. Nuclear Corp. of America, N.J., 15c, 20sc, 35s

Cerberus AG, Werk Fur Elektronentechnik, Switzerland, 5s, 35s, Cold Cathode s, Trigger s

Cetron Electronic Corp., Ill., 30sc

Collins Radio Co., Central Sales Office, Tex., 30s, 35s

Comet, Ltd., Switzerland, 40s

D.K.E. Electronic Bases, Inc., N.J., 30sc

Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, Image Dissector Camera c

Du Mont Laboratories, Inc., Allen B., Electronic Tube Div., N.J., 25sc

Dunlee Corp., Ill., 40sc

E.M.I.-Cossor Electronics, Ltd., Canada, 25sc, 35s

E.M.I. Electronics, Ltd., England, 15s, 25s

Edgerton, Germeshausen & Grier, Inc., Mass., 30s

Electro-Mechanical Research, Inc., Fla., 25s

Electron-Radar Products, Ill., 20sc

Electronic Enterprises, Inc., N.J., 30sc, 35sc

Electronic Products Co., N.Y., 15sc, 35sc

Electrons, Inc., N.J., 30s

English Electric Valve Co., Ltd., England, 30s, 35s, Direct View Storage s

Ericsson Telephone Co., Ltd., L.M., 215 Park Ave. S., New York 3, N.Y., 25, 30, 35, Tel: ORegon 7-8400
See ad on page 581

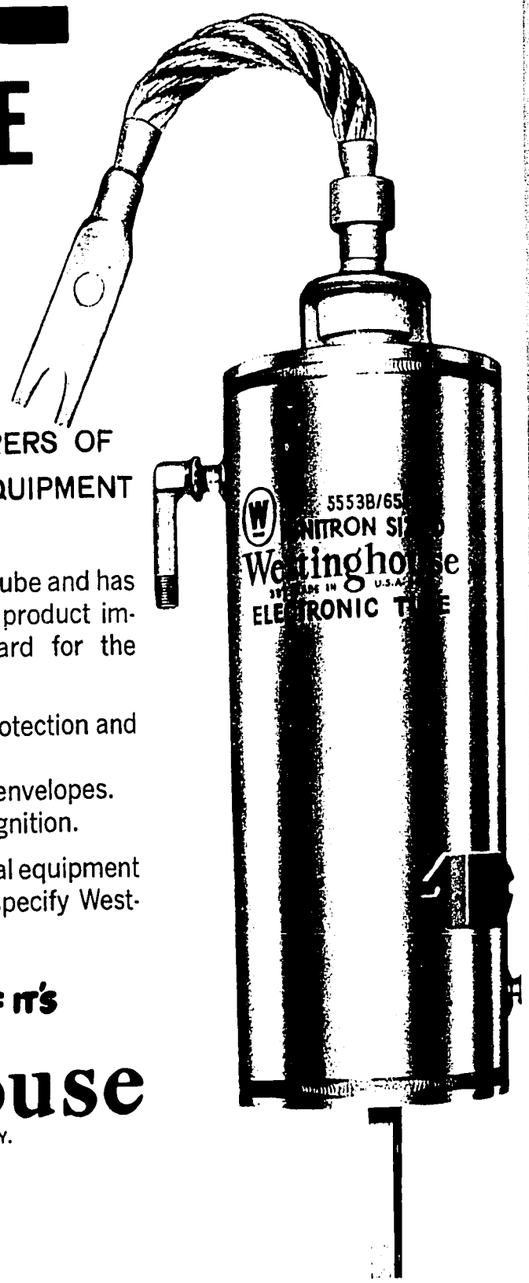


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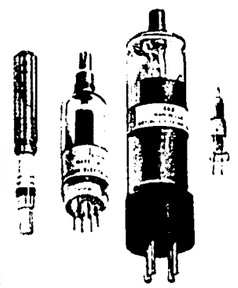


# Directory II. Components

## 78. Tubes, Special Purpose.

Etelco, Ltd., England, 5sc, 15sc, 30sc
Ferranti Electric, Inc., N.Y., 10s
**General Electric Co., Power Tube Dept., Building 267, Schenectady 5, N.Y., 30s, Tel: FRanklin 4-2211, Extension 5-3433**
**See ad on page 582**
General Electric Co., Receiving Tube Dept., Ky., 30s
General Electric Co., Ltd. of England, N.Y., 10s, 15s, 20s, 30s, 35s
General Electrodynamics Corp., Tex., 25c
Hoffman Electron Tube Corp., N.Y., 15s, 25s, 35s
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 30sc
Industrial Tubes, Inc., Ill., 30c
International Electronics Corp., Mullard Products, N.Y., 5s, 10s, 15s, 25s, 30s, 35s
International Telephone & Telegraph Corp., ITT Components Div., N.J., 30c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 25c, 30c
Kaman Nuclear, Div. Kaman Aircraft Corp., Colo., 40c, Accelerator c
Kin Electronics Corp., Conn., 30s, 35c, Cold Cathode s, Trigger s
Kuthe Laboratories, Inc., Subsid. Int. Tel. & Tel. Corp., N.J., 30s
Litton Industries, Electron Tube Div., Calif., 20c
Machlett Laboratories, Inc., The, Conn., 40s
MacKay Research Laboratories, Ariz., 25c, 30c, Photoconductive c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 30s, 35s
National Company, Inc., Mass., 25c
**National Electronics, Inc., Subsid. Eitel-McCullough, Inc., 628 North St., Geneva, Ill., 30sc, Tel: CEnter 2-7C00**
**See ad on page 576**
National Union Electric Corp., Electronics Div., Ill., 35s
Nippon Electric Co., Ltd., Japan, 5s, 10s, 20s, 30s, 35s
Nuclear Development Laboratory, Mo., 15sc
Nucleonic Corp. of America, N.Y., 5s, 15s, 25s
PEK Labs., Inc., Calif., 40c
Penta Laboratories, Inc., Calif., 30s
**Philco Corporation, Lansdale Div., Dept. 504, Church Rd., Lansdale, Pa., 20s, 35s, Tel: ULysses 5-4681**
**See ad on pages 31-34**
Philips Electronic Instruments, N.Y., 15s, 25s, 40s
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 15s, 20s, 25s, 30s, 35s, 40s
RCA Victor Co., Ltd., Canada, 25sc, 35sc
Radio Corp. of America, Defense Electronic Products, N.J., 20s, 25s
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 25s, 30s, 35s, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Rank Cintel, Ltd., England, 25s
Rauland Corp., The, Ill., 30sc, 40sc
Raytheon Co., Industrial Components Div., Mass., 5s, 10s, 15s, 30s, 35s
Rescon Electronics Corp., Mass., 15c, Thermal Analog c
Resitron Laboratories, Inc., Calif., 40sc
Scientific Electronic Labs., N.J., 20c, 35c
Signalite, Inc., N.J., 35sc
Sperry Products Co., Div. Howe Sound Co., Calif., 40s
Standard Telephones & Cables, Ltd., England, 5s, 30s, 35s
**Superior Electric Co., The, 600 Ames Ave., Bristol, Conn., 35s, Tel: LUdlow 2-9561**
**See ads on pages 412, 468, 494, 572, 586**
Sylvania Electric Products Inc., Electronic Tubes Div., Dept. 4310, 1100 Main St., Buffalo, N.Y., 5s, 10s, 20s, 30s, 35s, 40s, Tel: ELmwood 7993
**See ad on pages 50-51**


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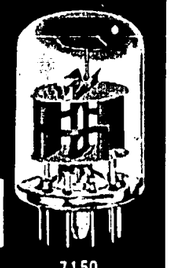
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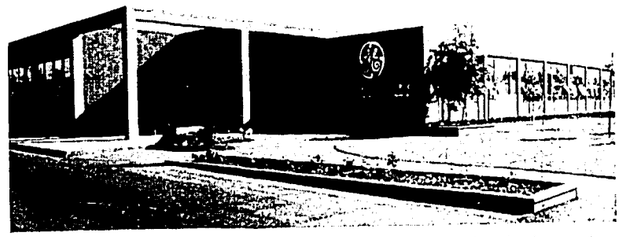
GE Power TUBES

First Choice

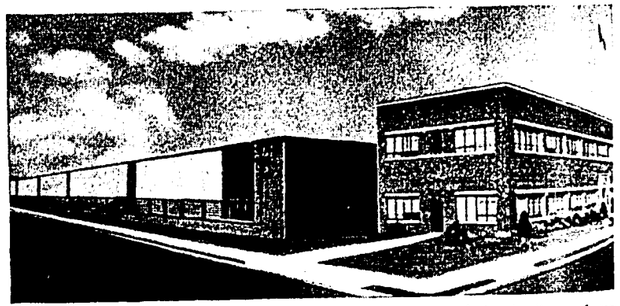
# FOR MILITARY AND COMMERCIAL APPLICATIONS

Products of the General Electric Power Tube Department include:

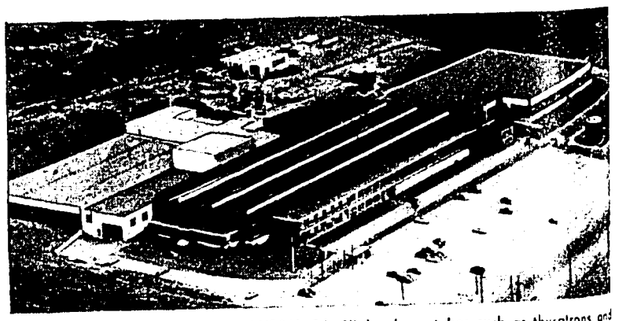
- Ignitrons
- Klystrons
- Magnetrons
- Thyratrons
- Voltage-Tunable Magnetrons
- Metal-Ceramic Tetrodes
- Camera Pick-up Tubes
- Traveling-Wave Tubes
- Parallel-Plane Microwave Tubes
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- Special Purpose Tubes



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## 78. Tubes, Special Purpose.

Thermosen, Inc., Conn., 20s, 35s
Tracerlab, Inc., Mass., 10sc, 15sc
Tucor, Inc., Conn., 20sc, 30sc
Tung-Sol Electric Inc., 1 Summer Ave., Newark 4, N.J., 30, 35, Tel: HUmboldt 2-4200
See ad on pages 74-75
Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 10c, Tel: AN 1-2660
See ad on page 678
Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio, 10s, 15s, 35s, Tel: ENdicott 1-6200
See ads on pages 535, 578
Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 25s, 30s, 40s, Tel: REgent 9-3611
See ad on page 580
Wood Counter Laboratory, N., Ill., 15sc

## 79. Tubes, Transmitting.

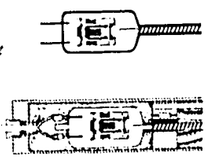
5. ATR & TR type
10. Air-cooled power
15. Iconoscopes
20. Image orthicons
25. Klystrons
30. Magnetrons
35. Monoscopes
40. Traveling wave
45. Water-cooled power

American Radio Co., Inc., N.Y., 40s
Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., 10s, 25s, 30s, 40s, 45s, Tel: WElls 1-6200
See ad on pages 42-45
Applied Radiation Corp., Calif., 25c
Bendix Corp., The, Red Bank Div., Electron Tube Div., State Highway #35, Eatontown, N.J., 5c, 25sc, 40c, Tel: LIberty 2-2000
See ad on page 574
Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 5sc, 25sc, 30sc, Tel: WAlker 2-6000
See ad on page 150
CBS Electronics, Div. Columbia Broadcasting System, Inc., Mass., 10s
Canadian Marconi Co., Canada, 30sc, 40sc
Canadian Westinghouse Co., Ltd., Canada, 10s
Cathodeon, Ltd., Meadowcroft Labs., England, 15s, 20s, 35sc, Vidicons s
Central Electronic Mfrs., Div. Nuclear Corp. of America, N.J., 5sc, 10sc, 40sc, 45sc
Cetron Electronic Corp., Ill., 10sc
Collins Radio Co., Central Sales Office, Tex., 10s, 25s, 30s
Collins Radio Co., Texas Division, Tex., 25s
D.K.E. Electronic Bases, Inc., N.J., 45c
DuMont Laboratories, Inc., Allen B., Electronic Tube Div., N.J., 40c, Planar Triodes sc
E.M.I.-Cossor Electronics, Ltd., Canada, 20s, 25s, 30s
E.M.I. Electronics, Ltd., England, 20s, 25s, 30s, 40s
Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., 10s, 25s, 40s, 45s, Tel: LYtell 1-1451
See ad on pages 80-81
Electronic Tube Corp., Pa., 40c
Engineering Associates, Ohio, 25c, 30c
English Electric Valve Co., Ltd., England, 10s, 20s, 25s, 30s, 40s, 45s, Vidicons s
Ericsson Telephone Co., Ltd., L.M., 215 Park Ave. S., New York 7, N.Y., 10, 25, 30, 40, 45, Tel: ORegon 7-8400
See ad on page 581
Ferranti Electric, Inc., N.Y., 5c, 25sc, 30sc
General Electric Co., Power Tube Dept., Building 267, Schenectady 5, N.Y., 10s, 20s, 25sc, 30s, 40sc, 45s, Planar s, Tel: FRanklin 4-2211, Extension 5-3433
See ad on page 582
General Electrodynamics Corp., Tex., Vidicons s
Grimson Color, Inc., N.Y., Vidicons c
Hoffman Electron Tube Corp., N.Y., 20s, 25s, 30s, 40s
Huggins Laboratories, Inc., Calif., 40sc
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 35sc
Intelex Systems, Inc., N.Y., 25s, 30s, 40s
International Electronics Corp., Mullard Products, N.Y., 25s, 30s, 40s
International Telephone & Telegraph Corp., ITT Components Div., N.J., 10sc, 25sc, 30sc, 40sc, 45sc
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 10c, 15c, 20sc, 25c, 30c, 40sc, 45c
Lignes Telegraphiques et Telephoniques, France, 25s, 30s
Ling Electronics Div., Ling-Temco Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 40s, Tel: PRospect 4-2900
See ads on pages 247, 285
Litton Industries, Electron Tube Div., Calif., 5c, 25c, 30c, 40c
Machlett Laboratories, Inc., The, Conn., 10s, 20s, 45s
MacKay Research Laboratories, Ariz., 30c
Marconi's Wireless Telegraph Co., Ltd., N.Y., 10s, 20s, 25s, 30s, 40s, 45s
Microwave Associates, Inc., Mass., 5s, 30s
Microwave Electronic Tube Co., Inc., Mass., 5sc, 10sc, 25sc, 30sc, 40sc
Microwave Electronics Corp., Calif., 40s
Nippon Electric Co., Ltd., Japan, 10s, 20c, 25s, 30s, 35c, 40s, 45s
PEK Labs, Inc., Calif., 10s, 35c, 45s
Penta Laboratories, Inc., Calif., 10s
Philips Laboratories, Div. North American Philips Co., Inc., N.Y., 25c, 30c, 40c
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 25s, 30s, 40s, 45s
Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 25sc, 30c, 40c, Tel: EXeter 2-4500
See ad on pages 107-108
RCA Victor Co., Ltd., Canada, 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc
Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 15s, 20s, 30s, 40s, 45s
Radio Corp. of America, Electron Tube Div., Section 1-22-Q, 415 S. 5th St., Harrison, N.J., 10s, 15s, 20s, 30s, 35s, 40sc, 45s, Tel: HUmboldt 5-3900
See ad on pages 54-55
Rantland Corp., The, III., 20sc, 40sc
Raytheon Co., Industrial Components Div., Mass., 40s
Raytheon Co., Microwave & Power Tube Div., Mass., 25s, 30s, 40s
Resistor Laboratories, Inc., Calif., Tex., 20s, 35s, 45s
Sperry Electronic Tube Div., Sperry Rand Corp., Pa., 25s, 30s, 40s
Sperry Gyroscope Co., Div. Sperry Rand Corp., N.Y., 25, 40s
Sperry Gyroscope Co. of Canada, Ltd., Canada, 25s, 30s
Standard Telephones & Cables, Ltd., England, 10s, 25s, 30s, 45s
Sylvania Electric Products Inc., N.Y., 5sc, 25sc, 30sc, 35sc, 40sc
Sylvania Electric Products Inc., Electronic Tubes Div., Dept. 4310, 1100 Main St., Buffalo, N.Y., 5s, 20s, 25s, 30s, 40s, Tel: ELmwood 7993
See ad on pages 50-51


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The Industry's Broadest Line of Traveling Wave Tubes



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# Directory II. Components

## 79. Tubes, Transmitting.

**Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 5, 25, 30, 40, Tel: YOrkshire 8-6211**
See ad on pages 48-49

Tucor, Inc., Conn., 5sc, 40sc

**Tung-Sol Electric, Inc., 1 Summer Ave., Newark 4, N.J., 10, Tel: HUmboldt 2-4200**
See ad on pages 74-75

United Electronics Co., N.J., 10c

**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 5sc, 10sc, 25sc, 30sc, 40sc, 45sc, Tel: DAvenport 6-4000**
See ad on pages 116-117

**Watkins-Johnson Co., 3333 Hillview Ave., Stanford Industrial Park, Palo Alto, Calif., 25c, 30c, 40s, Tel: DAvenport 6-8830**
See ad on page 236

Wave/Particle Corp., Calif., 25, 30, 40

**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 5s, 10s, 20s, 25s, 30s, 40s, 45s, Tel: REgent 9-3611**
See ad on page 580

**Tuning capacitors:**
**See class 44**

**Tuning coils:**
**See class 45**

**Tuning forks:**
**See class 33**

## 80. Tuners.

5. AM
10. FM
15. Klystron
20. Microwave
25. SSB
30. TV
35. UHF & VHF

**Aircom, Inc., 48 Cummington St., Boston, 15, Mass., 20s, Tel: COpley 7-9115**
See ad on page 309

**Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 15sc, 20sc, Tel: CHestnut 5-2990**
See ad on page 589

Airtron, Inc., Div. Litton Industries, Inc., N.J., 20c

**Alford Mfg. Co., 299 Atlantic Ave., Boston 10, Mass., 20s, 35s, Tel: HAncock 6-2150**
See ad on page 590

All Star Products, Inc., Ohio, 5c, 10c

Altec Lansing Corp., Calif., 5s, 10s

Alto Scientific Co., Inc., Calif., 20c, 35c

Amerac, Inc., Mass., 20sc

American Geloso Electronics, Inc., N.Y., 5s, 10s

Ampex Corp., Ampex Data Products Co., Calif., 5s, 10s

Ansco Division, General Aniline & Film Corp., N.Y., 20sc

**Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 20s, 30s, Tel: EDgewood 4-8770**
See ad on page 379

## 80. Tuners.

**Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 20sc, 35sc, Tel: POrt Washington 7-8707**
See ad on page 360

**Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 20c, Tel: EVergreen 8-6057**
See ad on page 409

Barker & Williamson, Inc., Pa., 25c

Blonder-Tongue Laboratories, Inc., N.J., 5s, 10s, 35s

Bogen-Presto Co., N.J., 5s, 10s

C.W.S. Waveguide Corp., N.Y., 20c

Calbest Electronics, Calif., 5sc, 10sc

Capehart Corp., Dynamic Electronics Div., N.Y., 5sc, 10sc, 15c, 20c, 25c, 30sc, 35c

Channel Master Corp., N.Y., 5s, 10s

Collins Radio Co., Central Sales Office, Tex., 5sc, 10sc, 15sc, 20sc, 25sc, 35sc

Collins Radio Co., Texas Division, Tex., 20s

Continental Mfg., Inc., Neb., 5s, 10s

**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 10c, 35c, Tel: FOrest 2-5571**
See ads on pages 390, 523

Crosby-Teletronics Corp., N.Y., 10s, 25c

Davis Electronics, Inc., Calif., 5s, 10s

**DeMornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, Calif., 20s, Tel: SYcamore 2-4142**
See ad on pages 52-53

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200 MC to 10 KMC

Single, double and triple stub tuners of rugged construction. Locking nuts insure stable operation.



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Designers For Industry, Inc., Ohio, 5c, 10c, 35c

De Wald Radio Div., United Scientific Labs., N.Y., 5sc, 10sc

Diamond Antenna & Microwave Corp., Mass., 15sc, 20sc

Direct T/V Replacements, Ltd., England, 5c, 30c, 35c

Dominion Electrohome Industries, Ltd., Canada, 5c, 10c

**Douglas Microwave Co., 252 E. Third St., Mount Vernon, N.Y., 20sc, Tel: MOunt Vernon 8-6900**
See ad on pages 90-91

Du Kane Corp., Ill., 5s, 10s

E.M.I. Electronics, Ltd., England, 10s, 15s, 30s, 35s

Eastern Industries, Inc., Conn., 15c

El-Rad Mfg. Co., Ill., 10c

Electronic Applications, Inc., Conn., 1c

Electronic Communications, Inc., Fla., 20c, 35c

**Electronic Instrument Co., Inc., (EICO), 33-00 Northern Blvd., Long Island City 1, N.Y., 5s, 10s, Tel: STillwell 6-8700**
See ad on page 283

**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 15c, 20sc, 35sc, Tel: VIctor 2-8400**
See ads on pages 307, 309, 313, 315, 379, 584

Engineering Associates, Ohio, 15c, 20c, 30c, 35c

Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 10c

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 20sc, Tel: RAvenswood 1-9300**
See ad on pages 125-128

Federal Manufacturing & Engineering Corp., N.Y., 5c, 10c, 35c

Fisher Radio Corp., N.Y., 10s, Multiplex s

**Frequency Standards, Inc., P.O. Box 504, Asbury Park, N.J., 15c, 20c, Tel: PRospect 4-0500**
See ad on page 443

General Electronic Laboratories, Inc., Mass., 20sc, 35sc

General Instrument Corp., Defense Engineering Products Group, N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c

Gilfillan Bros., Inc., Calif., 20c

Gombos Co., Inc., John, N.J., 20c

Gonset Division, Young Spring & Wire Corp., Calif., 5s, 10s

Granco Products, Inc., N.Y., 10s, 35s

Granite State Machine Co., Inc., N.H., 35c

Hallicrafters Co., The, Ill., 5c, 10c, 20c, 25c, 35c

Harman-Kardon, Inc., N.Y., 5sc, 10sc

Heath Company, Subsid. Daystrom Inc., Mich., 5s, 10s

I.D.E.A., Inc., Ind., 5c, 10c

Interference Testing & Research Lab. Inc., Mass., 5c, 35c

**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 35sc, Tel: DEwey 1-1000**
See ad on pages 76-77

Jones Electronics Co., Inc., M. C. Subsid. The Bendix Corp., Conn., 25

Knight Electronics Corp., Ill., 5s, 10s

**LEL, Inc., 75 Akron St., Copiague, L.I., N.Y., 5c, 10c, 20c, 35c, Tel: AMityville 4-2200**
See ad on page 365





Leak, Ltd., N.Y., 10s

Lettine Radio Mfg. Co., N.Y., 35c

**Lieco, Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 20sc, Tel: WAlnut 1-6300**
See ad on page 553

Magnavox Co., The, Ind., 5s, 10s, 30s, 35s

Mallory & Co., Inc., P. R., Ind., 10c, 30c, 35c

McIntosh Laboratory, Inc., N.Y., 5s, 10s

Melabs, Inc., Calif., 20s

Meridian Metalcraft, Inc., Calif., 20c

**Merrimac Research & Development, Inc., 517 Lyons Ave., Irvington 11, N.J., 20sc, Tel: ESsex 1-1616**
See ad on page 381

**Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 20s, Tel: WYman 2-5700**
See ad on page 380

Microtech, Inc., Conn., 20c

Microwave Development Laboratories, Inc., Mass., 20sc

Microwave Electronic Tube Co., Inc., Mass., 15c, 20c

Miller Co., J. W., Calif., 5s, 10s

Miratel, Inc., Minn., 5s, 10s, 30s, 35s

Modern Design, Div.. of H. C. Schloer, Inc., N.Y., 5c

Motorola Aviation Electronics, Inc., Calif., 5s, 35c

Motorola, Inc., Military Electronics Div., Ariz., 20c, 25c

Mytron, Inc., Mass., 20c

Narda Microwave Corp., The, N.Y., 20sc

Newcomb Audio Products Co., Calif., 5s, 10s

Nuclear Electronics Corp., Pa., 10s

**Oak Manufacturing Co., Dept. R, 1260 N. Clybourn Ave., Chicago 10, Ill., 5c, 10c, 30c, 35c, Tel: MOhawk 4-2222**
See ad on pages 86-87

**PRD Electronics, Inc., Subsid. Harris-Intertype Corp., 202 Tillary St., Brooklyn 1, N.Y., 15s, 20s, Tel: ULster 2-6800**
See ad on pages 68-69

Philco Corporation, Pa., 5c, 10c, 15c, 20c, 30c, 35c

Philips Electronics Industries, Ltd., Canada, 10s

Pitometer Log Corp., N.Y., 20sc, 35sc

**Polarad Electronics Corp., 43-20 34th St., Long Island City 1, N.Y., 15sc, 20sc, 35sc, Tel: EXeter 2-4500**
See ad on pages 107-108

Polydoroff & Assoc., W. J., D.C., 5c, 10c, 30c, 35c

Precise Electronics & Development Corp., N.Y., 5s, 10s

Precision Electronics, Inc., Ill., Multiplex sc

Precision Microwave Corp., Mass., 20c

RCA Victor Co., Ltd., Canada, 5c, 10c, 30c

Radio Condenser Co., N.J., 5c, 10c, 35c

Radio Corp. of America, N.J., 5s, 10s

Radio Corp. of America, Defense Electronic Products, N.J., 5s, 10s, 20s, 25s, 30s, 35s

Radio Engineering Laboratories, Inc., N.Y., 15sc, 20sc, 25sc, 35sc

Rantec Corporation, Calif., 20c

Resdel Engineering Corp., Calif., 35c

**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5c, 10c, 25c, Tel: LOckwood 5-4578**
See ad on page 324

Scott, Inc., H. H., Mass., 5s, 10s

Sherwood Electronic Labs., Inc., Ill., 5sc, 10sc, Multiplex sc

Sickles Div., F. W., General Instrument Corp., Mass., 10c, 30c, 35c

Sigma Electronics Research Corp., Wash., 15c, 20c

Simpson Mfg. Co., Inc., Mark, N.Y., 5s, 10s

Sinclair Radio Labs., Inc., N.Y., 20sc, 35sc

Sivers Lab., Sweden, 20s

Spectralab Instruments, Calif., 35c

**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 15c, 20c, Tel: REdwood 6-4161**
See ad on pages 100-101

Standard Coil Products (Canada), Ltd., 5c, 10c, 30c, 35c

Standard Kollsman Industries, Inc., Ill., 10c, 30sc, 35c

Stromberg-Carlson Div., General Dynamics Corp., N.Y., 10c, 15c, 20c, 25c, 35c

**Technical Materiel Corp., 700 Fenimore Rd., Mamaroneck, N.Y., 25s, Tel: OWens 8-4800**
See ads on pages 344, 345

Technicraft Div., Electronic Specialty Co., Conn., 20c

Telerad Mfg. Corp., N.Y., 25c

**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 20c, Tel: ULysses 5-5131**
See ad on page 438

Valor Instruments. Inc., Calif., 10s, 15s, 20s, 35s

Van Norman Industries, Inc., Electronics Div., N.H., 5sc, 10sc, 25sc

Vinco Electronics Corp., Conn., 5c, 10c, 35c

Warwick Mfg. Corp., Ill., 5c, 10c

Waveline, Inc., N.J., 20s

Wells-Gardner Electronics Corp., Ill., 5c, 10c, 35c

**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 25sc, Tel: JUdson 2-3030**
See ad on page 704

**Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 20c, Tel: HUnter 2-7876**
See ad on page 664

**Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 25sc, Tel: BEnton 1-0700**
See ad on page 573

**Tunnel diodes:**
**See class 70**

**Turntables:**
**See class 34**

**Vacuum tube machinery:**
**See class 96**

**Vacuum tube parts:**
**See class 104**

**Vacuum tube rectifiers:**
**See class 67**

**Vacuum tube voltmeters:**
**See class 14**

**Vacuum tubes, receiving:**
**See class 77**

**Vacuum tubes, special purpose:**
**See class 78**

**Vacuum tubes, transmitting:**
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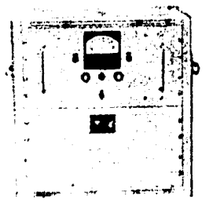
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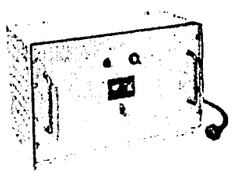
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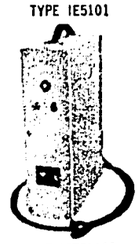
TYPE EMT4104UT



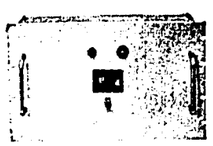
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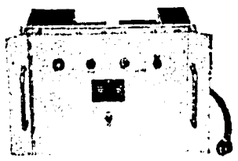
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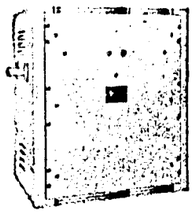
TYPE IET5102



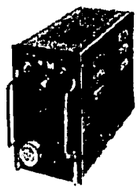
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Feature a transistorized circuit. Output voltage remains within a 0.5 volt bandwidth for any and all variations in line voltage, load current and load power factor (0.25 volt bandwidth for input voltage changes only; 0.25 volt bandwidth for load current and power factor changes from lagging 0.5 to unity).

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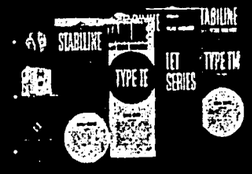
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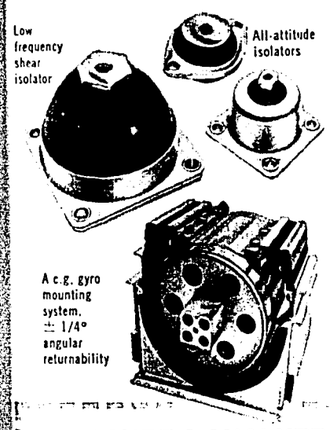
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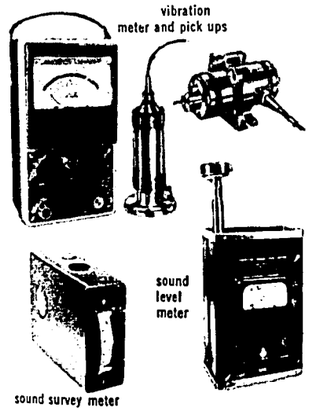
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Many completely transistorized portable meters and laboratory instruments and transducers.




The KORFUND Co. Inc
22 D CANTIAGUE ROAD
WESTBURY, L.I., NEW YORK

For details, circle #600 on Reader Service Card




# Directory II. Components

**Varistors:**
See class 82

## 81. Vibration Controls.

5. Vibration & shock mounts
10. Isolation pads

Allied Research Assoc., Inc., Mass., 5sc
Armstrong Cork Co., Pa., 10s
Barry-Wright Corp., Mass., 5sc
Federal Manufacturing & Engineering Corp., N.Y., 5c
Goodrich Industrial Products Co., B. F., Ohio, 5s
Houdaille Industries, Inc., Buffalo Hydraulics Div., N.Y., 5 Antenna Buffers sc
Johnson Co., Inc., K. W., Ohio, 5sc, 10sc
**Korfund Co., Inc., 22D Cantiague Rd., Westbury, L.I., N.Y., 5s, 10s, Tel: RAvenswood 9-7580**
**See ad on this page**
Lessells & Associates, Inc., Mass., 5c, 10c
Litton Industries, Maryland Div., Md., 5, 10
Lord Manufacturing Co., Pa., 5sc
MB Electronics, Div. Textron Electronics, Inc., Conn., 5s, 10s
**Metal Textile Corp., Div. General Cable Corp., 647 E. First Ave., Roselle, N.J., 10c, Tel: CHestnut 5-3000**
**See ad on page 552**
Minnesota Rubber Co., Minn., 10c
Pam Associates, Inc., Md., 5c
Robins Industries Corp., N.Y., 10s
Robinson Technical Products, Inc., N.J., 5sc, 10sc
Ucinite Co., The, Div. United-Carr Fastener Corp., Mass., 5
York Co., Inc., Otto H., N.J., 5c

**Vibrators:**
See class 47

**Vidicons:**
See class 79

**Voltage converters:**
See class 47

**Voltage dividers:**
See class 14

**Voltage regulated power supplies:**
See class 63

**Voltage regulating transformers:**
See class 76

**Voltage regulating tubes:**
See class 78

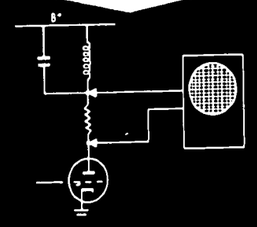
## 82. Voltage Regulators.

5. Automatic
10. Manually operated
15. Varistors

Advanced Research Associates, Inc., Md., 5c
American Research & Mfg. Corp., Md., 5c, 10c
**American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., Tube Savers s, Tel: CApital 2-3791**
**See ad on page 472**
**Amperite Co., Inc., 561 Broadway, New York 12, N.Y., 5s, Tel: CAnal 6-1446**
**See ad on page 579**
Applegate & Co., C. J., Colo., 5s
Automatic Timing & Controls, Inc., Pa., 5c
Barnes & Reinecke, Ill., 5c
Brach Mfg. Corp., Div. General Bronze Corp., N.J., 5sc
Bradley Semiconductor Corp., Conn., 15c
Brooks Research, Inc., N.Y., 5c
**Bulova Watch Co., Electronics Div., Dept. A-1376, 61-10 Woodside Ave., Woodside 77, N.Y., 5c, 15c, Tel: NEwtown 9-5700**
**See ad on page 426**
**CTS Corp., 1142 W. Beardsley Ave., Elkhart, Ind., Tube Savers c, Tel: ELkhart 3-0310**
**See ad on page 2**
Carborundum Co., N.Y., 15c
Central Electronic Mfrs., Div. Nuclear Corp. of America, N.J., 5s
Central Transformer Co., Ill., 5c, 10c
**Chicago Standard Transformer Corp., 3504 W. Addison St., Chicago 18, Ill., 5s, Tel: INdependence 3-7400**
**See ad on page 565**
Clark Controller Co., The, Ohio, 5c, 10c
Coil Co. of America, Inc., N.J., 10c
Collins Radio Co., Central Sales Office, Tex., 5c
Cook Electric Co., Ill., 5sc
Cornwell Electronics Corp., Conn., 5c
**Curtiss-Wright Corp., Electronics Div., 35 Market St., East Paterson, N.J., 5sc, Tel: SWarthmore 1-0100**
**See ad on page 510**
Davenport Mfg. Co., Ill., 5sc
Dayton Electronic Products Co., Ohio, 5sc, 10sc
Dicon Corporation, N.Y., 5c, 10c, 15c
Djordjevic Engineering Co., Djeco Div., Ill., 5sc, 10sc
Dorsett Electronics Labs., Inc., Okla., 5sc
Electric Autolite Co., The, Ohio, 5s
Electric Regulator Corp., Conn., 5sc
Electric Specialty Co., Conn., 5c, 10c, 15c
Electro-Physics Co., N.Y., 10c
Electro-Seal Corp., Ill., 5c
Electronet Div., Rue Prods., Calif., 5c
**Electronic Measurements Co., Inc., Maple Ave. & Lewis St., Eatontown, N.J., 5s, 10s, Tel: LIberty 2-0300**
**See ad on page 478**

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Ever try a measurement like this?**



*2 things happen . . .*

(1) power line current flows in scope and circuit—only 60 cycles show: (2) triode is loaded by shunt capacitance to ground . . . and gain changes.

**Solution:**
Use a Moeller Power Isolator to power scope or circuit.



**Now** Moeller Power Isolator supplies ideal isolation for line operated devices. Common grounding is not necessary. Use with oscilloscopes, voltmeters, amplifiers, signal generators, power supplies, recorders, or any line operated test equipment.

The Model 30 Power Isolator can supply up to 300 VA of isolated power at 115 VAC 60 cycle. Output impedance to ground < 2 ppf and > 50,000 megohms in parallel.

*Write for descriptive literature*

Quality industrial instrumentation since 1867
**MOELLER INSTRUMENT CO.**
ELECTRONICS DIVISION
132 St & 89 Ave., Richmond Hill 18, N.Y.

For details, circle #601 on Reader Service Card




Electronic Specialty Co., Calif., 5c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 10c
Fairfield Engineering Corp., Conn., 5c
Fidelity Instrument Corp., Pa., 5sc
Gemco Electric Co., Mich., 5c, 10c
General Electric Co., Apparatus Sales Div., N.Y., 5s, 10s
General Electric Co., Magnetic Materials Sect., Mich., 15sc
**General Magnetics, Inc.,** 2641 Louisiana Ave., Minneapolis 26, Minn., 5c, Tel: WEst 9-8571
See ad on page 363
General Meters, Inc., Colo., 5sc
**General Radio Co.,** 22 Baker Ave., West Concord, Mass., 5s, 10s, Tel: EMerson 9-4400
See ad on Cover 4
Gramer Halldorson Transformer Corp., Ill., 5c, 10s
Green Rectifier Co., N.J., 5c, 10sc
Gulton Industries, Inc., N.J., 5sc
Hamilton Standard Div., United Aircraft Corp., Conn., 5c
Hathaway Instruments, Inc., Colo., 5s
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 5c
Holt Instrument Laboratories, Wis., 5s
Hoover Electronics Co., Md., 5c
Intercontinental Electronics Corp., N.Y., 5c, 15c
**Interelectronics Corp.,** 2432 Grand Concourse, New York 58, N.Y., 15c, Tel: LUdlow 4-6200
See ads on pages 355, 487
**International Rectifier Corp.,** 233 Kansas St., El Segundo, Calif., 5s, Arc Suppressors s, Reference Elements and Packs s, Tel: OREgon 8-6281
See ad on pages 118-119
Kaiser Electronics, Inc., N.J., 5c
Kidde & Co., Inc., Walter, N.J., 5c
Kuhnke Elektrotechnische Fabrik, Germany, 5sc
Leland Airborne Products Div. of A.M.F., Ohio, 5c
Lindberg Engineering Co., Ill., 5
**Magnetic Amplifiers Div., Siegler Corp.,** 632 Tinton Ave., New York 55, N.Y., 5sc, 10c, Tel: CYpress 2-6610
See ads on pages 252, 364, 418
Magnetic Circuit Elements, Inc., Calif., 5c
Marathon Electric Mfg. Corp., Wis., 5
Marstan Electronics Corp., N.Y., 5c
Matthew Laboratories, N.Y., 5sc
Milro Controls Co., Inc., N.J., 5c, 10c
Minneapolis-Honeywell, Military Products Group, Minn., 5c
Modern Design, Div. of H. C. Schiber Inc., N.Y., 5c, 10c
**Moeller Instrument Co., Inc.,** Electronics Div., 132nd St. & 89th Ave., Richmond Hill 18, N.Y., 5, Tel: Virginia 9-210
See ad on this page
Montek Associates, Inc., Utah, 5sc
Nichols, Ltd., R. H., Canada, 5c
**North Hills Electronics, Inc.,** Alexander Pl., Glen Cove, L.I., N.Y., 5s, Tel: ORiole 1-5700
See ads on pages 405, 445, 588
Nothelfer Winding Labs., Inc., N.J., 5
Nucleonic Products Co., Inc., Calif., 5
Ohio Crankshaft Co., Ohio, 5sc
Ohio Semiconductors, Inc., Ohio, 5c
**Ohmite Manufacturing Co.,** 3692 Howard St., Skokie, Ill., 10sc, Tel: ORchard 5-2600
See ad on pages 78-79
Omega Mfg., Inc., N.Y., 5s, 10s
**Opad Electric Co.,** 43-8 Walker St., New York 13, N.Y., 5c, 10c, Tel: WOrth 6-0380
See ad on page 483
Otis Elevator Co., Defense & Industries Div., N.Y., 5c
Performance Measurements Co., Mich., 5c
Perkin Engineering Corp., Calif., 5c
Perma-Power Co., Ill., 5s, 10s
**Power Designs, Inc.,** 1700 Shames Dr., Westbury, L.I., N.Y., 5sc, Tel: EDgewood 3-6200
See ad on page 486
Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 5c
Rank Cintel, Ltd., England, 5s
Raytheon Co., Commercial Apparatus & Systems Div., Mass., 5c
Republic Electronic Industries Corp., N.Y., 5c, 10c
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 5c
Sel-Rex Corp., N.J., 5c, 10c
Sola Electric Co., Div. Basic Products Corp., Ill., 5sc
**Sorensen & Co., Inc.,** Subsid. Raytheon Co., Richards Ave., South Norwalk, Conn., 5sc, Tel: TEmple 8-6571
See ad on page 490


**NORTH HILLS'**



**CURRENT GOVERNOR**
Model CS-11
for ***Constant Current***

- Precision Current Source
- Gyro Torquer Supply
- Transistor and Diode Tester

▸ High Accuracy ▸ Excellent Stability ▸ Programmable

For testing and measurement of gyros, transistors, diodes, clutches, solenoids, meters, other current sensitive devices.

- Current Range is 1μa to 100 ma with 5 decades — digital in-line readout —
- Regulation and stability 0.002% —
- Accuracy 0.02%

In use by leading companies for gyro torquer supply, transistor avalanche test, diode PIV test, clutch testing, calibration.

*Literature describing this and other constant current sources from 0.1μa to 30 amp. may be obtained from*

**NORTH HILLS**
ELECTRONICS, INC.
Glen Cove, Long Island, New York ORiole 1-5700

For details, circle #602 on Reader Service Card








# Directory II. Components

## 82. Voltage Regulators.

Southwestern Industrial Electronics Co., Tex., 5sc
Specialty Electronics Development Corp., N.Y., 5c
Standard Electrical Products Co., Ohio, 5sc, 10sc,
Standard Telephones & Cables, Ltd., England, 5c
**Superior Electric Co., The,** 600 Ames Ave., Bristol, Conn., 5s, Tel: LUdlow 2-9561
See ads on pages 412, 468, 494, 572, 586
Tel-Instrument Electronics Corp., N.J., 5s
Telechrome Mfg. Corp., N.Y., 5sc
Thermo Electric Co., Inc., N.J., 5sc
Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 5c
Transformer Technicians, Inc., Ill., 5c
**Trionics Corp.,** P.O. Box 548, Madison 1, Wis., 5c, 15c, Tel: CEdar 8-2616
See ad on page 663
USI Western Design, Div. U. S. Industries, Inc., Calif., 5
Union Electric Products Co., N.J., 5c, 10c
United Electrodynamics, Inc., Calif., 5s
U. S. Science Corp., Calif., 5c, 10c
Varo Mfg. Co., Inc., Tex., 5sc
VecTrol Engineering, Inc., Conn., 5c
Vickers, Inc., Electric Products Div., Mich., 5c, 10c
**Victory Engineering Corp.,** P.O. Box 373, 114 Springfield Rd., Union, N.J., 15s, Tel: MUrdock 8-7150
See ad on page 535
Westinghouse Electric Corp., Small Motor Div., Aircraft Repair Dept., Ohio, 5sc
Wickes Engineering & Construction Co., N.J., 5c


*Your Airtec Sales Reps Are:*

*Florida*
Norman Hardy Associates
331 Second Avenue
Indialantic, Melbourne, Florida

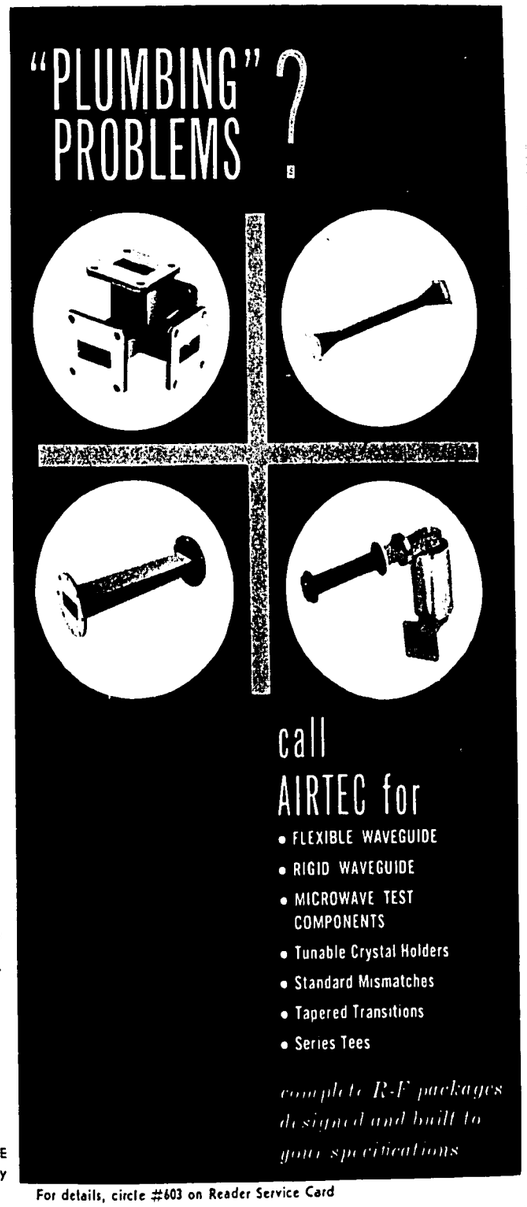
*S. Calif. & Arizona*
Connelly Sales Company
P.O. Box 485
La Mirada, California

*New England*
L. R. Provencher & Associates
3 Pleasant Street
Worcester, Massachusetts

*Long Island, Rochester & Upstate New York*
Jo-Ray Associates
143-37 35th Ave.
Flushing, Long Island

*Philadelphia Area, Maryland Area & N. Carolina*
Electronet Liaison, Inc.
P.O. Box 243
Forestville, Maryland

AIRTEC, INC.
139 EAST FIRST AVENUE
ROSELLE, NEW JERSEY




For details, circle #603 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

**Voltmeters:**
See class 58

**Voltmeters, audio frequency:**
See class 3

**Voltmeters, digital:**
See class 14

**Voltmeters, vacuum tube:**
See class 14

**Wattmeters, absorption:**
See class 21

**Wattmeters & watt hour meters:**
See class 58

## 83. Waveguides & Accessories.

2. Antenna feeds
4. Cavities
6. Couplings
8. Crystal-detectors
10. Crystal mixers
12. Crystal mounts
14. Directional couplers
16. Duplexers
18. Flexible waveguides
20. Horns
22. Hybrid junctions
24. Isolators
26. Multipliers
28. Phase shifters
30. Power dividers
32. Probes
34. Rigid waveguides
36. Rotary joints
38. Sampling lines, reflectors, etc.
40. Switches
42. Terminations
44. Transmission lines
46. Unfinished castings

ACF Electronics Div., ACF Industries, Inc., Md., 1sc, 10sc, 26sc, 30sc, 44s
APC Communication Products, Tex., 2s, 20s, 22s, 36s, 44s
**Ad-Yu Electronics Lab., Inc.,** 249 Terhune Ave., Passaic, N.J., 28s, Tel: GRegory 2-5622
See ad on page 329
Adams-Russell Co., Inc., Mass., 4sc, 12c, 30c, Diplexers c
Advanced Electronics, Inc., Conn., 32c
Aeroquip Corporation, Mich., 6sc, 18sc, 34sc
**Ainslie Corp.,** 531 Pond St., South Braintree 85, Mass., 2sc, 20c, 34sc, 42c, Tel: VIctor 8-0850
See ad on page 368
Airborne Instruments Lab., Div. Cutler-Hammer, Inc., N.Y., 2c

# From the AMCI Catalogue

## AUTOMATIC IMPEDANCE PLOTTERS



- *Continuous impedance display with frequency*
- *Available in portable and rack-mounted units*

| Type | Frequency Range (mc) | Line Size |
|---|---|---|
| 12 | 2.5-250 | Type N |
| 11-Q | 30-400 | Type N |
| 11-PS | 180-1100 | Type N |

## SLOTTED LINES

- *Residual swr under 1.010*
- *Rated error in detected signal under 1.005*
- *Available with a wide variety of tapered reducers*



TYPE 1026-4

| Type | Frequency Range (mc) | Impedance (ohms) |
|---|---|---|
| 1026-13 | 50-3000 | 50 or 75 |
| 1026-8 | 75-3000 | 50 or 75 |
| 1026-6 | 100-3000 | 50 or 75 |
| 1026-4 | 150-3000 | 50 or 75 |
| 1026-2 | 300-3000 | 50 or 75 |

## COAXIAL SWITCHES



TYPE 1038

- *High power ratings; swr under 1.06*
- *Pressurized*
- *Motor-driven and manually operated models*

| Type | Frequency Range (mc) | Line Size |
|---|---|---|
| 1038 | 0-450 | 6⅛" |
| 1136 | 0-500 | 3⅛" |
| Very high peak power models for radar applications | | |
| 1038-HV | 0-450 | 6⅛" |
| 1136-HV | 0-500 | 3⅛" |

## INSTRUMENT LOADS



TYPE 1108B

- *High stability; very low swr*
- *Nearly all transmission line sizes*

| Type | Frequency Range (mc) | Line Size | Max SWR |
|---|---|---|---|
| 1108B | 0-1100 | Type N | 1.02 |
| 2120 | 0-1000 | ⅞" | 1.03 |
| 1112 | 0-1000 | 1⅝" | 1.03 |
| 1110 | 0-650 | 3⅛" | 1.03 |

## HYBRIDS

- *Very broad band*
- *Very low residual unbalance*



TYPE 1104

| Type | Frequency Range (mc) | Max. SWR | Residual Unbalance (db) |
|---|---|---|---|
| 1027-K | 60-120 | 1.4 | −50 |
| 1027-L | 120-240 | 1.4 | −50 |
| 1027-M | 240-480 | 1.5 | −50 |
| 1027-N | 480-960 | 1.6 | −50 |
| 1098 | 960-1600 | 1.6 | −40 |
| 1102 | 1600-2400 | 1.5 | −40 |
| 1104 | 2400-3600 | 1.5 | −34 |
| 1100-K | 60-120 | 1.4 | −55 |
| 1100-L | 120-240 | 1.4 | −55 |
| 1100-M | 240-480 | 1.5 | −55 |
| 1100-N | 480-960 | 1.6 | −55 |
| 1099-N | 800-960 | 1.2 | −50 |
| 1099-O | 975-1175 | 1.2 | −50 |
| 1024 | TV Channels 2-13 | 1.05 | −50 |

## OTHER PRODUCTS

*TAPERED REDUCERS*
*LINE STRETCHERS*
*DIPLEXING FILTERS*
*VOR ANTENNAS*
*TV BROADCASTING ANTENNAS — directional and omnidirectional*
*ADJUSTABLE MATCHING NETWORKS*
*IMPEDANCE STANDARD LINES*

ANTENNA SYSTEMS — COMPONENTS — AIR NAVIGATION AIDS — INSTRUMENTS

AMCI **ALFORD** *Manufacturing Company*
299 ATLANTIC AVE. BOSTON, MASS

For details, circle #604 on Reader Service Card




## 83. Waveguides & Accessories.

**Aircom, Inc., 48 Cummington St., Boston 15, Mass., 2s, 4c, 6c, 8s, 10c, 12s, 14s, 16c, 18s, 20s, 22s, 26c, 28s, 30c, 32s, 34s, 36c, 38c, 40c, 42s, 44c, Adapters sc, Bends sc, Tees sc, Tel: COpley 7-9115**
See ad on page 309

Aircraft Armaments, Inc., Md., 2c, 4c, 6s, 14c

**Airtec, Inc., 139 E. 1st Ave., Roselle, N.J., 2sc, 4sc, 6sc, 8sc, 10sc, 12sc, 14sc, 16sc, 18sc, 20sc, 22sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36sc, 38sc, 40sc, 42sc, 44sc, Tel: CHestnut 5-2990**
See ad on page 589

Airtron Inc., Div. Litton Industries, Inc., N.J., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18sc, 20c, 22c, 24sc, 26c, 28c, 30c, 32c, 34c, 36c, 38c, 40c, 42c, 44c, 46c

**Alford Mfg. Co., 299 Atlantic Ave. Boston 10, Mass., 16c, 22s, 30c, 40s, 42s, 44s, Tel: HAncock 6-2150**
See ad on this page

Allied Research & Engineering Div., Allied Record Mfg. Co., Calif., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c 34c, 36c, 38c, 40c, 42c, 44c, 46c

American Development Electronics Co, N.J., 6c

**American Electronic Laboratories, Inc, 121 N. 7th St., Philadelphia 6, Pa. 2s, 4s, 8s, 12s, 20s, 34s, 40s, Tel: WAlnut 5-8780**
See ad on page 369

American Radar Components, Inc., N.J. Flanges sc

**Amtron Corp., 17 Felton St., Waltham 54, Mass., 6s, 14s, Tel: TWinbrook 4-5020**
See ad on page 591

Andrew Antenna Corp., Ltd., Canada, 2s, 14c, 16c, 18s, 20c, 22c, 28c, 30c, 32c, 34s, 40c, 42s, 44s

**Andrew Corp., 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 2s, 18s, 20c, 34s, 40c, 44s, Tel: TRiangle 4-4400**
See ad on page 371

Ansco Division, General Aniline & Film Corp., N.Y., 2sc, 4sc, 6sc, 14sc, 16sc, 22sc, 34sc, 38sc, 42sc

**Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 2s, 6c, 8s, 12s, 14s, 16c, 20s, 22c, 24c, 28c, 30s, 32c, 34s, 36s, 38c, 42s, 44s, Tel: EDgewood 4-8770**
See ad on page 379

Antenna Systems, Inc., Hingham Industrial Center, Hingham, Mass., 2c, 16c, 20c, 30c, 32c, 34c, 36c, 38c, 40c, 42c, 44c, 46c, Tel: RIverview 9-4700
See ad on page 369

Anton Machine Works, N.Y., 4c

Applied Radiation Corp., Calif., 4c

Applied Research, Inc., 76 S. Bayles Ave., Port Washington, N.Y., 14sc, Tel: POrt Washington 7-8707
See ad on page 360

Arwood Precision Casting Corp., N.Y., 4c

Automatic Metal Products Corp., 333 Berry St., Brooklyn 11, N.Y., 14c, 42c, Tel: EVergreen 8-6057
See ad on page 409

Avionics, Ltd., Canada, 8s, 10s, 14s, 36s, 42s

BJ Electronics, Borg-Warner Controls, Calif., 4sc, 14sc





# Directory II. Components

## 83. Waveguides & Accessories.

Barker & Williamson, Inc., Pa., 18c, 2nc, Baluns c

Bean & Co., Morris, Ohio, 46sc

Belz Industries, Inc., N.Y., 2sc, 4sc, 10c, 12c, 14c, 16c, 18c, 20sc, 22c, 24c, 28c, 30c, 32c, 34sc, 36c, 42c, 44c

Bendix Corp., The, York Division, Pa., 2c, 28c, 34c

**Bird Electronic Corp., 30303 Aurora Rd., Cleveland 39, Ohio, 42sc, Tel: CHurchill 8-1200**
See ad on page 306

Blaine Electronetics, Inc., Calif., 2c, 20c

Bogart Mfg. Co., N.Y., 2c, 4c, 10c, 14sc, 16c, 20c, 22c, 28c, 30c, 32c, 36c, 40sc, 42sc, 44c

**Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 4sc, 14sc, 16sc, 22sc, 30sc, Tel: WAlker 2-6000**
See ad on page 150

Bone Engineering Corp., Calif., 2c, 4c, 20c, 22c, 34c, 36c, 46c

Brooks & Perkins, Inc., Mich., 20c, 38c

Budd-Stanley Co., Inc., N.Y., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18c, 20c, 22c, 28c, 30c, 32c, 34c, 36c, 38c, 40c, 42c, 44c

Budelman Electronics Corp., Conn., 16c

CGS Laboratories, Inc., Conn., 4c

C.W.S. Waveguide Corp., N.Y., 2sc, 6c, 12c, 14c, 16c, 20c, 34sc, 36sc, 40c, 42c

Canadian Westinghouse Co., Ltd., Canada, 2c, 12c, 16c, 20c, 40c

Canoga Division, Underwood Corp., Calif., 2s, 4s, 14s, 16s, 20s, 24s, 34sc, 36sc, 42sc

Capehart Corp., Dynamic Electronics Div., N.Y., 2c, 4c, 8c, 10c, 14c, 22c, 24c, 26c, 28c, 30c, 32c, 42c

Carborundum Co., N.Y., 42c

Cardwell Condenser Corp., N.Y., 2sc, 4sc, 14sc, 16sc, 18c, 20sc, 28sc, 34sc, 36sc, 42sc, 44sc

Caswell Electronics Corp., Calif., 6sc, 14sc, 16sc, 24sc, 28c, 40c, 42sc

Central Electronic Mfrs., Div. Nuclear Corp. of America, N.J., 4sc, 6sc, 22sc, 26sc, 34sc

**Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 42s, Magnetron Wells s, Tel: WEst Lebanon 3-5851**
See ad on page 452

Chance Vought Electronics Div., Texas, 2sc, 4c, 6sc, 16c, 20c

Chase Brass & Copper Co., Conn., 46c

Chu Associates, Mass., 2c, 20c, 28c, 30c

Co-operative Industries, Inc., N.J., 18sc, 34c, 44c

Collins Radio Co., Texas Division, Tex., 2s

Connector Corp. of America, Calif., Flanges sc

Continental Electronics Mfg. Co., 4212 S. Buckner Blvd., Dallas 27, Tex., 2c, 22c, 30c, 44c, Tel: EVergreen 1-1135
See ad on page 156

Control Electronics Co., Inc., 10 Stepar Place, Huntington Station, L.I., N.Y., 4c, 8c, 12c, 14c, 16sc, 26c, 42c, Tel: HAmilton 7-7961
See ad on page 440

Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 28c, Tel: FOrest 2-5571
See ads on pages 390, 523

Crowley Div., A. O. Smith Corp., N.J., 42c

Custom Components, Inc., N.J., 24c, 32c, 42c

Dalmo Victor Co., Div. of Textron, Inc., Calif., 2c, 14c, 16c, 20c, 22c, 28c, 30c, 34c, 36c, 38c

Dayton Electronic Products Co., Ohio, 4c

DeMornay-Bonardi, 780 S. Arroyo Pkwy., Pasadena, Calif., 4s, 6s, 8s, 10s, 12s, 14s, 20s, 24s, 26s, 28s, 32s, 34s, 36s, 40s, 42s, Tel: SYcamore 2-4142
See ad on pages 52-53

Diamond Antenna & Microwave Corp., Mass., 2sc, 4sc, 6sc, 8sc, 10sc, 12sc, 14sc, 16sc, 18c, 20sc, 22c, 28sc, 30c, 32c, 34sc, 36sc, 40c, 42sc, 44c, 46c


## COAXIAL DIRECTIONAL COUPLERS

λ/4 side arm type, in rigid transmission line ⅞ in. to 6⅛ in. diameter — copper or aluminum—standard and pressurized types available.

- **Coupling 20db to 60db:** The value of coupling can be maintained within plus or minus 1db over a 2 to 1 frequency range.
- **Directivity 35db or better:** A directivity of over 40db can be held over a 30% frequency range.
- **Frequency range 200 to 2000mc.**

Send for complete details.

**AMTRON CORP.**
**17 Felton Street**
**Waltham 54, Massachusetts**

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## FERROTEC
### Ferrite Microwave Components

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WAVEGUIDE: From L Band to Ka Band, low power and high power, including test equipment isolators covering full waveguide band and microwave relay isolators. Special designs of ruggedized units are available for military applications.

COAXIAL: Compact coaxial isolators cover very broad bandwidth with moderate ratios of isolation to insertion loss. Other coaxial ferrite devices such as TWT amplitude regulators, variable attenuators, modulators, and phase shifters can be supplied.

- *CIRCULATORS*

FARADAY ROTATORS: These circulators cover the complete microwave relay bands. Narrow band units, which are miniaturized for Doppler navigation systems, are available in all frequency ranges.

DIFFERENTIAL PHASE TYPES: These units cover L Band to Ka Band and 10% bandwidth. Features are broad bandwidth, high isolation, and maximum waveguide power capabilities.

SHUNT TEE: Features narrow band, minimum size, and high isolation.

- *WAVEGUIDE SWITCH*

Ferrite devices offer a variety of switching functions. Features include fast switching time up to one microsecond and high power with constant input VSWR while switching. They can also be used to time-share antennas with one receiver and one transmitter. Switches can be reciprocal or non-reciprocal.

VARIABLE ATTENUATORS AND MODULATORS: Numerous ferrite configurations are used for electronically controlled modulators and attenuators.

- *SPECIAL DESIGNS*

An experienced engineering staff can be consulted on your problems. A complete ferrite materials laboratory can formulate ferrites for particular application.

**Ask about our latest developments in strip line ferrite components, coaxial ferrite devices, and broadband high-power tee circulators. Write for complete catalog.**

**FERROTEC, Inc.**
**217 California Street • Newton 58, Mass. • Decatur 2-7600**

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# SPECIALISTS

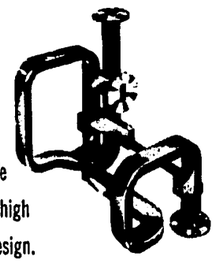
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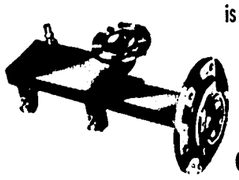
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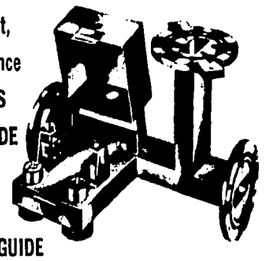


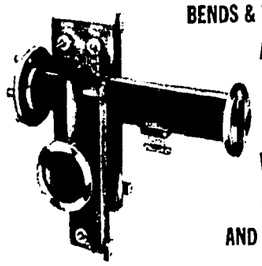
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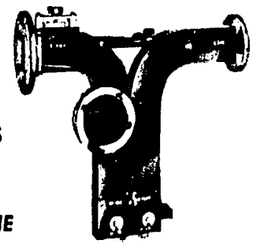


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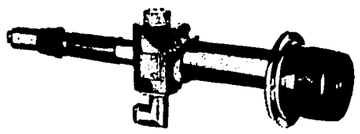








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## 83. Waveguides & Accessories.

Dielectric Products Engineering Co, Inc., Me., 2c, 4c, 6c, 14c, 16c, 22c, 28c, 32c, 34c, 36c, 38c, 40c, 42c, 44c, Multiplexers c

Dorne & Margolin, N.Y., 2c, 20c, 30c, 40c

**Douglas Microwave Co., 252 E. Third St., Mt. Vernon, N.Y., 2sc, 4sc, 6sc, 8sc, 10sc, 12sc, 14sc, 16sc, 20sc, 22sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36sc, 38sc, 40sc, 42sc, 44sc, Tel: MOunt Vernon 8-6900**

See ad on pages 90-91

Dynamic Gear Co., Inc., N.Y., 44c

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 24c, 32c, 34c, 38c, 40c, Tel: HAlifax 6-7491**

See ad on page 400

E.M.I.-Cossor Electronics, Ltd., Canada, 32s

E.M.I. Electronics, Ltd., England, 4s

**ESC Electronics Corporation, 534 Bergen Blvd., Palisades Park, N.J., 28c, Tel: WIndsor 7-0400**

See ad on page 436

Eagle Metalcraft, Inc., N.Y., 34c, 44c

Electro Tec Corp., N.J., 36c, 40c

Electronic Applications, Inc., Conn., 4s, 8s, 10s, 14s, 38s

Electronic Specialty Co., Calif., 2sc, 6c, 16c, 18sc, 20sc, 22sc, 30sc, 34sc, 40c, 42c, 44c

Electronic Transistors Corp., N.J., 40c

**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 4c, 8c, 10sc, 12c, 14c, 30sc, 42sc, Tel: VIctor 2-8400**

See ads on pages 307, 309, 313, 315, 379, 584

Enflo Corporation, N.J., 18c

**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 4c, 18c, 34c, Tel: BIgelow 2-2700**

See ad on page 170

Engineering Associates, Ohio, 18c

**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 2c, 4sc, 6c, 8s, 10c, 12s, 14s, 16c, 20s, 22s, 24s, 26c, 28c, 30c, 32s, 36c, 40sc, 42s, 46c, Tel: RAvenswood 1-9000**

See ad on pages 125-128

Falcon Division, Mass., 6s

Federal Mfg. & Eng. Corp., N.Y., 4c, 8c

**Ferrotec, Inc., 217 California St., Newton 58, Mass., 16sc, 24sc, 28c, 40c, Ferrite circulators sc, Tel: DEcatur 2-7600**

See ad on page 591

**Frequency Standards, Inc., P.O. Box 504, Asbury Park, N.J., 4c, 8c, 10c, 12c, 14c, 22c, 26c, Tel: PRospect 4-0500**

See ad on page 443

G B Electronics, N.Y., 2sc, 4c, 6c, 8c, 14c, 20sc, 28sc, 34sc, 36sc, 40c, 44c

**Gabriel Electronics Div., Gabriel Co, Millis, Mass., 12, 14, 20, 22, 36, Tel: FR 6-2953**

See ad on page 372

Gar Precision Parts, Inc., Conn., 4s, 6s, 20s, 22s, 36s

**General Communication Co., 677 Beacon St., Boston 15, Mass., 4c, 6c, 12c, 14c, 40c, Tel: COpley 7-6030**

See ad on page 331





# Directory II. Components

## 83. Waveguides & Accessories.

**General Electric Co., Power Tube Dept., Building 267, Schenectady 5, N.Y., 16s, Tel: FRanklin 4-2211, Extension 5-3433**

See ad on page 582

General Electronic Laboratories, Inc., Mass., 2sc, 4sc, 8sc, 10sc, 20sc, 36sc, 46c

Gilfillan Bros., Inc., Calif., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 28c, 30c, 32c, 34c, 36c, 38c, 40c, 42c

Gombos Co., Inc., John, N.J., 2c, 4sc, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 28c, 30c, 32c, 34c, 36c

Goodyear Aircraft Corp., Ohio, 2s, 6c, 20c, 32c, 34s, 36c

Gorham Electronics, Div. Gorham Mfg. Co., R.I., 2c, 4c, 6c, 10c, 12c, 14c, 16c, 18c, 20c, 22c, 28c, 30c, 32c, 34c, 36c, 42c, 46c

Granger Associates, Calif., 2c

Granite State Machine Co., Inc., N.H., 2c, 20c, 34c, 36c

**Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 36c, Tel: YOnkers 8-8400**

See ad on page 416

Hallicrafters Co., The, Ill., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 24c, 28c, 30c

**Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 12sc, Tel: WYman 8-8080**

See ad on page 450

**Hewlett-Packard Co., 1033D Page Mill Rd., Palo Alto, Calif., 6s, 8s, 10s, 12s, 14s, 26s, 28s, 32s, 38s, 40s, 42s, Tel: DAvenport 6-7000**

See ad on pages 3-18

High Voltage Engineering Corp., Mass., 4c, 28c

Hoffman Electron Tube Corp., N.Y., 6s, 8s, 10s, 12s, 14s, 18s, 24s, 28s, 34s, 42s, 44s

Hycon Mfg. Co., Calif., 2c, 8c, 10c, 12c, 14c, 16c, 22c, 24c, 28c, 30c, 34c, 40c, 44c

I-T-E Circuit Breaker Co., Special Products Div., Pa., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 34c, 38c, 40c, 42c, 44c, 46c

**Illumitronic Engineering, 680 E. Taylor St., Sunnyvale, Calif., 44s, Tel: REgent 9-2395**

See ads on pages 400, 692

**Industrial Products-Danbury Knudsen, Div. of Amphenol-Borg Electronics Corp., 33 E. Franklin St., Danbury, Conn., 34c, Tel: PIoneer 3-9272**

See ad on page 160

Intercontinental Electronics Corp., N.Y., 30c

International Telephone & Telegraph Corp., ITT Laboratories, N.J., 14c, 16c, 18c, 28c, 34c

**JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N.Y., 16sc, 26sc, Tel: DEwey 1-1000**

See ad on pages 76-77

**J-V-M Microwave Co., Ill., 2c, 4sc, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 26sc, 34sc, 36c**

**Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 14s, Tel: BAldwin 6-3456**

See ad on pages 114-115

Jones Electronics Co., Inc., M. C., Conn., 12s, 14sc, 38c, 42sc

Kaman Nuclear, Colo., 2c, 20c, 28c

**Kearfott Div., General Precision, Inc., Little Falls, N.J., 2c, 4c, 6c, 16c, 24sc, 34sc, 36c, Tel: CLifford 6-4000**

See ad on pages 120-121

Kennedy & Co., D. S., Mass., 2c, 10c, 20c, 34c, 36c, 44c

Knight Corp., Ewen, Mass., 24c, Ferrite Circulators c

Knopp, Inc., Calif., 28s

Kollmorgen Optical Corp., Mass., 4c, 6c

Laboratory for Electronics, Inc., Mass., 4c, 8c, 10c, 14c, 22c, 30c

La Pointe Industries, Inc., Conn., 4c

**Lavoie Laboratories, Inc., Matawan-Freehold Rd., Morganville, N.J., 4s, Tel: LOwell 6-2600**

See ad on page 312

**Lieco, Incorporated, 130 Eileen Way, Syosset, L.I., N.Y., 2c, 6sc, 8sc, 10sc, 12sc, 14sc, 16sc, 18c, 20c, 22sc, 28c, 30c, 32c, 34sc, 36sc, 40sc, 42sc, 44sc, Tel: WAlnut 1-6300**

See ad on page 553

Lignes Telegraphiques et Telephoniques, France, 4c, 8s, 10s, 12s, 14s, 16s, 20s, 22s, 24c, 28s, 30s, 34s, 40s, 42s

Litton Industries, Electron Tube Div., Calif., 10c

Lockheed Electronics Co., N.J., 2c, 30c

Lubrs & Co., C. H., N.J., 24s, 40s

**Makepeace Div., D. E., Engelhard Industries, Inc., Attleboro, Mass., 32, Tubing, Tel: ATtleboro 1-0089**

See ad on page 170

Malco Manufacturing Co., Ill., 42s

**Mark Products Co., 5439 Fargo Ave., Skokie, Ill., 2s, Tel: ORchard 5-1500**

See ad on page 375

Martin Co., The, Md., 2c, 4c, 8c, 14c, 16c, 20c, 22c, 28c, 30c, 42c, 44c

Maury & Associates, Calif., 4c, 12c, 14sc, 16c, 22c, 30sc, 40c, 42sc

McKiernan-Terry Corp., N.J., 2c, 14c, 20c, 30c, 36c

Melabs, Inc., Calif., 2c, 4s, 8s, 10s, 12s, 14s, 16s, 20c, 22s, 24s, 26s, 28s, 30s, 38c, 40s, 42c

Meller Co., Adolf, R.I., Windows s

Melpar, Inc., Special Products Dept., Va., 2c, 8c, 10c, 12c, 20c, 28c, 36c

Meridian Metalcraft, Inc., Calif., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 28c, 30c, 34c, 36c, 42c, 44c

**Merrimac Research & Development, Inc., 517 Lyons Ave., Irvington 11, N.J., 8sc, 10c, 12sc, 14c, 22sc, 26c, 28c, 30c, 42c, Tel: ESsex 1-1616**

See ad on page 381

Metal Fabricators Corp., Mass., 20c, 34c

Metavac, Inc., N.Y., 6

**Microlab, 570 W. Mt. Pleasant Ave., Livingston, N.J., 42s, Tel: WYman 2-5700**

See ad on page 380

Micromega Corp., Calif., 4c, 10c, 16c, 24c, 28c, 30c

**Microphase Corp., 1 Seneca Pl., P.O. Box 1166R, Greenwich, Conn., 2c, 4c, 8c, 10c, 12c, 14c, 22c, 30c, 42c, Tel: NOrmandy 1-6200**

See ad on page 204

Microtech, Inc., Conn., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18sc, 20c, 21c, 26c, 28c, 30c, 32c, 34c, 42c, 44c

Microwave Associates, Inc., Mass., 2s, 4s, 6s, 8s, 10s, 12s, 14s, 16s, 20s, 22s, 24s, 26sc, 30s, 34c, 36sc, 40s, 42s, 44c, 46c

Microwave Chemicals Laboratory, Inc., N.Y., 24

Microwave Development Laboratories, Inc., Mass., 2sc, 4sc, 6sc, 8sc, 10sc, 12sc, 14sc, 16sc, 18sc, 20sc, 22sc, 24sc, 26sc, 28sc, 30sc, 32sc, 34sc, 36sc, 38sc, 40sc, 42sc, 44sc, 46sc

Microwave Electronic Tube Co., Inc., Mass., 4c, 14c, 16sc, 24sc

Motorola, Inc., Military Electronics Div., Ariz., 16sc, 24sc, 28sc, 40sc

Mytron, Inc., Mass., 2c, 4c, 6c, 10c, 12c, 14c, 16c, 20c, 28c, 32c, 34c, 36c, 44c

N.R.K. Mfg. & Engineering Co., Ill., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 28c, 30c, 34c, 36sc, 40sc, 42c

Narda Microwave Corp., The, N.Y., 4s, 6s, 8s, 10s, 12s, 14sc, 16c, 18c, 20sc, 22s, 24s, 26s, 28c, 30s, 32s, 34s, 36c, 38s, 40c, 42s, 44c

**Naybor Laboratories, Inc., E. V., 26 Manorhaven Blvd., Port Washington, N.Y., 40c, Tel: PArt Washington 7-4300**

See ad on page 517

Norrich Plastics Corp., N.Y., 6c, 12c, 36c

PRD Electronics, Inc., Subsidiary of Harris-Intertype Corp., N.Y., 2020 Tillary St., Brooklyn 1, N.Y., 4s, 6s, 8s, 12s, 14s, 24s, 26s, 30s, 32s, 42s, Adapters s, Bends s, Mismatches s, Tees s, Tel: ULster 2-6800

See ad on pages 68-69

**Parker Seal Co., 10567 Jefferson Blvd., Culver City, Calif., 42c, Seals sc, Tel: VErmont 9-1161**

See ad on page 650

Phelps Dodge Copper Products Corp., N.Y., 34s, 44s

**Philco Corporation, Lansdale Div., Dept. 504, Church Rd., Lansdale, Pa., 10sc, Tel: ULysses 5-4681**

See ad on pages 31-34

Philco Corporation, Govt. & Industrial Group, Pa., 2sc

Pitometer Log Corp., N.Y., 4sc

**Portchester Instrument Corp., 114 Wilkins Ave., Port Chester, N.Y., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 34c, 36c, 38c, 40c, 42c, 44c, Tel: WEstmore 9-4092**

See ad on page 592

Precision Instrument Co., Calif., Discriminators sc

Precision Microwave Corp., Mass., 2c, 4c, 8c, 10c, 12c, 14c, 16c, 20c, 28c, 30c, 36c, 38c, 40c, 42c

Precision Tube Co., Inc., Pa., 44c

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

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## 83. Waveguides & Accessories.

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**See ad on page 383**

Radar Design Corp., N.Y., 4c, 6c, 8c, 10sc, 12sc, 14s, 16c, 20s, 22c, 24c, 30sc, 42sc, 44c

**Radar Measurements Corp., 190 Duffy Ave., Hicksville, L.I., N.Y., 4, 8, 12, 14, 16, 20, 22, 28, 32, 36, 40, 42, Tel: OVerbrook 1-5600**
**See ad on page 314**

Radio Corp. of America, N.J., 2s, 4s, 6s, 8s, 14s, 18s, 24s, 28s, 30s, 34s, 36s, 38s, 40s, 42s, 44s

Rantec Corporation, Calif., 2c, 8c, 10c, 14c, 16s, 20sc, 24sc, 28sc, 42sc, Ferrite Circulators sc, Ferrite Modulators sc

Raytheon Co., Microwave & Power Tube Div., Mass., 4s, 24s

Raytheon Co., Special Microwave Devices Operations, Mass., 24sc, 30c, 40sc, Ferrite Circulators sc

Reeves Instrument Corp., N.Y., 36s

Republic Aviation Corp., N.Y., 20c

Resdel Eng. Corp., Calif., 4s, 10s, 20s

Resitron Laboratories, Inc., Calif., 40sc

Rodé, Inc., Mass., 46sc

Rotary Devices Corp., N.J., 36sc

Ryan Electronics, Calif., 2c

Sage Laboratories, Inc., Mass., 4c, 8sc, 10sc, 12sc, 14sc, 20c, 22sc, 28sc, 30sc, 32sc, 36sc, 42sc

Sanders Associates, Inc., N.H., 6sc, 10sc, 12sc, 14sc, 22sc, 30sc, 42sc, 44sc

**Saxton Products, Inc., 4320 Park Ave., New York 57, N.Y., 44sc, Baluns sc, Tel: WEllington 3-6400**
**See ad on page 615**

Schutter Microwave Corp., N.Y., 10, 16, 36, 42

Scientific-Atlanta, Inc., Ga., 2sc, 8s, 10s, 20s, 26s, 36s

Sierra Electronic Corp., Calif., 14s, 42s

Sigma Electronics Research Corp., Wash., 2c, 4c, 6c, 8sc, 10c, 12sc, 14sc, 16c, 18c, 20sc, 22c, 24c, 26c, 28c, 30c, 32sc, 34c, 36c, 38sc, 40c, 42sc, 44c

Sinclair Radio Labs., Inc., N.Y., 2sc, 4sc, 6sc, 8sc, 12sc, 14sc, 16sc, 20sc, 22sc, 28sc, 30sc, 32sc, 38sc, 42sc

Sivers Lab., Sweden, 4sc, 6s, 10s, 12s, 14s, 28s, 32s, 34s, 36sc, 38s, 40sc, 42s, 44c

Smith Mfg. Co., J. & H., N.Y., 2c, 20c

Somerset Radiation Laboratory, Inc., N.J., 8s, 10s, 12s, 28s, 42s

**Specialty Automatic Machine Corp., 80 Cambridge St., Route 3A, Burlington, Mass., 34c, 46c, Tel: BRowning 2-0800**
**See ad on page 595**

Specialty Electronics Development Corp., N.Y., 2c, 4c, 6c, 14c, 16c, 22c

Spectralab Instruments, Calif., 4sc, 24sc

**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 2c, 4c, 6c, 8sc, 10sc, 12sc, 14sc, 16c, 20sc, 22c, 24sc, 26c, 28c, 30c, 32c, 36c, 38sc, 40c, 42sc, Tel: REdwood 6-4161**
**See ad on pages 100-101**

Standard Metals Corp., Mass., 34c





# Directory II. Components

## 83. Waveguides & Accessories.

Standard Telephones & Cables, Ltd., England, 4s, 28c

Strand Engineering Co., Mich., 2c, 36c, 40c

Sylvania Electric Products Inc., N.Y., Windows sc

TRAK Electronics, Div. CGS Laboratories, Conn., 4s

TRG, Incorporated, N.Y., 2sc, 4s, 6s, 8s, 10s, 12s, 14s, 16s, 20sc, 22s, 24s, 26s, 28s, 30s, 32s, 34s, 36sc, 38s, 40sc, 42sc, 44s, 46s

**Technical Appliance Corp., 1 Taco St., Sherburne, N.Y., 2sc, 4c, 6c, 20sc, 22sc, 30c, 34sc, 44sc, 46c, Tel: ORchard 4-2211**
**See ad on page 376**

Technical Research Group, Inc., Microwave & Antenna Dept., Mass., 2c, 4c, 10s, 12s, 14c, 20c, 24s, 30c, 36s, 42s

Technicraft Div., Electronic Specialty Co., Conn., 2c, 4c, 6c, 12c, 14c, 16c, 18c, 20c, 22c, 28c, 30c, 32c, 34c 36c, 42c, 44c

Telecomtrol Corp., N.J., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 24c, 28c, 32c

Telerad Mfg. Corp., N.Y., 2sc, 4sc, 6sc, 8c, 10c, 12c, 14c, 16sc, 18sc, 22c, 24c, 26c, 28c, 30c, 34sc, 36sc, 38c, 44sc

**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 30c, Tel: MIdway 6-7211**
**See ads on pages 456, 556**

**Telonic Engineering Corp., 773 Broadway, Laguna Beach, Calif., 8c, 10c, Tel: HYatt 4-7581**
**See ad on page 71**

Temco Electronics, Div. Ling-Temco Electronics Corp., Tex., 20c, 28c, 34c

Thompson Ramo Wooldridge Inc., Tapco Group, Ohio, 2c, 30c, 36c, 40sc

Transco Products, Inc., Calif., 12sc, 14sc, 16sc, 22sc, 30sc, 40sc, 42sc

Tri-Point Plastics, Inc., N.Y., 2 Plastic c

**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22sc, 30sc, 34s, 40c, 42sc, 44sc, Tel: ULysses 5-5131**
**See ad on page 438**

United Aircraft Products, Inc., Ohio, Seals s

United Electrodynamics, Inc., Calif., 4c

United Shoe Machinery Corp., Mass., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 24c, 28c, 30c, 32c, 34c, 36c, 38c, 42c, 44c

U. S. Dielectric Products, Inc., Mass., 2c

**Universal Mfg. Co., Inc., 1168 Grove St., Irvington 11, N.J., 14s, 34s, Tel: ESsex 4-9800**
**See ad on page 678**

Unwave, Inc., N.Y., 2c, 4c, 6c, 8c, 10c, 12c, 14c, 16c, 18c, 20c, 22c, 24c, 26c, 28c, 30c, 32c, 34c, 36c, 38c, 40c, 42c, 44c, 46c

Valor Instruments, Inc., Calif., 4s, 6s, 14s, 16s, 18s, 22s, 26s, 32s, 34s, 36s, 38s, 40s, 42s, 44s

**Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 4s, 10s, 14c, 16c, Tel: DAvenport 6-4000**
**See ad on pages 116-117**

VecTrol Engineering, Inc., Conn., 28sc

Vibro Mfg. Co., Inc., N.Y., 4c, 6c, 10c, 14c, 16c, 32c, 34c, 36c, 44c, 46c

WacLine, Inc., Ohio, 32c, 42c

Waltham Electronics Corp., Mass., 10c

Warren Components Div., El-Tronics, Inc., Pa., 12c

Waveguide, Inc., Calif., 2c, 4c, 6c, 10c, 14c, 20c, 34sc, 40c, 44c

Waveline, Inc., N.J., 2c, 4c, 6s, 8s, 10c, 12s, 14s, 16c, 20s, 22s, 28s, 30c, 32c, 34s, 36s, 38c, 40c, 42s, 44s

**Weinschel Engineering & Mfg. Corp., 10503 Metropolitan Ave., Kensington, Md., 42, Tel: LOckwood 4-0121**
**See ads on pages 315, 384**

**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 4s, 16s, Tel: REgent 9-3611**
**See ad on page 580**

Westronics of California, Calif., 40c, 42c

**Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 2c, 4c, 8c, 10c, 12c, 14c, 16c, 20c, 22c, 36c, 42c, Tel: HUnter 2-7876**
**See ad on page 664**

Wiley Electronics Co., Ariz., 2c, 18c, 40c

Wavemeters:
See class 21

Windows, waveguide:
See class 83

Wire & cable:
See class 85

Wire & tape recorders:
See class 29

Wirewound resistors:
See class 69

X-ray tubes:
See class 78

Yokes, deflection:
See class 45

Zener diodes:
See class 70

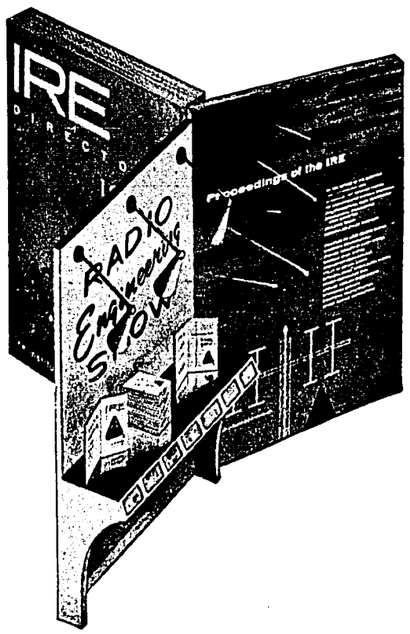




For details, circle #608 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

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# 1961 IRE DIRECTORY
# Directory III
# Materials & Services

### Fabricators, Machinery & Tools

### 21 major groups
### 194 products

The products and services of the radio-electronics industry have been organized into three basic directories:

I. Complete Equipment
II. Components
III. Materials & Services

Within these three basic directories, 104 major product and service groups are numbered consecutively throughout. Under each of these 104 classes a further breakdown is given, showing in detail by a system of code numbers after each firm listed what specific products within the class are manufactured by that firm.

For a terminology cross-index listing the 932 subproducts in alphabetical order, consult the pink section preceding page 1.

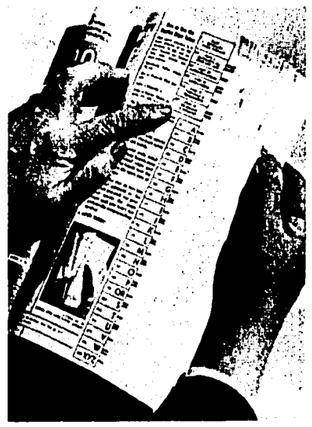
### The first few times you use this EDGE INDEX

follow the "How to use" instructions slowly—one step at a time. After that you will be able to open easily and almost instantly to the section that you seek.

Machol edge indexes covering the alphabetical section and each of the three major directory groups will be found on pages 135, 241, 359, and 597.

### HOW TO USE

1. Bend the Directory almost double with the back cover page on the inside.
2. Hold in your right hand with your four fingers near to the bound edge and your right thumb near the middle of the open side of this page.
3. From the heavy or light line symbol adjacent to the subject you seek, run your eyes across the page edges until you reach the horizontally corresponding symbol.
4. OPEN THERE!



LICENSE NO. 25G
MACHOL EDGE INDEX PATENT #2680630

For complete list of products and services, arranged alphabetically for fast reference, see the pink section preceding page 1.


| | |
|---|---|
| 1 | COMPLETE DATA SPREADS |
| 135 | ALPHABETICAL DIRECTORY |
| 241 | DIRECTORY I COMPLETE EQUIPMENT |
| 359 | DIRECTORY II COMPONENTS |
| 597 | DIRECTORY III MATERIALS & SERVICES |


## INDEX TO MATERIALS & SERVICES DIRECTORY


| Product No. | | Page No. |
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| 85 | Cable & Wire | 605 |
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| 87 | Chassis, Racks & Slides | 623 |
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| 98 | Molded Products | 689 |
| 99 | Plastics | 691 |
| 100 | Publishing | 695 |
| 101 | Semiconductor Materials | 697 |
| 102 | Shielding Materials | 699 |
| 103 | Solder | 700 |
| 104 | Vacuum Tube & Semiconductor Parts | 703 |
| 105 | Distribution | 707 |

**Abrasives:**
See class 95

**Adhesive labels & tapes:**
See class 91

**Aging racks:**
See class 14

**Air filters:**
See class 84

**Alloys:**
See class 97

**Alumina ceramics:**
See class 86

**Aluminizers:**
See class 96

**Anodes:**
See class 104

**Antennas:**
See class 39

**Atmospheric test chambers:**
See class 14

**Bases, tube:**
See class 104

**Battery chargers:**
See class 96

**Batteries:**
See class 41

**Bearings:**
See class 91

**Benches, test:**
See class 84

**Blower & fan motors:**
See class 60

**Blowers & fans:**
See class 42

**Bobbins:**
See class 91

**Book publishers:**
See class 100

**Boxes:**
See class 84

**Brackets, jewels, mounts, for pilot lights:** See class 62

**Brazers:**
See class 96

**Breadboards:**
See class 91

**Brushes, motor:**
See class 91

**Bushings & bearings:**
See class 91

## 84. Cabinets, Enclosures & Panels.

5. Assembly enclosures
10. Boxes, metal
15. Boxes, plastic
20. Consoles
25. Instrument & meter panels
30. Instrument & meter cases
35. Metal cabinets
40. Metal relay rack panels
45. Mobile huts
50. Molded plastic cabinets
55. Transit cases
60. Wood cabinets

A A Metal Products, Inc., Vt., 10c, 25c, 30c, 35c

Abalon Precision Mfg. Corp., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c

Accessory Controls & Equip. Corp., Conn., 20c, 25c, 35c

Ace Engineering & Machine Co., Inc., Pa., 45c




BODNAR PRODUCTS CORP.
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NEw Rochelle 6-4664
For details, circle #609 on Reader Service Card


## 84. Cabinets, Enclosures & Panels.

Ackerman Engravers, Inc., N.Y., 25c

Acro Products Corp., Ill., 5s, 20s, 25s, 30s, 35s, 40s

Acromark Co., N.J., 25c

Advanced Electronics, Inc., Conn., 5c, Test Benches c

Air-Maze Corp., Sub. Rockwell-Standard Corp., Ohio, Dust Filters sc

Air-Shields, Inc., Pa., 15sc, 35sc, 50sc

Aircraft Armaments, Inc., Md., 35c

Akro-Mils, Inc., Ohio, 35

Albano Co., Inc., N.Y., 20c, 45c, 55c, 60c

**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 5s, 10s, 25s, 30s, 35s, 40s, 55s, Tel: JUniper 3-0160**
**See ad on page 496**

Alden Systems Co., Mass., 40c, Test Benches c

Allen Electric & Equip. Co., Mich., 5c, 10c, 25c, 30c, 35c

Althor Products, N.Y., 15s

Aluminum Co. of America, Pa., 5c, 35c

**Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 5s, 10c, 20sc, 25s, 30s, 35s, 40s, 55c, Tel: UNderhill 7-8500**
**See ad on page 623**

**American Aluminum Co., 230 Sheffield St.—ID, Mountainside, N.J., 5c, 10c, 30c, 55c, Tel: ADams 3-3500**
**See ad on page 631**

American Insulator Corp., Pa., 15c, 50c

American Machine & Foundry Co., D.C., 5s, 20s, 25c, 30c, 35s

Anchor Specialty Mfg. Co., N.J., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 55c, 60c

**Anetsberger Brothers, Inc., 100 N. Anets Dr., Northbrook, Ill., 5c, 20c, 35c, Tel: CRestwood 2-0770**
**See ad on page 599**

**Antenna Systems, Inc., Hingham Industrial Center, Hingham, Mass., 5c, 20c, 35c, 45c, 55c, Tel: RIverview 9-4700**
**See ad on page 369**

Applied Electro Mechanics, Inc., Va., 15c, 50c

Applied Electronics Co., Subsid. Raytheon Co., Calif., 35c

Arrow Machinists & Fabricators, N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c

Artisan Metal Works Co., Ohio, 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c

Atkins & Merrill, Inc., Mass., 15c, 20c, 50c

Auburn Plastics, Inc., N.Y., 50c

Audio Electronic Corp., Wis., 30c, 60c

Auto-Test, Inc., Ill., 10c

Avionics Corp. of America, Pa., 5c, 20c, 35c, 40c

Bailey Meter Co., Ohio, 25c

Baker Co., Inc., The, Me., Test Benches sc

Barker & Williamson, Inc., Pa., 45c

Belz Industries, Inc., N.Y., 5c, 10c

Bernco Engineering Corp., Ind., 5c, 25c, 35c, 40c

Bingham Mfg. Co., J. F., Mass., 5c, 10c, 20c, 35c, 40c

**Bodnar Products Corp., 238X Huguenot St., New Rochelle, N.Y., 25c, Tel: NEw Rochelle 6-4664**
**See ads on pages 598, 632**

Boonton Molding Co., N.J., 15c, 50c







# Directory III. Materials & Services

## 84. Cabinets, Enclosures & Panels.

Bowl-Mor Company, Inc., Mass., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c, 60sc

Bradley Associates, Inc., Ill., 15sc

Bristol Co., Conn., 25c, 30c

Brooks & Perkins, Inc., Mich., 5c, 10c, 20c, 30c, 35c, 40c, 55c

Buck Engineering Co., N.J., 5c, 10c, 20c, 25c, 30c, 35c, 40c

**Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 5sc, 10sc, 20s, 25s, 30s, 35sc, 40s, Tel: HEnderson 1-7166**
**See ad on page 625**

Cadre Industries Corp., N.Y., 45c

Cambridge Filter Corp., N.Y., Air Filters sc

Cambridge Pattern Works, Inc., Mass., 30c, 60c

Campro Products, Inc., Ohio, 15s, 35c, 50s

Canadian Radium & Uranium Corp., N.Y., 25c

Carey Electronic Engineering Co., Ohio, Air Filters c

Carmody Corp., N.Y., 5sc, 20sc, 25sc, 35sc, 40sc, 60sc

Carroll Pressed Metal, Inc., Mass., 10c

Central Dynamics, Ltd., Canada, 5c, 10c, 20c, 25c, 30c, 35c, 40c

Centronix, Inc., Fla., 5c, 10c, 20c

Channel Master Corp., N.Y., 60s

Chicago Dial Co., Ill., 25c

Chicago Thrift-Etching Corp., Ill., 25c

Chisholm Industries, Ltd., Canada, 10c, 20c, 25c, 30c, 35c, 40c, 55c, 60c

Churchill Lighting Corp., Mass., 5c, 10sc, 25c, 30c, 35c, 40c

Cleveland Electronics, Inc., Ohio, 60s

Cleveland Metal Specialties Co., Ohio, 25c

Coils-Electronics Co., Pa., 10c, 30c

Cole Electric Co., Calif., 20c, 35c

Comco Plastics, Inc., N.Y., 15c, 25c, 30c

Conn-Craft Co., Conn., 25c

Consolidated Diesel Electric Corp., Conn., 45c

Controlled Atmosphere Enclosures Mfg. Co., Inc., Fla., 5sc, 10c, 15c

Cook Electric Co., Ill., 40sc

Cook Technological Center, Div. Cook Electric Co., Ill., 45c

Cooper Electronics, Inc., Pa., 10c, 30c

Craig Systems, Inc., Mass., 5c, 10c, 20c, 35c, 45c, 55c

Croname, Inc., Ill., 25c, 35c

Crown Engineering, N.M., 10c

Daco Instrument Co., N.Y., 25s

Dahlstrom Metallic Door Co., N.Y., 35c

Darrill Products Corp., Mass., 15c, 30c, 50c

Davies Molding Co., Harry, Ill., 15sc, 25sc, 30sc

Daystrom, Inc., Military Electronics Div., Pa., 5c

Deveo Engineering, Inc., N.J., 5c, 20c, 25c, 30c, 35c, 40c

Dietz Co., Inc., Henry G., N.Y., 25c

Division Lead Co., Ill., 10s, 35s

Dolin Metal Products, N.Y., 10sc, 35sc, 55sc

Dominion Electrohome Industries, Ltd., Canada, 20sc, 60sc

Donnelly Mfg. Co., Mass., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c

Du Kane Corp., Ill., 5s

Dura Plastics of New York, Inc., N.Y., 5c, 15c, 25c, 30c, 50c

Duralith Corp., Pa., 25c

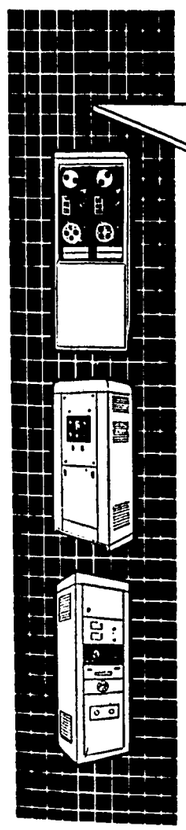
Dynamics Instrumentation Co., Calif., 5s

**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10sc, 20sc, 25sc, 35sc, 40sc, 55c, Tel: HAlifax 6-7491**
**See ad on page 400**

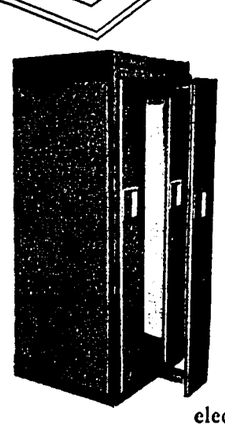
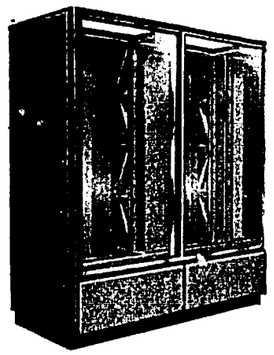
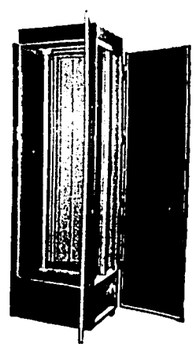
Eagle Metalcraft, Inc., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c

Eastern Foileal Nameplate Corp., N.J., 25c

Edo Corp., N.Y., 35sc

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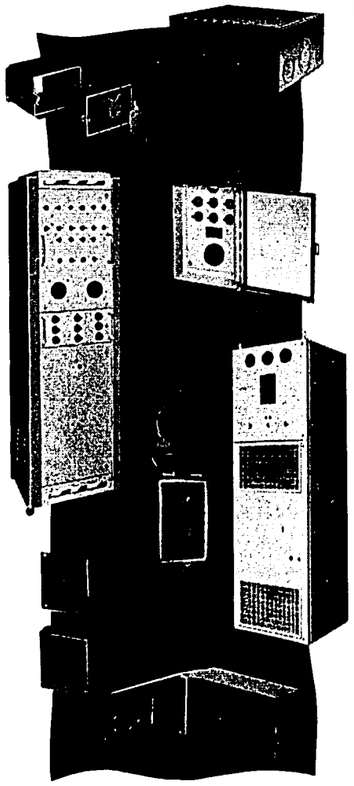
Anets ANETSBERGER BROS., INC.
100 NORTH ANETS DRIVE • NORTHBROOK, ILLINOIS

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*For FAST quotations on custom boxes, cabinets and enclosures..*



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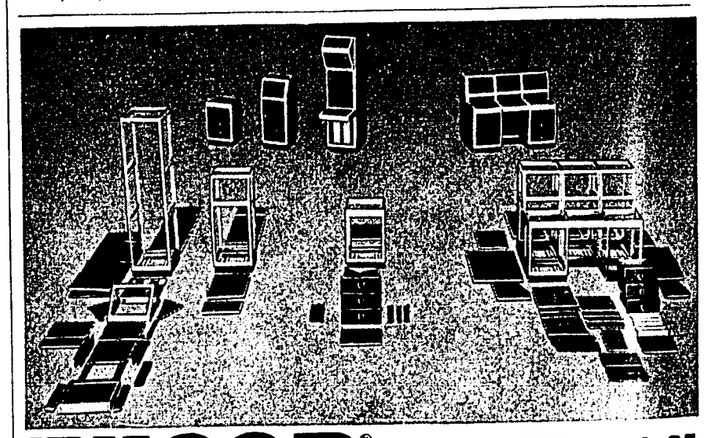
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Ehrick Co., The Fred, N.Y., 30c
Ehrenpreis, David, Consulting Engineers, N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
Electric Eye Equipment Co., Ill., 20c, 35c
Electro-Chemical Engraving Co., Inc., N.Y., 5c, 10c, 25c, 30c, 35c
Electro-Pack, Inc., Calif., 5c, 10c, 20sc, 25s, 30c, 35sc, 40sc
Electro-Seal Corp., Ill., 5c, 10c, 25c, 30c
Electronic Associates, Inc., N.J., 20c
Electronic Enclosures, Inc., Calif., 5sc, 10sc, 20sc, 25c, 30c, 35sc, 40sc
Electronic Plastics Corp., Mass., 25c
Elzee Metal Prods. Co., Inc., N.Y., 5sc, 10sc, 20sc, 25sc, 30sc, 35sc, 40sc, 55sc
**Emcor Ingersoll Products Div., Borg-Warner Corp., Dept. 1227, 630 Congdon Ave., Elgin, Ill., 5s, 20s, 35s, Tel: SHerwood 1-3490**
**See ad on this page**
Equipto Division, Aurora Equipment Co., Ill., 10s, 35s, Test Benches s
Equipto Electronics Corp., Ill., 5sc, 10c, 20sc, 25c, 30c, 35c, 40sc
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 15c, 50c, Tel: GLendale 6-8592**
**See ad on pages 40-41**
Erwood, Inc., Ill., 5c, 10c, 25c, 30c, 35c, 40c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 10c
Eugene Engineering Co., Inc., Mass., 5c, 10sc, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c, 60c
Everard Tap & Die Corp., N.Y., 25c, 30c, 35c
**Falstrom Company, 74A Falstrom Ct., Passaic, N.J., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 45c, 55c, Tel: PRescott 7-0013**
**See ad on page 634**
Farinon Electric Co., Calif., 35c
**Farwell Metal Fabricating, 73 W. Fairfield Ave., St. Paul 7, Minn., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c, Tel: CApital 4-5318**
**See ad on page 601**
Federal Manufacturing & Engineering Corp., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c
Feiner & Sons, Inc., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c
Fisher Berkeley Corp., Calif., 5c, 10c, 15s, 35c, 40c, 50s, 60c
Fisher & Crome, Pa., 25c
**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 5c, 10c, Tel: YEllowstone 4-2691**
**See ads on pages 341, 399, 403, 437, 563, 569**
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 5s, 10s, 35sc, Tel: CEnter 9-6100**
**See ad on page 480**
Franklin Co., Inc., Bernard, Pa., 10c, 35c, Dollies c, Work Benches c
Franklin Fibre-Lamitex Corp., N.Y., 15c, 25c
**Franklin Systems, Inc., 2734 Hillsboro Rd., P.O. Box 3250, West Palm Beach, Fla., 5c, 20c, 35c, Tel: TEmple 3-4602**
**See ad on page 320**



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# Directory III. Materials & Services

## 84. Cabinets, Enclosures & Panels.

G B Electronics, Subsid. General Bronze Corp., N.Y., 5c, 10c, 20c, 35c
Gables Engineering, Inc., Fla., 25c
Garlock Electronic Products, Garlock, Inc., N.J., 50c
Gemco Electric Co., Mich., 5s, 10s, 20c, 25c, 35s, 40s
General Automatics, Inc., Calif., 20c, 25c
General Metal Products Co., Pa., 5c, 10c, 20c, 25c, 30c, 35c, 40c
General Metals, Inc., N.C., 5c, 10sc, 35c, 40c
General Meters, Inc., Colo., 25sc, 30sc
Gilfillan Bros., Inc., Calif., 25c, 30c, 35c, 45c
Golding Manufacturing Co., N.J., 5c, 10c, 35c, 40c, 55c
Goldsman Co., Al, Pa., 5c, 30c, 45c, 55c, 60c
Gramm Trailer Corp., Ohio, 45sc
Granco Products, Inc., N.Y., Air Filters s
Granite State Machine Co., Inc., N.H., 35c
Great Eastern Mfg. Co., N.Y., Air Filters sc
Green Rectifier Co., N.J., 5c, 10c, 35c, 40c
HPL Manufacturing Co., Ohio, 10c, 25c
Hallett Mfg. Co., Calif., 5s
Halliburton, Inc., Mfg. Div., Calif., 5sc, 10sc, 30sc, 35sc, 55sc
Hardigg Industries, Mass., 55 cushioning
Hartley Products Co., N.Y., 20sc, 60sc
**Hawley Products Co., 333 N. Sixth St., St. Charles, Ill., 50c, Tel: JUno 4-3130**
**See ad on page 456**
Heath Company, Subsid. of Daystrom, Inc., Mich., 60s
Heldor Mfg. Co., N.J., 5c, 10sc, 35c, 40c
Henry & Miller Industries, Inc., N.J., 5c, 10c, 20c, 25c, 30c, 35c, 40c
Holden-Massey Corp., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c
**Hudson Tool & Die Co., Inc., 18-38 Malvern St., Newark 5, N.J., 10, Tel: MArket 4-1802**
**See ad on page 102**
Hughes-Treitler Mfg. Corp., N.Y., 5c, 10c, 20c, 25c, 30c, 35sc, 40c
Huppert Co., K. H., Ill., 25c, 30c
IE Manufacturing, Ill., 5s, 10s, 15s, 25s, 30s, 35s, 45s, 50s, 55s
Industrial Acoustics Co., Inc., N.Y., Sound-Proof sc
Insulating Fabricators of New England, Inc., Mass., 50c
International Telephone & Telegraph Corp., ITT Federal Div., N.J., 5c, 20c, 35c
Interstate Electronics Corp., Calif., 5c, 20c, 25c, 30c, 35c, 40c
Jan Hardware Mfg. Co., Inc., N.Y., 25s
Jetronic Industries, Inc., Pa., 5c, 10c, 35c
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 25c, 40c
Kent Lighting Corp., N.Y., 5c, 10c, 35c
Kerrco, Neb., 15c, 30c, 50c
**Keystone Mfg. Co., Div. of Avis Industrial Corp., 23338 Sherwood Ave., Warren, Mich., 5c, 10c, 30c, 35c, Tel: SL 5-4400**
**See ad on page 600**
Koch & Sons, H., Calif., 15c, 30c, 50c
Kurz-Kasch, Inc., Ohio, 15c, 50c
LMB-Heeger, Inc., Calif., 10s, 25c, 30c, 35s, 40s
Landsberger Plastics Co., N.Y., 15sc, 50c
Lavelle Aircraft Corp., Pa., 5c, 20c, 35c, 45c
Life Instrument Co., Inc., Mass., 30s, 50s
Lindsay Div., International Steel Co., Ind., 5c, 10c, 20c, 35c
Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Divs., Calif., 5s, 35s, 40s
Lowell Mfg. Co., Mo., 5sc, 35sc
Lynch Mfg. Co., R. H., Calif., 5c, 10c, 20c, 25c, 30c, 35c, 40c

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- Special Chassis, Small Parts & Components, Panels

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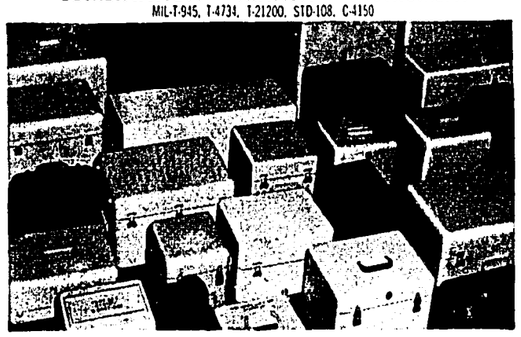
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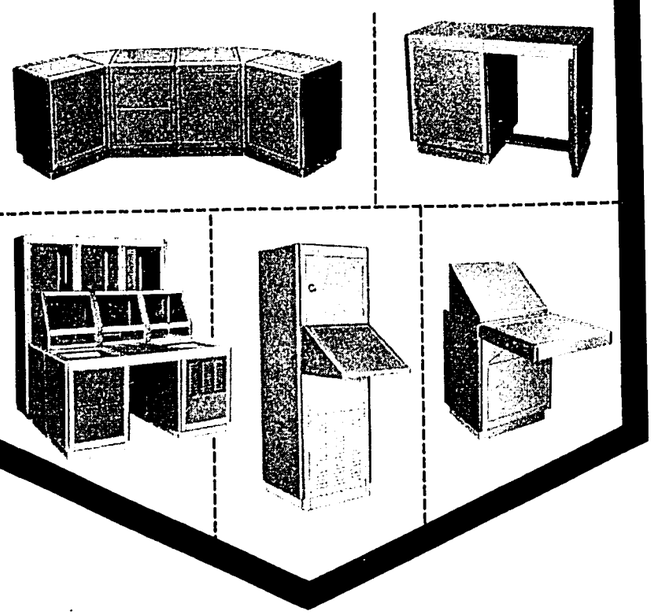
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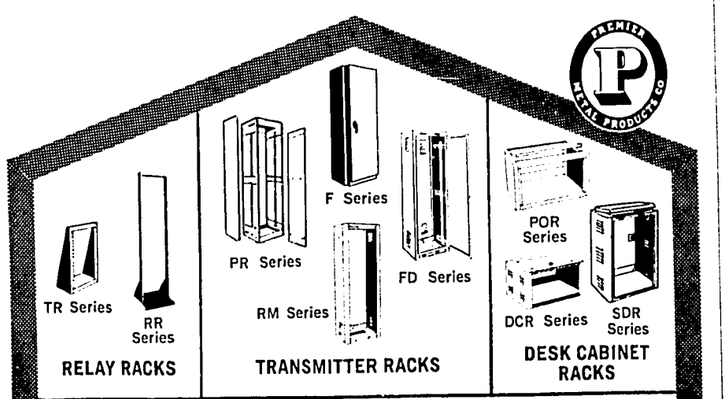
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EXPORT DEPARTMENT: EMEC, 127 Grace Street, Plainview, New York
IN CANADA: PREMIER METAL HOUSINGS, Ltd., 5810 Smart Ave., Montreal

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## 84. Cabinets, Enclosures & Panels.

**Lytle Corporation, 1404 San Mateo Blvd. S.E., Albuquerque, N.M., 5c, 10c, 20c, Tel: ALpine 5-8169**
See ad on page 201

**MM Enclosures, Inc., 111 Bloomingdale Rd., Hicksville, L.I., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c, Tel: WElls 1-1770**
See ad on page 601

M P Engineering Co., Conn., 20c, 60s
Magnasync Corp., Calif., 20sc
Malkin-Illion Co., N.J., 5c, 10c, 20c, 25c, 35c, 40c, 55c
Mandrel Industries, Inc., Calif., 5c, 10c, 20c, 35c, 40c
Marine View Electronics, Inc., N.Y., 15c, 35c, 40c
Marquardt Corp., Pomona Div., Calif, 20c, 35c
Master Etching Corp., N.J., 25c
Maxson Corp., The W. L., United Mfg. Co. Div., Conn., 20c, 25c, 35c
McKiernan-Terry Corp., N.J., 20c, 35c, 45c
Meridian Metalcraft, Inc., Calif., 10c, 20c, 25c, 30c, 35c, 40c, 55c
Metal Fabricators Corp., Mass., 5c, 10c, 20c, 25c, 35c, 40c, 45c
Metalcraft, Inc., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c
Meter-Makers, Inc., Ill., 25c, 30c
Mid-West Metal Products, Inc., Kan., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c
Midget Louver Co., Conn., Louvers sc
Miller Dial & Name Plate Co., Calif., 5c, 10c, 15c, 25c, 30c, 35c, 40sc
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 25sc, 40sc
Missile Systems Corp., Calif., 5c, 20c, 35c, 40c
Missimers, Inc., Calif., 5c, 20c, 30c
Mobil Electronics, Inc., Div. Radionic Labs., Inc., Ind., 5c, 10sc, 25c, 30sc, 35sc, 40sc
Nevada Air Products Co., Nev., 5c, 10c, 35c
New England Etching Co., Inc., Mass., 25c
**North Shore Nameplate, Division of Anodyne, Inc., 214-27 Northern Blvd., Bayside 61, N.Y., 25sc, Tel: BAyside 4-4000**
See ad on page 603
**Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 5c, 40c, Tel: NAtional 2-6485**
See ad on pages 27-30
Northern Engraving & Mfg. Co., Wis., 25c
Northwest Industries, Ltd., Canada, 5c, 10c, 15c, 25c
Otis Elevator Co., Defense & Industrial Div., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 55c, 60c

**For further information on advertised products, use the Reader Service Card at the back of this book.**





# Directory III. Materials & Services

## 84. Cabinets, Enclosures & Panels.

P.B.R. Manufacturing Co., Pa., 5c, 10c, 25c, 30c, 35c, 40c, 55sc, Dollies s
PIC Design Corp., N.Y., 25s
Pacific Mercury Electronics, Thomas Organ Co., Calif., 5c, 20c, 60c
Packard Bell Electronics Corp., Calif., 60s
Panellit, Div. Information Systems, Inc., Ill., 25c
**Par-Metal Products Corp., 32-42 49th St., Long Island City 3, N.Y., 5sc, 10sc, 20sc, 25c, 30sc, 35sc, 40sc, Tel: AStoria 8-8905**
See ad on page 626
Parkway Specialties Co., Mich., 5s, 20s, 60s
Pearce-Simpson, Inc., Fla., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 55c
Plasteck, Inc., Okla., 25c
Powers Co., J. J., Ill., 5sc, 10sc, 35sc, 60sc
Precision, Inc., Minn., 5c, 10c, 35c
**Premier Metal Products Co., 337 Manida St., New York 59, N.Y., 5s, 10s, 20s, 25s, 30s, 35s, 40s, Tel: WYandotte 1-6600**
See ad on page 602
Pressteel Co., Calif., Dollies s, Test Benches s
RCA Victor Co., Ltd., Canada, 10c, 35c, 40c, 60c
REF Manufacturing Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c, 55c
R-J Audio Products, Inc., N.Y., 60s
Racal Engineering, Ltd., England, 20c, 35s
Radio City Products Co., Inc., Pa., 5c, 10c, 20c, 35c, 40c
Radio Corp. of America, N.J., 20s, 25s, 30s, 35s, 40s
Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 45c
Rank Cintel, Ltd., England, 20s, 35s
Ray, Daisley Company, Inc., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 45c
Remler Co., Calif., 50c
Republic Aviation Corp., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 50c
Richardson Co., The, Ill., 50c
Richmond Engineering Co., Inc., Conn., 10c, 35c
Riester & Thesmacher Co., The, Ohio, 5c, 10c, 20c, 30c, 35c, 40c
Rimak, Inc., Calif., 5sc, 10sc, 20c, 25sc, 30c, 35sc, 40sc, 45c, 55c
Robertson Electric Co., Inc., N.Y., 5c, 25c, 35c, 40c
Rogers Mfg. Co., Dayton, Minn., 10c, 15c, 35c, 40c, 50c
Romar Plastics, Inc., Ill., 15c, 50c
Rowan Controller Co., The, Md., 40c
S & B Machine & Tool Co., Inc., N.J., 5c, 15c
Santa Anita Engineering Co., Calif., 5sc, 20sc, 35sc
Satellite Corp. of America, Me., 25c, 30c, 50c
Schaevitz Engineering, N.J., 35c
Schaffer Air Industries, N.Y., 5c, 10c, 25c
Scientific Wood Cabinet Co., N.J., 5c, 20c, 25c, 30c, 55c, 60c
Seiscor, Div. Seismograph Service Corp., Okla., 5c, 10c, 20c, 35c, 40c, 55c
Servo Development Corp., N.Y., 30sc
Shampaine Scientific Co., N.J., 35
Sheltered Workshops, Inc., Calif., 5c, 10c, 60c
Sillcocks-Miller Co., N.J., 15c, 50c
**Skydyne, Inc., River Rd., Port Jervis, N.Y., 15sc, 50sc, 55sc, Test Benches sc, Tel: 3-2241**
See ad on page 222
Sorensen Industrial Electronic Co., N.J., 5c, 25c, 35c, 60c
Sorohan Engineering, Inc., Fla., 25c
Specialty Electronics Development Corp., N.Y., 25c, 30c, 45 Fiberglas c, 55c
Spencer-Kennedy Laboratories, Inc., Mass., 30s
**Stafford Mfg. Co., Inc., 153 58th St., Brooklyn 20, N.Y., 5c, 10c, 15c, 20c, 25c, 30c, Tel: HYacinth 2-6000**
See ad on page 652


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*Beautiful multi-color ANODIZED ALUMINUM PANELS from NORTH SHORE can save you days...dollars...and radically change your thinking about panels and housings.*

Now you can obtain up to 10 different colors on a single panel. Any metal thickness.....any size panel.....completely fabricated to your drawing..... ELIMINATES ALL ENGRAVING!

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☞ 30 standard colors available, dull or shiny. Special colors to order.

☞ We are a licensee for the Kaiser Kalcolor Process.*

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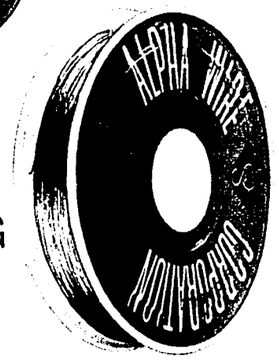
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- Bus-Bar
- Lacing Cord and Tapes
- Cord Sets
- Hi-Voltage Wire
- High Temperature Wire
- Magnet Wire
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- Multi-Conductor Cable–Shielded
- Multi-Conductor Flexible Cable
- Neoprene Jacketed Cable
- Service Cord–Rubber Sheathed
- Shielded Cable
- Shielding and Bonding–Tinned Copper
- Speaker Cable–Shielded
- Sub-Miniature Wire
- Teflon Wire and Multi-Conductor Cable
- Test Lead Wire
- Tinned Copper Wire
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- Sleeving
- Zipper Tubing

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MIL-C-7078A Aircraft Wire Shielding
MIL-W-16878C Hook-up Wire
- Type B
- Type C
- Type D
- Type E Teflon Insulation
- Type EE Teflon Insulation
- Type FF Silicone Rubber
- Type N Nylon

MIL-W-76A Hook-up Wire
- Type LW
- Type MW
- Type HW

MIL-W-13169 Test Lead Wire
MIL-W-13074 Bronze Wire
MIL-W-13276 Bronze Wire
MIL-W-3861 Tinned Copper
MIL-W-583A Magnet Wire
MIL-I-3190B Insulating Tubing
MIL-I-631C Insulating Tubing
MIL-I-7444A Insulating Tubing
QQB-575 Braid

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Subsidiary of LORAL Electronics Corp. Pacific Division: 1871 So. Orange Dr., Los Angeles 19, Calif. • WE 8-9141

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# Directory III. Materials & Services

## 84. Cabinets, Enclosures & Panels.

Stablin, Bros., Inc., Mich., 50c
Standard Pressed Steel Co., Pa., 35s
Staples-Hoppmann, Inc., Va., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 45c
Stevens Walden, Inc., Mass., 10sc, 35sc
Stone City Products Co., Ind., 35c
Sunshine Scientific Instrument, Pa., 25sc, 30sc
TMC (Canada), Ltd., Canada, 20sc, 40s, 55s
Taffet Electronics, Inc., N.Y., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 55c
Taylor Fibre Co., Pa., 15c, 55c
Tech-Art Plastics Co., N.J., 15sc, 50sc
Technical Service Corp., Ky., 25c, Dollies s
Tel-Labs., Inc., N.H., 15c
Telkor, Ohio, 10c, 20c, 25c, 30c, 35c, 40c
Temperature Engineering Corp., N.J., 25sc, 30sc, 35sc
Tocco Metal Products, Inc., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c
Topatron, Inc., Calif., 20sc
Transval Electronics Corp., Calif., 5c, 10c, 15c, 20c, 25c, 30c, 35c, 40c, 45c, 55c

**Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 25sc, Tel: EMpire 2-3700**
See ad on page 454

Union Steel Chest Corp., N.Y., 10sc, 35c, 50s
Unistrut Products Co., Ill., 5c, 30c, Clean Rooms c
United Aircraft Products, Inc., Ohio, 5c, 10c, 20c, 35c
United States Chemical Milling Corp., Calif., 5c, 10c, 15c, 25c, 30c, 35c, 40c, 50c
United States Radium Corp., N.J., 25c
Universal Circuit Controls, Ill., 25s
University Loudspeakers, Inc., N.Y., 60s

**Vector Electronic Co., Inc., 1100 Flower St., Glendale 1, Calif., 5sc, 10sc, Tel: CHapman 5-1076**
See ad on page 544

Vinco Electronics Corp., Conn., 60c
Vinson Co., Calif., 5c, 10c, 20c, 35c, 60c
Waldom Electronics, Ill., 15s, 25s, 30s
Warren Mfg. Co., Inc., The, Mass., 35sc
Warwick Products Co., Ohio, 5c, 15c, 20c, 25c, 30c, 55c, 60c
Washington Aluminum Co., Inc., Md., 5c, 10c, 20c, 25c, 30c, 35c, 40c, 45c, 55c
Waterbury Companies, Inc., Conn., 15c, 20c, 50c
Weber Aircraft Corp., Calif., 5c, 10c, 20c, 35c, 40c, 45c
Wells Electronics Co., Ind., 60c
Wells-Gardner Electronics Corp., Ill., 60c
Wells Industries Corp., Basic Electronic Controls Div., Calif., 10sc, 20sc, 35sc

**Western Devices, Inc., 600 W. Florence Ave., Inglewood 1, Calif., 5sc, 10c, 20c, 35c, 40c, Tel: ORegon 8-7827**
See ad on page 624

**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 20sc, 25sc, 40sc, Tel: JUdson 2-3030**
See ad on page 704

Wickes Engineering & Construction Co., N.J., 20c, 35c, 45c
Widney-Dorlec, N.Y., 5s, 25s, 35s
Winner Mfg. Co., Inc., N.J., 15c, 50c
Wood Steel Co., Alan. Penco Div., Pa., 10s, 35s
Wyco Metal Products, Calif., 5sc, 10sc, 20c, 30sc, 35sc, 40s
York Metal Products, Inc., N.Y., 5c, 10c, 20c, 25c, 30c, 35c, 40c
Zenith Plastics Co., Subsid. Minnesota Mining & Mfg. Co., Calif., 15c, 50c
Zero Manufacturing Co., Calif., 5c, 10s, 30sc, 35c, 55sc

**Cable clips:**
See class 91

**Cable testers:**
See class 14

## 85. Cable & Wire.

5. Aluminum
10. Antenna feeder line
15. Clad
20. Coaxial
25. Copper, bare
30. Cord sets
35. Enamel coated
40. Low-loss, high-frequency types
45. Magnet
50. Microphone
55. Plated
60. Precious & rare metals
65. Pre-formed wire harnesses
70. Rubber insulated
75. Shielded
80. Synthetic insulated
85. Wire mesh
90. Woven wire braid

AAA Wire Works, Inc., Conn., 20c, 30s, 50s, 70sc, 75c, 80c
AMP Incorporated, Pa., 65s, 80s
Abbott & Company, Ohio, 65c
Acme Wire Co., Conn., 35s, 45s, 80s
Advanced Electronics, Inc., Conn., 65c
Aerolite Electronics Corp., N.J., 30sc
Airdesign Corp., Pa., 65c

**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 30s, 65c, 75c, Tel: JUniper 3-0160**
See ad on page 496

Allied Allegri Co., Inc., N.J., 65c
Alloys Unlimited, Inc., N.Y., 5c, 15c, 60c

**Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 35s, 45s, 50s, 65c, 70s, 75s, 80s, 90s, Tel: ALgonquin 5-5400**
See ad on page 604

Aluminum Co. of America, Pa., 5s, 45s
American Brasing Alloys Corp., N.Y., 5s, 25s, 60s
American Communications Corp., N.Y., 20s
American Electric Cable Co., Mass., 35s, 50s, 65s, 75s, 80s
American Research & Mfg. Corp., Md., Miniature KV s

**American Silver Company, Inc., 36-06 Prince St., Flushing 54, N.Y., 60c, Tel: FLushing 3-8012**
See ad on page 685

**American Super-Temperature Wires, Inc., 10 W. Canal St., Winooski, Vt., 20c, 35c, 40c, 45c, Tel: UNiversity 2-9636**
See ad on page 606

## 85. Cable & Wire.

American Tube Bending Co., 15 Lawrence St., New Haven, Conn., 20 in metal tubing, Tel: STate 7-2131
See ad on this page

Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L.I., N.Y., High Temp. s, Tel: WElls 1-6200
See ad on pages 42-45

Amphenol-Borg Electronics Corp., Amphenol Cable & Wire Div., S. Harlem Ave. at 63rd St., Chicago 38, Ill., 20s, Tel: BIshop 2-1000
See ad on page 146

Amphenol-Borg Electronics Corp., Amphenol Connector Div., 1830 S. 54th Ave., Chicago 50, Ill., 65c, Tel: BIshop 2-1000
See ad on page 146

Anaconda Wire & Cable Co., N.Y., 5sc, 10sc, 15c, 20sc, 25sc, 35sc, 40sc, 45sc, 50sc, 55sc, 70sc, 75sc, 80sc, 85c, 90s

Andrew Antenna Corp., Ltd., Canada, 5c, 10s, 20s, 40s

Andrew Corp., 363 E. 75th St., P.O. Box 807, Chicago 42, Ill., 10s, 20s, Tel: TRiangle 4-4400
See ad on page 371


Phelps Dodge

Aluminum Sheathed

Air Dielectric

**COAXIAL CABLE**

STYROFLEX® SPIRAFIL® FOAMFLEX®

Delay Lines
Cut to Special Lengths
Bent to Specification
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Electrically and Mechanically
Tested for "Terminal to Terminal" Installation
Without Interruption for Transitions of any Kind.

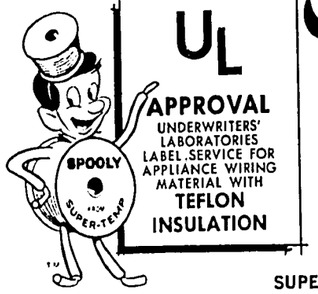
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ELECTRONICS DIV.

**AMERICAN TUBE BENDING COMPANY**
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NEW HAVEN, CONN.

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CABLES Single & Multiconductor | TFE Teflon Ext. or Tape | ✓ | ✓ | −90°+260° | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Any combinations of conductors and shielding available. |
| | FEP Teflon Extruded | ✓ | ✓ | −90°+200° | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Conductors and primary insulations per Mil-W-16878. |
| | Silicone Rubber | ✓ | | −55°+200° | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Special conductors and wall thicknesses of insulations available. |
| | PVC | ✓ | ✓ | −55°+105° | | | | ✓ | ✓ | ✓ | ✓ | | Bonding treatment of teflon primary or jacket insulations available. |
| COAXIAL CABLES | TFE Teflon Extruded | ✓ | | −90°+260° | ✓* | ✓ | ✓* | ✓ | ✓ | ✓ | ✓ | ✓ | Shielded with Silver Plated or Tinned Copper. |
| | FEP Teflon Extruded | ✓ | | −90°+200° | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * Per Mil-C-17B |
| | Polyethylene Solid or Foam | ✓ | | −55°+90° | | | ✓ | ✓* | ✓ | ✓ | ✓ | ✓* | Special constructions and jackets available. |
| AIRFRAME WIRES | TFE Teflon Tape and Imp. Glass | ✓ | | −60°+205° | | ✓ | ✓ | | | ✓ | ✓ | | Shielded with Silver Plated or Bare Copper. |
| | Silicone Rubber and Dacron | ✓ | | −55°+150° | | | ✓ | | | ✓ | ✓ | | Per Mil-W-7139A Shields and jackets available. |
| HOOK-UP WIRES | TFE Teflon Ext. or Tape | ✓ | ✓ | −90°+260° | Per Mil-W-16878 type E or EE, or thin wall or extra heavy wall | | | | | | | | Per Mil-W-8777A Shields and jackets available. |
| | FEP Teflon Ext. or Tape | ✓ | ✓ | −90°+200° | Produced to physical dimensions of Mil-W-16878 type E or EE | | | | | | | | UL APPROVED |
| | Silicone Rubber | ✓ | | −55°+200° | Per Mil-W-16878 type F or FF, special constructions | | | | | | | | Special constructions available. |
| | PVC | ✓ | ✓ | −55°+105° | Per Mil-W-16878 type B, C, or D with or without Nylon Jacket | | | | | | | | Twisting of two or more wires available. |
| | TFE Teflon Film | ✓ | | −90°+260° | Operating voltage 300 RMS—Solid conductors only | | | | | | | | Bonding treatment of teflon insulations available. |
| MAGNET WIRES | TFE Teflon Film | ✓ | | −90°+260° | Per Mil-W-19583 type III single, heavy, triple and quad. wall thickness | | | | | | | | Tempering and bonding treatments available. |
| | Silicone and Isonel | Natural | | −55°+155° | Per Mil-W-19583 type II single and heavy wall thickness | | | | | | | | |
| | Mica Magnet Wire | Natural | | −90°+350° | A special magnet wire for extremely high temperatures | | | | | | | | Available with nickel clad copper conductors. |

† DUPONT'S TFE RESIN

**TEFLON TAPES:** Type B, sintered and bondable; Type B, unsintered; all sizes; Mil. Std. 104 colors.
**TEFLON TUBING:** Extra flexible, tape wrapped. Mil. Std. 104 colors, solid or striped.

**FREE! 1960 CATALOG 88 Pages of valuable data.**




**American Super-Temperature Wires, Inc.**
A Subsidiary of Haveg Industries, Inc., Wilmington, Del.
10 West Canal St., Winooski, Vermont
General Sales Office: 195 Nassau St., Princeton, N.J. WAlnut 4-4459

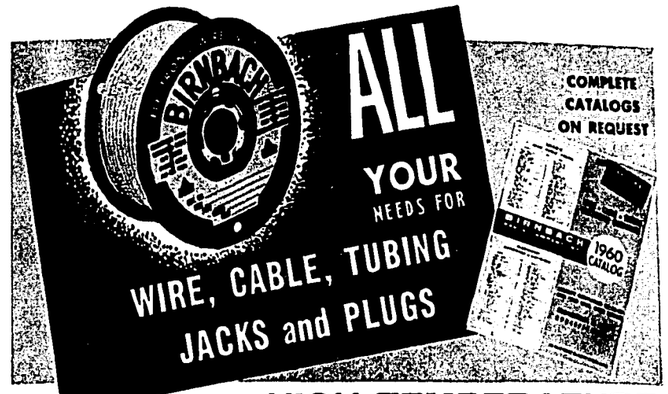
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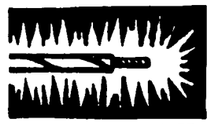


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TEFLON

## HIGH TEMPERATURE BB-1000 RETRACTILE



**POWER CORD, CORD SETS, MICROPHONE AND COMM. CABLE. MEETS ALL MIL/JAN SPECS.** JAN-C-76, MIL-W-76A, MIL-W-16878C, MIL-W-5086A, MIL-C-7078A, MIL-W-12349, MIL-I-631C, MIL-I-3190A, MIL-I-7444A, JAN-T-713, QQ-B-575, MIL-W-3861, MIL-W-5834.

COMPLETE WAREHOUSE STOCKS

**BIRNBACH** INC.
145 HUDSON STREET
NEW YORK 13, N. Y.

BIRNBACH

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# Directory III. Materials & Services

## 85. Cable & Wire.

Argonne Electronics Mfg. Corp., N.Y., 50s, 70s, 75s, 80s
Arkay Products Mfg. Co., Calif., 65c
Asco Wire & Cable Co., The, Conn., 35s, 45s
Associated Engineering & Mfg. Corp., N.J., 15s
Audiosears Corp., N.Y., 30sc, 50sc, Cable Assemblies sc
Avionics Corp. of America, Pa., 30sc
B&B Electronics Corp., Calif., 65c, Multiconductor c
Baker Platinum Div., Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 60, Tel: BIgelow 3-0300
See ad on page 170
Bently Scientific Co., Calif., High Temp. c
Berkshire Electric Cable Co., Mass., 20c, 40c, 50c, 75c, 80c
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 5s, 20s, 25sc, 30s, 35s, 40s, 45s, 50sc, 70s, 75sc, 80sc, Tel: WOrth 6-5611
See ad on this page


# Teflon* insulated high temperature wire & cable . . .

SPECIFICATIONS

| WIRE OR CABLE | PRIMARY INSULATION | COLORS MIL-STD-104 | OPERATING TEMPERATURE | JACKETS | REMARKS |
|---|---|---|---|---|---|
| High Temperature Hook-up Wire | Teflon, Extruded Teflon Tape Wrapped | Solid & Striped | −90°C−+260°C | ——— | Conforms to MIL-W-16878-C Types E & EE or other special specifications as required. |
| Cables A | Teflon, Extruded Teflon Tape Wrapped | Solid & Striped | −54°C−+105°C | PVC | Any combinations of conductors and shielding required. |
| Cables B | Teflon, Extruded Teflon Tape Wrapped | Solid & Striped | −54°C −+105°C | Nylon Braid Nylon Extruded | Any combinations of conductors and shielding required. |
| Cables CX | Teflon, Extruded Teflon Tape Wrapped | Solid & Striped | −90°C−+200°C | Teflon 100X Extruded | Any combinations of conductors and shielding required. |
| Cables CT | Teflon, Extruded Teflon Tape Wrapped | Solid & Striped | −90°C−+260°C | Teflon Tape | Any combinations of conductors and shielding required. |
| Cables H | Teflon, Extruded Teflon Tape Wrapped | Solid & Striped | −90°C−+260°C | Fiber-Glass Silicone Fiber-Glass Teflon Impregnated | Any combinations of conductors and shielding required. |
| Airframe Wire | Teflon Tape Plus Impregnated Glass | Solid Only | −60°C−+205°C | ——— | ——— |
| Miniature Coaxial Cable | Teflon, Extruded | Jackets Only Solid & Striped | −90°C−+260°C | Teflon Tape Teflon 100X Extruded Fiber-Glass Teflon | Conforms to MIL-C-17B and MIL-C- 8721. |
| Thermo Couple Wire | Teflon, Extruded | Solid & Striped | −90°C−+260°C | ——— | ——— |

**TEFLON TUBING** Extruded spaghetti solid MIL- Std 104 colors Commercial tubing. Teflon tubing inner-core for medium pressure to mil-H 25579 (USAF) Extruded fiber glass reinforced Pipe lining

**BONDING TREATMENT** Surface treatment to increase bondability for use with potting compounds

*REG. U.S. PAT. OFF. DUPONT TRADEMARK

**Cimco** wire & cable co.
303 W. CRESCENT AVENUE ALLENDALE N. J. DAVIS 7-2522

For details, circle #621 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# HITEMP

*Specialists in High Temperature Mil-Spec Wires and Cables*



**MIL-C-17C** **MIL-W-7139B** **MIL-W-16878C**

**MIL-W-5086B** **MIL-W-27300** **MIL-W-19583**

**U.L. Approval for 1/32"-1/64"-10 mil insulation thickness NAS 703**

**CERAMIC FILM INSULATED MAGNET WIRE—"CERAMATEMP"** A flexible magnet wire for operation at 1000 F. Available in sizes 17 to 44 AWG.

**TEFLON MAGNET WIRE—"TEMPRITE"** Sizes 14 to 50 AWG, single, heavy, triple or quadruple thicknesses, conforming to MIL-W-19583 (NAVY). Heavy triple and quadruple coatings. Available in 8 solid colors to conform with MIL Std-104.

**SPECIAL TEFLON MAGNET WIRE—"TEMPRITE X"** Same characteristics and sizes as regular Temprite, but specially processed for severe abrasion applications.

**MODIFIED RESIN ENAMEL MAGNET WIRE—"THERMESTER-L"** Sizes 14 to 42 AWG inclusive. Used for temperatures from —54° C to +155 C. Available in single or heavy thicknesses. Conforms to MIL-W-19583 (NAVY) except for temperature rating.

**MINIATURE EXTRUDED TEFLON HOOK-UP WIRE—"MX AND MXR"** Available in sizes 22 to 32 AWG with standard or reinforced conductor. This special 300 volt thin wall insulated wire is a boon to miniaturization.

**TEFLON HOOK-UP WIRE—"TEMPRENE"** Fused Teflon tape insulation on wire sizes 8 to 32 AWG. Two or three color striped combinations, plus 10 solid colors. Conforms to MIL-W-16878C (E and EE).

**TEFLON EXTRUDED HOOK-UP WIRE—"TEMPREX"** Sizes 10 to 32 AWG, in both striped and solid colors. Conforms to MIL-W-16878C (E and EE).

**SUB-MINIATURE TEFLON LEAD WIRE—"DQT"** Solid copper conductors with Teflon film insulation rated at 300 volts. Available in sizes 20 to 32 AWG, and in 8 solid colors.

**TEFLON INSULATED LEAD WIRE—"TEMPCLAD"** Teflon insulated lead wire with an outer covering of Teflon impregnated glass fiber braid. Sizes 10 to 28 AWG in 8 solid colors.

**TEFLON 100-FEP EXTRUDED HOOK-UP WIRES AND JACKETED CABLES** To all applicable military specifications. Sizes 4 to 32 AWG.

**FLEXIBLE TEFLON TUBING—"TEMPRENE NON-RIGID"** Sizes 10 to 26, solid colors and special striped combinations. Also large diameters ⅛" to 1" in 12" lengths.

**TEFLON EXTRUDED TUBING—"TEMPREX TUBING"** Sizes 2 to 30 AWG. Fourteen solid colors.

**100% SHIELDED WIRES** Seamless tube of solid metal (copper, nickel, stainless steel) formed over single or multiple insulated wires to afford 100% shielding for RF or radiation applications.

**SHIELDED AND JACKETED MINIATURE CABLES** Consist of Temprene or Temprex Conductors, shielded and jacketed for high temperature operation. Jackets available in fiberglass braids, Teflon, silicone saturated, fused Teflon tape, Teflon 100-FEP, or vinyl insulation.

**RIBBON CABLE ASSEMBLIES—"TEMPBRAID"** 100% Teflon, flexible, flat ribbon multi-conductor cables. Available from 2 to 50 conductors in sizes 12 to 32 AWG. Maximum width 3 inches.

**MINIATURE LOW NOISE COAXIAL CABLES** Available in 50, 75 and 95 ohm impedances and attenuations of 28, 20 and 15 db/100 ft. at 400 mc., respectively.

**MINIATURE LOW CAPACITANCE COAXIAL CABLES** Available at 8.5 or 10.5 mmfd/ft. capacitance ratings.

**MINIATURE COAXIAL CABLES** Consist of 50, 75 and 95 ohm cables, shielded and jacketed for applications up to +200° C. Cables approved for conformance to MIL-C-17C.

**HEATER CABLES** Teflon insulated for 600 volt operation. Sizes 12 to 26 AWG.

**HIGH TEMPERATURE AIRCRAFT WIRE** For 600 volt service at 400° F. Conforms to MIL-W-7139B (AER). Available in sizes 6 to 24 AWG, in 6 solid colors.

**BONDABLE TEFLON INSULATED WIRE—"HISBOND A"** Surface treated to assure adhesion by varnishes or encapsulants. Applicable on Temprite magnet wire, Temprene Teflon tape wire and Temprex Teflon extruded wire.

**POLYMER COAT, ADBOND**—Solutions available for on-the-spot bondable treatment to assure adhesion by varnishes or encapsulants.

**REINFORCED CONDUCTORS, ALLOY CONDUCTORS**—For high strength, extra flexibility, high temperature applications.

**HIWRAP TAPE**—Fused and unfused Teflon tape with high tensile strength and other superb physical properties.

**WRAP-IT**—Teflon tape for use as pipe dope and thread sealant.

**CUSTOM MULTI-CONDUCTOR HEAVY CABLE**—Up to 4" diameter for ground support and other applications.

**HITEMP WIRES, INC., 1200 SHAMES DRIVE, WESTBURY, NEW YORK, EDGEWOOD 3-4600**

**HITEMP, INC., 1532 SOUTH CALIFORNIA AVE., MONROVIA, CALIFORNIA, ELLIOT 9-8361**

a subsidiary of HITEMP WIRES, INC.

*Custom Wires and Cables Designed to Your Specifications*

See YELLOW SECTION for local offices, telephones, etc.

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# FINE WIRE

**for semiconductors**

**and electronic applications**

FINE wire (.001-.250), clad wire, rod, sheets and special shapes now available in any of the following metals:

- Pure Gold
- Gold Alloys
- Platinum and Alloys
- Palladium and Alloys
- Silver and Alloys
- Copper and Alloys
- Non-Ferrous Metal

Of critical importance are these outstanding features of Consolidated Reactive Metals' services:

1–Quality Control to assure Reliability

2–Production to Close Tolerances

3–Vacuum Annealing

Consolidated's engineering department is ready to assist in the development of suitable alloys to meet specific requirements. The processing division can provide sample and production runs most economically . . . with delivery as promised, usually within two weeks.

Write for data!

CRM

**CONSOLIDATED REACTIVE METALS, Inc.**

115 HOYT STREET

MAMARONECK, N. Y.



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# Directory III. Materials & Services

## 85. Cable & Wire.

Bishop & Co., J., Pa., 15sc, 55sc, 60sc, 85sc, Resistance sc

Bliss Electronic Corp., N.J., 65c

Boston Insulated Wire & Cable Co., Mass., 20c, 40c, 65c, 70c, 75c, 80c

Bram Metallurgical-Chemical Co., Pa., 25sc, 35sc, 40sc, 55sc, 60sc, 85sc

Brand-Rex Div., William, American Enka Corp., Mass., 10sc, 20sc, 40c, 50c, 75sc, 80sc

Bucklee Mears Co., Minn., 75c

Cable Designs, Inc., N.Y., 20c, 45sc, 70c, 75c, 80c, Molded Cable c, Cable Assemblies c, Multiconductor Cable c

Cable Specialists of Conn., Conn., 65s

Cadre Industries Corp., N.Y., 30sc, 65c

Camden Wire Co., Inc., N.Y., 25c

Canadian Marconi Co., Canada, 20s, 40s, 70s, 75s, 80s

Carol Cable Co., R.I., 30sc, 50sc, 70sc, 75c, 80c

Channel Master Corp., N.Y., 5s

Channer Corporation, Ill., 30c, 65c

Chase Brass & Copper Co., 5s, 25s, 85s

Chester Cable Corp., Oakland Ave., Chester, N.Y., 20s, 25s, 40s, 50s, 75s, 80s, Tel: HOmestead 9-2141


See ad on page 124


Chester Morton Electronics Corp., Pa., 30sc, 55c, Molded Cable sc, Cable assemblies sc

Chicago Electronic Div., Lund Air Inc., Ill., 65c, 75c

Cimco Wire & Cable Co., 303 W. Crescent Ave., Allendale, N.J., 20s, 75s, 80s, 90s, Tel: DAvis 7-2522


See ad on page 607


Cooperative Industries, Inc., N.J., 75s, 90s

Cohn Corp., Sigmund, 121 S. Columbus Ave., Mount Vernon, N.Y., 55sc, 60sc, Resistance sc, Tel: MOunt Vernon 4-5300


See ad on this page


Coleman Cable & Wire Co., Ill., 5s, 10s, 30s, 35s, 40s, 45s, 50s, 65s, 70s, 75s, 80s

Columbian Wire & Supply Co., Ill., 5s, 10s, 15s, 20s, 25s, 30s, 40s, 45s, 50s, 65s, 70s, 75s, 80s, 90s

Composite Industrial Metals, Inc., R.I., 15c, 60c


*Specialists in Unusual Products...Since 1901*

SIGMUND COHN MOUNT VERNON N.Y.

**Precious Metal Wire** – for Potentiometers and Resistance Thermometers.

**Small Enamel Insulated Wire**

**Galvanometer Suspension Strip**

**Thermocouple Wire** – Precious metal.

**Gold Alloys** doped for semiconductor devices; wire or special shapes.

**Wollaston Process Wire,** as small as .000005" diameter.

**Plating Solutions** – Gold and Rhodium

*Write for complete list of Products.*

**SIGMUND COHN CORP.** 121 So. Columbus Ave. • Mt. Vernon, N.Y.



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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# HUDSON WIRE COMPANY

*makers of quality fine wire for over 55 years*

MAGNET WIRE DIVISION
Winsted, Conn.
FRontier 9-3341
TWX-450
Cassopolis, Mich.
Hickory 5-2424
TWX-07

**FILM and FABRIC INSULATED MAGNET WIRES**

Conductors: Copper and other materials. Film insulations: Enamel, EZ-Sol (nylon), Hud-Sol (polyurethane), Formvar, Siliclad (silicone) and Isonel 175, all single and heavy. Film wires AWG 14 to 50. Fabric insulated wires: Celanese, nylon, silk, cotton, and Orlon in conventional and special constructions. Solid colors and tracers. Fabric wires AWG 14 to 44. NEMA and MIL-W specs.

**SPECIAL INSULATED WIRES**

High Frequency Litzendraht. Voice Coil. Bifilar and Trifilar Formvar. Pig-tail leads. Braided wires. Loop wires. Silver and tin plated copper and aluminum.

OSSINING DIVISION
Ossining, New York
Wilson 1-8500
TWX-964

**SINGLE END and STRANDED BARE CONDUCTORS**

Conductors: Bare wires in a wide choice of metals. Round and flat. Silver plated, tin plated, nickel plated, copper clad and others. Concentric, unilay, bunched, and rope stranding in finished AWG 6 to 32.

## FINE WIRE AT ITS FINEST

Available on Standard Wire Spools
and on the Exclusive
**HUD-PAK***
High Speed Wire
Payoff Package

- High Speed Payoffs.
- Controllable Tensions.
- Large Payoff Packages.
- A Rugged Container to Protect Wire in Use or Storage.
- Instantaneous Starts and Stops.
- All at Competitive Prices.



*The terms "Hud-Pak" and "De-Paker" are trademarks of Hudson Wire Co.



(Cut-away View)

Phone or Write Hudson NOW for spec quotes and technical assistance

PEQUOT DIVISION
Norwalk, Conn.
TEmple 8-8438

**WIRE CLOTH and FABRICATED PARTS**

Industrial wire cloth in brass, copper, commercial and phosphor bronzes, stainless and plain steels, Monel, nickel, aluminum, silver, tinned and plated wires. Custom fabricated parts from wire cloth and perforated metal.

## HUDSON WIRE COMPANY

Member: Nat'l Security Industrial Assoc.
Nat'l Electrical Manufacturers Assoc.

Sales Offices Albany N Y Casselberry Fla Chicago Ill Cleveland Ohio; Dallas Texas Knoxville Tenn Los Angeles Calif New York N Y Palo Alto Calif Rochester N Y St Louis Mo South Whitley Ind Syracuse N Y Waterbury Conn

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# Directory III. Materials & Services

## 85. Cable & Wire.

Consolidated Mining & Smelting Co. of Canada, Ltd., Canada, 60s

**Consolidated Reactive Metals Co., Inc., 115 Hoyt St., Mamaroneck, N.Y., 5c, 15c, 25c, 55c, 60sc, Tel: OWens 8-2300**
See ad on page 609

Consolidated Wire & Associated Companies, Ill., 5s, 15s, 20s, 25s, 30sc, 35s, 40s, 45s, 50s, 70sc, 75sc, 80sc, 90sc

Continental Wire Corp., Conn., 20sc, 40c, 50c, 75sc, 80sc

Cornish Wire Co., Inc., N.Y., 30c, 50c, 65c, 70c, 75c, 80c

Crucible Steel Company of America, Pa., 45s

D.K.E. Electronic Bases, Inc., N.J., 15c, 25c, 55c

Dalweld Company, Inc., N.Y., 5s, 25s, 60s

Dayton Aircraft Products, Inc., Fla., 10sc

Dielectric Products Engineering Co., Inc., Me., 10s, 20s

**Driver Company, Wilbur B., 1875 McCarter Highway, Newark 4, N.J., 35s, 80s, Tel: HUmboldt 2-5550**
See ad on page 186

Eagle Electric Mfg. Co., Inc., N.Y., 30s, 80s

Edison Industries, Thomas A., Instrument Div., N.J., 20s, 40sc

Electri-Cord Mfg. Co., Inc., N.Y., 30sc

Electric Autolite Co., The, Ohio, 20sc, 25sc, 35c, 40s, 45sc, 65sc, 70sc, 75sc, 80sc

Electric Cords & Supply Corp., Calif., 30sc, 65sc, 70sc, 75sc, 80sc

Electro-Physics Labs., Calif., 20s

Electromath Corp., N.Y., 65s, Cable Assemblies s

Electronic Applications, Inc., Conn., 50s, 75s

Electronic Cable Corp., Mass., 30c, 65c, 90c

Electronic Parts Mfg. Co., Inc., N.J., 15sc

Empire Electronics Co., Inc., N.J., 30c, 65c

**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 15sc, 60s, 85s, Tel: BIgelow 2-2700**
See ad on page 170

Essex Wire Corp., Cords Ltd., Ill., 5s, 30s, 70s

Essex Wire Corp., Magnet Wire Div., Ind., 25s, 35s, 45s

Ethylene Corp., N.J., 20s

Fairbanks Wire Co., Inc., N.Y., 45sc

**Fansteel Metallurgical Corp., North Chicago, Ill., 60s, Tel: DExter 6-4900**
See ad on pages 130-131

Farwest Mfg. Div., Inc., Wash., 20s, 50s, 65c

Fidelity Amplifier Co., Ill., 65c

**G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 50s, Tel: WOodland 8-9661**
See ad on page 640

Garrett Corp., The, Calif., 20c, 30c, 40c, 65c, 70c, 75c

Garron Aircraft Supply, Inc., N.Y., 5s, 60s

Gavitt Wire & Cable Co., Mass., 20c, 50c, 65c, 70c, 75c, 80c

General Cable Corp., N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 45sc, 50sc, 70sc, 75sc, 80sc

General Electric Co., Lamp Metals & Components Dept., Ohio, 15s, 45s, 55s, 60 Molybdenum, Tungsten s

General Insulated Wire Works, R.I., 10c, 20c, 25c, 30c, 35c, 40c, 50c, 55c, 65c, 70c, 75c, 80c

General Products Corp., N.Y., Assemblies sc

Gilfillan Bros., Inc., Calif., Cable Assemblies c

Godfrey Mfg. Co., Ill., 65c

Goldsmith Bros. Div., National Lead Co., Ill., 60c

Gore & Associates, Inc., W. L., Del., 20c, 65c, 75c, 80c, 90c

**Hackensack Cable Corp., 127 Orchard St., Hackensack, N.J., 10s, 80s, Tel: HUbbard 7-1100**
See ad on this page

Hallett Mfg. Co., Calif., 20s, 30s, 65s, 70s, 75s

Handy & Harman, N.Y., 60sc

Hatfield Wire & Cable, Div. Continental Copper & Steel Industries, Inc., N.J., 5s, 25s, 50c, 70s, 75s, 80s

Haveg Industries, Inc., Del., 20c, 45c, 75c, 80c

Hitemp Wires, Inc., 1200 Shames Dr., Westbury, L.I., N.Y., 20c, 45s, 80s, Tel: EDgewood 3-4600
See ad on page 608

Hoskins Manufacturing Co., 4457 Lawton Ave., Detroit 8, Mich., 35sc, Resistance sc, Alloy sc, Tel: TYler 5-2860
See ad on page 172

Hudson Wire Co., Magnet Wire Div., 981 Main St., Winsted, Conn., 25s, 35s, 40s, 45s, 55s, 80s, Tel: FRontier 9-3341
See ad on page 610

Hudson Wire Co., Ossining Div., 62 Water St., Ossining, N.Y., 5sc, 25sc, 35sc, 45sc, 55sc, 80sc, 85sc, 90sc, Tel: WIlson 1-8500
See ad on page 610

Ideas, Inc., Wyo., 30sc

Inso Electronic Products, Inc., 1200 Commerce Ave., Union, N.J., 20sc, 45sc, High Temp. s, Multiconductor s, Low Voltage s, Tel: MUrdock 6-4258
See ad on page 612

Intelex Systems, Inc., N.Y., 20s

Intercontinental Electronics Corp., N.Y., 20s

International Electric Industries, Inc., N.Y., 30sc, 65sc, Cable Assemblies sc

International Resistance Co., Pa., Multiconductor s

International Wire & Cable Co., Ill., 5s, 10s, 20s, 25s, 30sc, 40sc, 50sc, 65sc, 70s, 75sc, 80sc, 85sc, 90sc

International Wire Prod. Corp., N.J., 5sc, 15sc, 20sc, 25sc, 55sc, 60sc

Interstate Electronics Corp., Calif., 70s, 75s, Umbilical Cable s

Isomet Wire & Cable Co., Mass., 20c, 30c, 75c, 80c

Jelliff Mfg. Corp., The, Conn., 55s, Instruments

Jettron Products, Inc., 80 Route 10, Hanover, N.J., Assemblies s, Tel: TUcker 7-0571
See ads on pages 414, 544

Kerite Co., The, Conn., 55s, 65s, Instruments

Kerite Co., The, Conn., 55s, 65s, Instruments

Kerite Co., The, N.J., 10s, 15s, 20s, 25s, 30s, 35s, 45s

Kerite Co., The, N.J., 10s, 15s, 60s

Kuprian Manufacturing Corp., 357 Prospect Ave., Binghamton, N.Y., 20c, 30c, 75c, Tel: RAymond 3-0426
See ad on page 489

Lab. Frontier, Inc., 6050 N. Lincoln Ave., Chicago 18, Ill., 2s, 30s, 40s, 50s, 65s, 70s, 75s, c, Tel: GRaceland 7-7000
See ad on page 454

Laboratory for Applied Sciences, East Orange, N.J., 15s, 65sc

Lenz Electric Mfg. Co., Industrial Div., Ill., 15, 25, 35, 75s

Lenz Electric Mfg. Co., Ill., 20s, 50s, 75s

Lewis Mfg. Co., Inc., N.Y., 25s, 35s, 50s, 55s, 70s, 75s

Lewis Engineering Co., The, Conn., 20s, Hush Loops


# HACKENSACK

FOR

## SPECIAL CABLES

- Dial Cables
- Extra-flexible small diameter cables
- Antenna strands and cables
- Guy Cables

MADE OF
STAINLESS STEEL
GALVANIZED STEEL
MONEL
PHOSPHOR BRONZE
CADMIUM BRONZE
NYLON COATED
VINYL COATED

COMPLETE STOCKS

MANUFACTURERS OF WIRE ROPES
HACKENSACK Cable CORPORATION
127 Orchard Street — Hackensack, N.J.

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**MINIATURE TYPE "E" HOOK-UP WIRE (MIL-W-16878C)**
Insulation: 6 Mil (0.006") Wall Fused-Film Teflon
600 Volts RMS service; dielectric strength 2.2 KV; AC spark test 3.0 KV

| INSO PART NO. | AWG and Stranding | Diam. over insulation (nominal) | Weight in lbs. per M ft. |
|---|---|---|---|
| 6E-26 | 26 (19 x 38) | 0.033" | 1.47 |
| 6E-24 | 24 (19 x 36) | 0.038" | 2.20 |
| 6E-22 | 22 (19 x 34) | 0.0445" | 3.18 |
| 6E-20 | 20 (19 x 32) | 0.0527" | 5.10 |
| 6E-18 | 18 (19 x 30) | 0.063" | 7.40 |
| 6E-16 | 16 (26 x 30) | 0.0745" | 10.00 |
| 6E-14 | 14 (37 x 29) | 0.0921" | 17.10 |

**MINIATURE TEFLON COAXIAL CABLES (MIL-C-17)**
Temperature Rating: –90° C. to +250° C.

| | RG-188/U | RG-196/U | RG-187/U | RG-195/U |
|---|---|---|---|---|
| Impedance (ohms) | 50 ±2 | 50 ±2 | 75 ±3 | 95 ±3 |
| Dielectric Strength (Volts RMS, Min.) | 2000 | 2000 | 2000 | 2000 |
| Corona (Volts RMS, Min.) | 1200 | 1000 | 1200 | 1500 |
| Attenuation (BD/100 ft. Max.) | 20 | 29 | 21 | 17 |
| Conductor (S.P. Stranded copperweld) | (7 x 34) | 30 (7 x 38) | 30 (7 x 38) | 30 (7 x 38) |
| Max. O.D. | 0.110" | 0.080" | 0.110" | 0.155" |

Teflon jackets are available in solid colors and spiral striped combinations.
Special jacketing materials are available as required.

# INSO *fused film Teflon® insulated* WIRE and CABLE

## Made by Teflon specialists for applications demanding highest quality and top reliability

- As much as 100% space advantage and 35% weight saving.
- Economical long continuous lengths to meet your needs.
- Stays put in any position, any form.
- High dielectric strength per mil of insulation.
- Perfectly concentric Teflon insulation.
- Can be furnished surface treated for encapsulation with no discoloring, no reduction in dielectric strength.

**Other products and services**

TYPE "E" and "EE" (MIL-W-16878) wire and cable.

SPECIAL CABLES engineered to your specific environmental and space requirements utilizing INSO miniature or standard wire constructions.

LOW CAPACITY SHIELDED WIRES & CABLES — Reduction in shielded cable capacity (mmf/ft.) by as much as 25% by the use of INSO fused film Teflon insulation.

FLEX-WEAVE — A flexible flat ribbon multi-conductor, multi-colored cable of INSO Teflon insulated conductors arranged side by side and woven together by threads of Teflon yarn, Nylon or fiber glass.

**"FUSE-FLEX" FLEXIBLE THIN WALL TUBING**
Insulation: 6 Mil (0.006") Wall Fused-Film Teflon
Dielectric Strength: 5000 Volts RMS Minimum
Temperature Rating: –90° C. to +250° C.

| INSO PART NO. | AWG SIZE | INSIDE DIA. (±0.001") | WEIGHT LBS./C FT. |
|---|---|---|---|
| 6 FT-26 | 26 | 0.018" | 0.053 |
| 6 FT-24 | 24 | 0.022" | 0.060 |
| 6 FT-22 | 22 | 0.027" | 0.070 |
| 6 FT-20 | 20 | 0.034" | 0.082 |
| 6 FT-18 | 18 | 0.042" | 0.098 |
| 6 FT-17 | 17 | 0.047" | 1.073 |

Also available in many other sizes from No. 30 AWG through No. 10 AWG and with other wall thicknesses to solve your particular problems.

**MINIATURE SHIELDED AND TEFLON JACKETED CABLES**
Insulation: 6 Mil (0.006") Wall Fused-Film Teflon
600 Volts RMS Service; Dielectric Strength 2.2 KV
AC Spark Test 3.0 KV

| INSO PART NO. | NO. CONDUCTORS | AWG AND STRANDING | DIAM. OVER JACKET (NOMINAL) | WEIGHT IN LBS. PER M FT. |
|---|---|---|---|---|
| 1C-6E-26-STJ | 1 | 26 (19 x 38) | 0.063" | 5.6 |
| 2C-6E-26-STJ | 2 | 26 (19 x 38) | 0.094" | 8.6 |
| 1C-6E-24-STJ | 1 | 24 (19 x 36) | 0.069" | 7.2 |
| 2C-6E-24-STJ | 2 | 24 (19 x 36) | 0.104" | 11.3 |
| 1C-6E-22-STJ | 1 | 22 (19 x 34) | 0.077" | 8.1 |
| 2C-6E-22-STJ | 2 | 22 (19 x 34) | 0.114" | 13.6 |
| 1C-6E-20-STJ | 1 | 20 (19 x 32) | 0.085" | 10.9 |
| 2C-6E-20-STJ | 2 | 20 (19 x 32) | 0.124" | 18.5 |

Also available in many other AWG sizes and conductor arrangements in both 600 Volt and 1000 Volt Service ratings.

*Write, wire or call today for samples and technical data.*

**INSO ELECTRONIC PRODUCTS, INC.**
WIRE AND CABLE DIVISION
*A subsidiary of Vanderbilt Tire and Rubber Corporation*

1200 Commerce Ave., Union, N. J. • MUrdock 6-4258-9, TWX: UNVL-45

For details, circle #627 on Reader Service Card








# Directory III. Materials & Services

## 85. Cable & Wire.

Lignes Telegraphiques et Telephoniques, France, 20s, 40s

**Little Falls Alloys, Inc.**, 199 Caldwell Ave., Paterson 1, N.J., 5c, 15c, 55c, Alloy c, Tel: LAmbert 5-1014
See ad on this page

Litton Industries, Electronic Equipments Div., Calif., Laminated Etched Cable sc

Mackay, Inc., N.Y., 5s, 25s, 55s, 60s, 85s

MacLeod & Hanopol, Inc., Mass., 65c

Magnet Wire, Inc., N.Y., 25, 35, 45, 55, 80

Mandrel Industries, Calif., 65c, Molded c

**Mark Products Co.**, 5439 Fargo Ave., Skokie, Ill., 20s, Tel: ORchard 5-1500
See ad on page 375

**Markel & Sons, L. Frank**, School Lane, Norristown, Pa., 40s, 75c, 90c, Tel: BRoadway 2-8960
See ad on page 693

**Metal Textile Corp., Div. General Cable Corp.**, 647 E. First Ave., Roselle, N.J., 85sc, Tel: CHestnut 5-3000
See ad on page 552

Microdot, Inc., Calif., 20sc

Missile Systems Corp., Calif., 20c, 65c, 75c, Cable Assemblies c

Modelectric Products Corp., N.J., 65s, 85s

Molecu-Wire Corp., N.J., 5c, 25c, 35s, 55c, 60c, 75c, Resistance c

Mossman, Inc., Donald P., N.Y., 65c

National Multi-Products Co., Ill., 30c, 65c

**National Radio Co., Inc.**, Subsid. of National Co., Inc., 37 Washington St., Melrose 76, Mass., Elastic type, Tel: NOrmandie 5-4800
See ad on page 614

National-Standard Co., Mich., 55c, 85c, 90c

**Nesor Alloy Products Co.**, 666 Passaic Ave., West Caldwell, N.J., 5c, 25c, 55c, 60c, 75c, 85c, 90c, Tel: CApitol 8-0400
See ad on this page

New England Electrical Works, Inc., N.H., 25s, 35s, 40sc, 45s, 90sc

**Ney Company, J. M.**, Maplewood Ave., Bloomfield, Conn., 5c, 60sc, Tel: CHapel 2-2281
See ad on page 687

Nonotuck Mfg. Co., Mass., 25c

Norrich Plastics Corp., N.Y., 75c

North American Philips Co., Inc., Elmet Div., Mc., 45s, 55s

North Electric Co., Ohio, 65sc

Okonite Co., The, N.J., 5c, 10c, 20c, 25s, 35s, 40c, 45s, 50c, 70sc, 75c, 80c, 90c

Pacific Automation Products, Inc., Calif., 20c, 40c, 65c, 70c, 75c, 80c, 90c

Packard Bell Electronics Corp., Calif., 15sc, 45sc, Ceramic Insulated sc

Paraplegics Mfg. Co., Inc., Ill., 65c

Paul & Stein Bros., Inc., F. H., N.Y., 5sc, 60sc, 85sc

Phalo Plastics Corp., Mass., 10c, 20c, 30c, 40c, 50c, 65c, 75c, 80c

Phelps Dodge Copper Products Corp., N.Y., 10s, 15s, 20s, 25s, 35s, 40s, 45s, 55s, 70s, 75s, 80s

Phelps Dodge Copper Products Corp., Inca Manufacturing Div., Ind., 45sc

Philadelphia Insulated Wire Co., N.J., 20c, Multiconductor c

Plastic Wire & Cable Corp., The, Conn., 20c, 25c, 30sc, 50sc, 65sc, 75sc, 80sc

**Plastoid Corporation**, 42-61 24th St., Long Island City 1, N.Y., 20sc, 50sc, 75c, 80sc, Tel: STillwell 6-6200
See ad on page 615

Porter Co., Inc., H. K., National Electric Div., Pa., 70sc, 75c, 80sc

Porter Co., Inc., H. K., Riverside-Alloy Metal Div., N.J., 15c

Precision Tube Co., Inc., Pa., 20c, 75c

Prodelin, Inc., N.J., 20s, 40s

Raychem Corp., Calif., 5s, 20s, 40s, 75s, 80s

Rea Magnet Wire Co., Inc., Ind., 5sc, 25s, 35s, 45s

Rexo Insulated Wire Co., N.J., 10, 20, 30, 50, 80, 90


**Special Purpose Wire**

titanium · phosphor bronze · BERYLLIUM COPPER Silvercote® · ALUMINUM · ni-clad-ti NICKEL CLAD (for plating, TITANIUM WIRE) · FOR CERAMIC-TO-METAL BRAZING

round • flat — square ■ half-round ▬

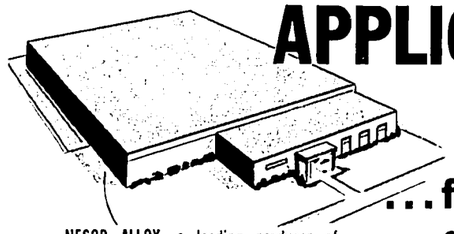
Consider WIRE and the importance of its function in your product. Whether a highly engineered application or a simple stapling purpose, your choice of the proper alloy or composition, temper and type of wire could mean success or failure during crucial test.

• OTHER NON-FERROUS
Precision gauges from ¼ to .002. Close tolerances held.
SPRING WIRE — WIRE FOR INSTRUMENTS — ELECTRONICS STRAND FOR WIRE ROPE AND BRAIDED APPLICATIONS — MANDREL WIRE — WIRE FOR FORMS — RIVETS — STAPLING — OTHER

**LITTLE FALLS ALLOYS** INCORPORATED
199 Caldwell Avenue Paterson 1, N. J.

For details, circle #628 on Reader Service Card

**FINE WIRE TO .0005" FOR SEMI-CONDUCTOR APPLICATIONS**



**. . . from our new plant!**

**NESOR ALLOY**, a leading producer of whisker wire for transistors and diodes, now offers a complete line of wire, drawn to .0005". High purity metals in Ruthenium Platinum, Iridium Platinum, Gallium Gold and Antimony Gold. 99.99% and 99.999% high purity Aluminum available for silicon rectifiers. Leads, both tinned and bare, are cut to specified lengths.

**Other metals and alloys available:** Aluminum and alloys, bare and tinned copper, silver-plated copper, beryllium copper, brass and alloys, phosphor bronze, lead and solder alloys, monel-nickel, resistance wire, stainless steel, both high and low carbon steel, coppercoated steel.

Nesor's new plant is now in full production, ready to meet your needs faster, more efficiently.

For complete technical data, prices or samples, write to Dept. A.

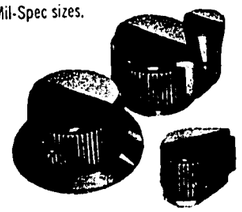
**The NESOR ALLOY PRODUCTS CO.**
666 Passaic Ave., West Caldwell, N. J. • CApitol 8-0400

For details, circle #629 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135 240.

## MIL-SPEC KNOBS

In stock! For immediate delivery! And produced by National!... a complete line of standard plastic control knobs made in conformance with MS-91528. There are four basic types: round, pointer, spinner (each with or without skirts) and dial skirted round . . . available in three different shaft sizes. Finishes are gloss, matte, or to your color specifications . . . in all Mil-Spec sizes.



Knobs: Made of plastic, type III, class H2, per Specification L-P-349. Set Screws: Cadmium plated, class 3, type II, per Specification QQ-P-416. Inserts: Brass, composition 4, hard, per Specification QQ-B-613.

## COILS-FILTERS-CHOKES

National Radio Company is engaged in the manufacture of precision coil and filter assemblies. Why not let our engineering staff quote on your specific requirements? In addition to coils and filters made to customer specifications, National Radio Company can supply a wide variety of stock coils for the electronic industry. Typical of these coils are the following families:

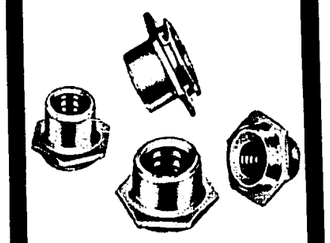
**R-45** series, a new family of ferrite bead chokes for use as filament chokes, parasitic suppressors, and series elements of low-pass filters for frequencies from 5 to 200 mc. Insulated with an impregnated fiberglass sleeving, these chokes will handle 2 amperes of filament current with voltage drop of less than 0.02 volts, temperatures to the Curie point of 125°C.

**R-40** series ferrite-core chokes...extremely high Q for small size. They are primarily for use in networks and filters at frequencies from 50 kc to 1500 kc, and as resonant elements in IF and RF circuits. Fungus-proof varnish impregnation per MIL-V-137A.

**R-25** series MIL-inductance chokes for high frequency circuits, as filament chokes and peaking coils, inductance per MIL-C15305A, coil forms per MIL-P-14, and impregnation per MIL-V-173A.

**R-33, R-50 and R-60** series RF coils are wound on molded phenolic forms per MIL-P-14 and coated with a tough, fungus-resistant varnish. R-50-10 choke is wound on a powdered-iron coil form instead of phenolic.

## CAPTIVE NUTS SELF-LOCKING TYPE



Self-locking, wear-resistant, machined, stainless steel threaded inserts for use in aluminum or brass. Easily applied, their reliable grip in the parent metal as well as their self-locking ability make them ideal for the variety of purposes they are designed to serve. The complete line includes one basic type in four sizes. Each of the four sizes may be obtained for insertion into any of five metal thicknesses.

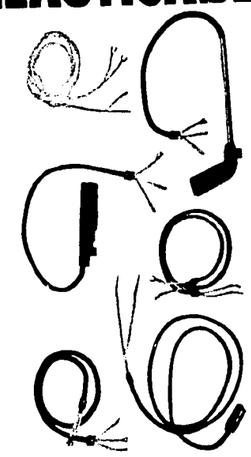
Material—Stainless steel Class 303 per FED QQ-S-763b

Finish—Passivated per MIL-P-12011

Other captive nuts and studs manufactured by National Radio Company include the line of exclusive "Flush Mount" types. Available in five sizes for use in metal thickness from 1/16" up. They provide permanent tapped holes and a flush fit on both sides of sheet.

The engineering staff will be glad to discuss your applications and possible variations to best meet your requirements.

## ELASTICABLE



**Elasticable** is an elastic type wire, made in single and multiple conductors. It will stretch to more than three times its relaxed length.

This unique elastic characteristic in a straight (not coiled or spring loaded) extra flexible wire gives the designer a new material to further his design concepts and assist him in solving heretofore impossible design problems.

Five types, three commercial and two military are available as stock items. A sample specification of one type is:

Type 2—Core. . . . . natural rubber
Insulation. . Nylon (braided)
Conductor. . bronze tinsel
Diameter. . . 1/8" approx.
Resistance. . 1.0 ohm per ft. approx.
Elongation
single conductor. . . . . 300%
multiple conductor. . . . 275%
Operating temperature
range. . . . . −25°C to +85°C

National Radio is providing many companies with complete assemblies incorporating special terminations, molded parts and custom mechanical configurations. The Elasticable Application Engineering group is available to discuss electric and mechanical characteristics, applications and terminations. Why not let them quote on your finished Elasticable cable assembly?

**OTHER NATIONAL COMPONENTS**

In addition to knobs, chokes, drives and captive hardware, National Radio Company also manufactures a complete line of dials, coil forms, condensers, tanks, grid and plate caps, IF transformers, tube and crystal sockets, ceramic insulators, bushings, spreaders, couplings, terminal assemblies, other electronic and electro-mechanical components. For specific design or development applications problems, write or call.

**National** RADIO COMPANY, INC.

MELROSE 76, MASSACHUSETTS • NORMANDIE 5-4800

A wholly owned subsidiary of National Co., Inc.
Export: AD AURIEMA, INC., 85 Broad Street, New York, N.Y., U.S.A.
In Canada. CANADIAN MARCONI CO., 830 Bayview Ave., Toronto 17, Ont.
Specifications subject to change without notice.

For details, circle #630 on Reader Service Card








# Directory III. Materials & Services

## 85. Cable & Wire.

Revere Corp. of America, Subsid. Neptune Meter Co., Conn., 65c, 70c, 75c, 80c
Reynolds Wire Div., National-Standard Co., Ill., 15c, 85sc
Robertshaw-Fulton Controls Co., A & I Div., Calif., 20sc, 65c, 75c, 80c
Robertson Electric Co., Inc., N.Y., 65s, Molded s
Rockbestos Wire & Cable Co., Div. Cerro de Pasco Corp., Conn., 20c, 40c, 75c, 80c
Rockland Insulated Wire Co., N.Y., 75sc, 80sc
Roebling's Sons Div., John A., Colorado Fuel & Iron Corp., N.J., 5sc, 15c, 25sc, 35sc, 45sc, 70sc, 75sc, 80sc
Rome Cable, Div. of Alcoa, N.Y., 5sc, 25s, 35sc, 45sc, 70sc, 75sc, 80sc
Royal Electric Corp., Div. ITT, R.I., 10s, 20sc, 30sc, 40sc, 50sc, 70sc, 75sc
Runzel Cord & Wire Co., Ill., 25sc, 30c, 65c, 75c, 80c, 90sc
Sag Harbor Industries, N.Y., 65c
Sanders Associates, Inc., N.H., 20c, 75s
**Saxton Products, Inc., 4320 Park Ave., New York 57, N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, 40sc, 50sc, 55sc, 65sc, 75sc, 80sc, 90sc, Tel: WEllington 3-6400**

See ad on this page

Schuyler Mfg. Corp., N.J., 85sc
**Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 5c, 35c, 55c, 60c, High Temp. c, Resistance c, Tel: WHite Plains 9-4757**

See ad on this page

Sequoia Wire & Cable Co., Calif., 20sc, 40c, 75sc
Sheltered Workshops, Inc., Calif., 30c
Simplex Wire & Cable Co., Mass., 5c, 20s, 40c, 50c, 60c, 65c, 70s, 75s, 80s
Sittler Corp., Ill., 25s, 65c, 90s
Skyscript, Inc., Ill., 65c
Smith, Inc., Herman H., N.Y., 50s, 70s
Smith Mfg. Co., Inc., E. C., Pa., 20c, 60c
South River Metal Products Co., Inc., N.J., 5s
Southwire Co., Ga., 5s, 25s
Standard Metals Corp., Mass., 35c, 40c
Standard Telephones & Cables Ltd., England, 20sc, 50s, 70s, 75s, 80s


*Flexible and Extra Flexible*
**CABLES to "MIL. SPEC."**
*with Certificate of Compliance and Source Inspection*

- Stock of the following Mil. Spec cables: MIL-W-C3432B, W-16878, W-76A, C-3884 and many others . . . all available with Certificate of Analysis and Certificate of Compliance.
- Also available . . . Special cables, telephone constructions, hook-up wire, shielded constructions—all in stock. Or, we will fabricate to your "Specs."
- Facilities to cut, strip, lug, notch, slot or perform other operations on various types of wire and cable. Write today for more information.

**saxton** wire and cable division
4320 PARK AVENUE
NEW YORK 57, N.Y.
WE 3-6400

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**WIRE for the heart of YOUR COMPONENT**

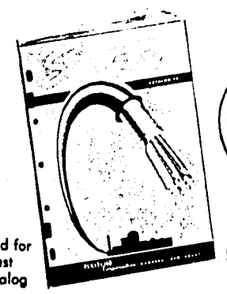
Wire drawn to your specifications (down to .00025") in base and precious metals and alloys . . . supplied bare, enameled, ceramic insulated for use at 1000° F., or electroplated . . . to close tolerances.

Our research and development staff is available to solve YOUR wire problems.

***Write for data on your specific needs.***

SECON METALS CORP.
7 Intervale St., White Plains, N.Y.
White Plains 9-4757
SECON

For details, circle #631 on Reader Service Card



Send for Latest Catalog

**Synkote®**

**SYMBOL OF THE FINEST and NEWEST DEPENDABLE WIRE and CABLE**

TV twin-leads, coaxial cable, hook-up wire, rotor antenna cable, custom-engineered multi-conductor cable. For prices, samples and technical data, contact your nearest Plastoid representative. (See list in manufacturers' section).

**CAA-SIGNAL & CONTROL CABLE**
(Thermoplastic Insulation and Jacket)

**COAXIAL CABLES**
Spec JAN-C-17A & MIL-C-17B
Including Low-Temperature, Non-Contaminating Jackets
Double Shielded & Jacketed Coaxial Cable

**SPECIAL PURPOSE CABLES**
Meteorlogical Survey Cable
Underwater Sound Equipment Cable
Geophysical Cable
Fire Control Wire & Cable
Electronic Computer Wire & Cable
Inside Telephone Cable
Special Design High Frequency Cable
Thermostat Cable 2-7 conductors (Twisted and Thermoplastic Jacketed)

Microphone Cables
Sound & Intercommunication Wire & Cable
Rotor Antenna Cable

**TEFLON INSULATED WIRE & CABLE**
MIL-W-16878A TYPES "E" & "EE"
Multi-conductor Cables
Teflon Coaxial Cables
MIL-W-7139A

**RADIO AND ELECTRONIC HOOK-UP WIRE**
MIL-W-76A (superseding JAN-C-76)
MIL-W-16878B (types B, C & D, with & without nylon jackets)
Underwriters Laboratory — 80°; 90°; 105°
(PVC insulation, nominal walls of .008; .015; .031; .047 & with braided outercovering or extruded nylon jacket)

**AIRCRAFT WIRE & CABLE**
MIL-W-5086A MIL-W-5274A
MIL-C-7078A MIL-W-7072A
MIL-W-8777A

**NAVY SHIPBOARD CABLE**
MIL-C-915A & MIL-C-2194B

**REA TELEPHONE CABLE**
(Spec PE-14)

**MULTI PAIR RURAL DISTRIBUTION WIRE**

**TRAFFIC CONTROL CABLES**
(Specs IMSA 19 & 20)

**POWER CONTROL CABLES**
(Specs IPCEA & IMSA)
(Thermoplastic Insulation and Jacket)

**AIRPORT LIGHTING CABLE**

PLASTOID Corporation

Synkote Insulated Wire and Cable is "Manufactured by the mile-tested by the inch"

**Plant: HAMBURG, N. J. • Offices: Long Island City, N. Y.**

For details, circle #633 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

ALLOY 63

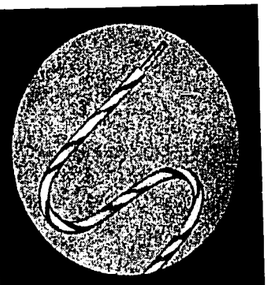
# Surco

• INSULATED WIRE
• CABLES
• TUBING

ALL SIZES FROM 0000 THROUGH 32 AWG
EXTREME RANGE OF OPERATING TEMPERATURES
• TO MILITARY SPECIFICATIONS • TO YOUR SPECIFICATIONS

**▲ ADVANCED CONDUCTOR MATERIAL**

Minimum Values: Conductivity, 80%; Tensile Strength, 55,000; Elongation, 8%; Yield Strength, 50,000; Exceptional Flex Life. AWG 16 thru 38, stranded or solid, bare wire, tin-plated, silver-plated, nickel-plated, silver-nickel plated.

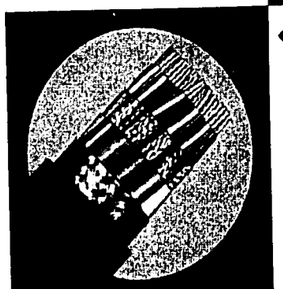


**◀ TEFLON* HOOK-UP WIRE**

For Continuous Operation from −90°C to +260°C
NEW MIL-W-27300 (USAF)
Types E & EE to MIL-W-16878C
NAS 703
UL APPROVED

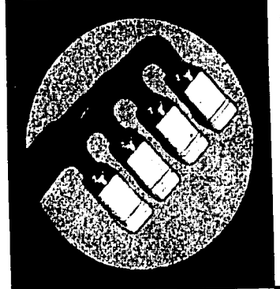
**◀ HOOK-UP WIRE**

Kel-F** to MIL-W-12349
• Silicone • Vinyl
• Polyethylene
• Irradiated Polyethylene
MIL-W-16878C, MIL-W-76A



**◀ MULTI-CONDUCTOR CABLES**

Teflon*, Kel-F**, Vinyl, Nylon, Polyethylene, Silicone Rubber, Neoprene, Irradiated Polyethylene. Made to your requirements as to size, type and number of conductors, insulation, shielding, braiding, jacketing.
Also to MIL-W-13777B



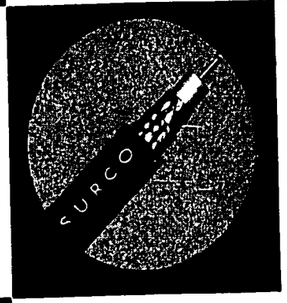
**◀ MOLDED CABLE ASSEMBLIES**

• Vinyl • Neoprene
• Polyurethane

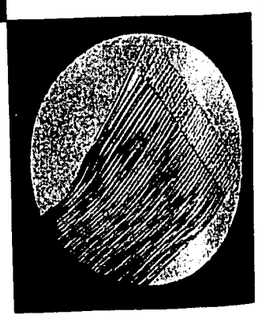
Single or multi-circuit, optional molded jacket supports and built-in strain relief members. To applicable Mil Specs or your own requirements.
• Harness Constructions

**COAXIAL CABLES ▶**

RG/Series to MIL-C-17C
Special Designs for Specific Applications
MINIATURE COAXIAL CABLES to MIL-C-8721




• AIRCRAFT WIRE to MIL-W-5086A, MIL-C-7078A, MIL-W-7072A, MIL-W-5274A
• HIGH TEMPERATURE AIRCRAFT WIRE to MIL-W-8777A, MIL-W-7139A
• MINIATURE WIRE AND CABLE
• UL and CSA APPLIANCE WIRE
• MEDICAL TUBING
• BONDABLE TEFLON*
• TEFLON* TAPE
• "SPIRALON" COLOR CODING





**◀ TUBING**

Teflon*, Vinyl, Polyethylene, Nylon, Irradiated Polyethylene
Clear or solid colors. In-stock service on standard compounds in regular sizes, .0159" to 2" I.D. Special formulations per your specifications.
• HEAT SHRINKABLE INSULATING TUBING

Multi-Conductor
**▲ FUSED RIBBON CABLE**

• Teflon* • Vinyl
• Polyethylene
• Irradiated Polyethylene
Bulk cable or precision cut and stripped. Break-outs and terminations as required. Single or multi-deck lengths in a wide range of sizes. Color coding available.

*Reg. Du Pont Trademark
**Reg. 3M Trademark

Surco PRODUCTS

# Surprenant

MFG. CO.

172 Sterling St. Clinton, Mass. 199 Washington St. Boston, Mass.

For details, circle #634 on Reader Service Card







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ARE IN USE THROUGHOUT THE WORLD

SEMI-FLEXIBLE ALUMINUM SHEATHED HELICAL MEMBRANE COAXIAL CABLE

Low attenuation and VSWR

High efficiency and power handling capacity

Specifically designed for all RF uses

50 ohm and 75 ohm characteristic impedances

Inner copper conductor separated from an aluminum outer sheath by a helical polyethylene membrane

½ inch to 3½ inch diameter

Bare aluminum sheath or vinyl protective sheath over the aluminum

Complete Range of matched fittings

Warehouse facilities on the East and West coast for immediate delivery

Competent engineering service

For complete information write to department E611

TELCON, INC.
PACIFIC PALISADES, CALIFORNIA
QUALITY CABLES AND FITTINGS SINCE 1864

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# Directory III. Materials & Services

## 85. Cable & Wire.

Standard Wire & Cable Co., Calif., 10s, 20s, 25s, 30s, 35c, 40s, 45s, 50s, 55s, 75sc, 80s, 90s

Steel Heddle Mfg. Co., Pa., Flattened sc

Superior Cable Corp., N.C., 20s, 40c, 50s, 75s, 80s

Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass., 5c, 20s, 40c, 65c, 75c, 80s, Cable Assemblies s, Multiconductor s, Tel: EMpire 5-6331
See ad on page 616

Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 30s, Tel: SPring 4-1515
See ad on page 554

Sylvania Electric Products Inc., Chemical & Metallurgical Div., Pa., 55s

Sylvania Electric Products Inc., Parts Div., Pa., 5s, 15s, 55s

Tamar Electronics, Inc., Calif., 20s

Tape Cable Corp., N.Y., 75c, 80s

Technical Industries Corp., Calif., 45sc

Technicraft Div., Electronic Specialty Co., Conn., 20c

Telcon, Inc., Dept. E611, P.O. Box 216, Pacific Palisades, Calif., 10s, 20s, 40s, 70c, 75c, 80c, Tel: GLadstone 4-4043
See ad on this page

Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 30c, Tel: MIdway 6-7211
See ads on pages 456, 556

Tensolite Insulated Wire Co., Inc., N.Y., 20sc, 35sc, 40c, 45sc, 50c, 75c, 80c, 90c, High Temp. c

Teveo Insulated Wire, Calif., 10s, 20s, 25c, 50s, 75c

Texas Instruments Incorporated, Metals & Controls Div., Mass., 5s, 15sc, 60sc

Thermal Wire of America, Vt., 5c, 20c, 45s, 75c, 80c

Thermax Wire Corp., N.Y., 20c, 40c, 75sc, 80sc, 90c, High Temp. sc, Multiconductor sc

Times Wire & Cable Co., Conn., 10s, 20s, 40s, 50s, 55s, 75s, 80s

Topper Mfg. Co., Inc., N.Y., 20s, 40sc, 45s, 65c

Tri-Dex Co., Calif., 65c

Tricon Mfg. Co., Ill., 60s

Trimm, Inc., 400 W. Lake St., Libertyville, Ill., 30sc, Tel: EMpire 2-3700
See ad on page 454

Uniform Tubes, Inc., Pa., 75c

United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 5sc, 60sc, Tel: BEekman 3-8870
See ads on pages 533, 699

United States Steel Corp., Pa., 25s, 45s, 80s, 85s

Universal Circuit Controls, Ill., 30c

Univox Corp., N.Y., 20c

Virginia Electronics Co., Inc., D.C., 65c

Wah Chang Corp., N.Y., 60sc

Warnock Wire Co., Vt., 35s, 20s, 25s, 35sc, 45s, 55s

Warren Wire Co., Wire Cord Assembly Subsid., Calif., 20s, 25s, 30s, 45s, 75s

Western Gold & Platinum Co., Calif., 60s

Western Rubber Co., Conn., 50s, 55s, 70s, 75s, 80s

Weston Bros. Stockings & Retainers, Calif., 60s

Wilbraham Co., The, Conn., 60sc

Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 60sc, Tel: UNiversity 7264
See ad on page 688

Wind Turbine Co., 245 E. Market St., West Chester, Pa., 10c, 25c, 85c, Tel: OWen 6-5110
See ad on page 477

Wire Cloth Enterprises, Inc., Pa., 85sc

Wire-o-matic Products, Inc., Mass., 40c, 75c, 80c

Wirecraft, Inc., Ind., 80c

York Co., Inc., Ohio H., N.J., 85sc

Zippertubing Co., The, 752 S. San Pedro St., Los Angeles 14, Calif., 75sc, 85sc, 90sc, Tel: MAdison 4-6064
See ad on page 659

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Cans:
See class 91

Caps, tube:
See class 104

Cases & cabinets:
See class 84

Castings, waveguide:
See class 83

Cathode tubing:
See class 104

Centrifuges:
See class 96

Ceramic insulating materials:
See class 93


Use the Reader Service Card for further information on advertised products.

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

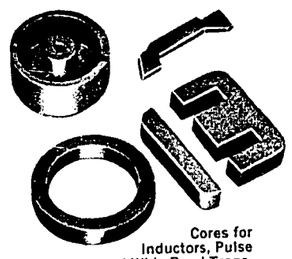
# Ferramic® Core Materials

RADIO and TV



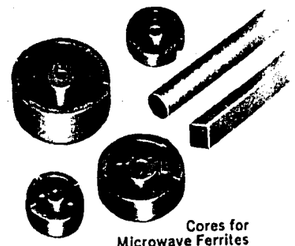
Ferrites for Flybacks, Yokes, IF Transformers and Tuners

INDUSTRIAL ELECTRONICS



Cores for Inductors, Pulse and Wide Band Transformers, Recording Heads

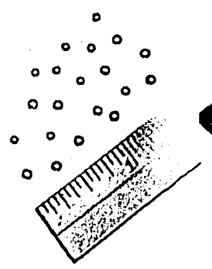
COMMUNICATIONS



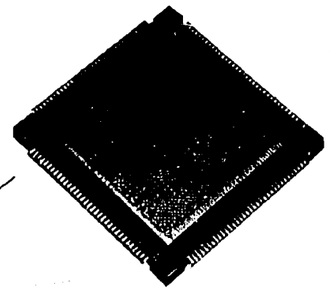
Cores for Microwave Ferrites and Telecommunication Filters and Loading Coils

# Memory Products

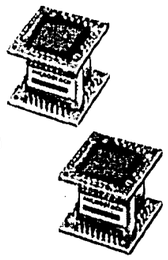
MEMORY CORES



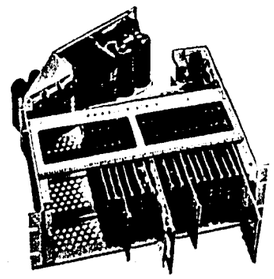
MEMORY PLANES



MEMORY STACKS



MAGNETIC CORE MEMORIES

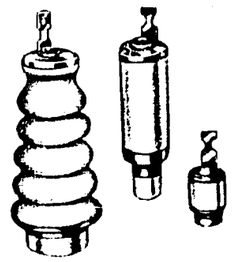


# Technical Ceramics

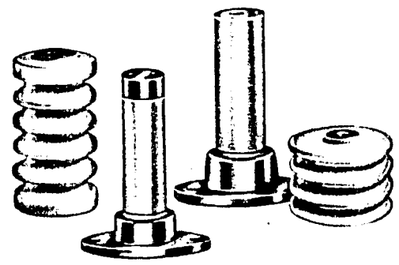
ELECTRONIC GRADE CERAMICS



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CERAMIC-TO-METAL ASSEMBLIES



General Ceramics offers the largest stock of off-the-shelf components in the widest variety of shapes and materials. In addition, General Ceramics engineers are always available to help you solve product design and development problems involving ferrites. For complete technical information, please write, outlining your requirement to Department P.

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TECHNICAL CERAMICS, FERRITE AND MEMORY PRODUCTS

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# Directory III. Materials & Services

## 86. Ceramics.

5. Alumina
10. Coil forms
15. Custom fabrication
20. Ferrites
25. Insulators
30. Metallized
35. Proprietary forms
40. Rare earths

AMP Incorporated, Pa., 5c, 10c, 15c, 25s
Accurate Specialties Co., Inc., N.Y., 5sc, 15sc, 30sc, 35sc
Aluminum Co. of America, Pa., 5s
Amatom Electronic Hardware Co., Inc., N.Y., 25sc
American Feldmuehle Corp., 11 W. 42nd St., New York 36, N.Y., 5c, Tel: PEnnsylvania 6-9751
See ad on this page
American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 5c, 10c, 15c, 25c, 30c, 35c, Tel: AMherst 5-3411
See ad on page 178
American Machine & Foundry Co., D.C., 15c, 25c
Antenna & Radome Research Associates (ARRA), 27 Bond St., Westbury, L.I., N.Y., 5c, 35c, Tel: EDgewood 4-8770
See ad on page 379
Bel Fuse, Inc., N.J., 30c
Bently Scientific Co., Calif., 15c
Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 25s, Tel: WOrth 6-5611
See ad on page 607
Bram Metallurgical-Chemical Co., Pa., 40sc
CFI Corporation, Dept. IRE, Cottage Place, Mineola, L.I., N.Y., 5c, 15c, 30c, 35c, Tel: PIoneer 6-0571
See ad on this page
Cambridge Thermionic Corp., Mass., 10s, 25s
Carborundum Co., N.Y., 5c, 10c, 15c, 25c, 30c, 35c
Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 30sc, Tel: WEst Lebanon 7-5851
See ad on page 452


PURITY 99%

**Hypalox®**

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for exacting applications...

hardness of sapphire . . .

high mechanical strength... compressive, tensile and flexural strengths, resistance to impact, vibration, and thermal shock.

low electric losses . . . at extreme temperatures and frequencies.

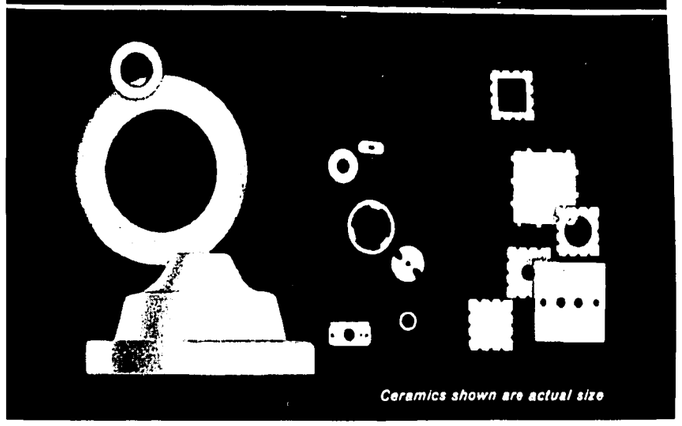
chemical inertness . . . All are characteristic of the high purity of **HYPALOX.**®

AMERICAN FELDMUEHLE CORPORATION

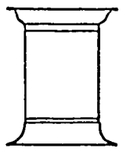
11 WEST 42nd STREET, NEW YORK 36, NEW YORK

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**Precision Technical Ceramics and Composites**



CFI Corporation provides integrated skills and facilities specifically adapted to the design, prototype development and production of high-temperature ceramics, components, ceramic-metal vacuum composites, glass-metal seals and specialized body compositions.

Typical ceramic products include modular forms, spacer and abrasion-resistant elements, metallized parts, multi-terminal composites, compact high-temperature power lead through elements and envelope assemblies.

Body compositions comprise high Alumina, Steatite, Forsterite, and customized materials, such as Series 1000 LOSSY ceramic for microwave attenuation.

For complete details on CFI custom-designed ceramics and ceramic-metal composites to fit your specifications, call CFI today. We're ready to work with you right now!

**CFI Corporation**
**Dept. IRE**
**Cottage Place**
**Mineola, N.Y.**
**PI 6-0571**

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Connecticut Instrument Corp., Conn., 15c, 20c
Cook Electric Co., Ill., 25sc
Coors Porcelain Co., Colo., 5c, 10c, 15c, 25sc, 30sc, 35c
**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 10c, 30c, Tel: FOrest 2-5571**
See ads on pages 390, 523
Corning Glass Works, Electrical Products Div., N.Y., 25s, 35s
Crowley Div., A. O. Smith Corp., N.J., 20c
D.K.E. Electronic Bases, Inc., N.J., 15c
Dayton Aircraft Products, Inc., Fla., 25sc
Diamonite Products Mfg. Co., Div. U. S. Ceramic Tile, Ohio, 5sc, 15c, 25c
Du-Co Ceramics Co., Pa., 5c, 10c, 15c, 25c
Electro Assemblies, Inc., Ill., 10s
Elna Ferrite Laboratory, Inc., N.Y., 20c
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 25s, 40s, Tel: BIgelow 2-2700**
See ad on page 170
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 15c, 25sc, Tel: GLendale 6-8592**
See ad on pages 40-41
Ferro Corp., Louthan Plant-Refractories Div., Ohio, 25sc
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 20sc, Tel: CHerry 6-2811**
See ads on pages 267, 354, 423, 457, 525, 620
Frenchtown Porcelain Co., N.J., 5c, 10c, 15c, 25c, 30c
Galaxy Engineering Corp., Calif., 25sc, 30sc
Garlock Electronic Products, Garlock, Inc., N.J., 25sc
**General Ceramics, Div. Indiana General Corp., Dept. P, Crows Mill Rd., Keasbey, N.J., 5sc, 20sc, 25sc, Tel: VAlley 6-5100**
See ad on page 618
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 20c, Tel: GRanite 6-4411**
See ads on pages 263, 267, 435, 437, 501, 621
Gulton Industries, Inc., N.J., 5sc, 25sc
Haveg Industries, Inc., Del., 15c, 25c, 35c
**Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 30sc, Tel: WYman 8-8080**
See ad on page 450
**Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 10sc, 15c, 25sc, Tel: MIllington 7-0385**
See ad on this page
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 20c, Tel: CLifford 6-4000**
See ad on pages 120-121
Kearfott Div., Microwave Products, General Precision, Inc., Calif., 20c
Kirchberger & Co., Inc., M., N.J., 5c, 10c, 15c, 25c
**Krystinel Corp., Fox Island Rd., Port Chester, N.Y., 20sc, Tel: WEstmore 7-5252**
See ad on page 423
**Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 5c, 15c, 25c, 30c, Tel: LE Roy 385**
See ad on pages 62-63
Lignes Telegraphiques et Telephoniques, France, 20s
**Litton Engineering Laboratories, P.O. Box 949, Grass Valley, Calif., 30c, Tel: 1730**
See ad on page 674
Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Divs., Calif., 20s
Mackay, Inc., A. D., N.Y., 40s
Maryland Lava Co., Md., 25c
Materials For Electronics, Inc., N.Y., 5sc, 15sc, 25sc, 30sc, 35sc, 40sc
Mica Fabricating Co., N.J., 15c, 25c
Microwave Chemicals Laboratory, Inc., N.Y., 15, 20, 35, 40
**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 10sc, 25s, Tel: DAvenport 4-4108**
See ad on page 402
Miller Co., J. W., Calif., 10sc
Minneapolis-Honeywell Regulator Co. Ceramics Laboratory, Minn., 5c, 10c, 15c, 25c, 30c, 35c, Piezoelectric c




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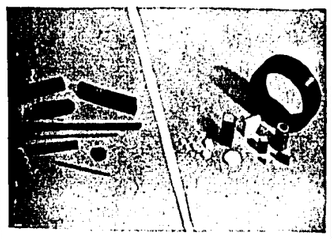




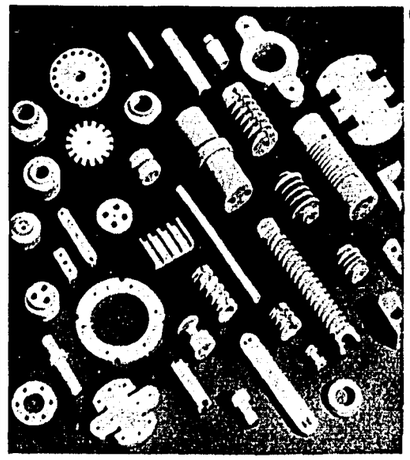

# Directory III. Materials & Services

## 86. Ceramics.

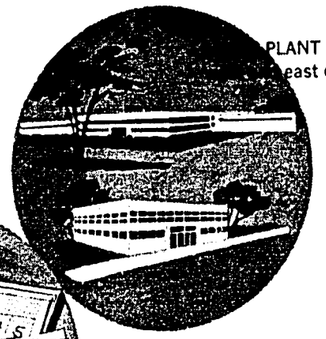
Minnesota Mining & Mfg. Co., Magnetic Products Div. & Electrical Prods. Div., Minn., 5sc, 15c, 20sc, 25sc
**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5sc, 10c, 25sc, 30c, Tel: WAverly 6-2250**
See ad on page 452
Motorola, Inc., Military Electronics Div., Ariz., 5c, 15c, 20c, 25c, 40sc
Mullenbach Div., Electro Machinery Mfg. Co., Electronic Dept., Calif., 15c, 35sc
Munzig International, Inc., Calif., 20s
Murata Mfg. Co., Ltd., Japan, 25c
**Mycalex Corporation of America, 126 Clifton Blvd., Clifton, N.J., 10sc, 25sc, 35sc, Tel: PRescott 9-8866**
See ad on page 658
Mykroy, Inc., Ill., 5c, 10sc, 15sc, 25sc, 30c
National Ceramic Co., N.J., 10c, 25c, 30c
National Moldite Co., Inc., N.J., 20c
**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 10, 25, Tel: NOrmandie 5-4800**
See ad on page 614
Norrich Plastics Corp., N.Y., 10c, 25c
Norton Company, Mass., 5sc, 15c
Nuclear Corp. of America, Instrument & Research Div., N.J., 40sc
Packard Bell Electronics Corp., Calif., 15sc, 25sc
Paktron Division, Illinois Tool Works, Va., 15c, 25c, 30c, 35c
Philips Electronics Industries, Ltd., Canada, 20s
Porcelain Products Co., Ohio, 15c, 25sc
Precision Metal Products Co. of Malden, Inc., Mass., 25s
**Pyrocircuits Div., Microtron, Inc., 6 Manhasset Ave., Port Washington, L.I., N.Y., 35c, Tel: POrt Washington 7-3949**
See ad on page 502
Quartzite Processing, Inc., Mass., 5c, 15c, 20c
Radio Mfg. Co., Inc., Calif., 20c, 40c
Raytheon Co., Microwave & Power Tube Div., Mass., 15c, 20sc, 25sc, 30sc
Research Chemicals, Div. Nuclear Corp. of America, Calif., 40s
Resitron Laboratories, Inc., Calif., 30sc
Richards Co., Inc., Arklay S., Mass., 25s
Ronson Metals Corp., Cerium Metals & Alloys Div., N.J., 40s
Smith, Inc., Herman H., N.Y., 25s
Smith Mfg. Co., Inc., E. C., Pa., 15c
Stackpole Carbon Co., Pa., 20sc
Star Porcelain Co., The, N.J., 10c, 15c, 25c
Steward Mfg. Co., D. M., Tenn., 5c, 10c, 15c, 20c, 25c, 30c
Supertex Electronics Corp., N.Y., 20s
Superior Porcelain Co., W.Va., 25sc
Superior Steatite & Ceramic Corp., 89 W. Forest Ave., Englewood, N.J., 5c, 10c, 15c, 25c, Tel: LOwell 8-4555
See ad on this page
TRG, Incorporated, N.Y., 5c, 15c, 30c, 40c
Technical Ceramics & Lava Corp., N.J., 10, 15, 25, 30
Technical Industries Corp., Calif., 15sc, 25sc
Telegraph Condenser Co., Ltd., The, England, 5s, 10s, 15c, 25s, 30s, 35c
Thor Ceramics, Inc., N.J., 5c, 10c, 15c, 25c, 30c, 35c
Togger Mfg. Co., Inc., N.Y., 5s
Trans-Tech, Inc., Md., 20sc
Trionics Corp., P.O. Box 548, Madison 1, Wis., 15c, 20c, 30c, 35c, 40c, Tel: CEdar 8-2616
See ad on page 663
Trotex, Inc., N.J., 30c
Union Carbide Corp., Linde Co., N.Y., 5sc
**United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 5c, 10c, 25c, 30c, 35c, 40c, Tel: BEekman 3-8870**
See ads on pages 533, 699
U. S. Sonics Corp., Mass., 40c
U. S. Stoneware Co., Alite Div., Ohio, 5c, 15c, 25s, 30c, 35s
Valpey Crystal Corp., Mass., 15sc

GE CERAMICS & FERRITES
General Electric ceramic and ferrite materials are specifically designed for special applications. Four distinctive compositions of *Barium Titanate* are complemented by three bodies of a new piezoelectric ceramic, *Lead Metaniobate*, for applications requiring high Curie temperature and broad bandwidths. *Delay Line Ferrite* for phase modulators and separate *Microwave Ferrites* for C, S and X bands provide tailored electrical properties.
227-22
GENERAL ELECTRIC
DEFENSE ELECTRONICS DIVISION
HEAVY MILITARY ELECTRONICS DEPARTMENT
DEFENSE INDUSTRIES SALES
COURT STREET, SYRACUSE, NEW YORK
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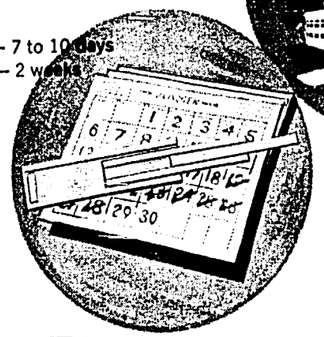
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Custom-molded, extruded or machined to close tolerances to meet your exact specifications. Prompt delivery at low cost on large or small orders. Over half a century of service is your guarantee of complete satisfaction.
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West Coast Representative:
Yarbrough Sales Co., 192 East Glenarm St., Pasadena, Calif.
For details, circle #642 on Reader Service Card


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PLANT OPERATION
east coast facilities

FAST DELIVERY:
PROTOTYPES — 7 to 10 days
PRODUCTION — 2 weeks



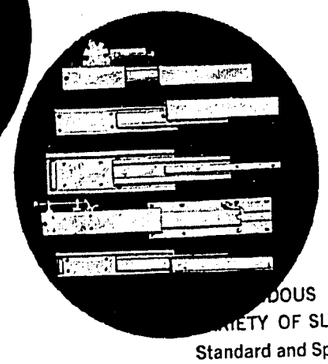
# GRANT SLIDES ARE RIGHT EVERY TIME

RESEARCH & DEVELOPMENT
constantly designing, testing, improving



NATIONAL FIELD SALES ENGI
. . . for at-your-plant assistance





UNCONDITIONAL GUARANTEE
all Grant Slides guaranteed against defects in workmanship or materials




DOUS
RIETY OF SLIDES
Standard and Special types . . . priced right every time too.

*write for your copy of the Grant Catalogue.*

*The nation's first and largest manufacturer of slides.*

## GRANT INDUSTRIAL SLIDES

GRANT PULLEY & HARDWARE CORPORATION 944 LONG BEACH AVENUE, LOS ANGELES 21, CALIF. • 43 HIGH STREET, WEST NYACK, N. Y.

For details, circle #643 on Reader Service Card






# Directory III. Materials & Services

## 86. Ceramics.

Vitro Chemical Co., N.Y., 40sc
Waters Mfg., Inc., Mass., 10s
Western Gold & Platinum Co., Calif., 5c, 15c, 25c
**Wind Turbine Co., 248 E. Market St., West Chester, Pa., 25c, Tel: OWen 6-3110**
See ad on page 377
Zirconium Corp. of America, Ohio, 15sc, 35sc, 40sc

**Chambers, environmental test:**
See class 14

**Changers, record:**
See class 61

**Chargers, battery:**
See class 96

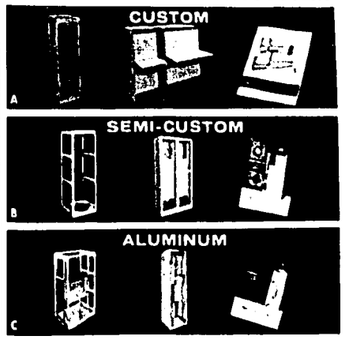
**Chart paper:**
See class 16

## 87. Chassis, Racks & Slides.

**5. Aluminum chassis**
**10. Chassis slides**
**15. Relay racks & cabinets**
**20. Steel chassis**

A A Metal Products, Inc., Vt., 5c, 20c
Abalon Precision Mfg. Corp., N.Y., 5c, 15c, 20c
Albano Co., Inc., N.Y., 15c
**Alden Electronic & Impulse Recording Equipment Co., Inc., Alden Research Center, Westboro 1, Mass., 10, 20, Tel: FOrest 6-4467**
See ad on page 276
**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 10s, 15s, 20s, Tel: JUniper 3-0160**
See ad on page 496
Allen Electric & Equip. Co., Mich., 5c, 20c
**Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 5c, 10s, 15s, 20c, Tel: UNderhill 7-8500**
See ad on this page
**American Aluminum Co., 230 Sheffield St.—ID, Mountainside, N.J., 5c, 15c, Tel: ADams 3-3500**
See ad on page 631
Anchor Specialty Mfg. Co., N.J., 5c, 15c, 20c
Applied Electronics Co., Subsid. Raytheon Co., Calif., 5c, 20c
Arrow Machinists & Fabricators, N.Y., 5c, 15c, 20c
Artisan Metal Works Co., Ohio, 5c, 15c, 20c
Avionics Corp. of America, Pa., 5c, 15c, 20c
Barry-Wright Corp., Mass., 5c, 10c, 15c, 20c
Belz Industries, Inc., N.Y., 5c, 10c
Bernco Engineering Corp., Ind., 15c
Bingham Mfg. Co., J. F., Mass., 5c, 20c
Bowl-Mor Company, Inc., Mass., 5c, 15c, 20c
Brooks & Perkins, Inc., Mich., 5c, 15c
**Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 5sc, 10s, 15sc, 20sc, Tel: HEnderson 1-7166**
See ad on page 625
Carroll Pressed Metal, Inc., Mass., 5c, 20c
Central Dynamics, Ltd., Canada, 5c, 15c, 20c
Centronix, Inc., Fla., 5c
**Chassis-Trak, Inc., 525 S. Webster Ave., Indianapolis 19, Ind., 10sc, Tel: FLeetwood 9-5407**
See ad on page 626
Chisholm Industries, Ltd., Canada, 5c, 15c, 20c
Churchill Lighting Corp., Mass., 5sc, 15c, 20c
Collins Radio Co., Central Sales Office, Tex., 5s, 10s, 15s, 20s
Cook Electric Co., Ill., 15sc, 20sc
Craig Systems, Inc., Mass., 15c
Crown Engineering, N.M., 5c, 20c
Dahlstrom Metallic Door Co., N.Y., 5c, 15c, 20c
Deveo Engineering, Inc., N.J., 15c
Donnelly Mfg. Co., Mass., 5c, 15c, 20c
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, 10c, 15c, 20c, Tel: HAlifax 6-7491**
See ad on page 400
Eagle Metalcraft, Inc., N.Y., 5c, 10c, 15c, 20c
Ehrenpreis, David, Consulting Engineers, N.Y., 5c, 10c, 15c, 20c
Electro-Chemical Engraving Co., Inc., N.Y., 5c, 20c
Electro-Pack, Inc., Calif., 5s, 10s, 15sc, 20s
Electronic Enclosures, Inc., Calif., 5c, 10c, 15c, 20c
Elzee Metal Prods. Co., Inc., N.Y., 5sc, 15sc, 20sc
Equipto Electronics Corp., Ill., 5c, 15sc, 20c
Erwood, Inc., Ill., 5c, 15c, 20c
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5c, 15c, 20c
Eugene Engineering Co., Inc., Mass., 5c, 10c, 15c, 20c
**Falstrom Company, 74A Falstrom Ct., Passaic, N.J., 5c, 15c, 20c, Tel: PRescott 7-0013**
See ad on page 634
**Farwell Metal Fabricating, 73 W. Fairfield Ave., St. Paul 7, Minn., 5c, 15c, 20c, Tel: CApital 4-5318**
See ad on page 601
Federal Manufacturing & Engineering Corp., N.Y., 5c, 15c, 20c
Feiner & Sons, Inc., N.Y., 5c, 15c, 20c
Fisher Berkeley Corp., Calif., 20c
**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 5c, 20c, Tel: YEllowstone 4-2691**
See ads on pages 341, 399, 403, 437, 563, 569
G B Electronics, Subsid. General Bronze Corp., N.Y., 5c, 10c, 15c, 20c
Gilfillan Bros., Inc., Calif., 5c, 10c, 15c, 20c
Golding Manufacturing Co., N.J., 5c, 15c, 20c
Gramm Trailer Corp., Ohio, 15c
Grand Sliding Mechanisms, Inc., Ill., 10c
Granite State Machine Co., Inc., N.H., 5c, 20c
**Grant Pulley & Hardware Corp., 43 High St., West Nyack, N.Y., 10sc, Tel: ELmwood 8-4400**
See ad on page 622
Green Rectifier Co., N.J., 5c, 15c, 20c
HPL Manufacturing Co., Ohio, 5c, 20c
Hauser Electronics Co., Inc., N.J., 5s, 20s
Hebbor Mfg. Co., Inc., 5c, 10c, 15c, 20c
Henry & Miller Industries, Inc., N.J., 5c, 10c, 15c, 20c
Holden-Massey Corp., N.Y., 5c, 15c, 20c
Hughes-Trettler Mfg. Corp., 5c, 15c, 20c
Hunter Spring Co., Div. American Machine & Metals, Inc., Pa., Cable Retrievers 5c
IE Manufacturing, Ill., 5s, 10s, 15s, 20s
Interstate Electronics Corp., Calif., 5c, 15c
Jacksonville Metal & Plastics Co., Fla., 5c, 15c, 20c
Jetronic Industries, Inc., Pa., 5c, 20c
Jonathan Mfg. Co., Calif., 10sc
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 15c


THE AMCO MODULAR INSTRUMENT ENCLOSURE SYSTEM




TWO COMPLETELY NEW LINES ADDED IN STEEL AND ALUMINUM TO GIVE 3 COMPLETE MODULAR FRAME LINES IN ONE OVER-ALL SYSTEM

**A. Custom Line.** Removable multi-panel, cowlings (19" width increments). Custom appearance for series mounting—space-saving and ideal for complex consoles. Double channel 16 gauge steel. Meets EIA standards.

**B. Semi-Custom Line.** Multi-width cowlings for single-unit appearance with frames in series. 19" wide panels, any thickness, can be recessed to any depth. Extra rugged, 14 gauge steel, box-type channel construction. Conforms to EIA mounting.

**C. Aluminum Line.** Box extrusions, cast corners for fast, easy assembly of cabinets any size from 7' to 20' in height, width or depth. Lock by hand, built-in locking device. All sizes standard.

**D. Accessories.** A full line of Amco integrated accessories (blowers, slides, mounts, lighting, etc.)

**Cost savings.** Orders can be grouped for best discount. Free Amco pre-assembly. **3 week delivery on standard parts!** Send for free literature.

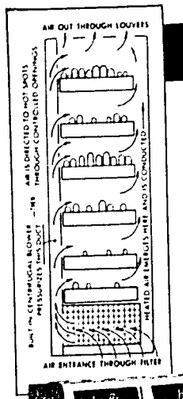
**AMCO ENGINEERING CO.**
**7333 W. Ainslie Street, Chicago 31,**

For details, circle #644 on Reader Service Card

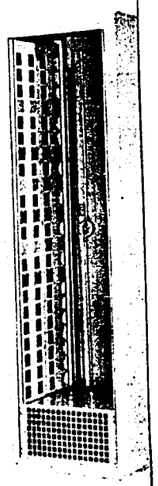

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# ONE SOURCE...CABINETS, CONSOLES and EASILY INSTALLED RELATED EQUIPMENT

VENTILATED or NON-VENTILATED
MIL Spec or Customer Spec




## RELAY RACK CABINETS and MATCHING CONSOLES



• Complete package modular construction • Mount standard 19", 24" or 30" wide panels • Panel space in multiples of 1¾" • All-welded frames of 12-ga. or heavy duty ¾" steel, or .125" aluminum alloy—tapped 10-32 or 12-24 • Steel or aluminum skin and doors • Hinged, lift-out or bolt-on doors—with or without louvers, glass panels or cut-outs • continuously adjustable rear mounting rails of 12-ga. steel • mounting built in for 'Chassis-Trak' slides.

Heavy duty MC type cabinets—surpass 30 G shock and vibration requirements of MIL-T-4807 (steel construction)—reinforcement for higher shock loading available.



CONSOLES—24", 30", 36" in depth. Modular shapes to fit 'U' or 'L' floor plans. Panel angled 15°, 30°, 45° or 60°.

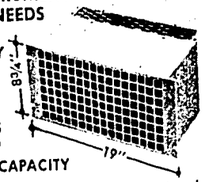
CABINETS— 18" to 36" deep in 2" increments.

*Cool exactly where needed* with fully controlled built-in cross-ventilation system—proven in 6 years operation in Government labs. Adjustable airflow pattern to your exact needs is effected by snap-in closures—no "chimney" effect (schematic above, left).

Any commercial or MIL Spec finish. Dolly optional.

## PANEL MOUNTING BLOWERS

COOL your INSTRUMENTS to your EXACT NEEDS




MIL SPEC QUALITY
COMPACT SIZE
YOUR CHOICE OF 8 DIFFERENT STANDARD MODELS (others 'TO ORDER')
LARGE COOLING CAPACITY

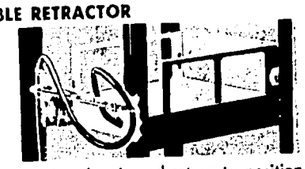
• 600—1200 CFM output • Mount as standard 8¾" EIA panel, 15" front-to-back • Meet MIL-I-16910A radio interference requirements • Air discharge areas to suit innumerable applications • Cleanable filter.

### REFRIGERATED BLOWERS

• Automatically maintain pre-set cabinet temperature • Mount as standard 19" rack panels • Control dust and humidity • Interference-free • MIL Spec.

These panel mounting refrigeration units, 14" and 21" high, 22¼" deep, discharge cooled air to distribution plenum, re-circulate it to reduce humidity while cooling.

### CABLE RETRACTOR

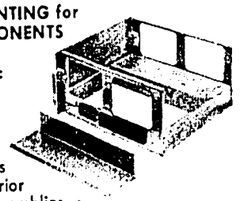


• You service chassis and return to position without snagging components below • Double action maintains correct tension and cable suspension—permits ample cable to fully extend and tilt chassis • Adaptable to all types of chassis or drawer slides, varying chassis lengths • Mounts on rear support rail on standard 1¾" spacing.

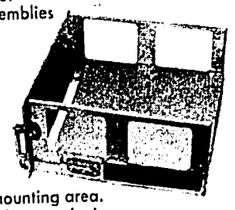
## UNIVERSAL CHASSIS

RIGID MOUNTING for your COMPONENTS

TWO TYPES:



MODULAR
2 or more sub chassis
Permits superior cooling of assemblies



SINGLE PANEL FLAT CHASSIS
Unrestricted front panel mounting area. Readily drilled or punched

• Maximum-height side frames have Heli-arc welded corners—give rigid equipment-protection in any position • Steel or aluminum—⅛" or 3/16" front panels, .062" side frames • All parts drilled for assembly • Panel drilled for handles, chassis drilled for slide mounting ('Chassis-Trak') if desired • Customer may specify all dimensions, materials, finish • Top, bottom covers available.

### HANDLES

Features offered individually or in combination: completely recessed stainless steel single or double latch types, blank handles, push-button panel locks, trigger for tilt lock, positive screw-down clamp type for extreme shock or vibration.

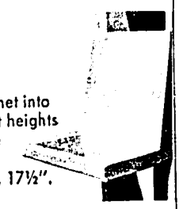
PHONE or WRITE for COMPLETE DATA

**ONE SOURCE...** for VENTILATED RELAY RACK CABINETS, CONTROL CONSOLES, BLOWERS, CHASSIS, CHASSIS-TRAK®, RELATED COMPONENTS

## CONVENIENT, MODULAR ACCESSORY EQUIPMENT

• Mount at any desired height on standard-tapped mounting rails • Standard construction spot-welded CRS (or aluminum for 4 top units) • Standard finish gray hammertone baked enamel—MIL or other available • Writing surfaces steel, Formica or aluminum • Easily installed.

SLOPE FRONT CONSOLE FRONT



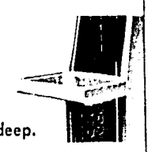
Converts rack cabinet into console. Slope front heights and writing surface depths: 12¼", 14", 17½".

TURRET FRONT



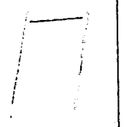
Slope front height: 8¾" to 15¾" in 1¾" increments. Slopes 15° or 30°.

RIGID, FLAT CONSOLE WRITING SURFACE



Requires only 3½" of valuable panel space. 15¾" or 18¾" deep.

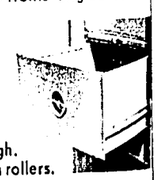
DESK TOP CONSOLE



Mount on desk, cabinet, counter. Panel space 12¼" or 17½" high. Base 12¼" or 15¾" deep.

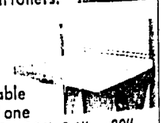
Standard width of above units is 21⅞"—available in 2, 3 or more section widths. Slope fronts angled 15° from vertical.

RACK MOUNTING DRAWERS



Standard 19" panel—multiples of 1¾" high. 10"—24" deep. Nylon rollers.

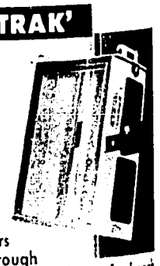
RETRACTABLE WRITING SURFACE



Uses only 1¾" valuable panel space—install one or more in cabinet. For 19", 24" or 30" racks. 16"—36" deep.

## 'CHASSIS-TRAK'

The IDEAL SLIDE for READY ACCESS to ENTIRE CHASSIS



• Ultra thin—mount 17" chassis in 17¾" opening • Extra strong • 'Basic' model tilts 120° above horizontal • 'Detent' model offers 7 locked positions through 210° • Finger touch releases chassis for bench work • 10"—24" long • Double extension • Finish approved for Military installations

Roller Types Available

ORegon 8-7877

**WESTERN DEVICES, INC.**
600 W. FLORENCE AVE., INGLEWOOD 1, CALIF.

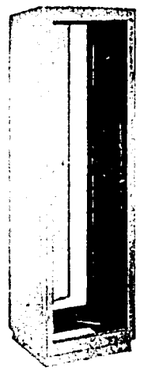
For details, circle #645 on Reader Service Card



# The Perfect Complement

## TO MODERN ELECTRONIC EQUIPMENT

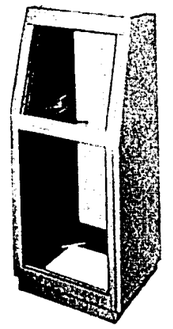
SERIES SIXTY CABINET RACKS



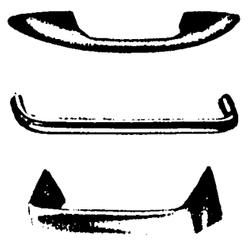
The most practical cabinet rack for either a single piece of equipment or a large instrumentation system.

Welded frame together with many exclusive features combine to make these cabinet racks exceptionally sturdy and highly versatile. They are available in 14 sizes and two color combinations.

The inclined panel cabinet racks have the same basic construction as the upright series. Nothing is sacrificed to provide strength and convenience while cost is kept to a minimum. Available in three sizes and two color combinations. Each model can be combined to create a rigid, homogeneous battery.

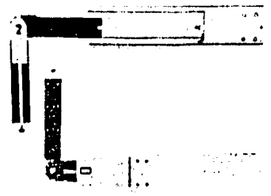


THESE ENCLOSURES ARE SHIPPED COMPLETELY ASSEMBLED AND READY FOR USE, ELIMINATING ALL CHANCES FOR ERROR IN ORDERING MULTIPLE COMPONENTS AND SAVING THE TIME AND COST OF COMPLETING THE ASSEMBLY.



## HANDLES

Bud handles are fabricated from steel, brass or cast aluminum. Their durable, attractive finish will provide long wear. They have unlimited applications in the electrical, electronic and many other fields. Bud handles are designed for rugged applications and are far superior to handles of similar appearance. They are available in a number of styles and sizes. Just a few typical examples are illustrated.



## CHASSIS SLIDES

The quality of a slide assembly is determined by the efficiency of operation under difficult conditions. The Bud line of quality ball bearing slides is designed to provide the highest possible serviceability under any conditions. Two types—16 styles and sizes provide the most flexible method of moving all kinds of equipment from enclosures. The "SI" line is designed primarily for military and industrial applications and the "SC" line for commercial use.

**For complete information concerning any of these products see your nearest Bud Distributor or write Dept. IR for Bulletin S-6060**

**BUD RADIO, INC.**
CLEVELAND 3, OHIO

For details, circle #646 on Reader Service Card





# Directory III. Materials & Services

## 87. Chassis, Racks & Slides.

Kerr Lindsay Corp., N.Y., 5c, 20c
EMP Electronics, Inc., Calif., 5c, 10c, 15c, 20c
Fabricated Sheet Products, Inc., Calif., 5c, 20c
Fairchild Controls Corp., Electronics, Aviation & Industrial Products Divs., 5c, 20c
Fansteel Mfg. Co., Ill., Calif., 5c, 15c, 20c
MM Enclosures, Inc., 111 Bloomingdale Rd., Hicksville, L.I., N.Y., 5c, 15c, 20c, Tel: WEIls 1-1770
See ad on page 631
M P Engineering Co., Conn., 5c, 20c
Maffei-Elbon Co., N.J., 5c, 15c, 20c
Marshall Industries, Inc., Calif., 5c, 10c, 15c, 20c
Marine Area Electronics, Inc., N.Y., 5c, 15c, 20c
Martin Co., Fla., Md., 5c, 15c, 20c
Meridian Metalcraft, Inc., Calif., 5c, 10c, 15c, 20c
Metal Fabricators Corp., Mass., 5c, 15c, 20c
Metalcraft, Inc., N.Y., 5c, 10c, 15c, 20c
Mid-West Metal Products, Inc., Kan., 5c, 15c, 20c
Miller Dial & Name Plate Co., Calif., 5c, 20c
Minneapolis-Honeywell Regulator Co., Brown Instrument Co. Div., Pa., 15sc
Minneapolis-Honeywell Regulator Co., Military Products Group, Minn., 5c, 10c, 15c, 20c
Missile Systems Corp., Calif., 15c
Mobil Electronics, Inc., Div. Radionic Labs., Inc., Ind., 5sc, 15sc, 20c
Northeastern Engineering, Inc., 25 S. Bedford St., Manchester, N.H., 15c, Tel: NAtional 2-6485
See ad on pages 27-30
Otis Elevator Co., Defense & Industrial Div., N.Y., 5c, 15c, 20c
P.B.R. Manufacturing Co., Pa., 15c
Par-Metal Products Corp., 32-42 49th St., Long Island City 3, N.Y., 5s, 10s, 15sc, 20s, Tel: AStoria 8-8905
See ad on page 626
Pearce-Simpson, Inc., Fla., 5c, 20c
Plug-In Instruments, Inc., Tenn., 5s, 10s
Premier Metal Products Co., 337 Manida St., New York 59, N.Y., 5s, 15s, 20s, Tel: WYandotte 1-6600
See ad on page 602
REF Manufacturing Corp., N.Y., 5c, 10c, 15c, 20c
Racal Engineering, Ltd., England, 20c
Radio City Products Co., Inc., Pa., 5c, 15c, 20c
Radio Corp. of America, N.J., 15s

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# chassis-trak® slides
## for rack-mounted electronic equipment



Chassis-Trak slides, formed from cold rolled steel, give complete accessibility and faster servicing . . . and the ultra-thin design means you can cut engineering costs by mounting 17" chassis in 19" standard racks. Wide bearing area design increases rigidity and reduces the possibility of binding due to misalignment.

Roller or solid bearing slides are available from stock. The "Detent" model locks in 7 tilt positions. The "Basic" model tilts with no lock assembly. These models are available in either standard weight or heavy-duty styles. Prefabricated gusset mounting assembly can be furnished with standard weight models.

In addition to the standard slides in stock, Chassis-Trak engineers will custom-build slides for special installations. All slides meet specifications for government or military projects and RETMA standards.

*Select the right slide for your application*

| ROLLER BEARING SLIDES | MODEL | SLIDE LENGTH | | | | | | | | LBS. MAX. LOAD |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | |
| Basic | CTRB | X | X | X | X | X | X | X | X | 175 |
| Detent | CTRD | | X | X | X | X | X | X | X | 175 |
| Cradle Track | CTEZ | | | X | X | X | X | X | X | 125 |
| Heavy Duty Basic | CTHRB | | | X | X | X | X | X | X | 275 |
| Heavy Duty Detent | CTHRD | | | X | X | X | X | X | X | 275 |
| Lightweight | C-357 | | X | X | X | X | X | X | X | 150 |
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| Detent | CTD | | X | X | X | X | X | X | X | 175 |
| Light Weight | CTL | | | X | X | X | X | X | X | 100 |
| Heavy Duty Basic | CTHB | | | X | X | X | X | X | X | 250 |
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## 87. Chassis, Racks & Slides.

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Waterbury Manufacturing Co., Inc., N.Y., 5c, 10c, 15c, 20c
Weber Aircraft Corp., Calif., 15c
Wells Industries Corp., Basic Electronics Controls Div., Calif., 15sc, 20sc
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See ad on page 624

Wyatt Metal Products, Calif., 5sc, 10s, 15sc, 20sc
York Metal Products, Inc., N.Y., 5c, 15c, 20c

Chemicals:
See class 95

Clamps, tube:
See class 104

Cleaners, ultrasonic:
See class 96

Cleaning compounds:
See class 95

Clips, cable:
See class 91

Clips, test:
See class 55

Coaxial cable:
See class 85

Coil dope:
See class 95

Coil forms, ceramic:
See class 86

Coil winding machines:
See class 96

Coils:
See class 45

Compounds, cleaning:
See class 95

Conductive coatings:
See class 95

Cones, loudspeaker:
See class 56

Connectors:
See class 46

## 88. Consulting Engineers.

5. Acoustical
10. Electrical
15. Electronic
20. Mechanical
25. Radio
30. Television

APC Communication Products, Inc., Pa., 15
Ace Engineering & Machine Co., Inc., Pa., 15
Adair Engineering Co., George P., Pa., 5, 15, 25, 30
Advanced Research Associates, Inc., Md., 15, 20
Aid Associates, Calif., 10, 15, 20
Aircraft Armaments, Inc., Md., 15, 20
Aireco, Inc., N.Y., 20
**Airtec, Inc.,** 139 E. 1st Ave., Roselle, N.J., 15, Tel: CHestnut 5-2990
See ad on page 580

All-Tronics, Inc., 45 Bond St., Westbury, N.Y., 25, Tel: EDgewood 3-3090
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Allied Research Assoc., Inc., Mass., 15, 20
Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 10, 15, 20, Tel: ALgonquin 5-5400
See ad on page 604

American Hydromath Corp., N.Y., 20
American Research & Mfg. Corp., Md., 15
Applied Magnetics Corp., Calif., 15
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Arde Assoc., Engrg. Div., N.J., 5, 10, 15, 20, 25, 30
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Armoux Corp., Calif., 15
Artronic Instrument Co., The, Md., 15
Associated Engineering & Mfg. Corp., N.J., 15
Associated Spring Corp., Conn., 20
Astra, Inc., N.C., 10, 15, 20, Nuclear
Atlantic Design Co., N.J., 10, 15, 20, Electro-Mechanical
Atlantic Research Corp., Va., 5, 15, 20
Atlantis Electronics Corp., Tex., 15
Atwood, Wilfred L., Ohio, 10, 15
Audio Design Service, N.Y., 5, 15
Austin Electronics, N.Y., 10, 15, 20
Automatic Timing & Controls, Inc., Pa., 10, 15, 20
Automation Engrg. Lab., Inc., Conn., 10, 15, 20
**Avco Corp., Research & Advanced Development Div.,** 201 Lowell St., Wilmington, Mass., 5, Tel: OLiver 8-8911
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Baracket, Albert J., Pa., 15
Barker & Williamson, Inc., Pa., 15, 25
Barnes Development Co., Pa., Automation

Cir-Kit Electronics Corp., 50 Terminal Ave., Clark, N.J., Tel: FUlton 8-[illegible]
See ad on page [illegible]

Clary Laboratories, N.J., Route 66, Mount Laurel, N.J., 15, 25, Tel: OAkwood 7-[illegible]
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Components for Research, Inc., 1879 Commercial St., Palo Alto 2, Calif., 15, Tel: DAvenport 1-5252
See ad on page 655

Concord Control, Inc., 1282 Soldiers Field Rd., Boston 35, Mass., 15, Tel: ALgonquin 4-5100
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Continental Connector, Inc., Pa., 20, 15, 20, 25, 30
Continental Scale Engineering, Inc., Wis., 5
Cook Technological Center, Div. Cook Electric Co., Ill., 10, 15
Corona Engineering Service, N.Y., 10, 15, 20, 25, 30
Crane Engineering, N.M., 15
Curtiss-Wright Corp., Electronics Div., IMI Branch, N.M., 1
Cutler-Hammer, Inc., Wis., 20, 25, 30
Dalmo Victor Co., Div. of Textron Inc., Calif., 15, 20
Datronics Engineers, Inc., 25, Commonwealth Ave., Md.
Datrol Co., Pa., N.J., 15
Davidson Electronics Development Co., Pa., 15
Davis, George C., D.C., 25, 30
Decker Corporation, The, Pa., 15, 20
DeRyder Electronics, N.J., 1
Designers for Industry, Inc., Conn., 5, 15, 20, 25, 30
Dewd Research Corp., Conn., 15, 20
Deyrup & Co., G. C., N.Y., 15



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Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 15, 20, 30
Dicon Corporation, N.Y., 10, 15, 20
Djordjevic Engineering Co., Djeco Div., Ill., 5, 10, 15, 20, 25, 30
Dumey, Arnold I., N.Y., Data Processing
Dyna Magnetic Devices, Inc., N.Y., 5
Dynamic Controls Co., Mass., 10, 15
Dynamic Gear Co., Inc., N.Y., 20
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5, 10, 15, 20, 25, Tel: HAlifax 6-7491**
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E.M.I.-Cossor Electronics, Ltd., Canada, 15
Ehrenpreis, David, N.Y., 5, 10, 15, 20
Eichwald & Co., Inc., N.Y., 10, 15, 25, 30, Automation
Eidson Electronic Co., Tex., Frequency Measuring
Elcor, Inc., Va., 15
Electro-Pack, Inc., Calif., 20
Electro Radiation, Inc., Calif., 15
Electron Corporation, Tex., 30
Electronic Associates, Inc., N.J., 15
Electronic Cable Corp., Mass., 15, 20
Electronic Computer Co., Inc., Pa., 15
Electronic Controls, Inc., Conn., 10, 15
Electronic Enclosures, Inc., Calif., 15, 20
Electronic Specialty Co., Calif., 10, 15
Electronics Research, N.J., 10, 15, 20
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**See ads on pages 307, 309, 313, 315, 379, 584**
Entron, Inc., Md., 30
**Ercolino, M. D., Asbury Park, N.J., 10, 15, Tel: PRospect 5-7252**
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Exact Engineering & Mfg., Inc., Calif., 20
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Feedback Controls, Inc., Mass., 15, 20
Ferranti/Packard Electric, Ltd., Canada, 15
Ferritronics, Limited, Ontario, 15
Filtron Co., Inc., N.Y., 15
**Foto-Video Electronics, Inc., 36 Commerce Rd., Cedar Grove, N.J., 10, 15, 20, 25, 30, Tel: CEnter 9-6100**
**See ad on page 480**
Franklin Fibre-Lamitex Corp., N.Y., 20
**Franklin Systems, Inc., 2734 Hillsboro Rd., P.O. Box 3250, West Palm Beach, Fla., 15, Tel: TEmple 3-4602**
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Frederick Research Corp., Md., 10, 15
Fried, Walter, N.Y., 10, 15, 20
Friend, Albert W., Pa., 5, 10, 15, 20, 25, 30
Funfstuck, Horst, Calif., 15
**Gabriel Electronics Div., Gabriel Co., Millis, Mass., 15, Tel: FR 6-2953**
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General Applied Science Labs., Inc., N.Y., 5, 10, 15, 20, 25, 30
General Atronics Corp., Pa., 15
General Automatics, Inc., Calif., 10, 15, 20
General Electronic Control, Inc., Minn., 10, 15, 20, 25
General Kinetics, Inc., Va., Computational
Geotechnical Corporation, The, Tex., 10, 15, 20
Gilfillan Bros., Inc., 10, 15, 30
Glasseal Products Co., Inc., N.J., 15
Godley Co., Paul, N.J., 10, 15, 25, 30
Gordon Associates, Inc., N.J., 15
Gulton Industries, Inc., N.J., 5, 15, Electro-Mechanical
HRB-Singer, Inc., Pa., 10, 15
Hadfield, Bertram M., Mass., 5, 10, 15
Hallmark, Clyde E., Ind., 15, 25, 30
Hampshire Engineering Co., Mass., 15
Harman-Kardon, Inc., N.Y., 15
Harris Transducer Corp., The, Conn., 5
Henry & Miller Industries, Inc., N.J., 10, 20
Hoberman, Max, N.J., 10, 15, 20
Hoffman Electron Tube Corp., N.Y., 10, 15
Industrial Acoustics Co., Inc., N.Y., 5
Industrial Components, Inc., Ore., 10
**Industrial Electronic Engineers, Inc., 5528 Vineland Ave., North Hollywood, Calif., 15, 20, Tel: TRiangle 7-1144**
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Industrial Electronic Rubber Co., Ohio, 15
Industrial Tubes, Inc., Ill., 10, 15
Instrument Laboratories, Ill., 10, 15
Instruments of New England, Mass., 10, 15, 20
Intercontinental Electronics Corp., N.Y., 25, 30
Interference Testing & Research Lab., Inc., Mass., 15
International Electric Corp., Div. ITT, N.J., Communications Systems
International Telephone & Telegraph Corp., ITT Laboratories, Calif., 15, 20
Interstate Electronics Corp., Calif., 10, 15, 20, 30
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Itek Corp., Mass., 15
Jampro Antenna Co., Calif., 30
Jansky & Bailey, Inc., D.C., 15, 25, 30
**Jerrold Electronics Corp., Industrial Products Div., Dept. ITE-46, 15th & Lehigh, Philadelphia 32, Pa., 30, Tel: BAldwin 6-3456**
**See ad on pages 114-115**
**Kahn, Leonard R., 81 S. Bergen Pl., Freeport, L.I., N.Y., 5, 15, 20, 25, Tel: FReeport 9-8800**
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Kroker Engineering & Development Co., Ill., 10
Labko Scientific, Inc., Okla., 15
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 10, 15, 20, 25
Lear, Incorporated, Mich., 10, 15, 20
Lehigh Design Co., Inc., N.J., 5, 10, 15, 20, 25, 30
Lenkurt Electric Co., Inc., Calif., 15, 25
Lessells & Associates, Inc., Mass., 5, 10, 15, 20
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Lyons, Leonard J., Calif., 20
M P Engineering Co., Conn., 5, 15
Madigan Electronic Corp., N.Y., 15
Magnetic Circuit Elements, Inc., Calif., 10
Manhattan Physical Research Group, Inc., N.Y., 10, 15, 20
Marantz Co., N.Y., 5, 15
Marconi's Wireless Telegraph Co., Ltd., N.Y., 15, 25, 30
Marstan Electronics Corp., N.Y., 15, 20
Mast Development Co., Inc., Iowa, 10, 20
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Menlo Research Laboratory, Calif., 10, 15, 20, 25, 30
**Merrimac Research & Development, Inc., 517 Lyons Ave., Irvington 11, N.J., 15, Tel: ESsex 1-1616**
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Metal Fabricators Corp., Mass., 20
Meter-Makers, Inc., Ill., 10, 15, 25
Micromega Corp., Calif., 15
**Microwave Services, Inc., 1475 Broadway, New York 36, N.Y., 15, 25, 30, Tel: BRyant 9-8517**
**See ad on this page**
Milro Controls Co., Inc., N.J., 10, 15
Miltronics Co., Wis., 15
**Mittelmann, Eugene, 549 W. Washington Blvd., Chicago 6, Ill., 15, Tel: CEntral 6-2983**
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Morecroft Design Eng., J. H., Calif., 10, 15, 20, 25
Morris, Jr., Fred W., Calif., 10, 15, 25
National Company, Inc., Mass., 10, 15, 25
National Scientific Laboratories, Inc., D.C., 5, 10, 15, 20, 25
National Standard Electronics, Inc., N.Y., 15
National Ultrasonic Corp., N.J., 5, 15
Northern Electronic & Vacuum Industries, Canada, 15, 25
Northwest Industries, Ltd., Canada, 10, 15, 20
**Ostlund, Evert M., P.O. Box 458, Andover, N.J., 10, 15, 25, Tel: PArkway 9-6635**
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Packard Bell Electronics Corp., Calif., 30
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Page Communications Engineers, Inc., Subsid. Northrop Corp., D.C., 15, 20
Palmer Instruments, Calif., 15, 20
Pam Associates, Inc., Md., 5, 15, 20
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Pastoriza Associates, Inc., James, Mass., 15
Patterson, Inc., Wayne D., Calif., 15
Pegasus Laboratories, Inc., Mich., 10, 15, 20
Perry, Donald B., Me., 10
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., Computational, Tel: COmmonwealth 6-5375**
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Piezo Products Co., Mass., 10, 15, 25
Point Consulting Co., Pa., 5, 10, 15, 20, 25, 30
Precise Electronics & Development Corp., N.Y., 15, 25, 30
Precision Specialties, Inc., N.J., 20
Pressman Associates, Inc., Pa., Circuitry
Progressive Tool & Die Co., Mass., 20
Publication Engineering Consultants, N.Y., 10, 15, 20, 25
RCA Victor Co., Ltd., Canada, 15, 25, 30
Racal Engineering, Ltd., England, 25
Radio City Products Co., Inc., Pa., 15
Radio Corp. of America, N.J., 30
Radio Corp. of America, Defense Electronic Products, N.J., 5, 10, 15, 25, 30
Radionics, Inc., 76 Cambridge St., Burlington, Mass., 15, 25, Tel: BRowning 2-1233
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Ramage & Miller, Inc., Calif., 15
Rank Cintel, Ltd., England, 15, 30
Reeves Soundcraft Corp., Conn., 10, 15
Republic Electronic Industries Corp., N.Y., 10, 15
Research, Inc., Minn., 10, 15, 20
Research Industrial Laboratory of Electronics, Pa., 15
Rimak, Inc., Calif., 15, 20
Robinette Co., W. C., Calif., 10, 15, 20
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Rodney Associates, Inc., N.Y., 15, 20
Rollet-Mike, Inc., N.Y., 10, 15, 20
Rosemount Engineering Co., Minn., 10, 15, 20
Rosenberg Associates, Paul, N.Y., 5, 10, 15, 20, 25, 30
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Ross & Associates, Donald, Mo., 10, 15, 20, 25, 30
Rototest Laboratories, Inc., Calif., 5, 10, 15
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Sanial Laboratories, N.Y., 5
Saville Ra Tele Nics Labs., Ky., 25, 30
Schmit Engineering Co., Calif., 20
Seg Electronics Co., Inc., N.Y., 15, 30
Seiscor, Div. Seismograph Service Corp., Okla., 15
Sel-Rex Corp., N.J., 10, 15
**Semicon, Inc., Sweetwater Ave., P.O. Box 328, Bedford, Mass., 15, Tel: CRestview 4-8542**
**See ad on page 507**
Servodyne Corp., Mass., Automation
Shepard Laboratories, Inc., N.J., 10, 15, 20
Shores Laboratories, N.Y., 15
Sigma Electronics Research Corp., Wash., 15
Sinclair Radio Labs., Inc., N.Y., 25
**Sloan, Gardner H., 1 Story St., Cambridge 38, Mass., 10, 15, Tel: ELiot 4-0766**
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Smith Electronics, Inc., Ohio, 10, 15, 20, 25, 30
Solatron, Inc., Mass., 15
**Solid State Electronics Co., Dept. I, 15321 Rayen St., Sepulveda, Calif., 15, Tel: EMpire 4-2271**
**See ad on page 420**
Southwest Products, Inc., Tex., 10, 15, 20
Specialty Electronics Development Corp., N.Y., 10, 15, 20
Sperry Products Co., Div. Howe Sound Co., Calif., 10, 20
**Spittal, William R., 90 Magnolia Ave., Westbury, L.I., N.Y., 15, Tel: BAldwin 3-8885**
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Stereatronics, Inc., Mass., 5, 10, 15, 25, 30
Surface Conduction, Inc., N.Y., 15, 25, 30
Systems Labs. Corp., Calif., 15
TMC (Canada), Ltd., Canada, 15, 25
TRG, Incorporated, N.Y., 15
Technical Information Corp., N.Y., 15
Telechrome Mfg. Corp., N.Y., 10, 15, 20, 25, 30
Telecomputing Corp., Calif., 15
Telecomtrol Corp., N.J., 15, 25
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 15, Tel: YE 2-8600**
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Telesis Co., The, N.J., 15, 25, 30
**Teltronics, Inc., 277 Main St., Nashau, N.H., 15, Tel: TUxedo 2-6264**
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Thompson & Co., John I., D.C., 10, 15, 20
Thompson Ramo Wooldridge Inc., Dage Television Div., Ind., 30
Transistor Applications, Inc., Mass., 15
**Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 15, Teletype, Tel: LOwell 7-3810**
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Trott Electronics, Inc., N.Y., 15
Trought Associates, Inc., N.J., 15, 20
Ultraudio Products, Div. Oberline, Inc., Calif., 5
Union Electric Products Co., N.J., 10
United Shoe Machinery Corp., Mass., 10, 15, 20
U. S. Controls, Inc., N.Y., 10
U. S. Science Corp., Calif., 10, 15, 20, 25
United States Testing Co., Inc., N.J., 5, 10, 15, 20, 25
Universal Circuit Controls, Ill., 15, 20
University Loudspeakers, Inc., N.Y., 5
Vicon Corp., Calif., 30
Videon Electronics Corp., Ind., 15
Virginia Electronics Co., Inc., D.C., 15, 25
**Wallson Associates, Inc., 912-914 Westfield Ave., Elizabeth, N.J., 15, Tel: FLanders 1-0700**
**See ad on page 294**
Waltham Electronics Corp., Mass., 15
Westlab, Inc., N.Y., 5
**Westman, Jr., Harold P., 45 Bond St., Westbury, L.I., N.Y., 5, 25, Tel: EDgewood 3-3090**
**See ad on this page**


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HAROLD P. WESTMAN, JR., & staff
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Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 15, 25, Tel: JUdson 2-3030
**See ad on page 704**
Westronics of California, Calif., 15
**Wheeler, Harold A., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 15, 25, 30, Tel: HUnter 2-7876**
**See ad on this page**


HAROLD A. WHEELER
Laboratories and Engineering Staff
Consultation—Research—Development
Radar and Communication Antennas
Microwave Assemblies and Components
Main office: Great Neck, N. Y. HUnter 2-7876
Antenna Laboratory: Smithtown, N. Y.
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**Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 15, 25, 30, Tel: HUnter 2-7876**
**See ad on page 664**
Wickes Engineering & Construction Co., N.J., 15
Wintronics, Calif., 5, 15
Yorinks, Alexander, N.Y., 15
York Research Corp., Conn., 5, 10, 15, 20, 25, 30
Yu, Y. P., N.J., 15

**Copper:** See class 97

**Cord & tape, lacing:** See class 91

**Cord sets:** See class 85

**Cores:** See class 48

**Counters:** See class 10

**Counting equipment, production control:** See class 4

**Couplings, mechanical:** See class 91

**Couplings, waveguide:** See class 83

**Crystal furnaces:** See class 96

**Crystals:** See class 49

**Custom builders:** See class 94

**Data sheet preparation:** See class 100

**Dealers, surplus:** See class 105

**Dehydrators:** See class 96

**Delay lines:** See class 50





# Directory III. Materials & Services

**Demagnetizers:** See classes 65 & 96

**Demineralizers:** See class 96

**Development laboratories:** See class 94

**Dials & dial assemblies:** See class 91

**Disks, recording:** See class 65

**Distribution:** See class 105

**Dollies, television camera:** See class 34

**Drills, ultrasonic:** See class 96

**Dynamotors:** See class 60

**Electro-plating:** See class 89

**Encapsulation:** See class 89

**Enclosures & cabinets:** See class 84

**Enclosures, shielded:** See class 14

**Engraving machines:** See class 96

**Engraving services:** See class 89

**Envelopes, tube:** See class 104

**Environmental test chambers:** See class 14

**Erection service, towers & antennas:** See class 39

**Exporters:** See class 105

**Extrusions, plastic:** See class 99

**Fabrication, ceramic:** See class 86

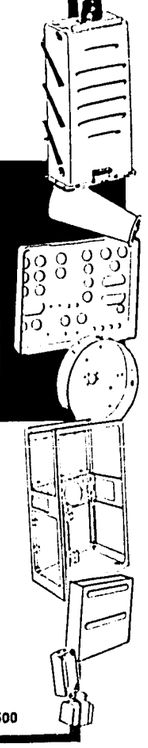
## 89. Fabricators & Services.

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35. Hermetic sealing service
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50. Packaging
55. Plastic fabricators
60. Plastic molders

ACF Electronics Div., ACF Industries, Inc., Md., 5
APC Communication Products, Tex., 5
**A.P.M. Corp., 252 Hawthorne Ave., Yonkers 5, N.Y., 35, Tel: YOnkers 8-2010**
**See ads on pages 451, 638**
A R & T Electronics, Inc., Ark., 10
A-1 Precision Products, Calif., 60
Abalon Precision Mfg. Corp., N.Y., 5, 45
Abbott & Company, Ohio, 5

## 89. Fabricators & Services.

Accessory Controls & Equip. Corp., Calif., 5
Accurate Electronics Corp., Ohio, 5, 30, 45, 55, 60
Accurate Specialties Co., Inc., N.Y., 45
Ace Electronics, Ill., 55
Ace Plastic Co., N.Y., 55, 60
Acme Electric Corporation, Inc., N.Y., 25
Acme Mfg. & Gasket Co., Pa., 45
Acme Wire Company, Ill., Conn., 15, 25, 55
Advanced Co., Ill., N.J., 20, 45
Advance Performance Corp., N.J., 5
Advanced Electronics, Inc., Conn., 5, 15
Ainslie Corp., 531 Pond St., South Braintree 85, Mass., 5, Tel: Victor 8-0850
**See ad on page 368**
Air Shields, Inc., Pa., 55
Aircraft Electronics, Ariz., 5
Airflyte Electronics Co., 537 Avenue A, Bayonne, N.J., 15, 60, Tel: HEmlock 9-2230
**See ad on page 408**
Airo, Inc., N.J., 5, 45
Allen Electric & Equip. Co., Mich., 5, 25, 45, 50, 60
Allied Allegri Co., Inc., N.J., 5
Allied Research & Engineering Div., Allied Record Mfg. Co., Calif., 5
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Alloys Unlimited, Inc., N.Y., 45
Alpha Metals, Inc., N.J., 45
Altec Service Co., Div. Altec Companies, Inc., N.Y., 5
Amatom Electronic Hardware Co., Inc., N.Y., 10, 25, 45
**Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill., 5, 45, Tel: UNderhill 7-8500**
**See ad on page 623**
**American Aluminum Co., 230 Sheffield St.—ID, Mountainside, N.J., 5, 45, Tel: ADams 3-3500**
**See ad on page 631**
American Brass Co., The, Fabricated Metal Goods Div., N.Y., 45
American Development Electronics Co., N.J., 5
American Gas Furnace Co., N.J., 30
American Hydromath Corp., N.Y., 5, 20
American Insulator Corp., Pa., 60
**American Molded Products Co., 2723 W. Chicago Ave., Chicago 22, Ill., 60, Tel: ARmitage 6-3235**
**See ad on page 639**
American Quartz Laboratories, Inc., N.Y., 25, 55
American Research & Mfg. Corp., Md., 5, 55, 60
Anchor Specialty Mfg. Co., N.J., 5, 20, 55
Ansco Division, General Aniline & Film Corp., N.Y., 5, 10, 45
**Antenna Systems, Inc., Hingham Industrial Center, Hingham, Mass., 5, Tel: RIverview 9-4700**
**See ad on page 369**
Anthony & Co., J. L., R.I., 45
Apex Coated Fabrics Co., Inc., N.Y., 50, 55
Applied Electro Mechanics, Inc., Va., 5
Applied Electronics Co., Subsid. Raytheon Co., Calif., 5
Arde Assoc., Engrg. Div., N.J., 5, 30, 45
Arlin Mfg. Co., Mass., 50, 55, 60
Armour Alliance Industries, Ohio, 50
Arrow Machinists & Fabricators, N.Y., 5, 45
**Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 5, 45, Tel: HUmboldt 4-2100**
**See ad on page 703**
Artronic Instrument Co., The, Md., 5, 15
Associated Engineering Corp., Mass., 60
Associated Engineering & Mfg. Corp., N.J., 45
Associated Spring Corp., Conn., 5, 30, 45
Associated Spring Corp., B-G-R Div., Mich., 5, 10, 30, 45, 50
Atkins & Merrill, Inc., Mass., 55, 60
Atlas Precision Products Co., Pa., 5
Atohm Electronics, Calif., 15
Attleboro Refining Co., Inc., Mass., Electrolytic Refining
Auburn Mfg. Co., Conn., 55
Auburn Plastics, Inc., N.Y., 60
Austenal Co., Div. Howe Sound Co., Microcast Products, N.Y., Investment Castings
Austin Electronics, N.Y., 5
Automatic Production Research, N.Y., 50
Automation Engrg. Lab., Inc., Conn., 5, 50
Autotron, Inc., Calif., 5, 15
**Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., 25, Tel: OLiver 8-8911**
**See ad on page 278**
Avionics Corp. of America, Pa., 5, 20
Avionics Ltd., Canada, 5, 10, 15
Avon Tube Div., Higbie Mfg. Co., Mich., 45
BJ Electronics, Borg-Warner Controls, Calif., 5
Bacon Industries, Inc., Mass., 5, 15, Rubber Molders
Baer Co., N. S., N.J., 55
Barker & Williamson, Inc., Pa., 5, 15, 25, 35, 55
Barnes Development Co., Pa., 5
Barry-Wright Corp., Mass., 5
Bellandi Co., Inc., M., Ill., 5, 10, 25, 40, 50, 55
Belz Industries, Inc., N.Y., 5
Bendix Corp., The, Montrose Div., Pa., 5, 15
Benson-Lehner Corp., Calif., 5
Bernco Engineering Corp., Ind., 5, 15, 30
Biggs Co., Inc., Carl H., Calif., 15, 35, 55, 60
**Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 5, Tel: WOrth 6-5611**
**See ad on page 607**
Blaw-Knox Co., Blaw-Knox Equipment Div., Pa., 5
Blinn Co., Inc., The Delbert, Calif., 60
**Bodnar Products Corp., 238Y Huguenot St., New Rochelle, N.Y., 5, 40, 55, 60, Tel: NEw Rochelle 6-4664**
**See ads on pages 598, 632**
Bonny Mfg. Corp., The, Mass., 55, 60
Boonton Molding Co., N.J., 15, 60
**Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 45, Tel: HAwthorne 7-1773**
**See ads on pages 449, 537, 547**
Bright Star Industries, N.J., 45, 60
Bristol Motors, Div. Vocaline Co. of America, Conn., 5
Brooks & Perkins, Inc., Mich., 5, 10, 45
Buck Engineering Co., N.J., 5
Buckbee Mears Co., Minn., 10, 20
**Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 5, 45, Tel: HEnderson 1-7166**
**See ad on page 625**
Bunnell & Co., J. H., N.Y., 5
**CFI Corporation, Dept. IRE, Cottage Pl., Mineola, L.I., N.Y., 35, Tel: Pioneer 6-0571**
**See ad on page 619**
CGS Laboratories, Inc., Conn., 5
C & K Components, Inc., Mass., 15
Cable Specialists of Conn., Conn., 5
Cadre Industries Corp., N.Y., 5





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California Computer Products, Inc., Calif., 5
Canadian Aviation Electronics, Ltd., Canada, 5
Canadian Radium & Uranium Corp., N.Y., 20, 40
Carroll Pressed Metal, Inc., Mass., 5, 45
Catalyst Research Corp., Md., Vacuum Metallizing
Central Dynamics, Ltd., Canada, 5, 20, 50
Centronix, Inc., Fla., 5
**Century Plating Co., 229 Ferris Ave., White Plains, N.Y., 10, Tel: WHite Plains 8-3777**
**See ad on page 632**
Chicago Electronic Div., Land-Air, Inc., Ill., 10
Chicago Thrift-Etching Corp., Ill., 10
Churchill Lighting Corp., Mass., 5
**Clegg Laboratories, N.J. Route 53, Mount Tabor, N.J., 5, Tel: OAkwood 7-6800**
**See ad on page 308**
Cleveland Fabricating Co., The, Ohio, 5, 50
Cleveland Metal Specialties Co., Ohio, 5, 15, 20, 50
Cobehn, Inc., N.J., 5
**Cohan Epner Co., Inc., 142 W. 14th St., New York 11, N.Y., 10, Tel: CHelsea 3-3411**
**See ad on this page**
Coils-Electronics Co., Pa., 50
**Collectron Corp., 304 E. 45th St., New York 17, N.Y., 55, 60, Tel: MUrray Hill 9-7120**
**See ad on page 547**
Columbus Electric Mfg. Co., Ohio, 5, 45
Comco Plastics, Inc., N.Y., 5, 55
Communications Engineering Co., Mich., 5
**Components for Research, Inc., 979 Commercial St., Palo Alto 2, Calif., 15, Tel: DAvenport 1-5252**
**See ad on page 688**
Conductorlab, Inc., Mass., 55
Conn-Craft Co., Conn., 20, 40, 55
Connecticut Instrument Corp., Conn., 20, Ultrasonic Services
Continental-Diamond Fibre Corp., Del., 20, 55, 60
Continental Precision Products, N.Y., 5, 45
Control Instrument Co., Inc., Subsid. Burroughs Corp., N.Y., 5
Controlled Atmosphere Enclosures Mfg. Co., Inc., Fla., 5, 55
Cook Electric Co., Ill., 5, 10, 25
Cook Technological Center, Div. Cook Electric Co., Ill., Instrument Calibration
Cortland Industries, Inc., Ill., 20, 55
Cosmo Plastics Co., Ohio, 60
Craig Systems, Inc., Mass., 5
Crane Packing Co., Ill., 60
Croname, Inc., Ill., 5, 10, 45
Crown Engineering, N. M., 5, 50
D.K.E. Electronic Bases, Inc., N.J., 45
Daco Instrument Co., N.Y., 5
Dale Products, Inc., Nebr., 5, 15
Dalmo Victor Co., Div. of Textron, Inc., Calif., 5
Darrill Products Corp., Mass., 55, 60
Daven Co., The, N.J., 15, 35, 50
Daystrom, Inc., Military Electronics Div., Pa., 5
Dayton Aircraft Products, Inc., Fla., 55
Defiance Machine & Tool Co., Mo., 30, 40
**Defiance Printed Circuit Corp., 81 Albion St., Wakefield, Mass., 10, 40, 55, Dip Soldering, Tel: CRystal 6-5311**
**See ad on page 497**
Dietz Co., Inc., N.J., 5
**Dependable Printed Circuit Corp., 827 Black Oak Ridge Rd., Wayne, N.J., 10, 55, Tel: TEmple 5-2765**
**See ad on page 499**
Designers for Industry, Inc., Ohio, 5
Deutsch Co., The, Electronic Components Div., Calif., 35
Devco Engineering, Inc., N.J., 20
Diamond Antenna & Microwave Corp., Mass., 5, 20, 55
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 5
Diebel Die & Manufacturing Co., Ill., 5, 45
Dielectric Products Engineering Co., Inc., Me., 5
**Dimco-Gray Co., 212 E. 6th St., Dayton 2, Ohio, 60, Tel: BAldwin 2-6703**
**See ad on page 641**
Division Lead Co., Ill., 4
Dixon Corp., R.I., 55, 60
Dolin Metal Products, N.Y., 5, 45
Donnelly Mfg. Co., Mass., 5
**Dresser-Ideco Co., Div. Dresser Industries, Inc., 875 Michigan Ave., Columbus 15, Ohio, 5, Tel: AX 9-2123**
**See ad on page 370**
Duke Engraving & Machine Corp., Mass., 20
Dura Plastics of New York, Inc., N.Y., 20, 55, 60
Duralith Corp., 20, 40, 55
Duro Specialty Co., Inc., Mass., 5
Dwyer Engineering Co., Inc., N.H., 15
E-Kay Mfg. Co., Inc., N.J., 45
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5, 10, 15, 20, 25, 30, 40, 45, 50, Tel: HAlifax 9-7491**
**See ad on page 499**
Eagle Metalcraft, Inc., N.Y., 5
Eagle Signal Co., Ill., 5, 35
Eastern Federal Nameplate Corp., N.J., 20, 40
Eastern Tool & Mfg. Co., N.J., 45
Elec-Tro-Matic, Hazel Pk., Pa., 60
Electronic Assembly Co., Inc., Ohio, 60
Electro Fire Equipment Co., Ill., 5
Electrical Industries, Div. Philips Electronics & Pharmaceutical Industries Corp., 691 Central Ave, Murray Hill, N.J., 35, Tel: CRestview 7-4300
**See ad on page 180**
Electrical Service Co., Calif., 15
Electro-Chemical Engraving Co., Inc., N.Y., 5, 40, 45
Electro-Pack, Inc., Calif., 5
Electro-Physics Co., N.Y., 5, 15
Electro-Seal Corp., Ill., 5, 15, 35, 40, 50
Electromath Corp., N.Y., 5
Electronet Div., Rue Prods., Calif., 5, 15
Electronic Cable Corp., Mass., 5, 15, 50
Electronic Enclosures, Inc., Calif., 5, 50
Electronic Mechanics, Inc., N.J., 5, 20, 55
Electronic Parts Mfg. Co., Inc., N.J., 5, 45
Electronic Plastics Co., Calif., 5, 15
Electronic Plastics Corp., Mass., 5, 25, 40, 55
Electronic Production & Development, Inc., Calif., 60
Electronic Prototypes, Inc., Mass., 5
Electronic Transistors Corp., N.J., 5, 35, 40
Elpac, Inc., Calif., 5


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Elzee Metal Prods. Co., Inc., N.Y., 5, 20, 45
Emeloid Co., Inc., The, N.J., 55, 60
Empire Electronics Co., Inc., N.J., 5
**Endicott Coil Co., Inc., 24 Charlotte St., Binghamton, N.Y., 5, Tel: SWarthmore 7-1263**
**See ad on page 401**
Enflo Corporation, N.J., 55, 60
Engineering Associates, Ohio, 5
Ensco, Inc., Utah, 5
Epoxy Products, Div. Joseph Waldman & Sons, N.J., 15, 50, 60
Equipto Electronics Corp., Ill., 5, 45
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5, 60, Tel: GLendale 6-8592**
**See ad on pages 40-41**
Erwood, Inc., Ill., 5, 45, 55
Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5, 10, 15, 35
Essex Electronics, Div., Nytronics, Inc., N.J., 5, 15
Ethylene Corp., N.J., 55, 60
Eugene Engineering Co., Inc., Mass., 5, 20, 45, 50, 55
Everard Tap & Die Corp., N.Y., 5, 30, 45
Excellex Electronics, Inc., N.Y., 45, 55
Fairchild Engine & Airplane Corp., Fairchild Astrionics Div., N.Y., 5
**Falstrom Company, 74A Falstrom Ct., Passaic, N.J., 5, Tel: PRescott 7-0013**
**See ad on this page**
Farrall Instrument Co., Neb., 20
**Farwell Metal Fabricating, 73 W. Fairfield Ave., St. Paul 7, Minn., 5, 45, 50, Tel: CApital 4-5318**
**See ad on page 601**


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Farwest Mfg. Div., Inc., Wash., 5, 20, 40, 55
Fastex Div., Illinois Tool Works, Ill., 45, 60
Federal Machine Co., Inc., N.J., 5
Federal Manufacturing & Engineering Corp., N.Y., 5, 10, 15, 25, 40, 45
Federal Tool & Mfg. Co., Minn., 45
Feiner & Sons, Inc., N.Y., 45
Fidelity Amplifier Co., Ill., 5, 20
Fischer & Porter Co., Pa., 55, 60
Fisher Berkeley Corp., Calif., 5
Fisher & Crome, Pa., 5, 20, 25, 40, 55
Fisher Engineering, Inc., Ind., 15
Fluoro Plastics, Inc., Pa., 55, 60
**Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 5, 15, 45, 55, Tel: YEllowstone 4-2691**
**See ads on pages 341, 399, 403, 437, 563, 569**
Form-It Products, Inc., Ill., 55, 60
Franklin Fibre-Lamitex Corp., N.Y., 15, 20, 25, 40, 55, 60
**Franklin Systems, Inc., 2734 Hillsboro Rd., P.O. Box 3250, West Palm Beach, Fla., 5, Tel: TEmple 3-4602**
**See ad on page 320**
Gables Engineering, Inc., Fla., 5
**Gabriel Electronics Div., Gabriel Co., Millis, Mass., 15, Tel: FR 6-2953**
**See ad on page 372**
Galaxy Engineering Corp., Calif., 35
Garde Mfg. Co., R.I., 60
Garlock Electronic Products, Garlock, Inc., N.J., 55, 60
General Applied Science Labs., Inc., N.Y., 5
General Automatics, Inc., Calif., 5, 50
General Circuits, Inc., N.Y., 10, 20, 55
**General Communication Co., 677 Beacon St., Boston 15, Mass., Die Casters, Tel: COpley 7-6030**
**See ad on page 331**
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 15, 50, Tel: GRanite 6-4411**
**See ads on pages 263, 267, 435, 437, 501, 621**
General Electric Co., Lamp Metals & Components Dept., Ohio, 45
General Electronic Laboratories, Inc., Mass., 10
General Findings & Supply Co., Industrial Div., Mass., 5, 10, 45
**General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 5, 35, Tel: VAlley Stream 5-6363**
**See ad on page 284**
General Metal Products Co., Pa., 5
General Metals, Inc., N.C., 5, 10, 45
Gibbs Mfg. & Research Corp., Wis., 5, 40
Gilfillan Bros., Inc., Calif., 15, 25, 40, 50
Gillies Co., Inc., Duncan M., Mass., 40
Glasseal Products Co., Inc., N.J., 35
Globe Electrical Mfg. Co., Calif., 20, 25, 55, 60
Godfrey Mfg. Co., Ill., 5
Golding Manufacturing Co., N.J., 5
Goldsman Co., Al, Pa., 5, 50
Good Electronic Corp., Fla., 5, 15, 25, 50
Goodrich Co., The, B. F., Conn., 50
Goodrich Industrial Products Co., B. F., Ohio, 60
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 45
**Great Eastern Metal Products Co., Div. of GEMP Manufacturing Corp., 22 Woodworth Ave., Yonkers 2, N.Y., 5, Tel: GReenleaf 6-7300**
**See ad on page 643**
Green Rectifier Co., N.J., 15, 45
**Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 60, Die Casters, Tel: NEw Rochelle 3-8600**
**See ad on page 643**
HPL Manufacturing Co., Ohio, 45
Hall-Barkan Instruments, Inc., N.Y., 5, 20
Hallett Mfg. Co., Calif., 5, 15
Halliburton, Inc., Mfg. Div., Calif., 10, 45
Hamner Electronics Co., Inc., N.J., 5
Harman-Kardon, Inc., N.Y., 15, 50
Harper-Leader, Inc., Conn., 10
Haveg Industries, Inc., Del., 55, 60
**Hawley Products Co., 333 N. Sixth St. St. Charles, Ill., 60, Tel: JUno 4-3130**
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Hayes, Inc., C. I., R.I., 30
Helco Products Co., Inc., N.Y., 20
Heldor Mfg. Co., Inc., 5, 35, 45
Henry & Miller Industries, Inc., N.J., 5, 10, 45
Hermes Plastics, Inc., N.Y., 20, 40, 55
Highland Design, Inc., N.Y., 5, 15
Hildebrand Co., John G., Mass., 15
Hinde & Dauch Div., West Virginia Pulp & Paper, Ohio, 50
Holden-Massey Corp., N.Y., 5
Hoover Electronics Co., Md., 5
Howard Precision, Inc., N.J., 45
**Hudson Tool & Die Co., Inc., 18-38 Malvern St., Newark 5, N.J., 45, Tel: MArket 4-1802**
**See ad on page 102**
Hughes-Treitler Mfg. Corp., N.Y., 45
**Hull Corporation, Davisville Rd., Hatboro, Pa., 15, 35, 55, Tel: OSborne 5-5000**
**See ad on page 673**
Hysol Corp., N.Y., 15, 60
IE Manufacturing, Ill., 5, 45, 50
Industrial Components, Inc., Ore., 5
Industrial Devices, Inc., N.J., 60
Industrial Engravers, Inc., N.Y., 20, 40
Industrial Plastic Fabricators, Inc., Mass., 55, 60
Insulating Fabricators of New England, Inc., Mass., 5, 30, 55, 60
Insulation Manufacturers Corp., Ill., 55
Insulation Products Co., Pa., 60
**International Eastern Co., 801 6th Ave., New York 1, N.Y., 20, 40, Tel: ALgonquin 5-5222**
**See ad on page 675**
International Electric Industries, Inc., N.Y., 5
International Wire Prod. Corp., N.J., 10
Interstate Electronics Corp., Calif., 5, 20, 45, 50
Investment Casting Co., N.J., 5 Investment Casting
Isochem Resins Co., R.I., 60
Isotopes Specialties Co., Div. Nuclear Corp. of America, Calif., 50 Radioactive
Itek Corp., Mass., 5
Jacksonville Metal & Plastics Co., Fla., 5, 20, 50, 55, 60





# Directory III. Materials & Services

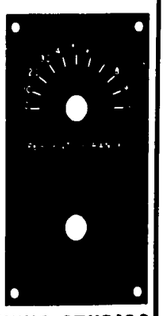
## 89. Fabricators & Services.

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Johnson & Hoffman Mfg. Corp., N.Y., 5, 45
K-W Engineering Works, Wis., 5
**Kahle Engineering Co., 3319 Hudson Ave., Union City, N.J., 15, Tel: UNion 7-6500**
**See ad on page 672**
Kearfott Div., General Precision, Inc., Microwave Products, Calif., Brazing
Kendick Mfg. Co., Ind., Coil Winding
Kent Lighting Corp., N.Y., 5, 45
Kerrco, Neb., 20, 55, 60
Keystone Electronics Corp., N.Y., 5, 55
Kidde & Co., Inc., Walter, N.J., 5
Kilo Engineering Co., Calif., 20
Kingsley Machine Co., Calif., 40
Kling Metal Spinning & Stamping Co., N.Y., 45
Koch & Sons, H., Calif., 55, 60
Kollmorgen Optical Corp., Mass., 15, 25, 35
Korry Mfg. Co., Wash., 60
Kurz-Kasch, Inc., Ohio, 60
**Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 5, 55, 60, Tel: GRaceland 7-7900**
**See ad on page 454**
Lacey Engineering & Mfg. Co., Ill., 20
Laminated Sheet Products Corp., Mass., 20, 25, 40, 55
Laminated Shim Company, Inc., Conn., 45
Land-Air, Inc., Subsid. California Eastern Aviation, Inc., Ill., 10
Landsberger Plastics Co., N.Y., 20, 50, 55, 60
Landsverk Electrometer Co., Calif., 5, 15, 35, 45, 60
Lansky Die Cutting Corp., N.Y., 5, 45, 50
La Pointe Industries, Inc., Conn., 5, 10, 15, 25, 45, 50
Lavelle Aircraft Corp., Pa., 5
Lawrence Adhesive & Chemical Co., Mass., 5, 15, 55, 60
Lee Spring Co., Div. Leetronics, Inc., N.Y., 45
Lelanite Corp., Mass., 50
Lenkurt Electric Co., Inc., Calif., 5
Lindberg Engineering Co., Ill., 30
Link Division, General Precision, Inc., N.Y., 5, 10
Litton Industries, U. S. Engineering Co. Div., Calif., 5, 10, 45, 55, 60
Lockheed Aircraft Corp., Electronics, Avionics, & Industrial Products Divs., Calif., 5, 15
Luzerne Rubber Co., N.J., 55, 60
M & G Metal Products Co., Ill., Brazing
**MM Enclosures, Inc., 111 Bloomingdale Rd., Hicksville, L.I., N.Y., 5, 45, Tel: WEIls 1-1770**
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MacLeod & Hanopol, Inc., Mass., 5, 15
Mandex Manufacturing Co., Inc., Ill., 5, 45, 55
Mandrel Industries, Inc., Calif., 5
Marantz Co., N.Y., 5
Marine View Electronics, Inc., N.Y., 5, 40
Marstan Electronics Corp., N.Y., 5, 15, 50
Masonware Co., R.I., 5, 45
Mast Development Co., Inc., Iowa, 5
**Master Engraving Studios, 135 Liberty St., New York 6, N.Y., 20, 40, Tel: WOrth 2-4230**
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Matthews & Co., Jas. H., Pa., 20, 40
McKiernan-Terry Corp., N.J., 5
Mechanical Engraving Co., Inc., N.Y., 20, 40
Melpar, Inc., Special Products Dept., Va., 15
Mergenthaler Linotype Co., N.Y., 5
Meridian Metalcraft, Inc., Calif., 5
Merit Plating Co., Inc., N.Y., 10
Metal Fabricators Corp., Mass., 5
Metal Findings Corp., N.Y., 5, 45
Metal Processing Co., Inc., N.J., 10
Metalcraft, Inc., N.Y., 5
Metronics, Inc., N.J., 45
Mica Fabricating Co., N.J., 55
Micarta Fabricators, Inc., Ill., 20, 55
Micromech Mfg. Co., Div. Sanford Mfg. Corp., N.J., 5
Microtech, Inc., Conn., 5
Miller Co., L. C., Calif., 5, 30
Miller Dial & Name Plate Co., Calif., 5, 15, 20, 25, 30, 40, 45, 55
Miltronics Co., Wis., 5
Minneapolis-Honeywell, Military Products Group, Minn., 15, 25, 45
Mitchell Electronics Corp., N.Y., 5
Mobil Electronics, Inc., Div. Radionic Labs., Inc., Ind., 5
Modelectric Products, Corp., N.J., 5
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 5, 50
Mossman, Inc., Donald P., N.Y., 5
Motorola, Inc., Military Electronics Div., Ariz., 5
Motson Co., J. Frank, Pa., 40
Mykroy, Inc., Ill., 5, 55, 60
Mytron, Inc., Mass., 5
National Company, Inc., Mass., 5
National Multi-Products Co., Ill., 5, 25, 40, 50
**National Tel-Tronics Corp., 53 St. Casimir Ave., Yonkers, N.Y., 55, Tel: YOnkers 8-6400**
**See ad on page 559**
National Vulcanized Fibre Co., Del., 55
Nevada Air Products Co., Nev., 5, 10
New England Etching Co., Inc., Mass., 20
New England Laminates Co., Inc., Conn., 55, 60
**New Hermes Engraving Machine Corp., 154 W. 14th St., New York 11, N.Y., 20, 40, 55, Tel: WAtkins 4-7373**
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New York Coil Co., Pa., 15, 45
Newcomb Spring Corp., N.Y., 45
Nichols Ltd., R. H., Canada, 5, 20
**Noesting Pin Ticket Co., Inc., 732 E. 136th St., New York 54, N.Y., 45, Tel: MO 9-6465**
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Norwich Plastics Corp., N.Y., 5, 15, 55, 60
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Northern Plastics Corp., Wis., 55
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Northwest Plastics, Inc., Minn.
Nylomite Products, Mass., 55
PBR Manufacturing Co., Pa., 5
Pacific Automotive Products, Inc., Calif., 5, 50
Packard Bell Electronics Corp., Calif., 55
Palmer Instruments, Calif., 5, 25
Pam Associates, Inc., Md., 5, 50
**Panob Corp., 40 Beech St., Port Chester, N.Y., 20, 45, 55, Tel: WEstmore 9-3066**
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Paramount Products Co., Inc., N.Y., 45
Pamphlegraf Mfg. Co., Inc., Ill., 5
**Parker Seal Co., 10567 Jefferson Blvd., Culver City, Calif., 35, Tel: VErmont 9-1161**
**See ad on page 650**
Patent Button Co. of Tennessee, Inc., The, Tenn., 60
Pearce-Simpson, Inc., Fla., 55, 60
Peck Spring Co., The, Conn., 45


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Penn Fibre & Specialty, Co., Inc., Pa., 45, 55
Pennsylvania Fluorocarbon Co., Inc., Pa., 15
Pennsylvania Tool & Mfg. Co., The, Pa., 5, 30
**Permag Corp., 88-06 Van Wyck Expressway, Jamaica 18, N.Y., 5, Tel: OLympia 7-1818**
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Permonite Mfg. Co., Ill., 5, 25, 55
Peter Partition Corp., N.Y., 50
**Photo Chemical Products, 999 Stewart Ave., Garden City, L.I., N.Y., 20, 40, 55, Tel: PIoneer 1-6500**
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Pix Manufacturing Co., N.J., 45
Plasteck, Inc., Okla., 20, 40, 55, 60
Plug-In Instruments, Inc., Tenn., 5, 50
Poinsettia Co., Inc., N.J., 5 Electro-Forming
Poly-Kote, Inc., Mass., 10
Poly-Scientific Corp., Va., 10 Miniature
Polymer Corp. of Pa., The, Pa., 55, 60
Precision Electroplating Co., Ill., 10
Precision, Inc., Minn., 5, 15
Precision Metal Products Co. of Malden, Inc., Mass., 5, 20, 25, 40, 55
**Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 5, 55, Tel: ARmitage 6-5200**
**See ad on page 649**
Precision Specialties, Inc., N.J., 5
Printloid, Inc., N.Y., 55
Production Engineering Corp., N.J., 15, 25


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Progressive Tool & Die Co., Mass., 60
**Pyrocircuits Div., Microtron, Inc., 6 Manhasset Ave., Port Washington, L.I., N.Y., 20, Tel: POrt Washington 7-3949**
**See ad on page 502**
Pyromet Co., Calif., Brazing
Quartzite Processing, Inc., Mass., 5
REF Manufacturing Corp., N.Y., 5, 55, 60
**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 5, Tel: DAvenport 1-1130**
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**Radionics, Inc., 76 Cambridge St., Burlington, Mass., 5, 20, Tel: BRowning 2-1233**
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Ray, Daisley Company, Inc., N.Y., 5
Raybestos-Manhattan, Inc., Pa., 55, 60
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Red Point Corp., Calif., 15
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Riester & Thesmacher Co., The, Ohio, 5
Rimak, Inc., Calif., 5, 40, 45
Riverside Plastics Corp., N.Y., 55
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5, 15, 25, 50, Tel: LOckwood 5-4578**
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Robertson Electric Co., Inc., N.Y., 15, 35
Robins Industries Corp., N.Y., 5, 50, 60
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S & B Machine & Tool Co., Inc., N.J., 5, 45, 55
Sargeant & Wilbur Heat Treating Corp., R.I., 30
Schaevitz Engineering, N.J., 5
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**Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 10, Tel: WHite Plains 9-4757**
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Seiscor, Div. Seismograph Service Corp., Okla., 5, 25
Sel-Rex Corp., N.J., 10 Precious Metal
**Semi-Alloys, Inc., 550 S. Fulton Ave., Mount Vernon, N.Y., 45 Semiconductors, Tel: MOunt Vernon 4-2800**
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Semi-Elements, Inc., Pa., 55, 60
Sheltered Workshops, Inc., Calif., 5, 40, 50
Sigma Electronics Research Corp., Wash., 5
Silicone Seals, Inc., Ill., 45
Sillcocks-Miller Co., The, N.J., 5, 15, 20, 35, 40, 45, 50, 55, 60
Skiatron Electronics & Television Corp., N.Y., 5
Slip Ring Co. of America, Calif., 60
Sorensen Industrial Electronic Co., N.J., 5, 20, 55
South River Metal Products Co., Inc., N.J., 5, 45
Southwest Products, Inc., Tex., 5
Space Electronics Corp., Calif., 5
Sparta Mfg. Co., Div. U. S. Ceramic Tile Co., Ohio, 55, 60
**Spaulding Fibre Co., 310 Wheeler St., Tonawanda, N.Y., 55, Tel: JAckson 2000**
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Spectronic Plating Co., Inc., N.Y., 10
Spincraft, Inc., Wis., 5, 45
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Standard Plastics Co., Inc., Mass., 60
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Staver Co., Inc., The, N.Y., 5, 45
Steel Protection & Chemical Co., Inc, Ind., 10
Stencilgraph Designs, N.Y., 40
Stevens Products, Inc., N.J., 60
Stevens Walden, Inc., Mass., 5, 10, 30, 45
Stewart Stamping Co., N.Y., 45
**Stimpson Co., Inc., Edwin B., 77 Franklin Ave., Brooklyn 5, N.Y., 45, Tel: ULster 5-3131**
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Stokes Corp., F. J., Pa., 15
Stone City Products Co., Ind., 5, 45
Strandberg Engineering Labs., Inc, N.C., 5
Sturrup, Inc., Conn., 5
Sun Dial Corp., N.J., 20, 40
Sunshine Scientific Instrument, Pa., 5
Sylvania Electric Products Inc., Parts Div., Pa., 5, 45, 60
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Taylor Electric, Inc., Mich., 55
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Tech-Art Plastics Co., N.J., 55, 60
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Technicraft Co., Mass., 15, 55
Techniques, Inc., N.J., 45
Technology Instrument Corp., Mass., 5, 15, 20, 60
Tel-Labs., Inc., N.H., 4, 40, 55, 60
Telecomputing Corp., Calif., 55, 60
**Telectro Industries Corp., 35-18 37th St., Long Island City 1, N.Y., 15, 35, Tel: YE 2-8600**
**See ad on page 338**
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 5, Tel: Midway 6-7211**
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Telkor, Inc., Ohio, 5, 20, 45
**Teltronics, Inc., 277 Main St., Nashua, N.H., 50, Tel: TUxedo 2-6264**
**See ad on page 337**
Temperature Engineering Corp., N.J., 5

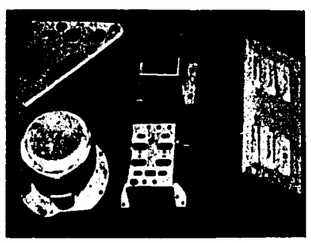




# Directory III. Materials & Services

## 89. Fabricators & Services.

Texas Instruments Incorporated, Metals & Controls Div., Mass., 45
Thomas & Sons, Inc., William, N.J., 45
Thompson & Co., John I., D.C., 50
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Topper Mfg. Co., Inc., N.Y., 15, 25, 35, 50, 55, 60
Torngren Co., Inc., C. W., Mass., 5, 45
Transistor Applications, Inc., Mass., 5, 50
Transval Electronics Corp., Calif., 5, 15, 45, 50
Tri-Dex Co., Calif., 5, 55
Tri-Point Plastics, Inc., N.Y., 55, 60
Tricon Mfg. Co., Ill., 5, 45
**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 5, Tel: ULysses 5-5131**
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Ultra Electroforming & Mfg. Co., N.J., 5, 10
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United International Dynamics Corp., Mass., 5, 45, 55
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United States Chemical Milling Corp., Calif., 5, 55, 60
U. S. Controls, Inc., N.Y., 5
U. S. Dielectric Products, Inc., Mass., 15, 55, 60
United States Radium Corp., N.J., 15, 40
U. S. Science Corp., Calif., 5, 15, 50
U. S. Stoneware Co., Alite Div., Ohio, 35
Universal Instruments Corp., N.Y., 5, 45, 50
Univox Corp., N.Y., 5
**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 35, Tel: AN 1-2660**
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Varo Mfg. Co., Inc., Tex., 5, 50
Video Industries Co., N.Y., 45
Vinson Co., E. R., Calif., 5
Virginia Electronics Co., Inc., D.C., 5, 15, 35
Vocaline Co. of America, Inc., Conn., 5
Waber Electronics, Inc., Pa., 5
Walkirt Co., Calif., 15
Waltham Electronics Corp., Mass., 5
Warren Components Div., El-Tronics, Inc., Pa., 35, 60
Waterbury Companies, Inc., Conn., 40, 60
Waveguide, Inc., Calif., 5
Weber Aircraft Corp., Calif., 5
**Weckesser Co., 5713-17 Northwest Hwy., Chicago 46, Ill., 45, 55, 60, Tel: RODney 3-6688**
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Wells Industries Corp., Basic Electronic Controls Div., Calif., 5
Western Gold & Platinum Co., Calif., 45
Westlab, Inc., N.Y., 5
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 5, Tel: JUdson 2-3030**
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Whitso, Inc., Ill., 60
Wickes Engineering & Construction Co., N.J., 5, 15
**Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 5, 10, 45, Tel: UNiversity 7204**
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Willson Camera Co., Pa., 55
Wilmington Fibre Specialty Co., Del., 5, 55
**Wind Turbine Co., 248 E. Market St., West Chester, Pa., 5, Tel: OWen 6-3110**
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Wintronics, Calif., 50
Wood Steel Co., Alan, Penco Div., Pa., 45
Worcester Pressed Steel Co., Mass., 45
Wright Equipment Corp., N.J., 5
**Wright Metalcoaters, Inc., 255 West St., South Hackensack, N.J., 10, Tinning, Tel: HUbbard 7-5136**
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Wyco Metal Products, Calif., 5
York Metal Products, Inc., N.Y., 5, 45
York Research Corp., Conn., 25, 35
Z & W Mfg. Corp., Electronics Div., Ohio, 15
Zenith Plastics Co., Subsid. Minnesota Mining & Mfg. Co., Calif., 60
Zero Manufacturing Co., Calif., 45, 50
Zierick Mfg. Corp., N.Y., 45

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See class 42

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See class 91

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Ferrites:
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## 90. Ferrimagnetic Materials.

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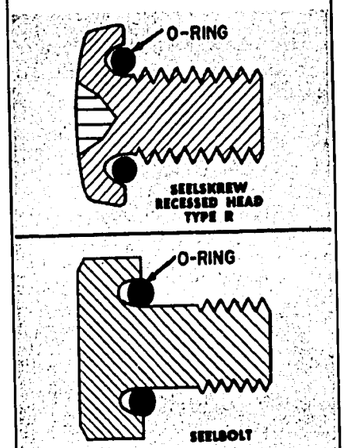
Alloys Unlimited, Inc., N.Y., 5c, 10c
Crucible Steel Company of America, Pa., 5c
E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 5c, Tel: HAlifax 6-7491
**See ad on page 400**
Electro Radiation, Inc., Calif., 5c, 10c
Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 5sc, Tel: CHerry 6-2811
**See ads on pages 267, 354, 423, 457, 525, 620**
General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 5c, Tel: GRanite 6-4411
**See ads on pages 263, 267, 435, 437, 501, 621**
General Magnetic Corp., Mich., 5c
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 10c
Isomet Corp., N.J., 5c, 10c
**Kearfott Div., General Precision, Inc., Little Falls, N.J., 5c, Tel: CLifford 6-4000**
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Lignes Telegraphiques et Telephoniques, France, 5s
**Lockheed Aircraft Corp., Missiles & Space Div., Dept. J-93, 962 W. El Camino Real, P.O. Box 504, Sunnyvale, Calif., 5c, 10c, Tel: REgent 9-4321**
**See ad on pages 112-113**
Microwave Chemicals Laboratory, Inc., N.Y., 5
Microwave Development Laboratories, Inc., Mass., 5sc
Motorola, Inc., Military Electronics Div., Ariz., 5sc, 10sc
Nuclear Corp. of America, Instrument & Research Div., N.J., 5sc
Radio Mfg. Co., Inc., Calif., 5c, 10c

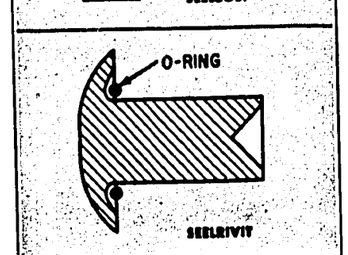
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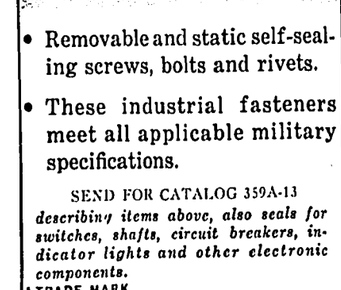
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Research Chemicals, Div. Nuclear Corp. of America, Calif., 5c
Semi-Elements, Inc., Pa., 5s, 10s
Steward Mfg. Co., D. M., Tenn., 5c
TRG, Incorporated, N.Y., 5c, 10c
Trans-Tech, Inc., Md., 5s, 10c
**Trionics Corp., P.O. Box 548, Madison 1, Wis., 5c, 10c, Tel: CEdar 8-2616**
See ad on page 663

**Ferrous metals:** See class 97

**Filters, air:** See class 84

**Findings & hardware:** See class 91

**Flexible shafts:** See class 91

**Fluxes:** See class 103

**Fungus & moisture proofing services:** See class 89

**Fungus preventative coatings:** See class 95

**Furnaces, crystal:** See class 96

**Furnaces, vacuum:** See class 92

**Fuses & fuse holders:** See class 53

**Gaskets:** See class 91

**Gears & gear-trains:** See class 30

**Germanium crystals:** See class 49

**Germanium, raw:** See class 101

**Getters:** See class 104

**Graphite, colloidal:** See class 95

**Grids & grid wire:** See class 104

**Grilles:** See class 91

**Grommets:** See class 91

**Guns & gun parts, vacuum tube:** See class 104

**Gyro testers:** See class 14

**Gyroscopes:** See class 4

**Handles:** See class 91

**Hardening & heat-treating services:** See class 89

**Hardware, microwave:** See class 83

## 91. Hardware & Findings.

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4. Bobbins, ceramic
6. Bobbins, paper
8. Bobbins, plastic
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12. Bushings & bearings
14. Cable clips
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See ads on pages 451, 638
A-1 Precision Products, Calif., 8c
Abalon Precision Mfg. Corp., N.Y., 16c, 26c, 46c
Abbott Products, Inc., N.Y., 20c, 28c, 32c, 46c, 48c
Accurate Electronics Corp., Ohio, 22s
Accurate Paper Tube Co., Inc., Ill. Tubing, Paper sc
Accurate Spring Mfg. Co., Ill., 52c
Ace Spring Manufacturing Co., Inc. N.Y., 52c
Ackerman Engravers, Inc., N.Y., 18sc, 32sc
Acme Mfg. & Gasket Co., Pa., 24c
Acromark Co., N.J., 18c, 36c, 38c
Actioncraft Products, N.Y., 34s, 36c
Aeroquip Corporation, Mich., Couplings s
**Airflyte Electronics Co., 537 Avenue A, Bayonne, N.J., 10c, Tel: HEmlock 6-2230**
See ad on page 408
Alac, Incorporated, Calif., 30s
**Alden Products Co., 140 N. Main St. Brockton 64, Mass., 8s, 16s, 20s, 32s, 42s, 48s, Tel: JUniper 3-0160**
See ad on page 496



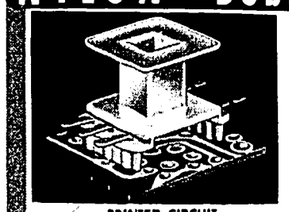


# Directory III. Materials & Services

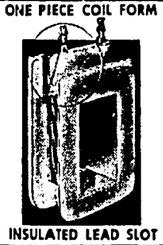
## 91. Hardware & Findings.

Algo, Inc., N.J., 16c
Allen Electric & Equip. Co., Mich., 30c, 32c, 46c
Allen Hollander Co., Inc., N.Y., 2sc, 38sc
Allied Allegri Co., Inc., N.J., 18c
**Allied Control Co., Inc., 2 East End Ave., New York 21, N.Y., Solenoid Valves sc, Tel: BUtterfield 8-7403**
See ad on page 508
Allmetal Screw Prods. Co., Inc., N.Y., 20s, 40s, 46c, 48s
**Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 34s, Tel: ALgonquin 5-5400**
See ad on page 604
Aluminum Co. of America, Pa., 20c, 44sc, 46sc, 48sc, 58sc
Alvo Nut & Bolt Co., Inc., Calif., 20s, 48s, 50s
Amatom Electronic Hardware Co., Inc., N.Y., 14sc, 20s, 28sc, 30sc, 32sc, 46c, 48sc, 52c, 56s
American Brass Co., The, Fabricated Metal Goods Div., N.Y., 16c, 20c, 28c
American Development Electronics Co., N.J., 10c, 18c
American Insulator Corp., Pa., 8c, 30sc, 32sc, 38c
American Latex Fibre Corp., Mass., 40sc
American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 4c, 28c, Tel: AMherst 5-3411
See ad on page 178
American Molded Products Co., 2723 W. Chicago Ave., Chicago 22, Ill., 8sc, 54sc, Tel: ARmitage 6-3235
See ad on this page
American Products Mfg. Co., La., 2s
American Screw Co., Conn., 46c, 48s, 50s
American Super-Temperature Wires, Inc., 10 W. Canal St., Winooski, Vt., 34c, Tubing Plastic c, Tel: UNIversity 2-9636
See ad on page 606
American Tube Bending Co., 15 Lawrence St., New Haven, Conn., 58, Tel: STate 7-2131
See ad on page 605
Analogue Controls, Inc., N.Y., 12s
Anseo Division, General Aniline & Film Corp., N.Y., 46sc
Anti-Corrosive Metal Products Co., Inc., N.Y., 20sc, 44sc, 46sc, 48sc
Applied Electro Mechanics, Inc., Va., 46c
Arber Mfg. Co., Inc., Conn., 16c
Argonne Electronics Mfg. Corp., N.Y., 18s, 32s
Arlin Mfg. Co., Mass., 34c, 40c
Armour Alliance Industries, Ohio, 40s
Arnoux Corp., Calif., 12s
Artisan Metal Works Co., Ohio, 26c
Associated Spring Corp., Conn., 14c, 20c, 42c, 52c, 54c
Associated Spring Corp., B-G-R Div., Mich., 42c, 48c, 52c
Atlee Corporation, Mass., Component Clips sc
Auburn Mfg. Co., Conn., 24sc, 28sc, 48s
Augat Brothers, Inc., 31 Perry Ave., Attleboro, Mass., 42s, Component Clips s, Tel: CAstle 2-2202
See ad on page 543
Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N.Y., 14c, 46c, Tel: EVergreen 8-6057
See ad on page 409


**AMERICAN MOLDED**
**NYLON—Bobbins & Coil Forms**


PRINTED CIRCUIT TRANSFORMER BOBBIN


ONE PIECE COIL FORM


INSULATED LEAD SLOT

**NEW IDEAS REDUCE COSTS!**

*NEW* innovation in bobbins, complete with lugs, for printed circuit transformers. Eliminates cost and assembly of terminal board! The lugs are embedded in nylon for permanent locations especially designed to prevent wire breakage.

*NEW* one piece coil form, complete with lugs, for printed circuit I. F. and oscillator coils. Integral construction, the tube and base cannot come apart—constant core torque . . . designed to prevent wire breakage.

*NEW* insulated lead slot automatically insulates lead and eliminates washers and taping. This revolutionary bobbin speeds up automatic winding.

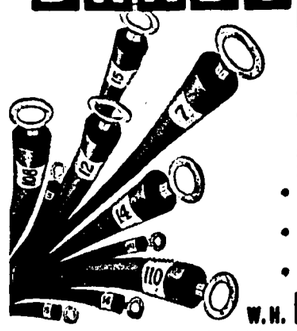
**NO TOOL COST ON STOCK BOBBINS**
**SPECIAL BOBBINS TO YOUR SPECIFICATIONS**

FREE samples and catalogs. Representatives in major cities. Write to this office for names and addresses.

**American Molded Products Company**
**2723 WEST CHICAGO AVENUE • CHICAGO 22, ILLINOIS**

For details, circle #674 on Reader Service Card

**BRADY** *Self-Sticking*
**PERMA-CODE WIRE MARKERS**



Positive "around-the-wire" identification for the electronic industry. Brady markers tell which wire goes where—quickly . . . increase production, cut costs . . . conform to NEMA-ASA, and MIL specifications. 3 stock sizes: 1½", ¾" and ½". 9 job tested materials.

- **MINIATURE MARKERS** permanently identify wires under 3/32" dia.
- **BLUE-STREAK® RELEASE COATING** assures fast distortion-free application.
- **WRITE FOR *FREE* WORKING SAMPLES!**

**W. H. BRADY CO.** 734 West Glendale Avenue Milwaukee 9, Wis. • Est. 1914

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

GC ELECTRONICS

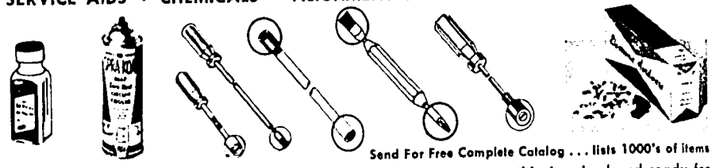
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SERVICE AIDS • CHEMICALS • ALIGNMENT TOOLS • ELECTRONIC HARDWARE.



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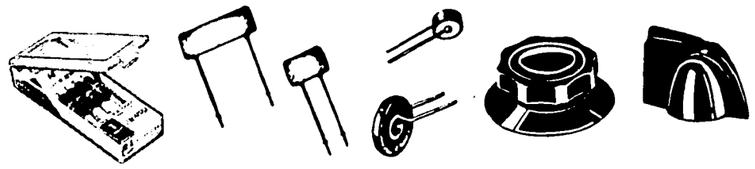
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G-C STACKPOLE CARBON RESISTORS • FUSE-SISTORS • GLOBAR THERMISTORS
GEE-LAR KNOBS AND OTHER COMPONENTS



G-C ELECTRONICS CO. • Division of Textron Electronics, Inc. • Los Angeles 18, Calif. • Rockford, Illinois

GC ELECTRONICS

ELECTROCRAFT COMPONENTS DIVISION

PLUGS • JACKS • CONNECTORS • SWITCHES



G-C ELECTRONICS CO. • Division of Textron Electronics, Inc. • Los Angeles 18, Calif. • Rockford, Illinois

audiotex MFG. CO.

HIGH FIDELITY AND STEREOPHONIC AUDIO ACCESSORIES



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Complete line of record and tape accessories designed for better audio and hi-fi performance.

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American Microphone MFG. CO.

MICROPHONES FOR EVERY BROADCAST, P.A., MOBILE OR RECORDING NEED



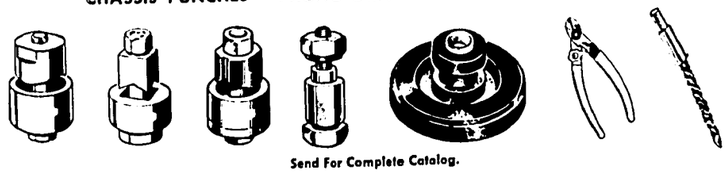
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Dependable, high quality, versatile microphones for all applications.

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Walsco ELECTRONICS MFG. CO.

CHASSIS PUNCHES • PHONO DRIVES • SERVICE AIDS & TOOLS



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High quality, specially designed products for every precision application.

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# Directory III. Materials & Services

## 91. Hardware & Findings.

Barden Corp., The, Conn., 12 Ball Bearings sc
Barker & Williamson, Inc., Pa., 32sc
Bastian Bros. Co., N.Y., 28s
Beckman Instruments, Inc., Helipot Div., Calif., 18sc
Beemer Engineering Co., Pa., 12sc
Bellandi Co., Inc., M., Ill., 38c
Belz Industries, Inc., N.Y., 24s
Bendix Corp., The, Friez Instrument Div., Md., 30s
Bentley-Harris Mfg. Co., Pa., 34s
Bevin-Wilcox Line Co., The, Conn., 18c
**Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 12s, 14s, 20s, 22s, 28s, 30s, 32s, 34s, 46s, 48s, 54s, Tel: WOrth 6-5611**

See ad on page 607

Bishop & Co., J., Pa., 58sc
Blaco Mfg. Co., Ohio, 14s, 22s
Blinn Co., Inc., The Delbert, Calif., 32sc, 48sc
**Bodnar Products Corp., 238 Huguenot St., New Rochelle, N.Y., 18c, 32c, 38c, Tel: NEw Rochelle 6-4664**

See ads on pages 598, 632

Bonny Mfg. Corp., The, Mass., 8c, 24c, 28c, 40c, 48c
Boonton Molding Co., N.J., 8c, 32c
Boots Aircraft Nut Corp., Conn., 20sc, 48sc
**Borg Equipment Div., Amphenol-Borg Electronics Corp., 120 S. Main St., Janesville, Wis., 18sc, Tel: PLeasant 4-6616**

See ad on page 524

Brady Co., W. H., 734 W. Glendale Ave., Milwaukee 9, Wis., 2sc, 18c, 28c, 36sc, 38c, 40c, Tel: EDgewood 2-8100

See ad on page 639

Brand-Rex Div., William, American Enka Corp., Mass., 36c
Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 14c, 28c, 52sc, Tel: HAwthorne 7-1773

See ads on pages 449, 537, 547

Breeze Corporations, Inc., N.J., 14c, 58c
Bright Radio Labs., Inc., N.Y., 46c
Bristol Co., Conn., 20sc, 46sc, 50sc
Buchanan Electrical Products Corp., 607 U. S. Highway 22, Hillside, N.J., 12s, 14s, Tel: WAverly 3-7474

See ad on page 557

Buckbee Mears Co., Minn., 26c
Bud Radio, Inc., Dept. IR, 2118 E. 55th St., Cleveland 3, Ohio, 22s, 30s, Tel: HEnderson 1-7166

See ad on page 625

Cambridge Thermionic Corp., Mass., 30sc, 32s, 46sc
Camloc Fastener Corp., N.J., 14s, 20s
Canadian Radium & Uranium Corp., N.Y., 18c, 38c
Carborundum Co., N.Y., 4c
Carmer Industries, N.J., 40sc, 46sc
Carroll Pressed Metal, Inc., Mass., 14sc, 16sc, 18c, 28c, 30c, 36c, 38c, 42c, 52c
Central Screw Co., Ill., 20s, 44s, 48s
**Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N.Y., 12s, Tel: WEst Lebanon 3-5851**

See ad on page 452

Channel Master Corp., N.Y., 44c, 58c
Chart-Pak, Inc., Mass., Pressure-Sensitive Symbols sc
Chase Brass & Copper Co., Conn., 12s, 20s, 26s, 28s, 44s, 48s, 58s
Chemo Products, Inc., R.I., 24s, 34s
Chicago Dial Co., Ill., 18c
Chicago Rivet & Machine Co., Ill., 44s
Chicago Thrift-Etching Corp., Ill., 18sc, 38sc
Churchill Lighting Corp., Mass., 36s
**Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif., 20s, 44s, 46s, 48s, Tel: WOodland 7-1113**

See ad on page 471

Clearprint Paper Co., Calif., Drafting paper and fade out preprint forms
Cleveland Container Co., The, Ohio, 40c
Cleveland Fabricating Co., The, Ohio, 24c, 28c, 40c
Co Engineering Co., N.J., Shaft Seals s, Couplings sc
Co-operative Industries, Inc., N.J., 58s
Coilcraft, Inc., Ill., 10c
**Collectron Corp., 304 E. 45th St., New York 17, N.Y., 10sc, Tel: MUrray Hill 9-7120**

See ad on page 547

Comco Plastics, Inc., N.Y., 8c, 12c, 46c
Corning Glass Works, Corning Electronic Components, 85 High St., Bradford, Pa., Glass Bobbins sc, Tel: FOrest 4-5521

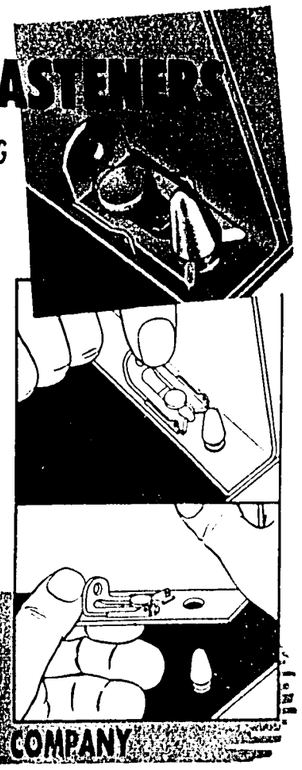
See ads on pages 96, 558

Cosmic Plastics Co., Ohio, 48s
Crucible Steel Company of America, Pa., 58s
Custom Components, Inc., N.J., 12s, 24s
Dale Products, Inc., Neb., 32s


DIMCO-GRAY

SNAPSLIDE FASTENERS

PROVIDE VIBRATION-PROOF HOLDING AND QUICK, FOOL-PROOF RELEASE!



APPROVED UNDER ARMY-NAVY STANDARDS

Here's a simple, easy means of securely fastening assemblies to withstand shock or vibration, *and yet allow quick removal for inspection or repair.* Instant snap action engages or releases fastener . . . no tools are required! After installation, fasteners never need adjustment . . . even with repeated use.

Three sizes available for different load requirements. Large and medium sizes are made of corrosion-resistant *stainless steel.* Small size is made of nickel-plated brass. Stock parts fit various thicknesses of flanges and mounting plates . . . special parts can also be supplied.

WRITE FOR [illegible]

COMPANY

212 E. SIXTH STREET DAYTON, OHIO

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# GUDELACE
## is engineered for problem-free lacing



It's no accident that Gudelace is the best lacing tape you can buy. Excellence is *engineered* into Gudelace. A sturdy nylon mesh is meticulously combined with the optimum amount of special microcrystalline wax. Careful selection of raw materials and superior methods of combining them give Gudelace outstanding strength, toughness, and stability. Gudelace is the original *flat* lacing tape which distributes stress evenly over a wide area. It is engineered to stay flat; it will not stretch out of shape when pulled. Gudelace's nonskid surface prevents slipping, eliminating the too-tight pull that causes strangulation and cold flow. Durability and dependability make Gudelace your most economic buy—with no cut insulation, fingers, or feelings.

Write for Data Book with specifications on Gudelace and Gudebrod's complete line of braided lacing tapes and dial cords—Temp-Lace, Stur-D-Lace, and Gude-Glass.

**GUDEBROD**
**BROS. SILK CO., INC.**

*Electronic Division*
225 West 34th Street, New York 1, N.Y.

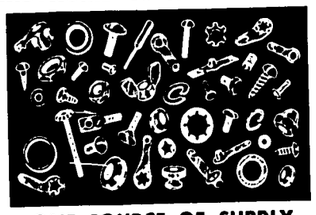
*Executive Offices*
12 South 12th Street, Philadelphia 7, Pa.

For details, circle #678 on Reader Service Card




Dante Electric Mfg. Co., Conn., 14c
Darrill Products Corp., Mass., 8c, 12c, 14c, 18c, 20c, 30c, 32c, 42c, 44c
Davies Molding Co., Harry, Ill., 8c, 18s, 30sc, 32sc
Davis & Hemphill, Md., 46c
DeLandri Precision Elements Co., Inc., N.Y., 46c
Defiance Machine & Tool Co., Mo., 36s, 38c
Dennison Mfg. Co., Mass., 2s, 36sc
Deutsch Co., The, Electronic Components Div., Calif., 14s, 28s, 44s, 46s
Deutsch Fastener Corp., Calif., 20
Diamond Antenna & Microwave Corp., Mass., 24c, 38c
Diamond Tool Engineering Co., Mass., Jewels sc
**Dimco-Gray Co., 212 E. 6th St., Dayton 2, Ohio, 20s, 30s, 32s, Tel: BAldwin 2-6703**
See ad on page 641
Division Lead Co., Ill., 24s, 48s, 58s
Dixon Corp., R.I., 8c, 24c, 28c, 46c
Du-Co Ceramics Co., Pa., 12c, 48c
Dura Plastics of New York, Inc., N.Y., 38c
Duralith Corp., Pa., 2c, 30c, 38c
Duramark, Inc., N.Y., 36s, 38s
Dzus Fastener Co., Inc., N.Y., 20sc, 28sc, 42sc, 52sc
E-Kay Mfg. Co., Inc., N.J., 46c
**E.M.I.-Cossor Electronics, Ltd., P.O. Box 525, Dartmouth, Nova Scotia, Canada, 30c, 32c, Tel: HAlifax 6-7491**
See ad on page 400


**HARDWARE**
**for**
**ELECTRONICS**
**INSTRUMENTS-AUTOMATION**



**ONE SOURCE OF SUPPLY FOR FASTENINGS**

SCREWS • NUTS • BOLTS • WASHERS
RIVETS • EYELETS • TERMINALS
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INSTRUMENT SCREWS
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COMPONENTS FOR ELECTRONICS

We carry in stock thousands of Standard and Special Items essential to the INSTRUMENT • ELECTRONIC • AUTOMATION Manufacturing Industry
SPECIAL COLD HEADED PRODUCTS
STAMPINGS — SCREW MACHINE PRODUCTS
**Made to order in all metals**
**WRITE FOR CATALOG #60**

**FEDERAL SCREW PRODUCTS, INC.**
**3917 N. Kedzie Ave. Chicago 18, Ill.**
**IRving 8-5744**

For details, circle #679 on Reader Service Card


Eagle Electric Mfg. Co., Inc., N.Y., 10s, 12s, 28s, Buzzers s
Eastern Foilcal Nameplate Corp., N.J., 2c, 36c, 38c
Eastern Tool & Mfg. Co., N.J., 36c, Bobbins, Metal c
Eckel Valve Co., Calif., Solenoid Valves sc, Cryogenic Valves sc
Elastic Stop Nut Corp. of America, N.J., 20s, 48s
Electric Autolite Co., The, Ohio, 38sc
**Electrical Industries, Div. Philips Electronics & Pharmaceutical Industries Corp., 691 Central Ave., Murray Hill, N.J., 16sc, CRestview 7-4300**
See ad on page 180
Electro-Chemical Engraving Co., Inc., N.Y., 36c, 38c
**Electro Contacts, Inc., Div. of Electro Switch Corp., Osterville, Mass., Brush Holders c, Tel: (Hyannis) GArden 8-6986**
See ad on page 548
Electro-Pack, Inc., Calif., 16c, 22sc, 30s, 32s
Electro-Seal Corp., Ill., 38c
Electronic Parts Mfg. Co., N.J., 58c
Electronic Plastics Corp., Mass., 30c, 4c
Electrovert, Inc., N.Y., 14s, 36s
Emerson Apparatus Co., Mass., 20s
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 58sc, Tel: BIgelow 2-2700**
See ad on page 170
Epoxy Products, Div. Joseph Waldman & Sons, N.J., 8c, 40c, 46c
**Erie Resistor Corp., 644 W. 12th St, Erie 6, Pa., 18c, 26c, 32c, 38c, Tel: GLendale 6-8592**
See ad on pages 40-41
Erwood, Inc., Ill., 18c, 30sc
Eugene Engineering Co., Inc., Mass., 18c, 20c, 30c, 32c, 46c
Evans Findings Co., Inc., R.I., 28
Everard Tap & Die Corp., N.Y., 20c, 44c, 48c
Falcon Division, General Thermodynamics Corp., Mass., 22 Couplings, Universal Joints s
Faradyne Electronics Corp., Affil. Mansol Ceramics, N.J., Tungsten coils
Fastex Div., Illinois Tool Works, Ill., 14sc, 20sc, 28sc, 42sc, 44sc, 54sc
Federal Mfg. & Eng. Corp., N.Y., 46c
**Federal Screw Products, Inc., 3917 N. Kedzie Ave., Chicago 18, Ill., 14s, 20s, 28s, 32s, 44s, 46s, 48s, 50s, Tel: IRving 8-5744**
See ad on this page
**Ferroxcube Corporation of America, 50 E. Bridge St., Saugerties, N.Y., 8s, Tel: CHerry 6-2811**
See ads on pages 267, 354, 423, 457, 525, 620
Fidelitone, Inc., Ill., Jewels s
Fischer & Porter Co., Pa., Tubing, Glass c
Fisher & Crome, Pa., 18c, 38c
Flock Process Co., Inc., Conn., 26sc
Fluoro Plastics, Inc., Pa., 24s
Fluorulon Laboratories, Inc., N.J., 8sc, 24c
Forbes & Wagner, Inc., 350 Central Ave., Silver Creek, N.Y., 46c, Tel: YEllowstone 4-2691
See ads on pages 341, 399, 403, 437, 563, 569







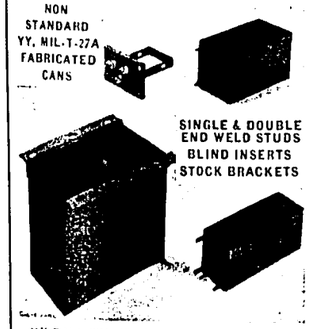
# Directory III. Materials & Services



Franklin Fibre-Lamitex Corp., N.Y., 2sc, 6c, 8sc, 18sc, 28c, 30c, 32c, 34sc, 38c
Frenchtown Porcelain Co., N.J., 4c
**G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 14s, 28s, 32s, 48s, Tel: WOodland 8-9661**
See ad on page 640
GOE Engineering Company, Calif., 8sc, 30sc, 46sc
Galaxy Engineering Corp., Calif., 20sc, 25sc, 30sc, 46sc
Garde Mfg. Co., R.I., 8sc
Garlock Electronic Products, Garlock, Inc., N.J., 24sc, 28sc
Garrett Corp., The, Calif., 18s
Garron Aircraft Supply, Inc., N.Y., 12s, 14s, 20s, 24s, 28s, 42s, 44s, 46s, 48s, 50s
Geartronics Corp., Actuator Products Div., Mass., 22s, 46c
Geartronics Corp., Massachusetts Gear Div., Mass., 46c
Gemco Electric Co., Mich., 30s
General Circuits, Inc., N.Y., 38c
General Findings & Supply Co., Industrial Div., Mass., 28c, 44c, 46c, 52c
General Gaskets, Inc., Conn., 24c, 28c
**General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 56, Tel: VAlley Stream 5-6363**
See ad on page 284
**General Radio Co., 22 Baker Ave., West Concord, Mass., 18s, 32s, Tel: EMerson 9-4400**
See ad on Cover 4
Gibson Electric Co., Pa., 44c
Goodrich Aviation Products, B. F., Co., 44s
Goodrich Co., The B. F., Conn., 46c
Goodrich Industrial Products Co., B. F., Ohio, 2s
**Grant Pulley & Hardware Corp., 48 High St., West Nyack, N.Y., 30sc, Tel: ELmwood 8-4400**
See ad on page 622
**Graphite Metallizing Corp., 1057 Nepperhan Ave., Yonkers, N.Y., 10sc, 12 Current-Carrying Bearings sc, Couplings sc, Tel: YOnkers 8-8400**
See ad on page 416
**Great Eastern Metal Products Co., 22 Woodworth Ave., Yonkers 2, N.Y., 16sc, 20 Weld studs & Inserts sc, 48s, Tel: GReenleaf 6-7300**
See ad on this page
Greer Stop Nut Co., Ill., 20s, 46c, 48s
**Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 8sc, 12sc, 14s, 20s, 32s, 44s, 48s, Tel: NEw Rochelle 3-8600**
See ad on this page
Gudebrod Bros. Silk Co., Inc., 225 W. 34th St., New York 1, N.Y., 44s, Tel: LAckawanna 4-3555
See ad on page 642
[illegible]
Heyman Manufacturing Co., 65 Michigan Ave., Kenilworth 7, N.J., 22s, 48s, 54s, Tel: CHestnut 5-2545
See ad on this page
Hinge & Part Inc., West Virginia Pulp & Paper Co., [illegible]
Hollaender Manufacturing Co., [illegible]
Holub Industries, Inc., Ill., 14 Plastics, 2s, 54s
Howard Products, Inc., N.J., Pots, 2sc


*Custom* *Built*
**BY GEMP**
**FABRICATED SHEET METAL CASES AND COVERS**

NON STANDARD YY, MIL-T-27A FABRICATED CANS



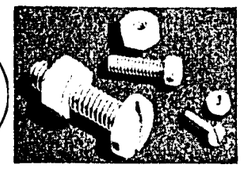

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- Bracket Fabrication and Assembly
- Insert and Stud Assembly
- Terminal Assembly
- Base Cover Assembly
- Special Cases
- Special Sample Service
- Machining of Special Parts

*Your Inquiry Invited*
*SAMPLES GLADLY PRODUCED*
**GREAT EASTERN METAL PRODUCTS CO.**
Div. of GEMP Mfg. Corp.
22 Woodworth Ave., Yonkers, N.Y.
GReenleaf 6-7300 TWX Yonkers, N.Y. 5358

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25 years of progress in tiny parts

GRC



**NYLON & DELRIN THREADED FASTENERS**

SCREWS
HEX NUTS
WASHERS
INSULATORS & BUSHINGS
COIL BOBBINS
WIRE TIES
WIRE CLAMPS

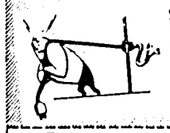
• GRC's complete line of high quality, close tolerance molded screws and hex nuts include screws in standard commercial heads—Phillips or slotted types—in sizes from #4 thru 1/4"; hex nuts in ten sizes (#2 thru 5/16") GRC molded miniature machine screws—half the weight of aluminum—in sizes as small as #0 make more compact designs possible. GRC's single cavity molding technique adds exceptional uniformity, accuracy, economy to Nylon's & Delrin's high strength-to-weight ratio, built-in electrical insulating qualities, stability, resilience and elasticity. GRC's molded fasteners are available from stock in a wide range of types, sizes and lengths.

*WRITE, WIRE, PHONE NOW for samples & GRC's new detailed Industrial fastener catalog.*

**GRIES REPRODUCER CORP.**
World's Foremost Producer of Small Die Castings
168 Beechwood Ave. • New Rochelle, N.Y.
Phone: NEw Rochelle 3-8600

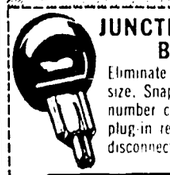
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**Heyco Nylon BUSHINGS**



**STRAIN RELIEFS**
The insulating bushing that anchors a cord set to an electrically operated machine or appliance.

**JUNCTION-TERMINAL BUSHINGS**
Eliminate "pig-tails" — Miniature size. Snap in assembly, color or number coded. Can be used as plug-in receptacle. Simple quick disconnect



ACCORDIAN TYPE
Fit curved surfaces
*Nylon bushing — brass tab*

**HEYCO NYLON Snap Bushings**

10 Sizes for holes from — to 1¼" dia. — various inside diameters. Snap into panels up to ¼" thick



**FREE SAMPLES!** BUSHINGS OF YOUR CHOICE

**HEYMAN MANUFACTURING COMPANY**
KENILWORTH 7, NEW JERSEY

For details, circle #682 on Reader Service Card



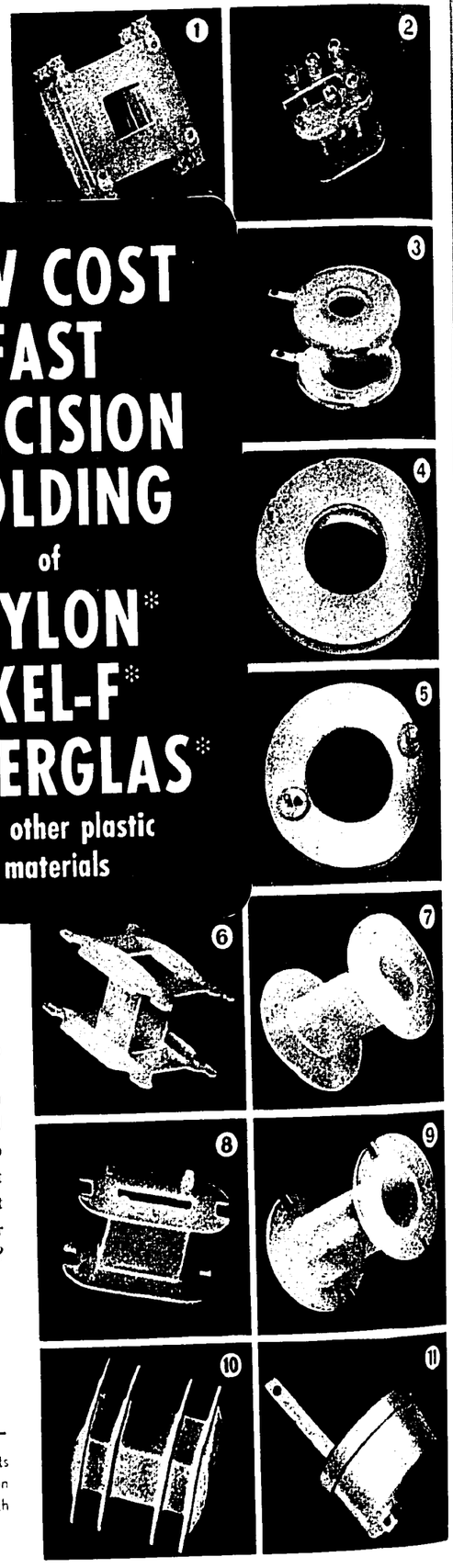

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-2[illegible]

Specialists in Precision Molding of Intricate

# COIL FORMS

HYDRO
ENGINEERED PLASTICS

and other ELECTRONIC COMPONENTS comprising delicate MOLDED-IN METAL INSERTS




LOW COST FAST PRECISION MOLDING of NYLON* KEL-F* FIBERGLAS* and other plastic materials

The use of "universal" molds of exclusive HYDRO design assures low-cost tooling and quick delivery of all types of coil forms. Precision tooling insures a flash-free product held to close tolerances. This service is particularly attractive for short runs where high mold costs can raise unit prices of component parts substantially. Similar savings are possible on many other electronic components. *May we quote on your requirements?*

## HYDRO MOLDING COMPANY, INC.

*Engineering and Manufacturing in Plastics*

PLATTSBURGH, NEW YORK

KEY TO ILLUSTRATIONS—1—2—3 Nylon bobbin with molded-in inserts . . . 4—5 Fiberglas bobbins with molded-in inserts . . . 6—7—8—9 Nylon bobbins . . . 10—Multi-pie flange Nylon bobbins . . . 11—Kel-F slider with molded-insert.

* Trademarks of DuPont, M. W. Kellogg and Owens-Corning

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# Directory III. Materials & Services

## 91. Hardware & Findings.

Huck Mfg. Co., Mich., 20sc, 44sc

**Hudson Tool & Die Co., Inc., 18-38 Malvern St., Newark 5, N.J., 16, Tel: MArket 4-1802**
See ad on page 102

Hunter Spring Co., Div. American Machine & Metals, Inc., Pa., 52c

**Hydro Molding Co., Inc., 100 Sharron Ave., Plattsburgh, N.Y., 8, 48, Tel: 2598**
See ad on page 644

IE Manufacturing, Ill., 14s, 20s, 24s, 30s, 38s, 42s, 46s, 48s, 52s

Ideas, Inc., Wyo., 2sc

Ilex Optical Co., N.Y., 42sc

**Illumitronic Engineering, 680 E. Taylor St., Sunnyvale, Calif., 14s, 34s, Tel: REgent 9-2395**
See ads on pages 400, 692

Industrial Engravers, Inc., N.Y., 18c, 38c

Industrial Plastic Fabricators, Inc., Mass., 48c

Industrial Retaining Ring Co., N.J., 42s

Industrial Tectonics, Inc., Calif., 12c, Ball & Roller Bearings c

**Inso Electronic Products, Inc., 1200 Commerce Ave., Union, N.J., Tubing, Plastic s, Tel: MUrdock 6-4258**
See ad on page 612

**Instrument Specialties Co., Inc., 284 Bergen Blvd., Little Falls, N.J., 46c, 52sc, Tel: CLifford 6-3500**
See ad on page 646

Insulation Manufacturers Corp., Ill., 2s, 6c, 8c, 34s

Insulation Products Co., Pa., 8c, 30c, 32c

International Powder Metallurgy Co., Pa., 12c

**Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 4c, Tel: MIllington 7-0385**
See ad on page 620

Jacksonville Metal & Plastics Co., Fla., 38c

Jan Hardware Mfg. Co., Inc., N.Y., 12s, 22s, 32sc

Janco Corp., Calif., 32c

Johns-Manville Co., N.Y., 2s

Johns-Manville, Dutch Brand Div., Ill., 2s, 34s, 40s

Johnson Co., E. F., Minn., 18s, 32s

Johnson & Hoffman Mfg. Corp., N.Y., 16c, 28c

Jonathan Mfg. Co., Calif., 30sc

Jonesville Paper Tube Corp., Mich., Paper Tubing s

Kanthal Corp., The, Conn., 58sc

Kaynar Mfg. Co., Kaylock Div., Calif., 20sc, 48sc

Keller, Jr., Hugo P., N.Y., 12s

Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 18c

Kendall Co., Polyken Sales Div., Ill., 2sc

Kerrco, Nels., 18c, 32c

Keystone Belt & Nut Corp., N.Y., 20sc, 44sc, 46sc, 48sc

Keystone Electronics Corp., N.Y., 12sc, 20sc, 46sc

Kilo Engineering Co., Calif., 18s [illegible] Counting sc, 32sc

Kintronic Div., Chicago Aerial Industries, Ill., 14s

**Krengel Mfg. Co., Inc., 227 Fulton St., New York 7, N.Y., 2s, 18s, 38c, Tel: COrtlandt 7-5714**
See ad on this page

**Kulka Electric Corp., 633-643 S. Fulton Ave., Mount Vernon, N.Y., 14s, 56s, Tel: MOunt Vernon 4-4024**
See ads on pages 551, 558

**Kupfrian Manufacturing Corp., 157 Prospect Ave., Binghamton, N.Y., 22sc, Tel: RAymond 3-6426**
See ad on page 489

Kurz-Kasch, Inc., Ohio, 8c, 18sc, 32sc

Laminated Sheet Products Corp., Mass., 24c, 28c

Landsberger Plastics Co., N.Y., 38c

Lansky Die Cutting Corp., N.Y., 38s

La Pointe Industries, Inc., Conn., 58sc

Leach & Garner Co., Industrial Div., Mass., 58c

Lee Electric, Inc., N.J., Buzzers s

Lee Spring Co., Div. Leetronics, Inc., N.Y., 52

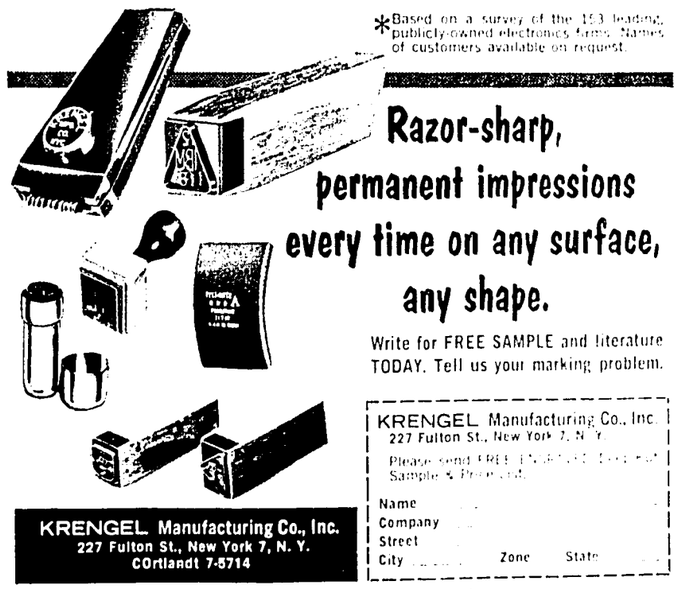
Lereco Electronics, Inc., Calif., 30s, 32sc, 46sc

Leyse Aluminum Co., Wis., 18c

Line Electric Co., N.J., Buzzers s


5½% *OF ALL ELECTRONIC FIRMS USE KRENGEL ENGRAVED DEEP-KUT® STAMPS

*Based on a survey of the 153 leading, publicly-owned electronics firms. Names of customers available on request.



Razor-sharp, permanent impressions every time on any surface, any shape.

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227 Fulton St., New York 7, N. Y.
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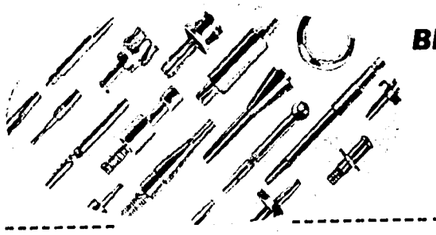
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates [illegible] built items. Complete addresses will be found in the Alphabetical Directory, [illegible]

**Reduce costs**
**Increase production**
**Step-up product quality**
**with...**

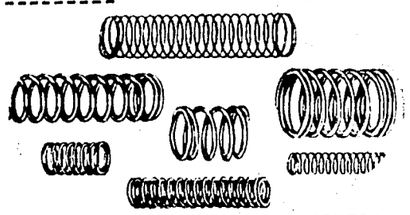
# I-S BERYLLIUM COPPER SPRINGS

Specially developed equipment and production processes, combined with the broad experience of I-S engineers, assure higher efficiency and better performance in your springs. Only 100% laboratory certified raw material is used in the production of micro-processed precision springs.



## BERYLLIUM COPPER MACHINED PARTS

Modern plant with complete facilities available for turning, grinding, milling, drilling, hardening and electroplating. Sample or medium production quantities are produced economically to exacting specifications. Our equipment is suitable for simple and intricate designs from .030" to 1.00" diameters.



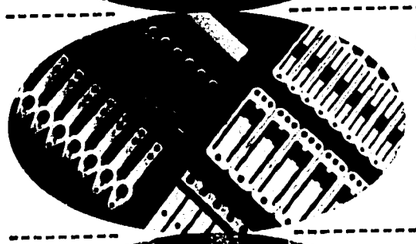
## COMPRESSION COIL SPRINGS

Exclusive patented coiling machines and special heat-treating equipment assure close tolerances and uniformity on diameter and load test at specified deflection. These, and other quality factors, assure longer service life, higher endurance strength, better electrical conductivity and lower drift.



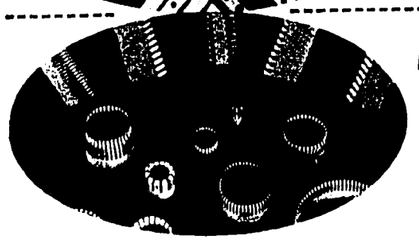
## SHORT RUN SERVICE

—for prototypes and pilot runs. The I-S short run department can save you time and money in the planning stage, or whenever production quantities are limited. A wide variety of diversified shop equipment is used to produce small orders at minimum cost.



## STRIP SPRINGS

Overall costs of many types of flat springs, used in high production quantities, are often reduced by use of I-S Strip Springs. Individual springs, separated by a score line, are fabricated from certified beryllium copper in lengths up to 12 or 16 inches long. Strip Springs, heat-treated to precise shape in multiple fixtures, are held to such close tolerances that hand adjustment in assembly is not necessary.



## HIGH FREQUENCY SPECIALTIES

I-S carries a complete line of standard items for use with lighthouse and similar tubes. A wide variety of finger contact strips for use in grounding and bonding applications are carried in stock. Standard items modified to meet specific applications are available on special order.

## Complete engineering and design service

*Call or write for I-S catalog including data on:*

- COMPRESSION SPRINGS
- FLAT SPRINGS
- STRIP SPRINGS
- CONTACT RINGS
- CONTACT STRIPS
- MACHINED PARTS

Our Engineering Department is available at all times to assist manufacturers in solving their problems in the application of micro processed beryllium copper springs. Their extensive knowledge and wide facilities often enable them to make specific recommendations that will result in a better part manufactured at a lower cost.

SEE OUR CATALOG IN SWEET'S OR WRITE FOR COPY

"MICRO-PROCESSED" I-S BERYLLIUM COPPER SPRINGS

**INSTRUMENT SPECIALTIES COMPANY • INC**

284 Bergen Blvd., Little Falls, N. J.—Telephone: CLifford 6-3500

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# Directory III. Materials & Services

## 91. Hardware & Findings.

**Metal Textile Corp., Div. General Cable Corp., 647 E. First Ave., Roselle, N.J., 24s, Tel: CHestnut 5-3000**
**See ad on page 552**

Mica Corporation, Calif., Printed Circuit Boards s
Micarta Fabricators, Inc., Ill., 38c
Milford Rivet & Machine Co., Conn., 44sc

**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 16sc, 18sc, 30s, 32sc, Tel: DAvenport 4-4108**
**See ad on page 402**

Miller Co., J. W., Calif., 16sc
Miller Dial & Name Plate Co., Calif., 18c, 36c, 38c, 42c
Miniature Precision Bearings, Inc., N.H., 12sc
Minnesota Mining & Mfg. Co., Magnetic Products Div. & Electrical Prods. Div., Minn., 2sc, 4sc
Minnesota Rubber Co., Minn., 24c, 28c

**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 4c, Tel: WAverly 6-2250**
**See ad on page 452**

Mobay Chemical Co., Pa., 40s
Molding Corporation of America, R.I., 8c, 18c, 30c, 32c
Molly Corp., Pa., 44s, 46sc, 48s
Monadnock Mills, Calif., 14s, 20s, 28s
Morris Co., J. L., Mass., 20sc, 44sc, 46sc, 48sc
Moxness Products, Inc., Wis., 25sc, 2sc 56c
Murdock Corp., The, Mass., Buzzers s
Mystik Adhesive Products, Inc., Ill., 2sc
Nameplates, Inc., N.Y., 18s, 38s
Narrow Fabric Co., The, Pa., 34c
National Moldite Co., Inc., N.J., 4s, 8s, Bobbins, Metal s
National Multi-Products Co., Ill., 14c, 3s
**National Radio Co., Inc., 37 Washington St., Melrose 76, Mass., 18, 46, Captive nuts & studs, Tel: NOrmandie 5-4800**
**See ad on page 614**

National Vulcanized Fibre Co., Del., 8c, 24c, 28c, 40c
Natvar Corporation, N.J., 34s, 36s
Neptune Electronics Co., N.Y., 40c, 56c
New Departure Div., General Motors Corp., Conn., 12 Ball Bearings sc
New England Etching Co., Inc., Mass., 18c, 38c
New Hampshire Ball Bearings, Inc., N.H., 12 Ball Bearings s

**New Hermes Engraving Machine Corp., 154 W. 14th St., New York 11, N.Y., 38c, Tel: WAtkins 4-7373**
**See ad on page 677**

Newcomb Spring Corp., N.Y., 52c
Nielsen Hardware Corp., 720 Wethersfield Ave., Hartford 5, Conn., [illegible], Tel: JAckson 2-4145
See ad on page 644
Noesting Pin Ticket Co., Inc., 732 E. 136th St., New York 54, N.Y., [illegible] Lead Wires s, Tel: MOtt Haven 9-6565
See ads on pages 582, 642, 758
[illegible] 12c, 16c, 38c, 42c, 44c, 48c
North Shore Nameplate, Div. Anodyne, Inc., 214-17 Northern Blvd., Bayside 61, N.Y., 28, 34c, 42s, 48s, Tel: BAyside 4-4848
See ad on page [illegible]
[illegible] 28s, 48s
[illegible] Nylon s
[illegible] Nylon Cord, N.J., 38s, 42s, 46s
PIC Design Corp., N.Y., 42s, 44sc, 46sc, 48s, 48s, 52c, Bobbins s, Bobbins
Pacific Transformer Corp., Calif., 2s
Paenson & Co., Ltd., England, 38s, 42s
Paiken Co., The, N.J., 20s, 42s
Pandum Corp., Ill., 14, Plastic [illegible] ducts
Panob Corp., 49 Beech St., Port Chester, N.Y., 18s, 32s, Tel: WEstmore 9-3666
See ad on page 689


**TERMINAL LEADS**
**for**
- **resistors**
- **capacitors**
- **transistors**
- **diodes**

***and other applications***

**WIRE FORMS**
***all types***

**PINS**
- ***upset***
- ***straight***

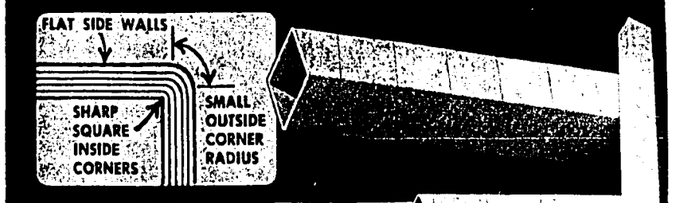
**all in a wide variety of metals and alloys to your specifications**

**Write for quotation.**

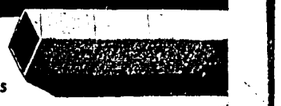
Mitronics Daily
Noesting
PIN TICKET CO. INC
732 East 136th St. New York 54 N.Y.

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***Better Coils begin with***
**PARAFORMED PAPER TUBES**




- *No sharp outside edges to cut wire*
- *No need for wedges to tighten wire*
- *Permits winding coils to closer tolerances*
- *Allows faster stacking of wound coils*
- *Has full rigidity and physical strength*



**ANY SIZE—SQUARE OR RECTANGULAR**

PARAFORMED paper tubes simplify coil winding operations and speed production, yet cost no more. In the exclusive PARAFORM method of tube making, no artificial heat or pressure is used —*Paraforming* takes place at the time of spiral winding. Hi-Dielectric. Hi-Strength. Kraft, Fish Paper, Acetate, Red Rope or any combination wound on automatic machines. *Produced from stock arbors or special sizes engineered for you.* Can also be supplied in regular or with slight bow.



SPIRAL WOUND
*Not Die Formed*

*Write on company letterhead for* STOCK ARBOR LIST *of over 2000 sizes*

**PARAMOUNT PAPER TUBE CORP.**
618 LAFAYETTE STREET, FORT WAYNE 2, INDIANA
***Manufacturers of Paper Tubing for the Electrical Industry Since 1931***

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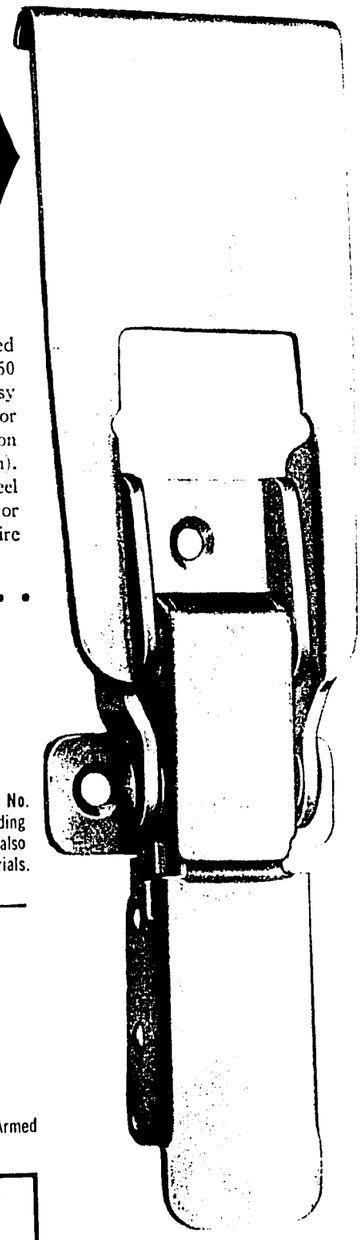
# COMPRESSION CATCHES
# ADJUSTABLE CATCHES
# HANDLES (all to Armed Forces qualifications)

## FOR INSTRUMENT CASES • TRANSIT CASES • CONTAINERS

No. VHC 340-2
(actual size)



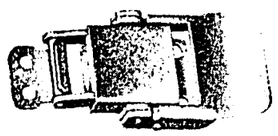
**A WIDE RANGE of STYLES and SIZES from junior..... to GIANT**



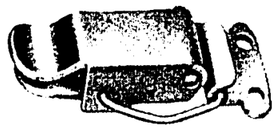
No. VHC 250-65
(actual size)

COMPRESSION SPRING CATCHES, No. 340 series, are miniature in size. Preloaded to 12 lbs. Standard 18 lb. holding tension. Cold rolled steel, plated or finished to specifications, or stainless steel. Styles with lever straight, as illustrated, or with up-sweep or down-sweep.

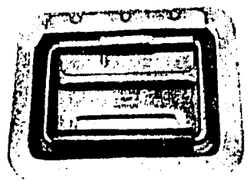
ADJUSTABLE CATCHES for varied applications (also recessed), No. 250 series, provide secure holding, easy engagement, rapid release. Steel or aluminum base. Designed to function up to 1,000 lbs. (manual operation). Stress strength to 3,000 lbs. (steel base). Styles for surface mounting or recessed in a plate. Hole for wire seal and slot for ¾" "Navy" seal.



**COMPRESSION SPRING DRAW PULL CATCH No. SC-B-83314-42** with springs concealed. Provides 70 lbs. holding tension on standard specification.



**HEAVY-DUTY PULL-DOWN CATCH No. HC201** with holes for fastening or for welding applications. Available in plated finishes; also of brass, stainless steel, or aluminum materials.



**RECESSED HANDLE No. H560** available in steel or aluminum.



**SURFACE HANDLE No. H945** to meet Armed Forces Specification MIL-T-945.

**A VARIED LINE OF CATCHES AND HANDLES to meet commercial requirements. Descriptive literature on request. Inquiries invited on design and application problems.**

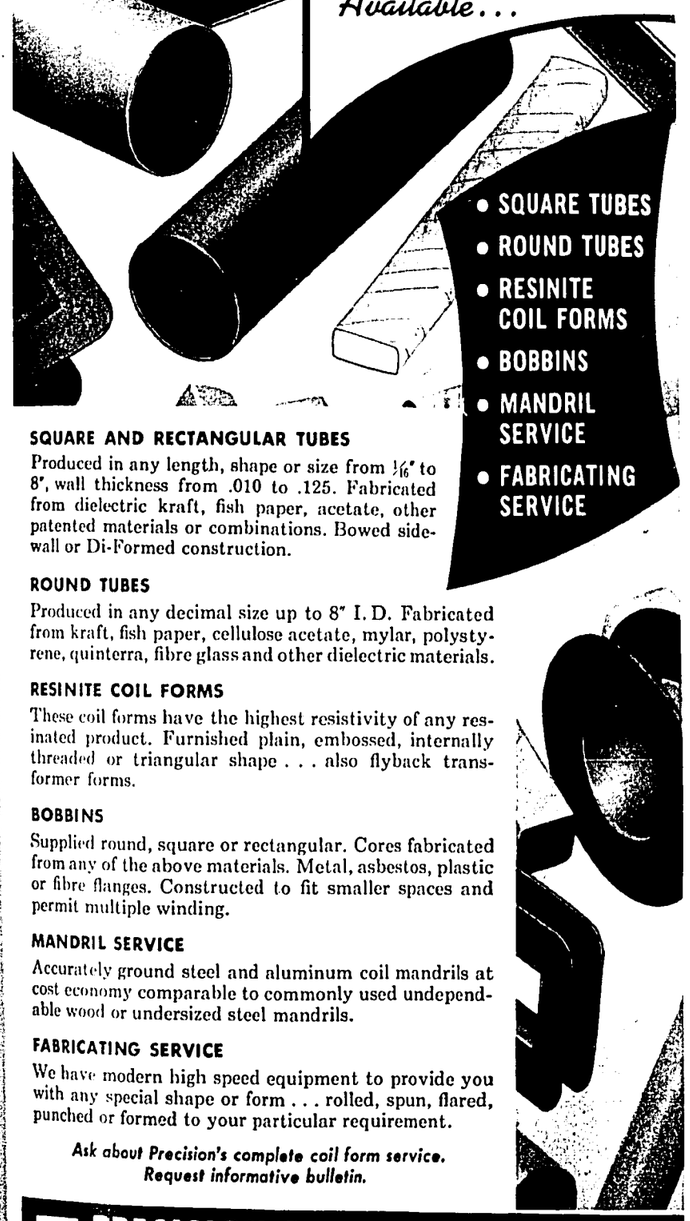
## NIELSEN HARDWARE CORPORATION
### 770 WETHERSFIELD AVE., HARTFORD 1, CONN.

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# PRECISION

*The Only* **COMPLETE COIL FORM SERVICE** *Available...*



- SQUARE TUBES
- ROUND TUBES
- RESINITE COIL FORMS
- BOBBINS
- MANDRIL SERVICE
- FABRICATING SERVICE

**SQUARE AND RECTANGULAR TUBES**
Produced in any length, shape or size from 1/16" to 8", wall thickness from .010 to .125. Fabricated from dielectric kraft, fish paper, acetate, other patented materials or combinations. Bowed sidewall or Di-Formed construction.

**ROUND TUBES**
Produced in any decimal size up to 8" I. D. Fabricated from kraft, fish paper, cellulose acetate, mylar, polystyrene, quinterra, fibre glass and other dielectric materials.

**RESINITE COIL FORMS**
These coil forms have the highest resistivity of any resinated product. Furnished plain, embossed, internally threaded or triangular shape . . . also flyback transformer forms.

**BOBBINS**
Supplied round, square or rectangular. Cores fabricated from any of the above materials. Metal, asbestos, plastic or fibre flanges. Constructed to fit smaller spaces and permit multiple winding.

**MANDRIL SERVICE**
Accurately ground steel and aluminum coil mandrils at cost economy comparable to commonly used undependable wood or undersized steel mandrils.

**FABRICATING SERVICE**
We have modern high speed equipment to provide you with any special shape or form . . . rolled, spun, flared, punched or formed to your particular requirement.

***Ask about Precision's complete coil form service. Request informative bulletin.***



## PRECISION PAPER TUBE COMPANY
**2062 West Charleston Street, Chicago 47, Illinois**
*Plant No. 2: 1 Flower Street, Hartford, Conn.*
*Representatives throughout United States and Canada*

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# Directory III. Materials & Services

## 91. Hardware & Findings

Patent Seal Co., Inc., Providence, R. I. 8
Culver City Cable Co., Culver City, Calif. 24
Del Vitro Manufacturing Co., Inc., Brooklyn, N. Y. 24
Seal-It Corp., Cincinnati, Ohio 24
Electrical Industries, Inc., Edgewood, Md. 24
Pioneer Plastics, Inc., Auburn, Me. 24
Plastic Materials & Products Co., Inc., Freeport, N. Y. 24
Plastic Molded Products Co., Inc., Brooklyn, N. Y. 24
Precision Paper Tube Co., Inc., Chicago, Ill. 24
Prestole Corp., Miami, Fla. 24
Quality Components, Inc., St. Marys, Pa. 24
Quality Coil Co., Inc., Brooklyn, N. Y. 24
Radio Frequency Laboratories, Inc., Boonton, N. J. 24
Rayfo Co., Los Angeles, Calif. 24
Reel Products, Inc., Chicago, Ill. 24

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Precision Tube Co., Inc., Phila., Pa. 24
Prestole Corp., Miami, Fla. 24
QC Components, Inc., Santa Ana, Calif. 24
Quality Coil Co., Inc., Brooklyn, N. Y. 24
Quality Metal Parts, Inc., Brooklyn, N. Y. 24
Radio Frequency Laboratories, Inc., Boonton, N. J. 24
Rayfo Co., Los Angeles, Calif. 24
Reel Products, Inc., Chicago, Ill. 24

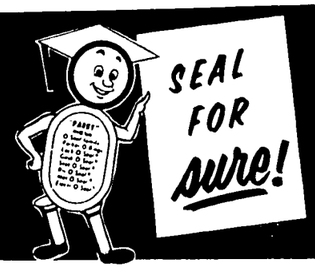
See ad on page 24

Rayway Board Co., Inc., 241-5 Chrystie St., New York, N. Y. 24
Reel Products, Inc., Chicago, Ill. 24

See ad on page 24

Rayfo Co., Los Angeles, Calif. 24
Reel Products, Inc., Chicago, Ill. 24

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom built items. Complete addresses will be found in the Alphabetical Directory, pages 151-[illegible]



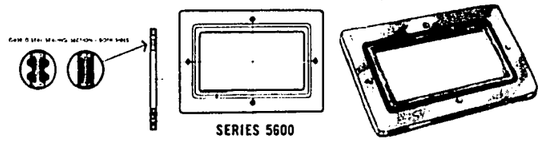

# Parker SEAL COMPANY

Culver City, California and Cleveland, Ohio

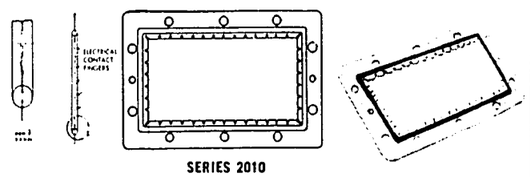
A DIVISION OF PARKER-HANNIFIN CORPORATION

## WAVE GUIDE SEALS

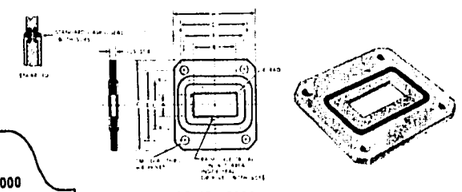
Parker Seal Company's metal retained seals are based upon controlled confinement of a seal "gland" that has a "memory", either induced or inherent. All tolerance factors of the seal are taken care of in the design and manufacture, thus obtaining significant benefits and considerable savings. This unique application of the proven theory that rubber resists deformation result in a far superior seal. These seals have all been laboratory and field tested. They are in use in many hundreds of applications throughout industry, military as well as commercial. Electro-O-Seals are especially designed to provide the ultimate in sealing effectiveness, plus complete electrical continuity for prevention of R/F leakage in wave guide or micro-wave applications—equipment, guides, "clean rooms", data machines, etc.



SERIES 5600

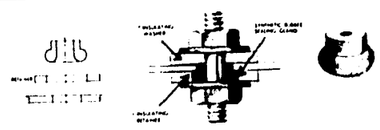


SERIES 2010



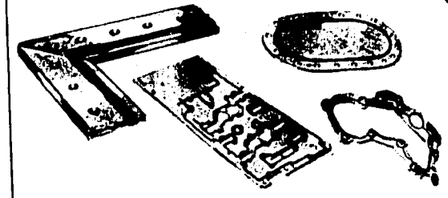
SERIES 5620

## TERMINAL SEALS SERIES 5000



Specially designed to seal the style of terminal illustrated, these seals provide sealing effectiveness with good anti-arcing conditions. The gland only is furnished and they are available as standards in sizes 4, 6, and 10, for both general purposes and extreme temperature usage.

## FLANGE & ORIFICE SEALS



Gask-O-Seals® and Strip-O-Seal are the finest seals for the purpose available. They provide positive sealing while affording many other advantages. They afford the design engineer with a design tool that allows considerable freedom from worries about leakage under difficult conditions. They can be made to meet almost any configuration requirement to seal almost any fluid, from high vacuum to 20,000 PSI, covering a temperature range from —80° to 350°F. (500° intermittent)

## BOLT AND STUD SEALS

SERIES 800

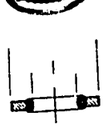
Series 800 Lock-O-Seals® provide unequalled sealing effectiveness for purposes intended. They are available in the small sizes 2 thru 6 and meet the same usage specifications as series 600.



## BOLT AND STUD SEALS

SERIES 600

Series 600 Stal-O-Seals® provide the finest mechanical sealing for bolts, studs, rivets and some other fasteners and fittings. The seal is mechanically bonded, one-piece construction with proven sealing effectiveness. They are very economical and easy to assemble. Available in sizes —8 thru 2" for nearly all types of fluids and uses from —80° to +375°F. (500° intermittent)



## O-RINGS



Parker O-rings have been proven superior in actual use. They are available in all standard sizes and in specials and in compounds to meet nearly every requirement as to fluids, recommended pressures and temperatures, meeting all military as well as industrial specifications.






# Directory III. Materials & Services

## 91. Hardware & Findings.

Reed & Prince Mfg. Co., Mass., 20s, 44s, 48s
Reeves Instrument Corp., N.Y., 18s
Remler Co., Calif., 32c, 46c
Republic Lens Co., Inc., N.Y., Mirrors c
Resinite Corp., Ill., 58c
**Richco Plastic Co., 3722 W. North Ave., Chicago 47, Ill., 14s, 20s, 54s, Tel: BElmont 5-2646**
**See ad on this page**
Richfield Coined Products Co., N.J., 28sc
Rimak, Inc., Calif., 16sc, 18c, 20c, 26c, 30c, 32c, 38c, 44sc, Breadboards, Patchboards sc
Robertshaw-Fulton Controls Co., Fulton Sylphon Div., Tenn., Shaft Seals s
**Rogan Brothers, Inc., 8009 N. Monticello, Skokie, Ill., 18s, 30s, 32s, Tel: ORchard 5-1233**
**See ad on page 690**
Rogers Mfg. Co., Dayton, Minn., 8c, 16c, 18c, 24c, 26c, 28c, 30c, 32c, 38c
Rohn Manufacturing Co., Ill., 14s, 28s, 58s
Romar Plastics, Inc., Ill., 8c
Rosan, Incorporated, Calif., 20s, 46s, 48s, 50s
Roulements Miniatures S. A., Switzerland, 12s
Sag Harbor Industries, N.Y., 8c
St. Marys Carbon Co., Pa., 10c, 12c
Schuyler Manufacturing Corp., N.J., 24sc
Sealol, Inc., R.I., 22sc, Mechanical Seals sc, Cryogenic Valves sc
Shakeproof Div., Illinois Tool Works, Ill., 20sc, 48sc, 50sc
Sillcocks-Miller Co., The, N.J., 2c, 16c, 18c, 20c, 24c, 28c, 32c, 36c, 38c, 40c
Simmons Fastener Corp., N.Y., 20s, 30s, 32s
Sittler Corp., Ill., 10sc
Slip Ring Co. of America, Calif., 8c
Smith, Inc., Herman H., N.Y., 14s, 18s, 20s, 22s, 28s, 30s, 32s, 34s, 46s, 48s, 54s
Southco Div., South Chester Corp., Pa., 20s, 44s
**Spaulding Fibre Co., 310 Wheeler St., Tonawanda, N.Y., 24c, 28c, 46c, Tel: JAckson 2000**
**See ad on page 657**
Speer Carbon Co., Speer Resistor Div., Pa., 8sc
**Stafford Mfg. Co., Inc., 153 58th St., Brooklyn 20, N.Y., 2sc, 12c, 14c, 16c, 18c, 30c, 32c, 36sc, 38sc, Tel: HYacinth 2-6000**
**See ad on page 652**
Standard Metals Corp., Mass., 58s
Standard Pressed Steel Co., Pa., 20s, 46s, 50s
Standard Screw Co., Ill., 20sc, 46s, 48s
Star Precision Devices, N.Y., 20s, 44s
Staver Co., Inc., The, N.Y., 16sc, 20c, 24c
Steel Co., Herman D., Pa., 46c, 52c
Steel Heddle Mfg. Co., Pa., 16sc, Bobbins, Stainless Steel sc
Stevens Walden, Inc., Mass., 46c
Steward Mfg. Co., D. M., Tenn., 4c
**Stewart Corp., F. W., 4311-13 Ravenswood Ave., Chicago 13, Ill., 22c, Tel: GRaceland 2-6600**
**See ad on page 653**
Stewart Stamping Co., N.Y., 14sc, 42sc
**Stimpson Co., Inc., Edwin B., 77 Franklin Ave., Brooklyn 5, N.Y., 20sc, 28s, 44sc, 48sc, Tel: ULster 5-3131**
**See ad on page 652**




"NOW AT LOW COST"

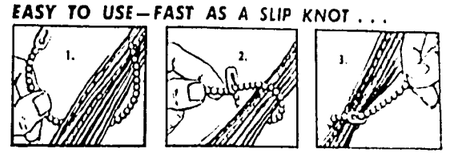
PLASTIC

E-Z

WIRE TIES

Made from Polyethylene and Nylon. Re-useable feature, easy locking. Polyethylene sizes: 4" and 10". Nylon sizes: 10".

EASY TO USE—FAST AS A SLIP KNOT . . .




SELF-LOCKING
No knotting or twisting, locks tight automatically

ADJUSTABLE
add or remove wires without damaging ties or harness

REUSABLE
can be used over and over when making mockups and prototypes

COLOR CODED
available in red, yellow and blue polyethylene, and white nylon

FREE SAMPLE UPON WRITTEN REQUEST

RICHCO PLASTIC CO.

3722 W. NORTH AVENUE CHICAGO 47, ILLINOIS

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BEARINGS

RELIABLE SUPPLIERS OF

Aircraft, Accessory and Instrument Bearings for Precision Applications

YOUR INQUIRIES SOLICITED

RAWAY BEARING CO., INC.

141-5 Chrystie Street Tel. WAlker 5-8150 New York 2, N.Y.

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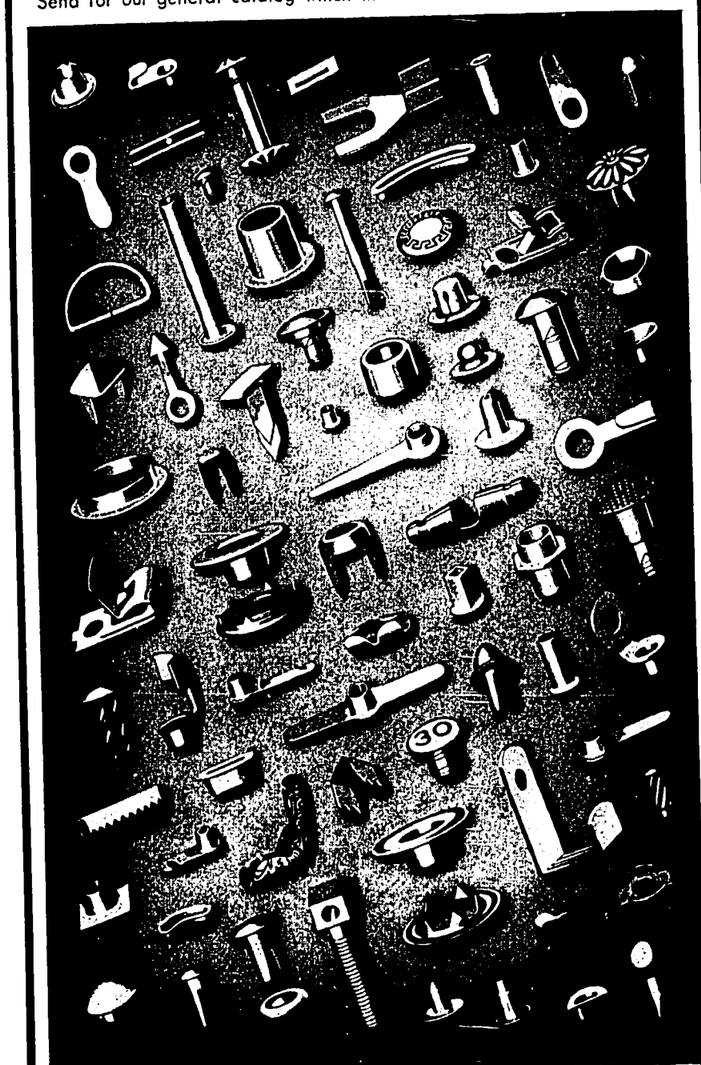

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## NOWHERE IN THE WORLD WILL YOU FIND SUCH A VARIETY OF FASTENERS UNDER ONE ROOF

EYELETS, RIVETS, GROMMETS, WASHERS, HOLE PLUGS
SNAP FASTENERS, FERRULES, TERMINALS, STAMPINGS

and many similar fasteners are made in enormous variety and quantity. Made from most any metal and in all finishes. We also make a complete line of machines for attaching eyelets, rivets, etc.

Send for our general catalog which illustrates over 1000 metal articles.



77 FRANKLIN AVENUE EDWIN B 77 FRANKLIN AVENUE
STIMPSON
BROOKLYN 5, N.Y.,U.S.A. COMPANY. BROOKLYN 5, N.Y.,U.S.A.

**77 FRANKLIN AVENUE, BROOKLYN, N. Y.**

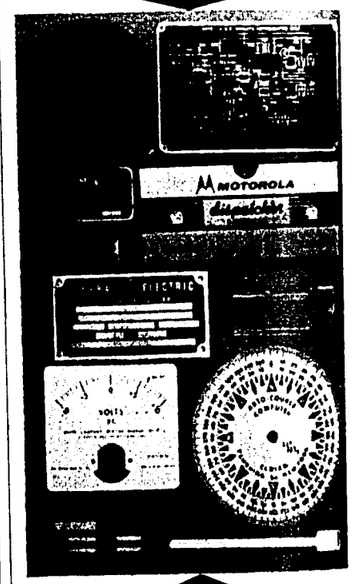
For details, circle #693 on Reader Service Card



## STAFFORD

**FOR QUALITY MARKING**

- Sharp, precision work
- Accurate to your most critical tolerances
- Uniform throughout any size run
- Meeting all government and mil-specs
- Delivery on time




**SCHEMATICS • PANELS DIALS and SCALES NAME PLATES**

Any size, shape or style. Engraved, lithographed, etched or silk-screened in any metal or plastic. Hairline accuracy assured. Approved under MIL-P-7788 for edge-lit panels and dials.

**CABLE MARKERS**

Any shape or size. Embossed, stamped, etched or engraved in aluminum, brass or stainless steel. Furnished blank, lettered or numbered. Enameled any color.

**STAFCALS**

New concept in nameplates . . . in multi-colored anodized aluminum foil. Any size, shape, color or finish. Any type adhesive backing.

**STAFFORD MFG. CO. INC**
153 58th ST . BROOKLYN 20, N Y
HYacinth 2-6000

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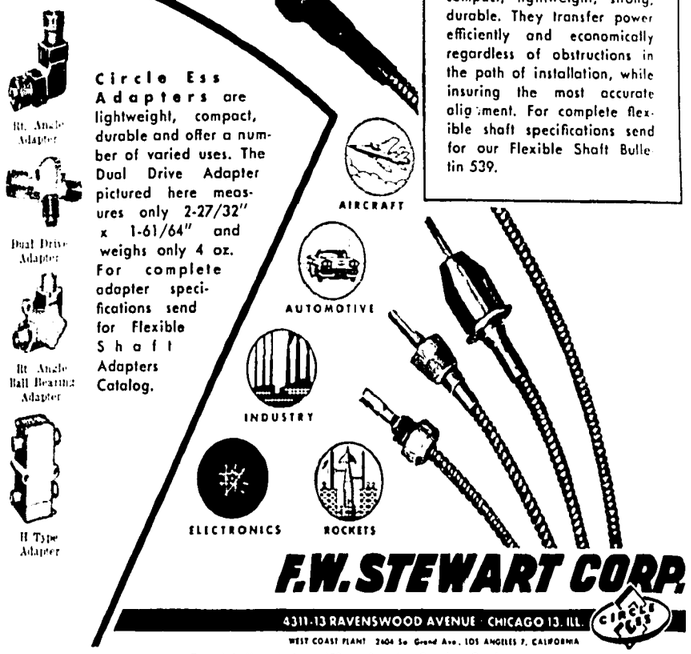


## Flexible Shafts

**FOR MANY FIELDS**

CIRCLE ESS

Circle Ess Flexible shafts are compact, lightweight, strong, durable. They transfer power efficiently and economically regardless of obstructions in the path of installation, while insuring the most accurate alignment. For complete flexible shaft specifications send for our Flexible Shaft Bulletin 539.




**Circle Ess Adapters** are lightweight, compact, durable and offer a number of varied uses. The Dual Drive Adapter pictured here measures only 2-27/32" x 1-61/64" and weighs only 4 oz. For complete adapter specifications send for Flexible Shaft Adapters Catalog.

**F.W. STEWART CORP.**
4311-13 RAVENSWOOD AVENUE · CHICAGO 13, ILL.
WEST COAST PLANT 2404 So. Grand Ave. LOS ANGELES 7, CALIFORNIA

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## 4 WAYS TO END ALL CORD AND CABLE SERVICE FAILURES *Economically*

**PROTECT YOUR PRODUCT**

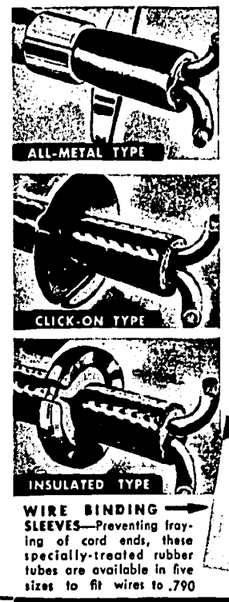
*at point of strain*

Protect product salability too—by insuring long life for cords, cables and conductors. Genuine "GRIPMASTER" Strain Reliefs provide these vital features—

- ★ Anchor cords to housing
- ★ Eliminate taping or threading
- ★ Prevent unraveling
- ★ Prevent cord pull damage
- ★ All sizes and styles
- ★ Easy to apply
- ★ Inexpensive

Gripmaster Strain Reliefs are "tremendous trifles" that make good products better!

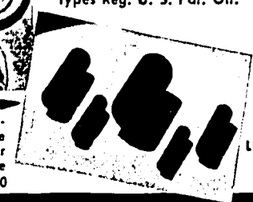
*Ask for Samples.*




**GRIPMASTER STRAIN RELIEFS**

**Interruptions due to cable and cord connection failures are eliminated because they anchor the cord to the product at the point of strain. GRIPMASTER Strain Reliefs can withstand pulls up to 100 lbs., and are acceptable to Underwriters Laboratories. All types Reg. U. S. Pat. Off.**

**WIRE BINDING SLEEVES**—Preventing fraying of cord ends, these specially-treated rubber tubes are available in five sizes to fit wires to .790



**WRITE FOR SAMPLES AND LITERATURE TODAY!**

**GEORGE WALKER COMPANY**
118 AMSTERDAM AVE., PASSAIC, NEW JERSEY

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# Directory III. Materials & Services

## 91. Hardware & Findings.

Taurus Corporation, 8 Carroll St., Lambertville, N.J., 6c, Tel: EXpress 9-3333
See ad on page 55c

[illegible]

Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 8s, 6c, Tel: MIdway 6-7211
See ads on pages 45c, 55c

Templeman Co., Inc., 10 E. [illegible], 32

Tetrad Co., Inc., The, N.Y. [illegible]

Texas Instruments [illegible] Metals & Controls Div., Mass. [illegible]

Theta Instrument [illegible] N.J. 3s

Thomas & Betts Co., Inc., The, 36 Butler St., Elizabeth 1, N.J., 14s, Tel: ELizabeth 4-4321
See ad on page 414

Thompson Bremer & Co., Div. American Machine & Foundry Co., Ill., 24s, 26se, 48se, 50c, 52c, 54

Thomson Mfg. Co., Jackson L., Mass., 44se

Thor Ceramics, Inc., N.J., 6c, 8c

Timmerman Products, Inc., Ohio, 24s, 26s, 42s, 48s, 54s

Topflight Corp., Pa., 2c

Torrington Co., The, Conn., 12s, 26s, 46c

Townsend Co., Pa., 26s, 28c, 48s, 50c

Tricon Mfg. Co., Ill., 48c

Trinity Equipment Corp., N.Y., Thomaswells 8c

Tubular Rivet & Stud Co., Mass., 2c, 44se, 48s

Tuck Mfg. Co., Mass., 32c

Uniform Tubes, Inc., Pa., 8c

Union Carbide Corp., National Carbon Co., N.Y., 8c

United Screw & Products, Inc., Ohio, 24s, 26c

United Carr Fastener Corp., Mass., 2c

United-[illegible] Mass., 2c, 2s, 2se, 4s

U. S. [illegible] Ohio, Ill., Mich., 8c

United States [illegible] Corp., 28s, 38c



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates [illegible] built items. Complete addresses will be found in the Alphabetical Directory, pages [illegible]




Lepel induction heating equipment represents the most advanced thought in the field of electronics... the most practical and efficient source of heat developed for numerous industrial applications. You are invited to send samples of work with specifications. Our engineers will process and return the completed job with full data and recommendations without cost or obligations.

**FLOATING ZONE UNIT FOR METAL REFINING AND CRYSTAL GROWING**

A new floating zone fixture for the production of ultra-high purity metals and semi-conductor materials. Purification or crystal growing is achieved by traversing a narrow molten zone along the length of the process bar while it is being supported vertically in vacumm or inert gas. Designed primarily for production purposes, Model HCP also provides great flexibility for laboratory studies.


Model HCP

*Features*

- A smooth, positive mechanical drive system with continuously variable up, down and rotational speeds, all independently controlled.
- An arrangement to rapidly center the process bar within a straight walled quartz tube supported between gas-tight, water-cooled end plates. Placement of the quartz tube is rather simple and adapters can be used to accomodate larger diameter tubes for larger process bars.
- Continuous water cooling for the outside of the quartz tube during operation.
- Assembly and dis-assembly of this system including removal of the completed process bar is simple and rapid.

WRITE FOR NEW LEPEL CATALOG
Electronic Tube Generators from 1 Kw to 100 Kw
Spark Gap Converters from 2 Kw to 30 Kw

**Lepel HIGH FREQUENCY LABORATORIES, INC.**
55th ST. & 37th AVE., WOODSIDE 77, N. Y.

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United States Steel Corp., Pa., 16s, 20s, 52s, 58s

Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 24sc, Tel: AN 1-2660
See ad on page 678

Vector Electronic Co., Inc., 1100 Flower St., Glendale 1, Calif., 16s, 20s, 42s, 48s, Breadboards, Patchboards s, Tel: CHapman 5-1076
See ad on page 544

Vemaline Products Co., N.J., 18sc, 30sc, 32sc

Video Industries Co., N.Y., 58sc

Waldes Kohinoor, Inc., N.Y., 20sc, 42sc

Waldom Electronics, Inc., Ill., 14s, 18s, 20s, 28s, 32s, 38s, 48s

Walker Co., George, 118 Amsterdam Ave., Passaic, N.J., 54, Tel: PRescott 7-3337
See ad on page 653

Walsco Electronics Mfg. Co., Div. of G-C Textron Electronics, Inc., 400 S. Wyman St., Rockford, Ill., 2s, 14s, 20s, 28s, 32s, 34s, 36s, 48s, 54s, Tel: WOodland 8-9661
See ad on page 640

Warren Components Div., El-Tronics, Inc., Pa., 48s

Waterbury Companies, Inc., Conn., 12sc, 32sc

Weckesser Co., 5713-17 Northwest Hwy., Chicago 46, Ill., 14s, 46s, 48s, Tel: RODney 3-6688
See ad on this page

Wells Electronics Co., Ind., Bobbins, Glass c

Western Coil & Electrical Co., Wis., 14s

Western Devices, Inc., 600 W. Florence Ave., Inglewood 1, Calif., 26sc, 30sc, 32sc, Tel: OREgon 8-7828
See ad on page 624

Westfield Metal Products Co Inc, Mass., 46sc, 48sc

Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 56s, Tel: REgent 9-3611
See ad on page 580

Westline Products Div., Western Lithograph Co., Calif., 2sc, 36sc

Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., Retainers sc, Tel: JUdson 2-3030
See ad on page 704

White Industrial Div., S. S., Dept. PR, 10 E. 40th St., New York 16, N.Y., 22sc, Tel: MUrray Hill 3-3015
See ad on page 682

Whitso, Inc., Ill., 8c, 14s, 32sc

Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 58sc, Tel: UNiversity 7204
See ad on page 688

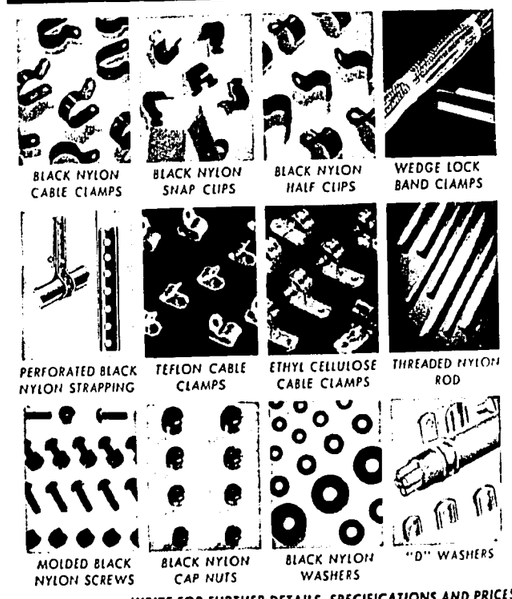
Wilmad Glass Co., Inc., N.J., Tubing, Glass c

Wilmington Fibre Specialty Co., Del., 12c, 24c, 28c, 30c, 32c, 36c

Winslow Co., Inc., The, N.J., 20s

Worcester Pressed Aluminum Corp., Mass., 14sc, 16c, 20c


**Weckesser Plastic Products**




*WRITE FOR FURTHER DETAILS, SPECIFICATIONS AND PRICES*

**Weckesser COMPANY**
5713-17 Northwest Highway • Chicago 46, Ill.

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# Directory III. Materials & Services

## 91. Hardware & Findings.

Wrought Washer Mfg. Co., Wis., 24c, 42c, 48sc

York Co., Inc., Otto H., N.J., 24c

Z & W Mfg. Corp., Electronics Div., Ohio, 4sc

Zierick Mfg. Corp., N.Y., 14s, 20s

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Headers:
See class 54

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Heat exchangers:
See class 96

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Heat sinks:
See class 104

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Heat-treating services:
See class 89

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## 92. Heating Equipment.

5. Brazing, soldering & welding
10. Di-electric heating
15. Electric heaters & elements
20. Induction heating
25. Infrared
30. Ovens

Abalon Precision Mfg. Corp., N.Y., 5c

Ackerman Gould Co., Inc., 10 Neil Ct., Oceanside, L.I., N.Y., 15sc, Tel: ORiole 8-4110
See ad on page 667

American Brasing Alloys Corp., N.Y., 5s

American Gas Furnace Co., N.J., 5s, 30c

American Instrument Co., Inc., Md., 15s

Arde Assoc., Engrg. Div., N.J., 5s

Associated Spring Corp., Conn., 15c

Associated Testing Laboratories, Inc., 115 Route 46, Wayne, N.J., 30sc, Tel: CLifford 6-2800
See ads on pages 279, 660

Atwood, Wilfred L., Ohio, 5c, 10c, 20c

BTU Engineering Corp., Mass., 5c, 30c, Constant Temp. Furnaces c

Baker Co., Inc., The, Me., Vacuum sc

Belz Industries, Inc., N.Y., 5c

Berneo Engineering Corp., Ind., 5c

Blickman, Inc., S., N.J., 30 controlled atmosphere

Blue M Electric Co., Ill., 15c, 30sc

Carborundum Co., N.Y., 15c

Cavitron Electron Oscillator Co., Calif., 10 VHF c

Ceramic Specialties Co., Inc., Ohio, High-Temp. Refractories c

Cohehn, Inc., N.J., 15s

Cole Electric Co., Calif., 15c

Controlled Atmosphere Enclosures Mfg. Co., Inc., Fla., 30sc

Cox & Co., Inc., N.Y., 15c, 30c

Cutler-Hammer, Inc., Wis., 15s, 20s

Dalweld Company, Inc., N.Y., 5s

Dee Electric Co., 1648 W. Haddon St., Chicago 22, Ill., 5sc, Tel: BElmont 5-5151
See ad on this page

Design Tool Corp., N.Y., 5s

Djordjevic Engineering Co., Dieco Div., Ill., 10c, 20c

Dominion Electrohome Industries, Ltd., Canada, 10c, 20c

Dunham-Bush, Inc., Conn., 5s

Dunton Co., The M. W., R.I., 5c

E.M.I. Electronics, Ltd., England, 10s

Eisler Engineering Co., Inc., 753 S. 13th St., Newark 3, N.J., 5c, Tel: BIgelow 3-5310
See ad on page 669

Electric Hotpack Co., Inc., The, Pa., 25sc, 30sc

Electro-Flex Heat, Inc., Conn., 15c

Electrofilm, Inc., Calif., 5c, 10c, 15c

Electronica Industrial, Ltda., Brazil, 5sc, 10sc, 20sc, 25sc

Electrovert, Inc., N.Y., 25s

Emerson Apparatus Co., Mass., 30s

Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5s, 15sc, Tel: BIgelow 2-2700
See ad on page 170

Eppley Laboratory, Inc., The, R.I., Constant Temp. s

Erdco Engineering Corp., Ill., 10sc, 20sc

Ewald Instruments, Route 7, Kent, Conn., 5sc, Tel: WAlker 7-3278
See ad on page 671

FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 5s, 20s, 30s, Tel: RAvenswood 1-9000
See ad on pages 125-128

Fasco Industries, Inc., N.Y., 15sc

Forma Scientific, Inc., Ohio, 15sc, 25sc, 30 Vacuum sc

Fusion Engineering, Ohio, 5c, 25c, 30c

General Electric Co., Apparatus Sales Div., N.Y., 15s, 20c

General Electrodynamics Corp., Tex., 10c, 20c

General Vacuum Corp., Mass., Vacuum s

Glass-Tite Industries, Inc., R.I., 5sc

Green Rectifier Co., N.J., 30c

Gruenberg Electric Co., Inc., N.Y., 15sc, 30sc

Hallett Mfg. Co., Calif., 5s

Hull Electronics, Inc., N. [illegible] St., Mechanicsburg, Pa., [illegible] Poplar 5-7511
See ad on page [illegible]

Hull Corporation, Daisyville Rd., Hatboro, Pa., Vacuum Furnaces, 1-4 OSborne 5-5[illegible]
See ad on page [illegible]

[illegible]

Industrial Electronic Engineers, Inc., Culver City, Calif., 15c

Kahle Engineering Co., 5339 Hudson Ave., Union City, N.J., 30c, Tel: UNion 7-6500
See ad on page 672

Kanthal Corp., [illegible]

Kwikheat Mfg. Co., Calif., [illegible]

Laminated Shim Co., Inc., [illegible]

Lepel High Frequency Laboratories, Inc., 55th St. & 37th Ave., Woodside 77, N.Y., 5, 20, Tel: HAvemeyer 6-4580
See ad on page 654

Lindberg Engineering Co., Ill., 5, 20, 30

Liquid Carbonic, Div. General Dynamics Corp., Ill., 5s

Litton Engineering Laboratories, P.O. Box 949, Grass Valley, Calif., 5s, 30s, Tel: 1730
See ad on page 674

Luma Electric Equipment Co., Inc., Ohio, 5s

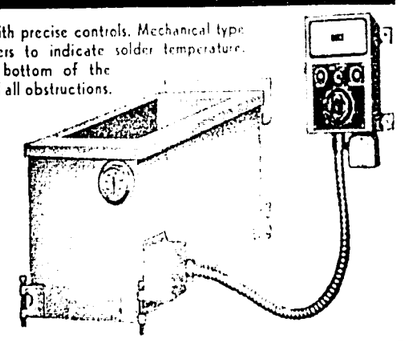
Marine Electric Corp., N.Y., 15s

Marion Instrument Div., Minneapolis-Honeywell Reg. Co., N.H., 20s


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Proven design with precise controls. Mechanical type dial thermometers to indicate solder temperature. Hydraulic thermostats. Walls and bottom of the solder cavities are smooth and free of all obstructions.

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory pages [illegible]

# Directory III. Materials & Services

## 92. Heating Equipment.

Marstan Electronics Corp., N.Y., 25c
Materials Research Corp., N.Y., 30c
McDowell Electronics, Inc., N.J., 20sc
Melpar, Inc., Special Products Dept., Va., 30c
Merco Products, Inc., Ore., 15sc, 25sc, 30c
Merit Short Wave Diathermy Company, Calif., 10s
Microwave Development Laboratories, Inc., Mass., 5sc
Miller Co., L. C., Calif., 5sc, 20sc
Minco Products, Inc., Minn., 15sc
Miskella Infra-Red Co., The, Ohio, 25sc, 30sc
Missimers, Inc., Calif., 30s
**Mittelmann, Eugene, 549 W. Washington Blvd., Chicago 6, Ill., 10c, 20c, Tel: CEntral 6-2983**
**See ad on page 629**
Modern Laboratory Equipment Co., N.Y., 15sc, 30sc
**N R C Equipment Corp., Dept. RE-A, 160 Charlemont St., Newton 61, Mass., 5c, Vacuum Furnaces c, Tel: DEcatur 2-5800**
**See ad on page 676**
New Rochelle Thermatool Corp., N.Y., 5c, 10c, 20c
Nichols, Ltd., R. H., Canada, 10c
Norton Company, Mass., 15s, High Temp. Refractories sc
Ohio Crankshaft Co., Ohio, 5c, 20sc
Ohmweve Co., Inc., The, Conn., 15s
Peeco Corp., Calif., 15sc
Philips Electronic Instruments, N.Y., 5c, 10c, 20c
Philips Electronics Industries, Ltd., Canada, 5s, 10s, 20s
Premier Research Laboratories, Inc., N.Y., 30s
Ray, Daisley Company, Inc., N.Y., 5c
Reeve Electronics, Inc., Ill., 10sc, 20sc
Research, Inc., Minn., 5sc, 15sc, 25sc, 30sc
Safeway Heat Elements, Inc., Conn., 15c
Scaico Controls, Inc., N.J., 5c, 15sc, 20c
Scientific Engineering Laboratories, Calif., 30 Vacuum sc
Selas Corporation of America, Pa., 5c, 30c
Servodyne Corp., Mass., 10c
Sherman Industrial Electronics Co., Pa., 5c, 10s, 20s
Sta-Warm Electric Co., Ohio, 15sc
Standard Telephones & Cables, Ltd., England, 5sc, 10sc, 20s
Stokes Corp., F. J., Pa., 30s
Temperature Engineering Corp., N.J., 15sc, 25sc, 30sc, Vacuum sc
Thompson Fiber Glass Co., H. L., Calif., 15c
Tricon Mfg. Co., Ill., 5sc
Tubular Rivet & Stud Co., Mass., 12sc
Union Carbide Corp., Linde Co., N.Y., 5s
Unitek Corp., Weldmatic Div., Calif., 5s Welding
**Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 30c, Tel: AN 1-2660**
**See ad on page 678**
Vacuum Specialties Co., Inc., Mass., 20c, 30c, Vacuum c
Vulcan Electric Co., Mass., 15sc, 25c
Waage Electric, Inc., N.J., 15c
Wall Mfg. Company, P., Pa., 5s
Watlow Electric Mfg. Co., Mo., 15sc
Wiegand Co., Edwin L., Pa., 15sc, 25sc, 30c
Wirekraft, Inc., Ind., 15c
Young Brothers Co., Ohio, 10c, 30c

**Hermetic sealing services:**
**See class 89**

**Hermetic seals:**
**See class 54**

**Holders, cable:**
**See class 91**

**Holders, crystal:**
**See class 49**

**Holders, fuse:**
**See class 53**

**Horns, waveguide:**
**See class 83**

**Humidity testers:**
**See class 14**

**Huts, mobile:**
**See class 84**

**Importers:**
**See class 105**

**Incandescent lights:**
**See class 62**

**Indium antimonide & indium arsenide: See class 101**

**Induction heating equipment:**
**See class 92**

**Instrument panels:**
**See class 84**

**Insulation solvents:**
**See class 95**

**Insulation testers:**
**See class 14**

**Insulators, ceramic:**
**See class 86**

**Insulators, molded:**
**See class 98**

**Insulators, vacuum tube:**
**See class 104**

## 93. Insulating Materials.

**5. Cambric sheeting**
**10. Cambric tubing**
**15. Ceramic**
**20. Cotton tapes**
**25. Fiberglas tapes**
**30. Fiberglas tubing**
**35. Glass bonded mica**
**40. Paper**
**45. Plastic**
**50. Resins**
**55. Rubber**
**60. Silicones**
**65. Synthetics**

AMP Incorporated, Pa., 45s
Ace Fabricators, Ill., 45s
Acme Wire Company, The, Conn., 5s, 25sc, 40sc, 50sc
Actioncraft Products, N.Y., 45s
**Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 30s, 45s, Tel: ALgonquin 5-5400**
**See ad on page 604**
American Insulator Corp., Pa., 45sc
**American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 15c, Tel: AMherst 5-3411**
**See ad on page 178**
American Quartz Laboratories, Inc., N.Y., 45sc, 60sc
**American Super-Temperature Wires, Inc., 10 W. Canal St., Winooski, Vt., 30c, 45c, Tel: UNiversity 2-9636**
**See ad on page 606**
Aries Laboratories, Inc., Conn., 45sc, 50s
Arlin Mfg. Co., Mass., 45sc, 50sc
Asheville-Schoonmaker Mica Co., Va., Mica sc
Associated Commodity Corp., N.Y., Mica s
Auburn Mfg. Co., Conn., 5s, 25c, 40s, 45s, 55s, 60s, 65s
Auburn Plastics, Inc., N.Y., 45c
**Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., 45s, Tel: OLiver 8-8911**
**See ad on page 278**
B&C Insulation Products, Inc., N.J., 15s, 30s
Bacon Industries, Inc., Mass., 50c, 60c
Baer Co., N. S., N.J., 45c
Bentley-Harris Mfg. Co., Pa., 10s, 30s, 60s
Biggs Co., Inc., Carl H., Calif., 50sc, 65sc
**Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 15s, 30s, 45sc, 65sc, Tel: WOrth 6-5611**
**See ad on page 607**
Bishop Mfg. Corp., N.J., 25s, 45s, 65s
Blackburn, Inc., P. W., N.Y., Quartz sc
Bo Myte Co., The, Pa., 45sc
Bonny Mfg. Corp., The, Mass., 45sc
Boonton Molding Co., N.J., 45c
Borden Chemical Co., The, N.Y., 25c, 30sc, 45sc
**Brady Co., W. H., 734 W. Glendale Ave., Milwaukee 9, Wis., 20c, 25c, 40c, 45c, Tel: EDgewood 2-8100**
**See ad on page 639**
Brand-Rex Div., William American Enka Corp., Mass., 10s, 30sc, 45sc, 60sc
Brush Beryllium Co., The, Ohio, Mica s
**CFI Corporation, Dept. IRE, Cottage Pl., Mineola, L.I., N.Y., 15c, Tel: PIoneer 6-0571**
**See ad on page 619**
Carborundum Co., The, N.Y., 15c
Carborundum Co., The, Refractories Div., N.J., 15c
Carmer Industries, N.J., 45sc

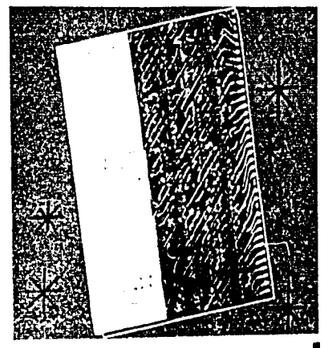




## 93. Insulating Materials.

Catalyst Research Corp., Md., 40c
Celanese Plastics Co., Div. Celanese Corp. of America, N.J., 45s
**Centralab, Electronics Div. of Globe-Union, Inc., 900A E. Keefe Ave., Milwaukee 1, Wis., 15c, Tel: WOodruff 2-9200**
**See ad on page 152**
Ceramic Specialties Co., Inc., Ohio, 15c
Chemfab Corporation, N.Y., 45c
Chemo Products, Inc., R.I., 45s
Ciba Products Corp., N.J., 50s
Cleveland Container Co., The, Ohio, 40c, 45c
Cleveland Fabricating Co., The, Ohio, 55c, 60c
Conco Plastics, Inc., N.Y., 35s, 45s, 60s
Commercial Plastics Co., Ill., 45sc
Connecticut Hard Rubber Co., The, Conn., 25s, 55 Silicone s, 60s, 65s
Continental-Diamond Fibre Corp., Del., 25sc, 30sc, 35sc, 45sc, 60sc
Coors Porcelain Co., Colo., 15c
Corkpak Co., Inc., The, N.Y., 20s, 40s
Corning Glass Works, Electrical Products Div., N.Y., 35s
Cortland Industries, Inc., Ill., 45c, 60c, 65c
Cottrell Paper Co., Inc., N.Y., 40sc
Crane Packing Co., Ill., 45s
Darrill Products Corp., Mass., 45c
Dennison Mfg. Co., Mass., 40c
Diamonite Products Mfg. Co., Div. U. S. Ceramic Tile, Ohio, 15c
Dilectrix Corp., N.Y., 45s
Dimick Mfg. Co., Ore., 45c
Dixon Corp., R.I., 45s
Dow Corning Corp., Mich., 45s, 50s, 55s, 60s, 65s
Du-Co Ceramics Co., Pa., 15c
Du Pont de Nemours & Co., E. I., Del., 45s, 50s, 65s
Duramic Products, Inc., N.J., 15sc
Electrofilm, Inc., Calif., 50sc
Electronet Div., Rue Prods., Calif., 55s, 65s
Electronic Mechanics, Inc., N.J., 35c, Mica c
Electronic Production & Development, Inc., Calif., 50sc
Emerson & Cuming, Inc., Mass., 15s, 45s, 50s
Entlo Corporation, N.J., 45sc
**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 15sc, Tel: BIgelow 2-2700**
**See ad on page 170**
Epoxy Products, Div. Joseph Waldman & Sons, N.J., 45sc, 50sc
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 15sc, Tel: GLendale 6-8592**
**See ad on pages 40-41**
Ethylene Corp., N.J., 45s
Farley & Loetscher Mfg. Co., Iowa, 45s
Ferro Corp., Louthan Plant—Refractories Div., Ohio, 15sc
Fisher & Porter Co., Pa., 45c
Fluoro Plastics, Inc., Pa., 45s
Fluorulon Laboratories, Inc., N.J., 45sc
Foote Mineral Co., Pa., 15s
Franklin Fibre-Lamitex Corp., N.Y., 10sc, 20sc, 25sc, 30sc, 40sc, 45sc, 60c
Frenchtown Porcelain Co., N.J., 15c
Furane Plastics, Inc., Calif., 45s, 50s
Garlock Electronic Products, Garlock Inc., N.J., 45sc, 55sc, 60sc, 65sc
General Electric Co., Laminated Products Dept., Ohio, 30s, 45s
General Electric Co., Silicone Products Dept., N.Y., 45s, 50s, 55s, 60s, 65s
General Gaskets, Inc., Conn., 40c, 45c, 55c, 60c, 65c
General Plastics Corp., N.J., 25s, 45s
Gentape Corporation, N.J., 25c
Goodrich Co., The B. F., Conn., 45s, 55sc, 65sc
Gore & Associates, Inc., Del., 65c
Green Rectifier Co., N.J., 50c
Haveg Industries, Inc., Del., 30c, 35c, 45c, 50c
**Hitemp Wires, Inc., 1200 Shames Dr., Westbury, L.I., N.Y., 45c, Tel: EDgewood 3-4600**
**See ad on page 608**
Hooker Chemical Corp., Durez Plastics Div., N.Y., 45s, 50s
Hysol Corp., N.Y., 45s, 50s, 65s
**Illumitronic Engineering, 680 E. Taylor St., Sunnyvale, Calif., 5s, 10s, 15s, 35s, 40s, 45s, Tel: REgent 9-2395**
**See ads on pages 400, 692**
Industrial Accessories, Inc., N.J., 60c
Industrial Electronic Rubber Co., Ohio, 55c, 60c, 65c
Industrial Plastic Fabricators, Inc., Mass., 45c
Insulating Fabricators of New England, Inc., Mass., 35c, 45c, 60c
Insulation Manufacturers Corp., Ill., 5s, 10s, 20s, 25s, 30s, 35s, 40s, 45s, 50s, 55s, 60s, 65c
Insulation Products Co., Pa., 45c
Isochem Resins Co., R.I., 35c, 45c, 50c, 55c, 60c, 65c
**Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 15sc, Tel: MIllington 7-0385**
**See ad on page 620**
Joclin Mfg. Co., Conn., Teflon tapes
Johns-Manville Co., N.Y., 20s, 25s, 40s, 45s
Johns-Manville, Dutch Brand Div., Ill., 20s, 40s, 45s, 55s, 65s
Jonesville Paper Tube Corp., Mich., 40c
Kendall Co., Polyken Sales Div., Ill., 20sc, 25sc, 40sc, 45sc
Kirchberger & Co., Inc., M., N.J., 15c
Koppers Co., Inc., Plastics Div., Pa., 45
Laminair, Inc., Calif., 25 Metallized c, 30 Metallized c
**Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 15sc, Tel: LE Roy 385**
**See ad on pages 62-63**
Lawrence Adhesive & Chemical Co., Mass., 45c, 50c
London Chemical Co., Inc., Ill., 50s
Luzerne Rubber Co., N.J., 45sc, 55sc
Macallen Co., Inc., The, N.H., 25sc, 30sc, 35sc, 40sc, 45sc, 50sc, 60sc
Malden Mfg. Co., Inc., Jamestown Exchange St., Malden 48, Mass., 5s, 15c
DAvenport 4-4148
See ad on page 4[illegible]
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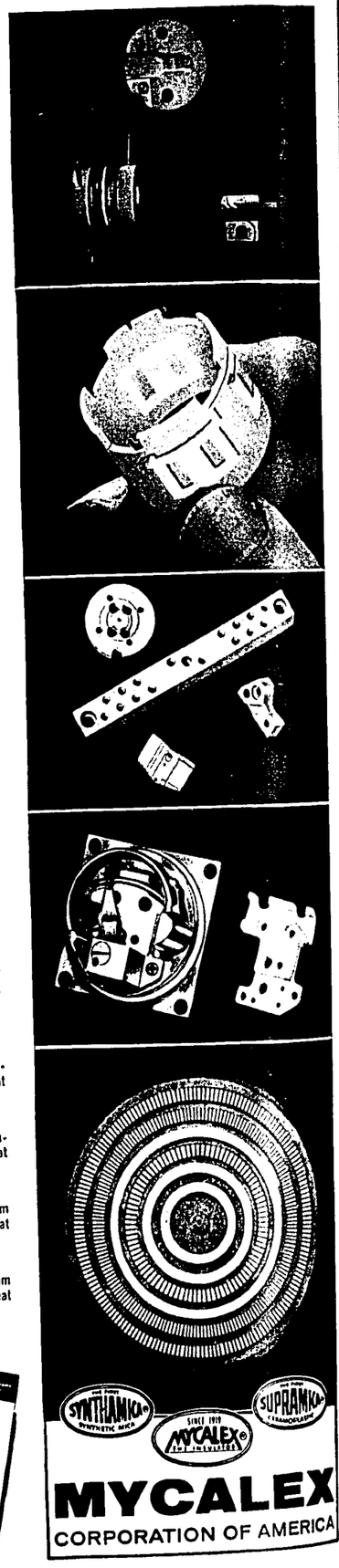


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WHATEVER YOUR HIGH-TEMPERATURE NEEDS—to 1550°F.—one of the MYCALEX family of quality insulating materials is sure to meet your most critical requirements. Each of these dependable insulating materials offers a *unique combination* of special advantages for electronic and electrical design: the *plus* factors of the inorganics *and* the design latitudes of the organics.

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Machinable insulation that withstands a maximum temperature endurance of 700°F. (unstressed) and a heat distortion temperature* of 850°F.

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Precision-molded insulation that withstands a maximum temperature endurance of 650°F. (unstressed) and a heat distortion temperature* of 690°F.

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Lightweight precision-molded insulation that withstands a maximum temperature endurance of 575°F. (unstressed) and a heat distortion temperature* of 690°F.

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Machinable insulation that withstands a maximum temperature endurance of 700°F. (unstressed) and a heat distortion temperature* of 850°F.

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Machinable insulation that withstands a maximum temperature endurance of 1550°F. (unstressed) and a heat distortion temperature* of 1360°F.

**SUPRAMICA 500 ceramoplastic**
Machinable insulation that withstands a maximum temperature endurance of 700°F. (unstressed) and a heat distortion temperature* of 900°F.

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Precision-molded insulation that withstands a maximum temperature endurance of 932°F. (unstressed) and a heat distortion temperature* of 870°F.

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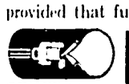





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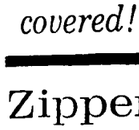
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with overlap Type 74 meets requirements of MIL-I-7444B. Type 63 meets MIL-I-631C. QPL certificates of conformance or test reports furnished on request.



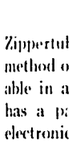
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# Directory III. Materials & Services

## 93. Insulating Materials.

Minnesota Rubber Co., Minn., 60c
Mitchell-Rand Mfg. Corp., N.Y., 45s, 50sc
**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 15sc, Tel: WAverly 6-2250**
See ad on page 452
Molded Fiber Glass Sheet Co., Ohio, 45c
Molding Corporation of America, R.I., 45c
Mosinee Paper Mills Co., Wis., 40s
Motorola, Inc., Military Electronics Div., Ariz., 15c
Moxness Products, Inc., Wis., 55sc, 60s
Murata Mfg. Co., Ltd., Japan, 15c
Murray Plastics Co., N.Y., 30sc, 45s, 60c
**Mycalex Corporation of America, 126 Clifton Blvd., Clifton, N.J., 15sc, 35sc, Tel: PRescott 9-8866**
See ad on page 658
Mykroy, Inc., Ill., 15sc, 35sc, 45sc
Mystik Adhesive Products, Inc., Ill., 25s, 45s
Narmco Materials Div., Narmco Industries, Inc., Subsid. Telecomputing Corp., Calif., 45s, 50s
Narrow Fabric Co., The, Pa., 25c, 30c
National Ceramic Co., N.J., 15c
**National Tel-Tronics Corp., 53 St. Casimir Ave., Yonkers, N.Y., 40s, 60s, Tel: YOnkers 8-6400**
See ad on page 559
National Vulcanized Fibre Co., Del., 45s
Natvar Corporation, N.J., 5s, 25s, 30s, 45s, 60s, 65s
Norrich Plastics Corp., N.Y., 30c, 35c, 45c
Northern Plastics Corp., Wis., 45c
Norton Company, Mass., 15sc
Packard Bell Electronics Corp., Calif., 15sc
**Parker Seal Co., 10567 Jefferson Blvd., Culver City, Calif., 55s, 60s, 65s, Tel: VErmont 9-1161**
See ad on page 650
Parkway Specialties Co., Mich., 45s
Paul & Stein Bros., Inc., F. H., N.Y., 45sc
Penn Fibre & Specialty Co., Inc., Pa., 40c, 45c
Pennsylvania Fluorocarbon Co., Inc., Pa., 45sc
**Perfection Mica Co., Magnetic Shield Div., 1322 N. Elston Ave., Chicago 22, Ill., 35c, 65c, Mica c, Tel: EVerglade 4-2122**
See ad on page 698
Permacel, N.J., 25s, 45s, 50s, 60s
Plastic Associates, Calif., 45sc, 50sc, 60sc, 65sc
Polymer Corp. of Pa., The, Pa., 45sc, 65sc
Porcelain Products Co., Ohio, 15c
Precision Metal Products Co. of Malden, Inc., Mass., 40s, 45s
**Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 30sc, 40sc, 45sc, 65sc, Tel: ARmitage 6-5200**
See ad on page 649
Spaulding Fibre Co., 310 Wheeler St., Tonawanda, N.Y., 45c, Tel: JAckson 2060
See ad on page 657
Spruce Pine Mica Co., Inc., N.C., 45s, Micas
Star Porcelain Co., Pa., N.J., 15c
Stevens Products, Inc., N.J., 5s, 45sc
Steward Mfg. Co., D. M., Iowa, 35
Stone City Products Co., Ind., 5s, 15c
Superior Steatite & Ceramic Corp., 89 W. Forest Ave., Englewood, N.J., 15c, Tel: LOwell 8-4555
See ad on page 621
Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass., 45sc, Tel: EMpire 5-6331
See ad on page 616
Swiss Jewel Co., Pa., 65s
Synthane Corp., Pa., 30sc, 45sc, 60sc
Synthetic Mica Co., N.J., 35s, 45s, 65s
Taylor Fibre Co., Pa., 40s, 45s, 50s, 60s
Tech-Art Plastics Co., N.J., 45c, 60s
Technical Ceramics & Lava Corp., N.J., 15
Technical Industries Corp., Calif., 15sc
Technical Tape Corp., N.Y., 20s, 25s, 45
Metallized s
Tech-Craft Co., Mass., 45s, 50s
Telecomputing Corp., Calif., 15c, 25c, 30s, 45s, 50sc, 60c, 65s
Telegraph Condenser Co., Ltd., Eng., England, 15sc
Thermal American Fused Quartz Co., N.J., Quartz sc
Thompson Fiber Glass Co., H. I., Calif., 5s, 20s, 25s, 30s, 45c
Thorn Ceramics, Inc., N.J., 15c
Tinnerman Products, Inc., N.Y., 45sc, 50s
Trans-Tech, Inc., Md., 15
Trionics Corp., P.O. Box 545, Madison 4, Wis., 15c, 45c, 50c, Tel: CEdar 8-2616
See ad on page 663
Union Carbide Corp., Linde Co., N.Y., Ceramics
Union Carbide Corp., Silicones Div., N.Y., 60s

Code numbers shown after each firm refer to product or service subdivisions listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240

# Directory III. Materials & Services

## 93. Insulating Materials.

United States Chemical Milling Corp., Calif., 30c
U. S. Dielectric Products, Inc., Mass., 45c
U. S. Stoneware Co., Alite Div., Ohio, 15c
Varflex Corp., N.Y., 10s, 30s, 45s, 60s
Victory Mica Mfg. Co., Inc., N.Y., Mica sc
Warren Wire Co., Vt., 15sc, 25sc, 60sc
Waterbury Companies, Inc., Conn., 45c
Wilmington Fibre Specialty Co., Del., 40c, 45c
Wirekraft, Inc., Ind., 45c
**Zippertubing Co., The, 752 S. San Pedro St., Los Angeles 14, Calif., 10sc, 25sc, 30sc, 45sc, 60sc, 65sc, Tel: MAdison 4-6664**
See ad on page 659
Zirconium Corp. of America, Ohio, 15sc
**Zophar Mills, Inc., 112-130 26th St., Brooklyn 32, N.Y., 65sc, Tel: SOuth 8-0907**
See ad on page 665

**Isolation pads:**
See class 81

**Jacks, jack fields & plugs:**
See class 55

**Jewels:**
See class 91

**Jewels, pilot light:**
See class 62

**Jobbers:**
See class 105

**Knobs:**
See classes 91 and 98

**Labels & tapes, adhesive:**
See class 91

## 94. Laboratories & Custom Builders.

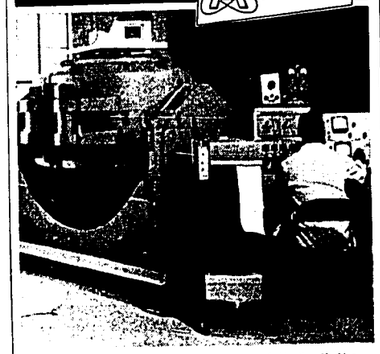
5. Individual item builders
10. Pilot run plants
15. Research & development labs
20. Subminiaturization service
25. Testing & certifying organizations

ACF Electronics Div., ACF Industries, Inc., Md., 20
APC Communication Products, Tex., 5, 15
A R & T Electronics, Inc., Ark., 15
Ace Engineering & Machine Co., Inc., Pa., 25
**Acton Laboratories, Inc., 500-B Main St., Acton, Mass., 15, 25, Tel: COlonial 3-7756**
See ad on page 346
Advanced Electronics, Inc., Conn., 5
Aeronutronic, Div. Ford Motor Co., Calif., 15
Aircraft Armaments, Inc., Md., 5, 10, 15
Aircraft Electronics, Ariz., 5, 10, 15



Airtronics International Corp., Fla., 5
**All-Tronics, Inc., 45 Bond St., Westbury, L.I., N.Y., 25, Tel: EDgewood 3-3090**
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Allied Allegri Co., Inc., N.J., 5
Allison Labs, Inc., Calif., 15
Alpha Corporation, Tex., 15
Altec Service Co., Div. Altec Companies, Inc., N.Y., 5
**American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., 15, 25, Tel: WAlnut 5-8780**
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American Hydromath Corp., N.Y., 15
American Instrument Co., Inc., Md., 5
American Research & Mfg. Corp., Md., 5, 10, 15
**Amtron Corp., 17 Felton St., Waltham 54, Mass., 5, Tel: TWinbrook 4-5020**
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Anchor Specialty Mfg. Co., N.J., 5, 15
Andersen Labs., Inc., Conn., 5, 10, 15
Ansco Division, General Aniline & Film Corp., N.Y., 5, 10, 15
Applegate & Co., C. J., Colo., 5, 15, 20
Applied Dynamics, Inc., Mich., 5, 10
Applied Magnetics Corp., Calif., 15, 20
Applied Radiation Corp., Calif., 15
Applied Technology, Inc., Calif., 15
Arde Assoc., Engrg. Div., N.J., 5, 10, 15
Ark Electronics Corp., Pa., 15, 25
Armour Research Foundation, Illinois Institute of Technology, Ill., 15
Artronic Instrument Co., The, Md., 5, 10, 15, 20


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**Associated Testing Laboratories, Inc., 115 Route 46, Wayne, N.J., 5, 25, Tel: CLifford 6-2800**
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Astra, Inc., N.C., 5, 15
Atkins & Merrill, Inc., Mass., 5
Audio Design Service, N.Y., 15
Austin Electronics, N.Y., 15
**Automatic Electric Co., Northlake, Ill., 15, Tel: FIllmore 5-7111**
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Automatic Production Research, N.Y., 10, 15, 20
Automation Engrg. Lab., Inc., Conn., 10, 15
Autometric Corp., N.Y., 15
Autonetics, Div. North American Aviation, Inc., Calif., 15
**Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., 15, 25, Tel: OLiver 8-8911**
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Avionics Corp. of America, Pa., 5, 10
BJ Electronics, Borg-Warner Controls, Calif., 15, 25
Bacon Industries, Inc., Mass., 15
Bailey, Inc., P. A., Conn., 5
Barnes Development Co., Pa., 5
Barnes Engineering Co., Conn., 5
Barnes & Reinecke, Ill., 5, 15, 20
Beck's, Inc., Minn., 10, 20
Belz Industries, Inc., N.Y., 25
Bendix Corp., The, Bendix-Pacific Div., Calif., 15
Benson-Lehner Corp., Calif., 5, 15
Bently Scientific Co., Calif., 15
Biggs Co., Inc., Carl H., Calif., 5, 15
Biophysical Electronics, Inc., Pa., 5, 15
Bjorksten Research Laboratories, Wis., 10, 15
Blaine Electronetics, Inc., Calif., 5
Blaw-Knox Co., Blaw-Knox Equipment Div., Pa., 5
**Bomac Laboratories, Inc., Salem Rd., Beverly, Mass., 15, Tel: WAlker 2-6000**
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Brocker Laboratories, Calif., 5, 10, 15
Brooks & Perkins, Inc., Mich., 5, 10
Brooks Research, Inc., N.Y., 15
Brown, Inc., Dayton T., N.Y., 15, 25 Environmental
Brunswick Instruments, N.J., 15
**Building Blocks Electronic Co., 2172 E. 36th St., Brooklyn 34, N.Y., 5, 10, Tel: CLoverdale 3-8931**
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Burnett Radio Lab., W. W. L., Calif., 5, 15, 25
Burr-Brown Research Corp., Ariz., 15
C-E-I-R, Inc., Va., Computing Services
CGS Laboratories, Inc., Conn., 5, 15, 20
C & K Components, Inc., Mass., 20
Cable Specialists of Conn., Conn., 5, 10
Campbell Co., Inc., Colin, Conn., 10
Canadian Aviation Electronics, Ltd. Canada, 15
Canadian Marconi Co., Canada, 15
Canadian Westinghouse Co., Ltd., Canada 25
Carad Corp., Calif., 5, 10, 15
Carey Electronic Engineering Co., Ohio, 15
Central Dynamics, Ltd., Canada 5, 20
Cetron Electronic Corp., Ill., 15
Chesapeake Instrument Corp., Md., 15
Chicago Aerial Industries, Inc., Ill., 15
Chicago Electronic Div., Land-Air, Inc., Ill., 5, 10, 15, 20
**Circo Ultrasonic Corp., 51 Terminal Ave., Clark, N.J., 25, Tel: FUlton 8-8600**
See ad on page 669
**Clegg Laboratories, N.J., Route 53, Mount Tabor, N.J. 5, 10, 15, Tel: OAkwood 7-6800**
See ad on page 308
Cleveland Metal Specialties Co., Ohio, 5, 20
Coils-Electronics Co., Pa., 5, 10, 15, 20
Collins Radio Co., Central Sales Office, Tex., 5, 10, 15, 20
Communications Engineering Co., Mich., 5
Computing Devices of Canada, Ltd., Canada, 15
Conap, Inc., N.Y., 15
Consolidated Vacuum Corp., N.Y., 5, 15
Continental Sound Engineering, Inc., Wis., 5
Control Data Corp., Minn., 15
Control Equipment Corp., Mass., 5, 15
Control Indicating Corp., Conn., 5, 20
Control Instrument Co., Inc., Subsid. Burroughs Corp., N.Y., 5, 15
Convair/Pomona, Convair Div. of General Dynamics Corp., Calif., 15 Missiles
Cook Electric Co., Ill., 5, 15, 20, 25
Cook Technological Center, Div. Cook Electric Co., Ill., 5, 10, 15, 25
Crown Engineering, N.M., 5, 10, 15
Daco Instrument Co., N.Y., 5, 10, 15
Dalmo Victor Co., Div. of Textron, Inc., Calif., 5, 10, 15
Datronics Engineers, Inc., Md., 10
Daven Co., The, N.J., 5, 20
Davenport Mfg. Co., Ill., 5, 10, 15
Davidson Electronic Development Co., Pa., 5
Daystrom, Inc., Military Electronics Div., Pa., 5, 15
Dayton Aircraft Products, Inc., Fla., 5, 10, 15, 25
Dayton Electronic Products Co., Ohio, 15, 20
Dietz Co., Inc., N.J., 5
DeRyder Electronics, N.J., 15, 25
Designers For Industry, Inc., Ohio, 5, 10, 15, 20, 25
Devco Engineering, Inc., N.J., 5
Developmental Engineering Corp., (DECO), D.C., 15, Antenna Design
Devol Research Corp., Conn., 15
Dewey & Co., Inc., G. C., N.Y., 15
Diamond Antenna & Microwave Corp., Mass., 5, 15
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 5, 10, 15
Dicon Corporation, N.Y., 5, 10, 15
Dielectric Products Engineering Co., Inc., Me., 15
Dimick Mfg. Co., Ore., 10
Djordjevic Engineering Co., Djeco Div., Ill., 5, 15, 20, 25
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Dunn Engineering Associates, Inc., Mass., 15
Duro Specialty Co., Inc., Mass., 5
Dwyer Engineering Co., Inc., N.H., 5, 20
E.M.I.-Cossor Electronics, Ltd., Canada, 15
Ebauches S.A., Dept. Oscilloquartz, c/o Freeport Engineering Co., N.Y., 15
Ehrenpreis, David, Consulting Engineers, N.Y., 5, 10, 15, 20, 25
**Eisler Engineering Co., Inc., 753 S. 13th St., Newark 3, N.J., 5, Tel: BIgelow 3-5310**
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Elcon Laboratory, Inc., Mass., 15
Electric Autolite Co., The, Ohio, 15
Electric Hotpack Co., Inc., The, Pa., 5
Electrical Testing Laboratories, Inc., N.Y., 15, 25
Electro-Optical Systems, Inc., Calif., 15
Electro-Physics Co., N.Y., 5, 15
Electro Radiation, Inc., Calif., 15
Electro-Seal Corp., Ill., 5
Electronic Cable Corp., Mass., 5, 20
Electronic Controls, Inc., Conn., 15
Electronic Enclosures, Inc., Calif., 15
Electronic Parts Mfg. Co., Inc., N.J., 15
Electronic Plastics Co., Calif., 20
Electronic Prototypes, Inc., Mass., 5, 10
Electronic Specialty Co., Calif., 5, 15, 20
Electronic Transistors Corp., N.J., 20
Electronics Research, N.J., 5, 10, 15
Elk Electronic Labs., Inc., N.Y., 5, 10, 15
Elzee Metal Prods. Co., Inc., N.Y., 5
**Empire Devices Products Corp., 37 Prospect St., Amsterdam, N.Y., 5, 15, Tel: VIctor 2-8400**
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Engineering Associates, Ohio, 5
Engineering Model Lab., Inc., Mass., 5, 10, 15
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 20, Tel: GLendale 6-8592**
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Espey Mfg. Co., Inc., Saratoga Industries Div., N.Y., 5, 10, 15, 20, 25
Everard Tap & Die Corp., N.Y., 5, 10, 15
**FXR, Inc., 25-26 50th St., Woodside 77, N.Y., 25, Tel: RAvenswood 1-9000**
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Fairchild Engine & Airplane Corp., Fairchild Astrionics Div., N.Y., 15
Federal Electric Corp., Div. ITT, N.J., 10
Federal Manufacturing & Engineering Corp., N.Y., 5, 10, 15, 25
**Federal Tool Engineering Co., 1400 Pompton Ave., Cedar Grove, N.J., 20, Tel: CLifford 6-5300**
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Feedback Controls, Inc., Mass., 5, 15
Felker Manufacturing Co., Calif., 5
Ferranti/Packard Electric, Ltd., Canada, 15
Filtron Co., Inc., N.Y., 15, 25
Fisher Co., Inc., Oscar, N.Y., 5
Food Machinery & Chemical Corp., Calif., 15
[illegible] Co., [illegible], 5
Foto-Video Electronics, Inc., 99 Commerce Rd., Cedar Grove, N.J., 5, 15, Tel: CEnter 9-6[illegible]
See ad on page 4[illegible]
Franklin Systems, Inc., 3754 Hillsboro Rd., P.O. Box 3259, West Palm Beach, Fla., 15, Tel: TEmple 3-4[illegible]
See ad on page 32[illegible]
[illegible] Research Corp., Md., 15
[illegible] Mfg. Co., Pa., 10
G. B. Electronics, Subsid. [illegible] Bronze Corp., N.Y., 15
Gables Engineering, Inc., Fla., 5
Gabriel Electronics Div., Gabriel Co., Millis, Mass., 5, 10, 15, Tel: FR 6-2953
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General Applied Science Labs., Inc., N.Y., 5, 10, 15
General Atomics Corp., Pa., 15
General Automatics, Inc., Calif., 5, 10, 15, 20
**General Communication Co., 677 Beacon St., Boston 15, Mass., 15, Tel: COpley 7-6030**
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General Electric Co., Defense Systems Dept., N.Y., 5, 15
**General Electric Co., Heavy Military Electronics Dept., Defense Electronics Div., Court St., Syracuse, N.Y., 20, Tel: GRanite 6-4411**
See ads on pages 263, 267, 435, 437, 501, 621
General Electronic Control, Inc., Minn., 5, 15
**General Hermetic Sealing Corp., 99 E. Hawthorne Ave., Valley Stream, L.I., N.Y., 25, Tel: VAlley Stream 5-6363**
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General Kinetics, Inc., Va., 5, 15, 25
General Testing Laboratories, Inc., N.J., 15, 25
General Time Corp., Central Research Lab., N.Y., 15
Geotechnical Corporation, The, Texas, 5, 10, 15
Giannini Controls Corp., Calif., 15
Gibbs Mfg. & Research Corp., Wis., 5, 15
Gilfillan Bros., Inc., Calif., 15, 20
Gjadny Corp., Richard, N.Y., 5
Godfrey Mfg. Co., Inc., 10
Good Electronic Corp., Fla., 5, 15, 20
Gordon Associates, Inc., N.J., 15
Gorham Electronics, Div. Gorham Mfg. Co., R.I., 15
Gow Mac Instrument Co., N.J., 5
Granger Associates, Calif., 5, 10, 15
Gray Instrument Co., Pa., 25
Hadfield, Bertram M., Mass., 5, 15
Hall Barkan Instruments, Inc., N.Y., 5
Hallicrafters Co., The, Ill., 15
Hallmark, Clyde E., Ind., 15
Hampshire Engineering Co., Mass., 5, 15
Harman-Kardon, Inc., N.Y., 15, 20
Hathaway Instruments, Inc., Colo., 15
Hazeltine Electronics Div., Hazeltine Corp., N.Y., 5, 15, 20



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Hehn, Lester C., N.Y., 15
Henry & Miller Industries, Inc., N.J., 15
Hermetic Seal Transformer Co., Div. Dresser Industries, Inc., Tex., 25
Hildebrand Co., John G., Mass., 15
Hoberman, Max, N.J., 15, 20
Hoffman Engineering Corp., Conn., 5, 25
Hoover Electronics Co., Md., 15, 20
Houston Fearless Corp., Calif., 15
Image Instruments, Inc., Mass., 15
Industrial Acoustics Co., Inc., N.Y., 15
Industrial Components, Inc., Ore., 5
Industrial Electronic Rubber Co., Ohio, 15, 20
Industrial Research Products, Inc., Ill., 15
Instron Engineering Corp., Mass., 25
Instrument Laboratories, Ill., 5, 15, 25
Instruments of New England, Mass., 5, 15
Intercontinental Electronics Corp., N.Y., 15
Interference Measurement Laboratory, Inc., N.Y., 15, 25
Interference Testing & Research Lab., Inc., Mass., 15, 25
International Electric Corp., Div. ITT, N.J., 10, 15
International Electronics Mfg. Co., Md., 10, 15
International Telephone & Telegraph Corp., ITT Laboratories, Calif., 15
International Telephone & Telegraph Corp., ITT Laboratories, N.J., 15, 20
Invengineering, Inc., N.J., 5, 15
Itek Corp., Mass., 15


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**Itemco, Inc., 16 Beechwood Ave., Port Washington, L.I., N.Y., 25 Environmental, Tel: POrt Washington 7-8420**
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Jansky & Bailey, Inc., D.C., 5, 10, 15, 25
K-W Engineering Works, Wis., 5
Kennedy & Co., D. S., Mass., 15
Kidde & Co., Inc., Walter, N.J., 5, 15, 20
Kip Electronics Corp., Conn., 5, 10, 15, 20
Knight Corp., Ewen, Mass., 15
Knopp, Inc., Calif., 15
Kollmorgen Optical Corp., Mass., 5, 15
Kroker Engineering & Development Co., Ill., 5
Kulite Semiconductor Products, Inc., N.J., 15
Kurtston Electronics, N.Y., 5, 15
L.A.B. Corp., N.Y., 25
Labko Scientific, Inc., Okla., 5, 15
Lacey Engineering & Mfg. Co., Ill., 15
Land-Air, Inc., Subsid., California Eastern Aviation, Inc., Ill., 5, 10, 15, 20
Lansky Die Cutting Corp., N.Y., 5
Lawrence Adhesive & Chemical Co., Mass., 5, 15
Lenkurt Electric Co., Inc., Calif., 15
Lessells & Associates, Inc., 5, 15, 25
Little, Inc., Arthur D., Mass., 15
**Litton Engineering Laboratories, P.O. Box 949, Grass Valley, Calif., 15, Tel: 1730**
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**Lockheed Aircraft Corp., California Div., Dept. 1810, 2402 North Hollywood Way, Burbank, Calif., Aircraft electronics, Tel: TRiangle 7-2711**
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Lyons, Leonard J., Calif., 15
**M F Electronics Co., 122 E. 25th St., New York 10, N.Y., 20, Tel: GRamercy 3-5899**
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Mackay, Inc., A. D., N.Y., 15
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MacLeod & Hanopol, Inc., Mass., 5
Madigan Electronic Corp., N.Y., 10, 15
Magnaflux Corp., Subsid. General Mills, Ill., 25
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**Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn., 5, 15, Tel: DAvis 5-1391**
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Marquardt Corp., The, Pomona Div., Calif., 5, 15, 25
Marstan Electronics Corp., N.Y., 15
Mast Development Co., Inc., Iowa, 5, 15
Materials Research Corp., N.Y., 15
Maurer, Inc., J. A., N.Y., 15
Mayberry Electronics Co., Calif., 15
**Measurements, A McGraw-Edison Div., P.O. Box 180, Boonton, N.J., 15, Tel: DEerfield 4-2131**
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Medistor Instrument Co., Wash., 15, 20
Mergenthaler Linotype Co., N.Y., 5, 15
Meridian Metalcraft, Inc., Calif., 15
Meter-Makers, Inc., Ill., 5, 25
Micromega Corp., Calif., 5, 15
Microtech, Inc., Conn., 15
Microwave Chemicals Laboratory, Inc., N.Y., 15
Microwave Development Laboratories, Inc., Mass., 15
Midwest Research Institute, Mo., 15
**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5, Tel: DAvenport 4-4108**
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Missouri Research Laboratories, Inc., Mo., 5, 15
**Mittelmann, Eugene, 549 W. Washington Blvd., Chicago 6, Ill., 15, Tel: CEntral 6-2983**
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Modern Design, Div. of H. C. Schloer, Inc., N.Y., 5, 10, 15
Modern Laboratory Equipment Co., N.Y., 5
Molding Corporation of America, R.I., 5, 20
Montek Associates, Inc., Utah, 5, 10, 15
Morecroft Design Eng., J. H., Calif., 5, 15
Motorola, Inc., Military Electronics Div., Ariz., 5, 10, 15, 20
Naniloa Corporation, Ohio, 5, 15
National Company, Inc., Mass., 15
National Radio Research Labs., N.Y., 5, 15, 20
National Scientific Laboratories, Inc., D.C., 5, 15, 20, 25
National Standard Electronics, Inc., N.Y., 5, 15
National Ultrasonic Corp., N.J., 5, 10, 15
**Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa., 5, 10, 15, Tel: HOward 5-7700**
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New York Testing Laboratories, Inc., N.Y., 10, 15, 25
Nichols, Ltd., R. H., Canada, 5
**Norrman Labs., Ernst, Williams Bay, Wis., 5, Tel: CIrcle 5-5516**
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Northwest Industries, Ltd., Canada, 5
Nuclear Electronics Corp., Pa., 5, 10, 15, 20
Olympic Radio & Television, Div. Siegler Corp., N.Y., 25
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 5, Tel: WOrth 6-0380**
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**Ostlund, Evert M., P.O. Box 458, Andover, N.J., 5, 10, 15, Tel: PArkway 9-6635**
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Owen Laboratories, Inc., Calif., 5
Pacific Technical Co., Calif., 15
Page Communications Engineers, Inc., Subsid. Northrop Corp., D.C., 15
Paktron Division, Illinois Tool Works, Va., 5, 10, 15, 20
Palomar Scientific Corp., Calif., 15
Pam Associates, Inc., Md., 5, 10, 15, 25
Parke Mathematical Laboratories, Inc., Mass., 15
Parks Laboratory, Henry Francis, Wash., 5
Parzen, Benjamin, N.Y., 15, 25





# Directory III. Materials & Services

## 94. Laboratories & Custom Builders.

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Pegasus Laboratories, Inc., Mich., 15
Pennsylvania Tool & Mfg. Co., The, Pa., 15
Performance Measurements Co., Mich., 5
**Peschel Electronics, Inc., Towners, R.F.D. #1, Patterson, N.Y., 5, 25, Tel: TRinity 8-3251**
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Pesco Products Div., Borg-Warner Corp., Ohio, 5, 15
**Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass., Computing Service, Tel: COmmonwealth 6-5375**
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**Philco Corporation, Lansdale Div., Dept. 504, Church Rd., Lansdale, Pa., 15, 20, Tel: ULysses 5-4681**
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Piezo Products Co., Mass., 15
Pitometer Log Corp., N.Y., 15, 20
Planer Ltd., G. V., England, 15
Plastics & Electronics Corp., N.Y., 20
Precision Microwave Corp., Mass., 5, 10, 15
Process & Instruments, N.Y., 5, 15
Pyromet Co., Calif., 15 Metals
**R S Electronics Corp., 435 Portage Ave., Palo Alto, Calif., 15, Tel: DAvenport 1-1130**
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Radiation Electronics Co., Ill., 5, 15
Radio Corp. of America, Astro-Electronic Products Div., N.J., 10, 15
**Radionics, Inc., 76 Cambridge St., Burlington, Mass., 5, 10, 15, Tel: BRowning 2-1233**
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Ramage & Miller, Inc., Calif., 15, 25
Rank Cintel, Ltd., England, 5, 15
Raytheon Co., Industrial Components Div., Mass., 20
Raytheon Co., Missile Systems Div., Mass., 15
Rectico, Inc., N.J., 5
Reed Research, Inc., D.C., 5, 15
Republic Electronic Industries Corp., N.Y., 5, 10, 15, 20, 25
Research, Inc., Minn., 15
Research Industrial Laboratory of Electronics, Pa., 5, 15
Riverbank Laboratories, Dept. of Engineering, Ill., 15
**Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md., 5, 15, Tel: LOckwood 5-4578**
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Robinette Co., W. C., Calif., 15
Rockwell Engineering Co., Ind., 25
Rosenberg Associates, Paul, N.Y., 5, 15
Ross & Associates, Donald, Mo., 15, 25
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Round Hill Associates, Inc., N.Y., 15
Ruckelshaus Laboratories, Inc., John G., N.J., 5, 15
Ryan Electronics, Div. Ryan Aeronautical Co., Calif., 15
S & B Machine & Tool Co., Inc., N.J., 5, 15
St. John X-Ray Laboratory, N.J., 25 Radiation
Sams & Co., Howard W., Ind., 25
Saville Ra Tele Nics Labs., Ky., 15
Schoene Electronics Laboratory, Ind., 5
Seg Electronics Co., Inc., N.Y., 5, 15, 25
Seiscor, Div. Seismograph Service Corp., Okla., 5, 10, 15
Sel-Rex Corp., N.J., 5, 10, 15
Shepard Laboratories, Inc., N.J., 5, 15
Shores Laboratories, N.Y., 15
Sickles Div., F. W., General Instrument Corp., Mass., 5
**Sierra Research Corp., P.O. Box 22T, Buffalo 25, N.Y., 5, 15, Tel: NF 2-8823**
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Sigma Electronics Research Corp., Wash., 15
Sillcocks-Miller Co., The, N.J., 5
Sinclair Radio Labs., Inc., N.Y., 15
Skiatron Electronics & Television Corp., N.Y., 15
Smith Electronics, Inc., Ohio, 15, 25
Solatron, Inc., Mass., 15
Southwest Products, Inc., Tex., 5, 10, 15
Southwest Research Institute, Tex., 15
Space Electronics Corp., Calif., 5, 10, 15, 20
Specialties, Inc., N.Y., 5, 15
Specialty Electronics Development Corp., N.Y., 15
Spectra Electronics Corp., Div. Douglas Microwave Co., Inc., N.Y., 5, 10, 15
Spectralab Instruments, Calif., 15
Sperry Gyroscope Co., Sunnyvale Development Center, Calif., 15
**Sperry Microwave Electronics Co., Div. Sperry Rand Corp., P.O. Box 1828, Clearwater, Fla., 15, Tel: REdwood 6-4161**
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Sperry Products Co., Div. Howe Sound Co., Calif., 15, 25
Standard Electric Time Co., The, Mass., 5
Stanford Research Institute, Calif., 15
State Testing Laboratory, Inc., Conn., 5, 15, 25
Sylvania Electric Products Inc., Special Tube Operations, 500 Evelyn Ave., Mountain View, Calif., 15, Tel YOrkshire 8-6211
See ad on pages 45-47
Synthetic Mica Co., N.Y., 15
Systems Labs Corp., Calif., 15
TRAK Electronics, Div. COS Laboratories, Conn., 5, 15, 25
Technograph Printed Electronics, Inc., N.C., 15
Technology Instrument Corp. of Calif., Calif., 25
Technology Instrument Corp., Mass., 5, 15, 20, 25
Telechrome Mfg. Corp., N.Y., 5, 10, 15
Telecomputing Corp., Calif., 15, 20, 25
Telecontrol Corp., N.J., 5, 10, 15
Telephonics Corp., N.Y., 15
**Telex, Inc., 1633 Eustis Ave., Telex Park, St. Paul 1, Minn., 15, Tel: MIdway 6-7211**
See ads on pages 456, 556
Teltronics, Inc., 277 Main St., Nashua, N.H., 5, 15, Tel: TUxedo 2-6264
See ad on page 337
Thermo Electron Engineering Corp., Mass., 15
Thompson & Co., John I., D.C., 5, 15
Tocco Metal Products, Inc., N.Y., 5
Topper Mfg. Co., Inc., N.Y., 15, 20
Trans-Tech, Inc., Md., 15
Transistor Applications, Inc., Mass., 5, 10, 15
Transval Electronics Corp., Calif., 5
Trepac Corp. of America, 30 W. Hamilton Ave., Englewood, N.J., 10, 15, 20, Tel: LOwell 7-3810
See ad on page 520
Tri-Dex Co., Calif., 5, 10
Trio Laboratories, Inc., Dept. IRE-61, Plainview, L.I., N.Y., 5, 15, 20, Tel: OVerbrook 1-0400
See ad on page 294


MATERIALS—APPLICATIONS—PROTOTYPES
FOR THE ELECTRONICS INDUSTRY

TRIONICS CORPORATION

| FIELDS | SERVICES |
|---|---|
| Ceramics & Metallurgy | Research & Development |
| Industrial Chemistry | Consulting |
| Electronics & Applied Physics | Systems Analysis |

P. O. BOX 548, MADISON 1, WISCONSIN

For details, circle #705 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

HumiSeal

PROTECTIVE

INSULATING

COATINGS

for electronic applications

HumiSeal protects electronic components and assemblies from, temperature extremes, humidity, fungus attack, dust, saline atmospheres and other environmental stresses.

A HumiSeal "Selector Chart" is available to facilitate the choice of coating best suited for the requirements. Columbia Technical's staff of chemists and engineers will gladly assist in recommending a standard or custom-formulated coating for any electronic application.

Write for data.

Columbia Technical CORPORATION
61-02 Thirty-first Avenue
Woodside 77, N. Y.
AStoria 8-7401

For details, circle #706 on Reader Service Card




Trionics Corp., P.O. Box 548, Madison 1, Wis., 5, 10, 15, 20, Tel: CEdar 8-2616
See ad on page 663

Trott Electronics, Inc., N.Y., 5, 15
Trought Associates, Inc., N.J., 10, 15
Ultronix, Inc., Calif., 5, 15, 20
United Aircraft Corp., Sikorsky Aircraft Div., Conn., 15
U. S. Controls, Inc., N.Y., 5
U. S. Dielectric Products, Inc., Mass., 5
United States Testing Co., Inc., N.J., 5, 15, 20, 25
Universal Match Corp., Armament Div., Mo., 5, 15, 20
Varo Mfg. Co., Inc., Tex., 5, 10, 15, 20
Videon Electronics Corp., Ind., 15, 25
Vinco Electronics Corp., Conn., 5, 10, 15
Vinson Co., E. R., Calif., 5
Virginia Electronics Co., Inc., D.C., 5, 10, 15
Waber Electronics, Inc., Pa., 5, 10, 15
Walkirt Co., Calif., 15, 20
Walsh Engineering Co., N.J., 15
Waters Mfg., Inc., Mass., 25
Wells Electronics Co., Ind., 5, 10, 15
Western Union Telegraph Co., The, N.Y., 15
Westlab, Inc., N.Y., 5, 15
Westronics of California, Calif., 10, 15, 25
Wheeler Automation Co., N.Y., 5, 15
Wheeler Laboratories, Inc., 122 Cutter Mill Rd., Great Neck, L.I., N.Y., 5, 15, Tel: HUnter 2-7876
See ad on this page
Wilcox Electric Co., Inc., Wilcox Magnetics Div., 14th and Chestnut, Kansas City 27, Mo., 5, 10, 15, 20, 25, Tel: BEnton 1-0700
See ad on page 573
Wind Turbine Co., 248 E. Market St., West Chester, Pa., 15, Tel: OWen 6-3110
See ad on page 377
Wintronics, Calif., 5, 15, 20
Wright Equipment Corp., N.J., 5
Wyle Laboratories, Calif., 15, 25
Wyle-Parameters, Inc., N.Y., 15, 25 Environmental
York Research Corp., Conn., 15, 25
Zenith Plastics Co., Subsid. Minnesota Mining & Mfg. Co., Calif., 25

**Lacing cord & tape:**
**See class 91**

## 95. Lacquers, Chemicals & Compounds.

5. Chemicals
10. Coil dope
15. Conductive coatings
20. Finishing & protecting lacquer
25. Fungus preventatives
30. Graphite—colloidal
35. Insulation solvents
40. Moisture proofing
45. Salt spray resistive
50. Sealing & potting compounds

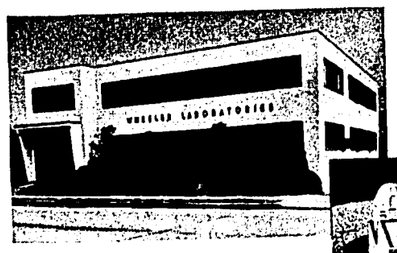
Acme Wire Company, The, Conn., 20s, 25s, 40c, 45s, 50sc
Allied Chemical Corp., General Chemical Div., N.Y., 5s


In the field of microwave engineering, Wheeler Laboratories occupies a unique position as an industrial laboratory devoted exclusively to consulting and development.

As a service to many prominent laboratories and manufacturers, WL designs radar and communication antennas, waveguide components, and microwave assemblies. Your inquiries are invited.

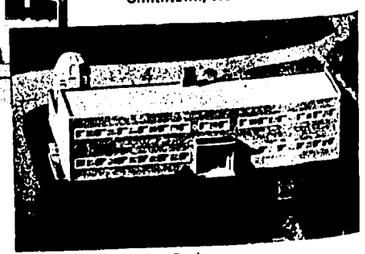
WHEELER LABORATORIES, INC.

ON LONG ISLAND/A SUBSIDIARY OF HAZELTINE CORPORATION



Main Office and Microwave Laboratory Great Neck, New York

Antenna Laboratory and Test Range Smithtown, New York



WL HAROLD A. WHEELER and Engineering Staff

For details, circle #707 on Reader Service Card






# Directory III. Materials & Services

## 95. Lacquers, Chemicals & Compounds.

Ambroid Co., Inc., Mass., 5sc, 10sc, 15sc, 20sc, 25sc, 40sc, 50sc
American Products Mfg. Co., La., 20s, 35s, 50s
American Sealants Co., Conn., 50s
Armstrong Cork Co., Pa., 50s
Armstrong Products Co., Ind., 50sc
Auburn Plastics, Inc., N.Y., Vinyl Coatings s
Bacon Industries, Inc., Mass., 50s, Production Solvents s
Baker Chemical Co., J. T., N.J., Reagents s
Barco Chemical Prods. Co., Ill., 5s, Production Solvents s
Barium & Chemicals, Inc., Ohio, 5s Tube
Barta-Griffin Co., Mass., Marking Compounds sc
Barton Mines Corp., N.Y., Abrasives sc, Lapping Compounds sc
Bel Fuse, Inc., N.J., 15s
Biggs Co., Inc., Carl H., Calif., 15sc, 35sc, 40sc, 50sc
Bischoff Chemical Corp., N.Y., 20, 50
Bishop & Co., J., Pa., 5sc Electroplating
Biwax Corp., Ill., 50, Epoxys, waxes, asphalts
Black Light Eastern Corp., N.Y., Fluorescent Paint sc
Borden Chemical Co., The, N.Y., 5c, 20c, 50c
Brooks Research, Inc., N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 50sc
Brush Beryllium Co., The, Ohio, 5 Beryllium s
Caig Labs., N.Y., 5s, Cleaning Compounds sc
Coast Pro-Seal & Mfg. Co., Calif., 50
Cobehn, Inc., N.J., Cleaning Compounds s
Columbia Technical Corp., 61-02 31st Ave., Woodside 77, N.Y., 20s, 40s, Tel: AStoria 8-7401
See ads on pages 434, 664
Connecticut Hard Rubber Co., The, Conn., 50 Silicone s
Cratex Mfg. Co., Calif., Abrasives s
Davis Electronics, Inc., Calif., 50s
Division Lead Co., Ill., Production Solvents s
Dixon Crucible Co., Joseph, N.J., 30sc
Dow Corning Corp., Mich., 10s, 40s, 50s
Du Pont de Nemours & Co., E. I., Del., 5s, Production Solvents s
Dwyer Engineering Co., Inc., N.H., 15sc
Electric Soldering Iron Co., Inc., Conn., 50s
Electro Chemical Co., N.Y., 25s
Electrochemical Inds., Inc., Mass., 15c
Electrofilm, Inc., Calif., 15sc, 30sc, 35sc
Electronic Chemical Corp., N.J., 5s, 15s, 40s, Cleaning Compounds s
Electronic Production & Development, Inc., Calif., 35sc, 50sc
Emerson & Cuming, Inc., Mass., 10s, 15s, 25s, 35s, 40s, 45s, 50s
Fidelity Chemical Products Corp., N.J., 5s, 15s, 50s
Foote Mineral Co., Pa., 5 Lithium s, 50s
Franklin Fibre-Lamitex Corp., N.Y., 50sc
Furane Plastics, Inc., Calif., 25s, 35s, 40s, 45s, 50s
G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5s, 10s, 25s, Tel: WOodland 5-9661
See ad on page 640
General Electric Co., Lamp Metals & Components Dept., Ohio, 5s
General Electric Co., Silicone Product Dept., N.Y., 40s, 50s
General Plastics Corp., N.J., 15s, 30s, 45s
Goodrich Industrial Products Co., B. F., Ohio, 50s
Grafo Colloids Corp., Pa., 30s
Green Rectifier Co., N.J., 50c
Hi-Test Chemical Corp., N.Y., 40s, 50s
Hunt Co., Philip A., N.J., Production Solvents s
Hysol Corp., N.Y., 15s, 20s, 50s
Industrial Electronic Rubber Co., Ohio, 50c
Industrial Plastic Fabricators, Inc., Mass., 50c
Insulation Manufacturers Corp., Ill., 20s, 25c, 40s, 50sc
[illegible] Research [illegible] 25s, 35s [illegible]
[illegible] Corp. of America [illegible] 35s
[illegible] Materials Div., Beech-Nut, Inc., 5s
Kester Solder Co., 4204 Wrightwood Ave., Chicago 39, Ill., 35s, Tel: BEDmont 5-1661
See ad on page 709
Korfund Co., Inc., 22D Cantiague Rd., Westbury, L.I., N.Y., Damping Compounds sc, Tel: RAvenswood 9-7580
See ad on page 587
Krylon, Inc., Pa., 5s, 20s, 25s, 40s, 45s
LMB-Heeger, Inc., Calif., 45s
Lawrence Adhesive & Chemical Co., Mass., 40c, 45sc, 50sc
Liquid Carbonic, Div. General Dynamics Corp., Ill., Low Temp CO Gases sc
London Chemical Co., Inc., Ill., 5s, 20s, 35s, 40s, 45s, 50s
Mackay, Inc., N. D., N.Y., 5s, 15s, 30s
Marblette Corp., The, N.Y., 20s, 50sc
Materials for Electronics, Inc., N.Y., 5sc, 15sc


ZOPHAR

WAXES

COMPOUNDS

Zophar Waxes, resins and compounds to impregnate, dip, seal, embed or pot electronic and electrical equipment or components of all types; radio, television, etc.

Cold flows from 100°F. to 285°F. plain or fungicidal.

Special waves non-cracking at 76°F.

Let us help you with your engineering problems. For immediate service contact:

L. E. Mayer, Sales Manager
A. Saunders, Technical Director
H. Saunders, Chemical Laboratory
PHONE: SOuth 8-0907

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ZOPHAR MILLS, INC.
112-130 26th Street,
Brooklyn 32, N. Y.

For details, circle #708 on Reader Service Card


Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# Directory III. Materials & Services

## 95. Lacquers, Chemicals & Compounds.

Melpar, Inc., Special Products Dept., Va., 20sc, 25sc, 40sc, 45sc, 50sc, Marking Compounds s
Mesa Plastics Co., Calif., Production Solvents s
Metal & Thermit Corp., N.J., 5s, 15s, 20s, 25s, 45s
Micro-Circuits Co., Mich., 15sc, 20s, 45s
Minnesota Mining & Mfg. Co., Chemical Div., Minn., 5s, 50s, Coolants s
Minnesota Mining & Mfg. Co., Magnetic Products Div. & Electrical Prods. Div., Minn., 10sc, 20sc, 50sc
Mitchell-Rand Mfg. Corp., N.Y., 45sc, 50sc
Mona Industries, Inc., N.J., 5s, 35s, 50s, Cleaning Compounds s
Monsanto Chemical Co., Mo., 5s, Coolants s, Liquid Dielectrics s
Moyen Co., C. P., Ill., 10c, 20c, 50c
Narmco Materials Div., Narmco Industries, Inc., Subsid. Telecomputing Corp., Calif., 50s
Norton Company, Mass., 50s, Abrasives s
Optical Coating Laboratory, Inc., Calif., Optical Coatings c
Pancro Mirrors, Inc., Calif., 15c, Vacuum-Metallized Coatings c
Peeco Corp., Calif., 50sc
Permacel, N.J., 50s
Pettinos Graphite Corp., Charles, N.Y., 15s
Pilot Chemicals, Inc., Mass., Scintillation Chemicals sc
Plastic Associates, Calif., 15sc, 20sc, 35sc, 40sc, 45sc, 50sc
Polymer Corp. of Pa., The, Pa., 20sc, 45sc
**Profile Electronics, Inc., 6 Bridge St., Concord, N.H., Vacuum-Metallized Coatings c, Tel: CApitol 4-1232**
**See ad on page 404**
Ram Chemicals, Inc., Calif., 5s, 20s, 50s, Production Solvents s
Reichhold Chemicals, Inc., N.Y., 50s
Republic Aviation Corp., N.Y., 15c
Resin Consultants & Mfg. Co., Inc., N.Y., 5sc, 25s, 35s, 40s, 45s, 50s, Production Solvents sc
Robins Industries Corp., N.Y., 5s
Rubber & Asbestos Corp., N.J., Bonding Compounds s
Sauereisen Cements Co., Pa., 10s, 15s, 50s
**Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 50c, Tel: WHite Plains 9-4757**
**See ad on page 615**
Shanda Labs., N.J., 5c
Shipley Company, Inc., Mass., 5s, 15s
State Testing Laboratory, Inc., Conn., 5c
Stieh Chemicals, Inc., N.Y., Decontaminants c
Stokes Corp., F. J., Pa., 15s
Swift Textile Metalizing & Laminating Corp., Conn., 15s
Sylvania Electric Products Inc., N.Y., 5s, 15s
**Technic, Inc., P.O. Box 965, Providence 1, R.I., 5s, 15s, Tel: ST 1-6100**
**See ad on page 686**
Technicraft Co., Mass., 50s
Tempil Corp., N.Y., Thermal Compounds sc
Thomas Electronics, Inc., N.J., 15s, 20s
Trans-Tech, Inc., Md., 15c
**Trionics Corp., P.O. Box 548, Madison 1, Wis., 15c, 40c, 45c, 50c, Tel: CEdar 8-2616**
**See ad on page 663**
Ultra Violet Products, Inc., Fluorescent Paint sc
**Ultrasonic Industries, Inc., Dept. 57-IRED-60, 141 Albertson Ave., Albertson, L.I., N.Y., Production Solvents sc, Tel: PIoneer 1-4333**
**See ad on page 679**
Union Carbide Corp., Silicones Div., N.Y., 5s, 15s, 20s, 40s, 45s, 50s
United States Steel Corp., Pa., 5s
Var-Lac-Oid Chemical Co., N.Y., 5
Vickers, Inc., Electric Products Div., Mo., 15
Waldom Electronics, Inc., Ill., 20s
**Walsco Electronics Mfg. Co., Div. of G-C Textron Electronics, Inc., 400 S. Wyman St., Rockford, Ill., 5s, 10s, 15s, 20s, 25s, Tel: WOodland 8-9661**
**See ad on page 640**
Western Gold & Platinum Co., Calif., 15c
Wheelabrator Corp., Ind., Cleaning Abrasives c
**Zophar Mills, Inc., 112-130 26th St., Brooklyn 32, N.Y., 25s, 40s, 45s, 50s, Tel: SOuth 8-0907**
**See ad on page 665**

**Laminations, core material:**
**See class 48**

**Laminations, plastic:**
**See class 99**

**Lead wires, tube:**
**See class 104**

**Leads, test:**
**See class 55**

**Lenses, infrared:**
**See class 17**

**Lenses, television camera:**
**See class 34**

**Lighting equipment, studio:**
**See class 34**

**Lighting equipment, tower:**
**See class 39**

**Lights, pilot:**
**See class 62**

**Complete addresses are supplied in the product sections of this directory for those firms who have placed advertisements in this issue. For addresses and phone numbers of non-advertisers, see the Alphabetical Directory, pages 135-240.**

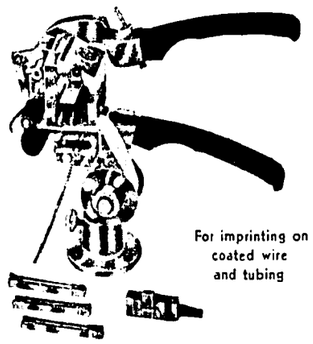
## 96. Machinery & Tools.

2. Aluminizers
4. Battery chargers
6. Coil winding machines
8. Crystal furnaces
10. Dehydrators
12. General production machinery & tools
14. Magnetizers
16. Marking & engraving machines
18. Molding machinery
20. Printed circuit machinery
22. Soldering irons & guns
24. Tension devices
26. Ultrasonic drills
28. Ultrasonic cleaners
30. Ultrasonic solderers
32. Vacuum tube machinery
34. Vacuum pumps
36. Vibration exciters
38. Welders & brazers
40. Wire strippers

ACF Electronics Div., ACF Industries, Inc., Md., Electronic Weighing Equipment sc
AMP Incorporated, Pa., 12s, 20s, 24s, 40s
Accessory Controls & Equip. Corp., Conn., 10sc, Demineralizers sc
**Ackerman Gould Co., Inc., 10 Neil Ct., Oceanside, L.I., N.Y., 16c, Tel: ORiole 8-4110**
**See ad on page 667**
**Acme Electric Corp., 44 Water St., Cuba, N.Y., 4sc, Tel: CUba 4**
**See ad on page 476**
Acoustica Associates, Inc., N.Y., 28sc
Acromark Co., N.J., 16c
Adre Company, Wis., Burnishers sc
Advance Electronics Co., Mich., 12 Demagnetizers, TV Tube Envelope sc
Aeroflex Corp., The, Aeroflex Laboratories Div., N.Y., 36s
Aeroprojects, Inc., Pa., 30c, 38 Ultrasonic c
Affiliated Manufacturers, Inc., N.J., 12 Miniature Parts Gagers & Feeders c
Air-O-Tronics Engineering Co., Calif., 12 Pin Straightener sc
Aircraft Electronics, Ariz., 4c, 14c
Alcar Instruments, Inc., N.J., 28sc, 30sc
Alden Systems Co., Mass., 12 Work Systems c
All American Tool & Mfg. Co., Ill., 36s, Filing Machines s
Allied Research Assoc., Inc., Mass., 36c
American Electrical Heater Co., Mich., 22s
**American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn., 4sc, Tel: CApital 2-3791**
**See ad on page 472**
Apex Machine Co., N.Y., 16sc
Applied Dynamics Corp., Mass., 10s, 34s
Applied Electro Mechanics, Inc., Va., 16c
Argonne Electronics Mfg. Corp., N.Y., 4s, 40s
Armstrong Products Co., Ind., 12 Coating sc
Arnhold Ceramics, Inc., N.Y., 12 Compacting Presses s
Arnold Magnetics Corp., Calif., 6sc
**Artos Engineering Co., 2735 S. 28th St., Milwaukee 46, Wis., 12 Terminal Attaching s, 40s, Tel: MItchell 5-6010**
**See ad on page 667**
Associated American Winding Machinery, Inc., N.Y., 6s, 24s
Associated Engineering & Mfg. Corp., N.J., 32c, 34c
Associated Spring Corp., Conn., 24c
**Associated Testing Laboratories, Inc., 115 Route 46, Wayne, N.J., 36s, Tel: CLifford 6-2800**
**See ads on pages 279, 660**

Atlantis Electronics Corp., Texas, 6sc
Automatic Production Research, N.Y., 20c
Automation Engrg. Lab. Inc., Conn., 12c
Automation Management, Inc., Mass., 12c
**Avco Corp., Research & Advanced Development Div., 201 Lowell St., Wilmington, Mass., 12 Coating c, 24c, 36c, Tel: OLiver 8-8911**
**See ad on page 278**
Baker Co., Inc., The, Maine, 12 Bearings sc, Dry Boxes sc
Baldwin-Lima-Hamilton Corp., Electronics & Instrumentation Div., Mass., 24c
Barium & Chemicals, Inc., Ohio, 10s
Barnstead Still & Sterilizer Co., Mass., Demineralizers c, Water Treatment Equipment c, Baths c
Barrett Co., The Leon J., Mass., Centrifuges sc
Barry-Wright Corp., Mass., 36sc
Beach-Russ Co., N.Y., 10sc, 34sc
Bendix Corp., The, Industrial Controls Section, Mich., 12c
Bendix Corp., The, Pioneer-Central Div., Sonic Energy Products, Iowa, 28sc


The New Model HTT Portable Wire Marking Tool



For imprinting on coated wire and tubing

This small portable wire marking tool is sold complete, electrically heated, marking tapes type and wire guides. To operate, simply set type in holder, push or pull coated wire through guide, press and mark the wire where you want.

This tool is guaranteed by ACKERMAN GOULD, manufacturers of marking equipment for 35 years.

For Production Requirements we offer three models . . . MM-2—MM-4—MM-6 . . . as well as specials to meet your marking needs.

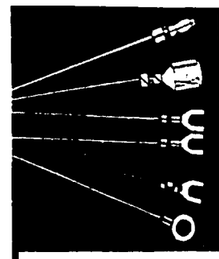
*For further information contact:*

ACKERMAN GOULD CO., INC.

10 Neil Court, Oceanside, L.I., N.Y., ORiole 8-4110

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Birnbach Radio Co., Inc., 145 Hudson St., New York 13, N.Y., 12 Wire Measuring s, Tel: WOrth 6-5611
**See ad on page 607**
Black Light Eastern Corp., N.Y., Optical Inspection sc
Black & Webster, Inc., Mass., 12s
Blickman, Inc., S., N.J., Dry boxes
Blinn Co., Inc., The Delbert, Calif., 12s
Blue M Electric Co., Ill., Baths c
Boesch Mfg. Co., Inc., Conn., 6sc, 12c, 24s
Bon-De Electronic Laboratories, Inc., Mass., 34c
Bowl-Mor Company, Inc., Mass., 12sc
Branson Ultrasonic Corp., Conn., 28s
Bruel & Kjaer, A/S, Denmark, 36s
Bruno-New York Industries Corp., N.Y., 12 Lead Cutting, Forming, Wrapping s
**Buchanan Electrical Products Corp., 607 U. S. Highway 22, Hillside, N.J., Crimping Tools s, Tel: WAverly 3-7474**
**See ad on page 557**
Budd Electronics, Inc., N.Y., 10c, Cooling Devices sc, Heat Exchangers sc, Refrigeration Equipment sc
Burke & James, Inc., Ill., 20sc
Caig Labs., N.Y., 22s
Caltron Products Co., Calif., 12c, 14c
Carad Corp., Calif., 34c
Carpenter Mfg. Co., N.Y., [illegible]
Castle Electric Co., [illegible]
Century Circuit, Inc., Pa., 36s
Cetron Electronic Corp., Pa., 12s
Chart-Pak, Inc., Mass., 12 Drafting, Scribing sc
Chicago Rivet & Machine Co., Ill., 12s
Cincinnati Sub-Zero Products, Inc., Refrigeration Equipment c
Circo Ultrasonic Corp., 51 Terminal Ave., Clark, N.J., 26sc, 28sc, 30sc, Tel: FUlton 8-8699
**See ad on page 669**
Clipper Gear & Machine Co., Machine Gear Check Fixtures s
Cohelm, Inc., N.J., Cleaning Equipment s
Coil Winding Equipment Co., 19 Maxwell Ave., Oyster Bay, N.Y., 6sc, Tel: WAlnut 2-5660
**See ad on page 668**
Connecticut Instrument Corp., Conn., 26s
Consolidated Vacuum Corp., N.Y., 34s
Constantin & Co., L. L., N.J., 12s, Vacuum Plating Machines s
**Contact, Inc., P.O. Box 244, Maynard, Mass., 22s, 38s, 40s, Tel: TWinoaks 7-2642**
**See ad on page 669**

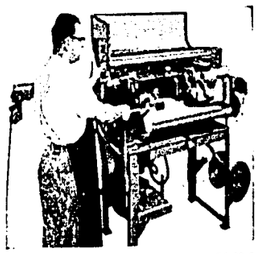
DO YOU NEED AUTOMATION for FINISHED WIRE LEADS with Terminals Attached?

NEW ARTOS TA-20-S
Performs 4 Operations Automatically!

1. Measures and cuts solid or stranded wire 2" to 250" in length.
2. Strips one or both ends of wire from 1/8" to 1".
3. Attaches any prefabricated terminal in strip form to one end of wire. (Model CS-9-AT attaches terminals to BOTH ENDS OF WIRE simultaneously.)
4. Marks finished wire leads with code numbers and letters (optional attachment).

UP TO 3,000
finished pieces per hour. Can be operated by unskilled labor. Easily set up and adjusted to different lengths of wire and stripping. ENGINEERING consultation without obligation. Machines for all types of wire lead finishing.

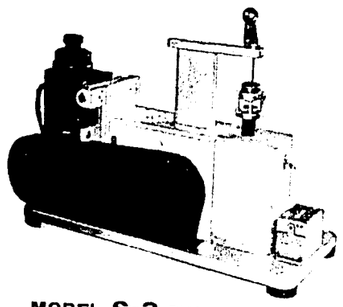
AGENTS THROUGHOUT THE WORLD



WRITE for FREE Bulletin No. 655 on Artos TA-20-S

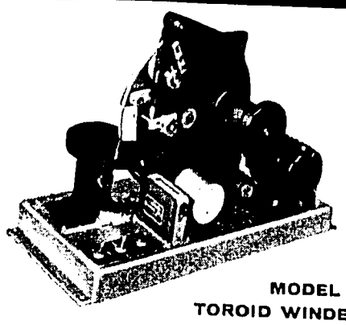
ARTOS ENGINEERING CO.
2735 South 28th Street • Milwaukee 46, Wisconsin
For details, circle #710 on Reader Service Card

# The most advanced coil winding equipment in the world today!



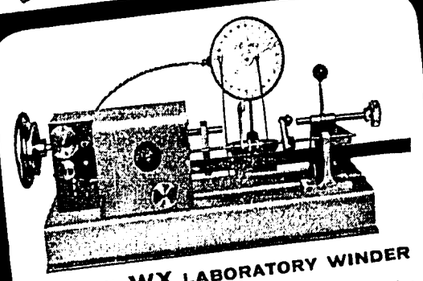
**MODEL S-3 STATOR WINDER**

Smallest of our family of machines for both internal and external winding in lamination stacks.



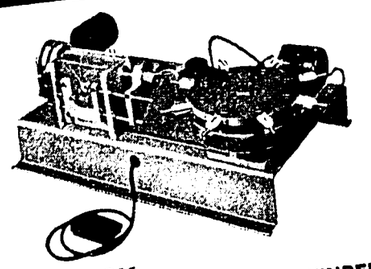
**MODEL T TOROID WINDER**

One of several types of toroid winders for inductances, auto transformers, rheostats, etc.



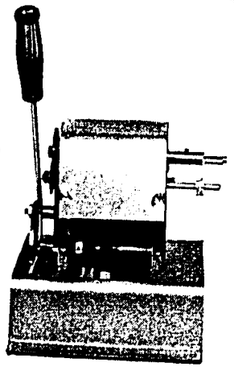
**MODEL WX LABORATORY WINDER**

The world's most versatile winding machine for all types of radio frequency coils as well as bobbins, transformers, resistors, etc. Features continuous gain or feed adjustment and our exclusive adjustable cam.



**MODEL CK AUTOMATIC TURRENT WINDER**

One of our several models to wind many coil types on a completely automatic or semi-automatic basis.



**MODEL MP HAND WINDER**

Coils with up to 60 turns produced in a single stroke of the lever.

***Write today for complete literature***

Representatives in all major electronic market areas throughout the country

## COIL WINDING EQUIPMENT CO.

**OYSTER BAY, NEW YORK – WAlnut 2-5660**

COWECO

For details, circle #711 on Reader Service Card

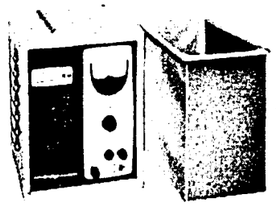




# ultrasonics Cleans parts in seconds

CIRCOSONIC* Multi-Purpose cleaning units pay for themselves in quick order by radically cutting costs and saving labor. They are ideal for removing excess solder flux, fingerprints, lint, waxes, polishing compounds from such parts as gears, bearings, instruments and hundreds of other applications.

CIRCOSONIC units are available in a wide range of sizes to serve your every cleaning need. CIRCO engineers will be pleased to offer technical assistance and recommend the specific units to fit your needs.



with CIRCOSONIC® cleaners



Send for our new booklet "Tips on Ultrasonic Cleaning."

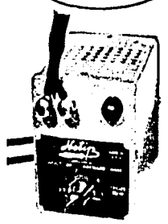
**CIRCO** ultrasonic **CORPORATION**

Specialists in ultrasonic energy

51 TERMINAL AVENUE, CLARK, NEW JERSEY

For details, circle #712 on Reader Service Card

'Hotip'



Choice of 3 power supply units with multi-position switches

## THERMAL WIRE STRIPPING AND RESISTANCE SOLDERING EQUIPMENT

Save time, cut costs and improve quality with Hotip thermal wire stripping and resistance soldering equipment.

HOTIP THERMAL STRIPPERS are designed for use on plastic wire including Teflon®. Tool operates on a simple, straight pull action Equipment includes 5-position power supply and foot switch.

HOTIP RESISTANCE SOLDERING eliminates cold joints. Choice of tweezer and probe units for all types of delicate work. Equipment includes 5-position power supply and foot switch.

TEFLON® is Dupont's registered trademark for its fluorocarbon resins, including TFE (tetrafluoroethylene) resins.

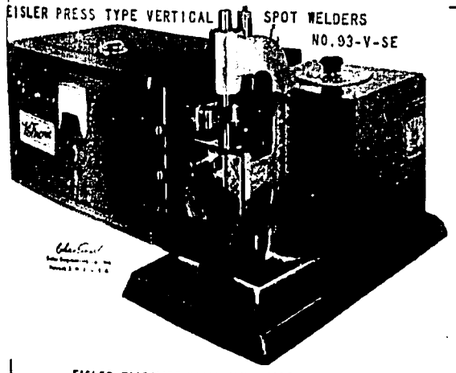
WRITE OR PHONE FOR FULL INFORMATION ON HOTIP EQUIPMENT.

**CONTACT, INC.**

BOX 244 - MAYNARD, MASS. - TEL. TWINOAKS 7-2642

For details, circle #713 on Reader Service Card

EISLER PRESS TYPE VERTICAL SPOT WELDERS NO. 93-V-SE



Eisler makes precision press type bench spot welders, foot or air operated. Made up to 150 K.V.A. supplied with synchronous or non-synchronous timers and stored energy units. For the manufacturing of electronic tubes and miniature parts. We also make a complete line of glass working equipment for the electronic industry.

(WRITE FOR CATALOG)

EISLER ENGINEERING CO., INC., 753 SOUTH 13TH STREET, NEWARK, N.J.

For details, circle #714 on Reader Service Card



# Directory III. Materials & Services

96. Machinery & Tools

Dee Electric Co., 345 West Hatton St., Chicago 22, Ill. Sales Po... Tel: BEImont 5-5252

See ad on page 655

Fisher Engineering Co., Inc., 753 S 13th St., Newark 3, N.J. 66, 326, 345, 3xx. Tel: BIgelow 3-5829

See ad on this page

Electralab Printed Electronics Corp., 179 "A" St., Industrial Ctr., Needham Heights 94, Mass., 12c. Tel: HIllcrest 5-5952

See ad on page 459

Fisher Engineering Co., Inc., 753 S 13th St., Newark 3, N.J. 66, 326, 345, 3xx. Tel: BIgelow 3-5829

See ad on this page



Code numbers shown after each firm refer to product or service classes listed at the beginning of each product classification. "S" indicates stock items. "C" indicates custom built items. Complete addresses will be found in the Alphabetical Directory, page 135 ...

# Directory III. Materials & Services

## 96. Machinery & Tools.

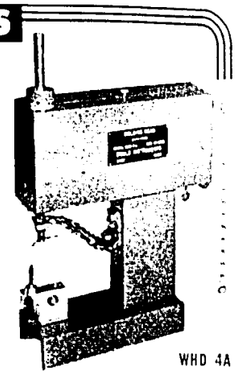
Ellison Draft Gage Co., Inc., Ill., Gas and Liquid Gages sc
Enjaco Corp., R.I., 12 Wire and Cable sc
Eraser Co., Inc., The, N.Y., 40 Twisters sc
Erwood, Inc., Ill., 12c, 36c
Enhanced Engineering Co., Calif., 12s, 40s
Everard Tap & Die Corp., N.Y., 12 Threading c

Ewald Instruments, Route 7, E... Conn., 32c, 38sc, Tel: WAlker 7...
See ad on this page

FXR, Inc., 25-26 50th St., Woodside N.Y., 12sc, 22sc, 38sc, 40sc, T... RAvenswood 1-9000
See ad on pages 125-125

Fairwest Mfg. Div., Inc., Wa... 16c, 20c, 22c, 34c, 38c, 40c


**MINIATURE WELDERS**



• **BENCH WELDING HEAD WHD 4A** • Pressure adjustable on calibrated scale 1 to 20 lbs. Foot or air operation. Linear motion in ball bushings. Stroke 2". Low inertia. Easy to set up and to jig up.

• **MINIATURE HEAD WHD 5A** • For very small work. Wire welds .0003 to .010" dia., other very small work. Pressure 1 ounce to 3 lbs. Ball bearing operation, ultra low inertia. Electrodes 1/8 or 1/16 dia.

• **STORED ENERGY POWER SUPPLIES** • Models from 3.6 to 100 watt-second capacity.

• **AC POWER SUPPLIES** • Synchronous and non-synchronous timer power supplies ½ to 3 KVA. ½ to 10 cycle or .05 to 2 seconds timers.

**Tap welders for potentiometers – Portable Thermocouple welders and tackers — Tweezers & Handtools — Production welding machines.**

*Submit parts for sample welds and ask for data sheet*

WHD 4A

**EWALD** *INSTRUMENTS* ROUTE 7 KENT, CONN.

For details, circle #719 on Reader Service Card

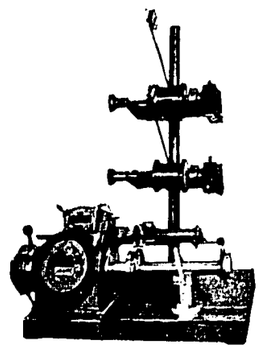


**CUT WINDING COSTS** *automatically*

WITH THE MOST COMPLETE LINE OF AUTOMATIC COIL WINDING EQUIPMENT EVER OFFERED TO THE ELECTRICAL/ELECTRONICS INDUSTRIES

**MICAFIL**

TWO EXAMPLES FROM THE MICAFIL LINE

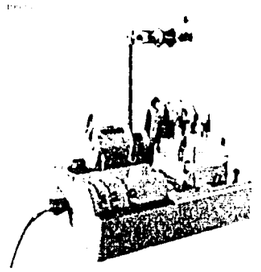


Type OFA series of coil winders

- ▲ Stepless adjustable traverse feed – no cams – no change gears – just DIAL your wire size even while machine is running.
- ▲ Wire feed ranges in 5 groups from #56 up to #9 AWG
- ▲ Winding speeds up to 18,000 rpm.
- ▲ Accurate micrometer adjustment of layer width – no cams.
- ▲ Constant-distance wire guide, adjusts automatically to increasing coil diameter.
- ▲ The MICAFIL Building Block System – buy what you need – nothing more – add other functional attachments later on.
- ▲ Single and multiple winding
- ▲ Automatic paper interleaving attachments.
- ▲ World-renowned Swiss workmanship.
- ▲ Installed and serviced by factory-trained engineers.

Type [illegible] Toroidal winder, Model [illegible] automatic winding of precision toroidal coils

- ▲ Stepless adjustable [illegible]
- ▲ Automatic [illegible]
- ▲ [illegible]
- ▲ Core feed adjustable [illegible]
- ▲ Adjustable [illegible]
- ▲ Multiple [illegible]
- ▲ Installed [illegible]



1001 *Call us* and let our experienced engineers solve your winding problems

**hirschmann**

*Swiss precision with American service*

**CARL HIRSCHMANN COMPANY, INC.**
30 PARK AVENUE MANHASSET, N. Y.
Branches 6015 N. Cicero Ave., Chicago 46, Ill. • 5124 Pacific Blvd., Los Angeles 58, Calif. • Carl Hirschmann Co. of Canada Ltd., 5112 Dundas St. West, Toronto, Canada.

For details, circle #720 on Reader Service Card

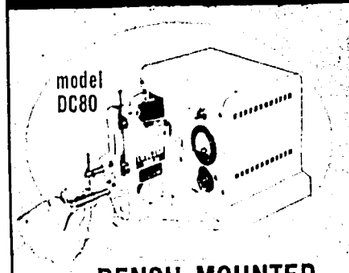

Code numbers shown after each firm refer to product or service ... beginning of each product classification. "s" indicates stock item ... built items. Complete addresses will be found in the Alphabetical ...




**NOW** produce up to 6,000 welds per hour . . . automatically . . . with one operator.

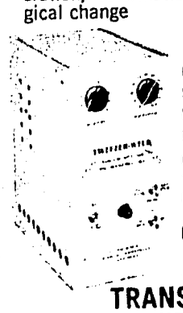
**TWEEZER WELD**

Precision Resistance Welding Equipment




**BENCH MOUNTED STORED ENERGY WELDER**

- New TW5 low friction welding head
- Stored energy panel of 80 Watt second capacity
- Discharge time of 0.0008 to 0.0012 second
- Permits welding of difficult materials, i.e.: copper, silver, tungsten, etc.
- Reliable welds without discoloration, deformation, metallurgical change



COMPACT SYNCHRONOUS WELDING TIMER
6" wide
10½" high
8½" deep
model T-3

**TRANS-SYNC WELD-TIMER**

- 1 KVA capacity utilizing semiconductors.
- Also ideally suited with high speed automatic machinery.
- Operates at a rate up to 1200 welds per minute . . . welds partially oxidized materials with ease.
- Welding time: ½ cycle (8 milliseconds) to 10 cycles (160 milliseconds).

**FEDERAL TOOL ENGINEERING CO.**
1400 Pompton Ave.
Cedar Grove, New Jersey

TWEEZER WELD **WRITE FOR INFORMATION**

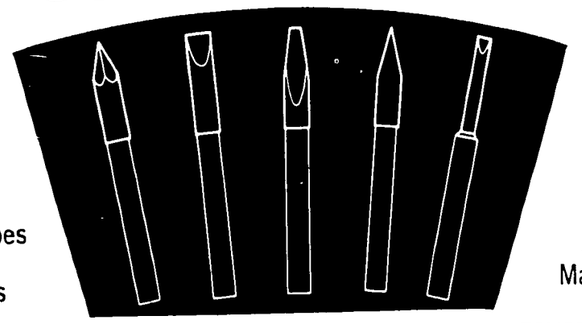
For details, circle #715 on Reader Service Card



*ANOTHER IMPORTANT BREAKTHRU!*

**DUROTHERM**
**Non-freezing Long-Life SOLDERING TIPS**

In ALL Shapes and Sizes



Fit ALL Makes

HI-PERFORMANCE Tips for use in HI-PERFORMANCE, HI-TEMPERATURE Irons. Tips positively cannot stick or freeze in any iron—easily removed after months of service. No need to remove tips daily. Minimum loss of heat delivery. Tip shank immunized from solder, except on working surface at end of tip—prevents creeping of solder into element tip hole and spilling of solder on components.

INDUSTRY'S No 1 HEXACON SOLDERING IRON

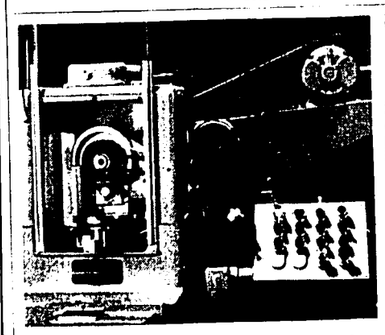
**SEND FOR CATALOG**—showing the most complete line of industrial Soldering Irons and Long-Life Clad Tips.

**HEXACON ELECTRIC COMPANY**
181 West Clay Avenue, Roselle Park, New Jersey

*SERVING INDUSTRY FOR OVER A QUARTER OF A CENTURY*

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**SLICE CRYSTALS**
**with the fully automatic FITCHBURG**
**SEMICONDUCTOR SLICING MACHINE**

- Automatic back-off mechanism prevents surface imperfections.
- Wafer thickness adjustable from 0.025 to 0.007 ± 0.0005".
- Spindle speed controlled up to 9,200 rpm by a Variac.
- Ingot sections easily mounted.
- New orienting table with accuracy ± 1' of arc available.

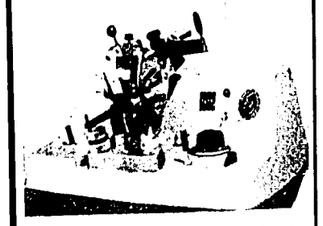
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**FITCHBURG ENGINEERING CORPORATION**
FITCHBURG, MASSACHUSETTS

For details, circle #717 on Reader Service Card



**GORMAN**



**TOROIDAL WINDER**
**Model 600**

- Toroids from .055 I.D. to 2 in. O.D.
- Wire sizes from #46 to #26
- Speed from 0 to 1200 TPM
- Dynamic braking for instant stop
- Automatic Sector & Bank winding
- Accurate all-Transistor turns counter
- Jockey Stick core positioning
- Powered positive core rotation
- 4 power driven Shuttle Rollers
- Portable: 60 lbs.

**GORMAN Machine Corp.**
480 S. Main Street, Randolph, Mass.

West Coast Representative:
J. S. Trier & Associates
208 Standard St., El Segundo, Calif.

See us at IRE, Wescon & NEREM!

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# Accelerate production with

# KAHLE

EXPERIENCED-DESIGNED

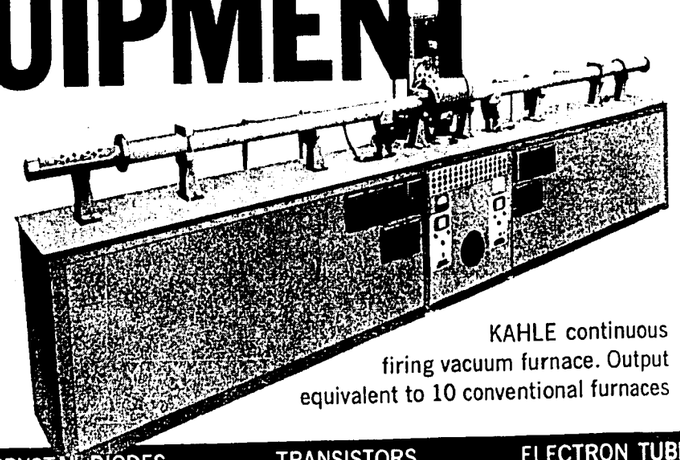
# AUTOMATION EQUIPMENT

Lower your costs with high volume KAHLE precision production machines for . . . .

**CRYSTAL DIODES**
- Tube Cutting
- Lead Beading
- Crystal Growing
- Crystal Refining
- Crystal Mounting
- Body Forming
- Welding
- Final Sealing

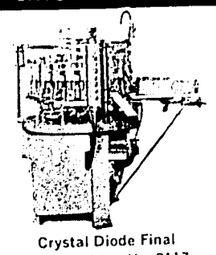
**TRANSISTORS**
- Header Forming
- Crystal Mounting
- Welding
- Exhausting
- Sealing

**ELECTRON TUBES**
- Stem Forming
- Bulb Making
- Tubulating
- Lead Welding
- Lead Beading
- Grid Winding
- Heat Treating
- Degassing
- Exhausting
- Sealing
- Bombarding
- Testing
- Flaring



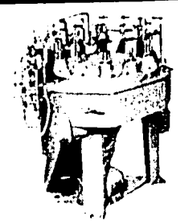
KAHLE continuous firing vacuum furnace. Output equivalent to 10 conventional furnaces

**CRYSTAL DIODES**



Crystal Diode Final Seal Machine No. 3117

**TRANSISTORS**



Transistor Header Machine No. 2707

**ELECTRON TUBES**



Electron Tube Button Stem Machine No. 3017

**Complete Engineering, Design and Machine Building Services—**

KAHLE engineers have built well over 1,000 performance-proven machines for high speed, low cost production in the electronic, electrical and glass working industries.

For example, the latest KAHLE continuous firing vacuum furnace provides uninterrupted operation and an output equal to 10 conventional furnaces.

KAHLE experience in raising production quality and reducing costs is available to help solve your fabrication problems. For recommendations on specific applications, just call or write outlining your requirements.

## KAHLE ENGINEERING COMPANY

General Offices: 3319 HUDSON AVENUE, UNION CITY, NEW JERSEY, U. S. A.

*WORLD'S LARGEST EXCLUSIVE BUILDER OF PRODUCTION AND SPECIAL PURPOSE MACHINES FOR THE ELECTRONIC INDUSTRY*

For details, circle #721 on Reader Service Card






# Directory III. Materials & Services

## 96. Machinery & Tools.

Denver Co., "Wire Wrap" Div., 96s, 12 Wire Wrappers s
Circuits, Inc., N.Y., 20c
Electric Co., Apparatus Sales Div., N.Y., 22s
Electro Mechanical Corp., N.Y., 28c
Instrument Corp., Defense Engineering Prods. Group, N.Y., Cooling Devices c
Kinetics, Inc., Va., 28c
**General Magnetics, Inc., 2641 Louisiana Ave., Minneapolis 26, Minn., 4sc, Tel: WEst 9-8571**
See ad on page 363
Meters, Inc., Colo., 4sc
Research & Supply Co., Mich., 16s, 20s
Vacuum Corp., Mass., 34s
Incorporated, Calif., 36s, Controllers s
Co., Inc., Duncan M., Mass., 16s
Industries, Ltd., Axiom Works, England, 36sc
**Gorman Machine Corp., 480 S. Main St., Randolph, Mass., 6sc, Tel: WOodlawn 3-7353**
See ad on page 670
Instrument Co., N.J., Gas Gages s
Green Instrument Co., 34s, 42s
Green Rectifier Co., N.Y., 28s
Grilcon Industries, Inc., N.Y., 30s, 38s
Handicraft Tools, Inc., Industry, Inc., N.Y., 12 Hand Tools
Harder Co., Donald C., Calif., 28s
Hathaway Instruments, Inc., Colo., 28s
Hayes, Inc., C. J., Ill., 16s
Hermes Plastics, Inc., N.Y., 28s
**Hexacon Electric Co., 181 W. Clay Ave., Roselle Park 9, N.J., 22s, Tel: CHestnut 5-6200**
See ad on page 670
High Vacuum Equipment Corp., 8sc, 34sc, Vacuum Machines
Hillyer Corp., N.J., 12s, 28s
**Hirschmann Co., Inc., Carl, 3 Park Ave., Manhasset, L.I., N.Y., 9s, Tel: MAnhasset 7-5300**
See ad on page 671
**Hoffman Co., P. R., 321 Cherry St., Carlisle, Pa., 12s, Tel: CHapel 2-2121**
See ad on page 429
Hoffman Electron Tube Corp., N.Y., 28s
Holub Industries, Inc., Ill., 30s
Howe Scale Co., Div. Art, Electronic Weighing Equipment 28s
Huck Mfg. Co., Mich., 12 Rivet Setting Machines 28s
Hughes Aircraft Co., Vacuum Tube Products Div., Calif., 34s, 38s
Industrial Welder, Wire Welding Machines 28s
Wire Specialties Co., N.Y., 28s
New York Wire Cloth Co., N.Y., 16s
Whitehall Co., 28s
Special Purpose Machines


**new** DESIGN in PERFORMANCE VERSATILITY

**NO CAMS . . . NO GEARS**

*Infinitely variable pitch, traverse and speed. Single and multiple winding. Close or space winding.*

HEAVY DUTY, AUTOMATIC and SEMI-AUTOMATIC **AUMANN** High Precision

**COIL WINDING MACHINES**

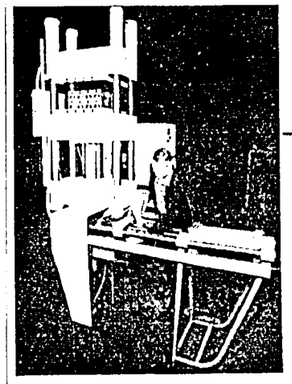
*For High Production and Laboratory*

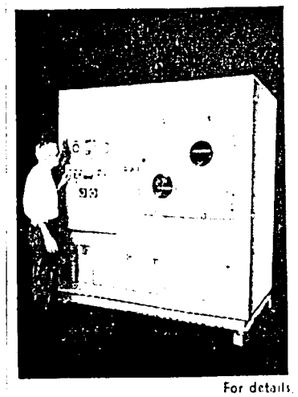
—ALSO—
Toroid Winding Machines
Armature Winding Machines
Bracket Bobbin Winders
Reeling and Spooling Machines
Pail Packaging Machines
Wire Take-ups (constant tension)
Take-offs (stands, pails, overhead)
Wire Tension Meters, etc.
Wire Twisters (for strengthening ends)

Send for literature • No obligation

INDUSTRIAL WINDING MACHINERY Corp.
P.O. Box 62 New York 5, N.Y.
WHitehall 3-1754 COrtlandt 7-2425

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- Vacuum Impregnation and Potting
- Encapsulation
- Vacuum Metallizing
- Relay Drying and Filling
- Liquid Resin Metering Mixing, Dispensing
- Vacuum Casting
- Vacuum Heat Treating
- Freeze Drying

UP TO DATE NEWEST IN STANDARD & CUSTOM

HULL CORPORATION

Export Office: 1505 Race St., Philadelphia 2, Penna.

For details, circle #723 on Reader Service Card

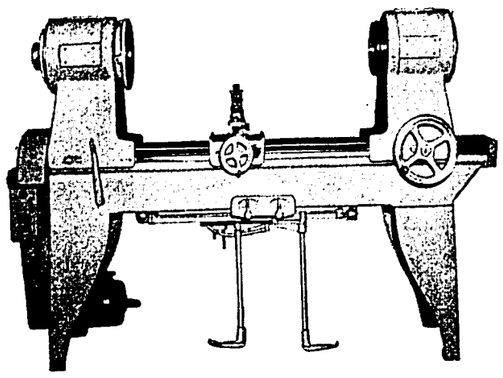

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# Directory III. Materials & Services

## 96. Machinery & Tools.

International Eastern Co., 801 6th Ave., New York 1, N.Y., 12sc, 16sc, 20sc, Tel: ALgonquin 5-5222
See ad on this page
International Equipment Co., Mass., Centrifuges sc
International Pump & Machine Works, N.J., 32, 34
Jan Hardware Mfg. Inc., N.Y., 36s
Jennings Machine Corp., Pa., 40, Terminal attaching machines
Jones & Lamson Machine Co., Vt., 12 Boring s, 20s, Optical Comparators s
Kahle Engineering Co., 3319 Hudson Ave., Union City, N.J., 6c, 8c, 12c, 32c, 38c, Tel: UNion 7-6500
See ad on page 672
Kellogg Switchboard & Supply Co., Communications Div. ITT Corp., Ill., 4c
Kester Solder Co., 4219 Wrightwood Ave., Chicago 39, Ill., 22sc, Tel: BElmont 5-1601
See ad on page 700
Kingsley Machine Co., Calif., 16sc, Wire Marking machines
Kinney Manufacturing Div., New York Air Brake Co., 3631 Washington St., Boston 30, Mass., 2c, 8c, 34s, Vacuum Machinery & Accessories s, Tel: JAmaica 2-7100
See ad on page 35
Klein & Sons, Inc., Mathias, Ill., 12sc Pliers sc
Knopp, Inc., Calif., 4c
Krengel Mfg. Co., Inc., 227 Fulton St., New York 7, N.Y., 16s, Tel: COrtlandt 7-5714
See ad on page 645
L.A.B. Corp., N.Y., 36sc
La Pointe Industries, Inc., Conn., 20c
Lear, Inc., Calif., 34c
Leesona Corp., P.O. Box 1605, Providence 1, R.I., 6s, Tel: WIlliams 1-5200
See ad on page 674
Leland Airborne Products Div., A.M.F., Ohio, 4sc
Lessells & Associates, Inc., Mass., 36c
Levin & Sons, Inc., Louis, Calif., 12s
Ling Electronics Div., Ling-Temco Electronics, Inc., 1515 S. Manchester Ave., Anaheim, Calif., 36s, Tel: PRospect 4-2900
See ads on pages 247, 285
Liquid Carbonic, Div. General Dynamics Corp., Ill., 38s
Litton Engineering Laboratories, P.O. Box 949, Grass Valley, Calif., 12s, 32s, 34s, Tel: 1730
See ad on page 674
Luma Electric Equipment Co., The, Ohio, 22s, Demagnetizers s
Luxo Lamp Corp., Dock St., Port Chester, N.Y., Bench lamps, Tel: WEstmore 7-4433
See ad on this page
MB Electronics, Div. Textron Electronics, Inc., Conn., 3c
Macart, Inc., N.Y., 4c, 12 Contact Interrupter sc
Macdonald & Co., Calif., 12sc
Magnaflux Corp., Subsid General Mills, Ill., 14s
Maico Manufacturing Co., Ill., 30c
Markem Machine Co., N.H., 16s
Martindale Electric Co., Ohio, 16s, 30s
Massa Division, Cohu Electronics, Inc., Mass., 36s
Materials Research Corp., N.Y., 8c
Matthews & Co., Jas. H., Pa., 16sc
McKenna Laboratories, Calif., 28sc
McKiernan-Terry Corp., N.J., 12c, Centrifuges c
Melpar, Inc., Special Products Dept., Va., 20c
Mico Instrument Co., 79 Trowbridge St., Cambridge 38, Mass., 6s, 16s, 34s, Tel: KIrkland 7-8660
See ad on page 674
Micro Balancing, Inc., N.Y., 12 Balancing Machines sc
Micromech Mfg. Co., Div. Sanford Mfg Corp., N.J., Wafering machines


# GLASS WORKING LATHES



**MODEL ESA $3200.00**
Price f.o.b. Grass Valley

**STANDARD EQUIPMENT**

Two face plates
One collet draw-in bar
One 6-fire seven jet burner assembly
Hand carburetion control
Foot pedal control of air or nitrogen supply and of oxygen-gas volume
Main air valve controlling air in either or both spindles
½ h.p. Motor, 230 volt, three phase, single speed, 60 cycle, AC
Face plate wrench
One motor belt
One motor pulley

**General Specifications**

Variable Speed Drive — Electronic Control (As shown) Available at extra cost

| | | | |
|---|---|---|---|
| Maximum length overall | 84" | Spindle hole diameter | 7¼" |
| Maximum width overall | 24" | Radial clearance above apron | 13¾" |
| Maximum length spindle nose to spindle nose | 47" | Net weight | Approx. 1250 pounds |
| | | Approx. shipping weight | 1500 pounds |

**Litton Engineering Laboratories**
Grass Valley, California • P. O. Box 949
5173
For details, circle #724 on Reader Service Card

# How to cut coil winding costs

1 2

With the super-precise, fully automatic LEESONA No. 107 Coil Winder for paper-insulated coils. Speeds up to 2500 rpm . . . short paper attachment (1⅜" insert) . . . paper miss detector . . . space wind attachment for high voltage coils. 1 operator for 2 or more machines.

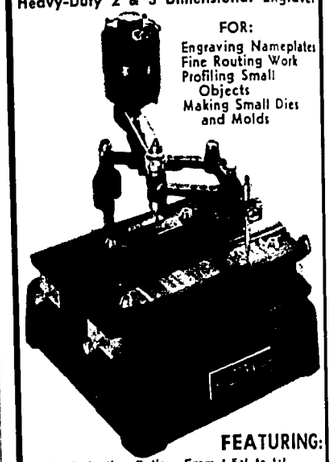
With today's most productive hand-fed coil winder — the LEESONA No. 108. Ideal for short runs . . . standard machine handles wire from No. 19 to No. 42 (B&S), *finger tip control*, quick, simple, set-ups.

LEESONA

**LEESONA CORPORATION**
P.O. Box 1605 • Providence 1, Rhode Island
For details, circle #725 on Reader Service Card

# MICO

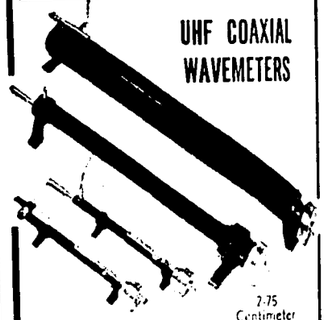
Heavy-Duty 2 & 3 Dimensional Engraver



FOR:
Engraving Nameplates
Fine Routing Work
Profiling Small Objects
Making Small Dies and Molds

**FEATURING:**
- Six Reduction Ratios—From 1.5:1 to 4:1.
- 1/10 H.P. Ball Bearing Motor permits continuous operation for die or mold work in steel.
- Absolute accuracy for three-dimensional reproduction.
- Uses standard taper-shank cutters or ⅛" diameter straight shank cutters and end mills.
- Copy and work right-side-up: always in direct view of operator.
- Many attachments available to increase versatility of machine.

## UHF COAXIAL WAVEMETERS

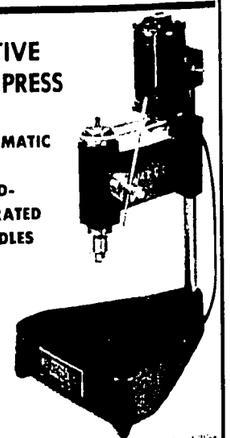


2-75 Centimeter Range

MODEL 433 .....20 to 75 Centimeters
MODEL 501 .....4 to 20 Centimeters
MODEL 402A .....2 to 10 Centimeters
MODEL 402B 2 to 10 centimeters (Reaction Type)

## SENSITIVE DRILL PRESS

PNEUMATIC and HAND-OPERATED SPINDLES

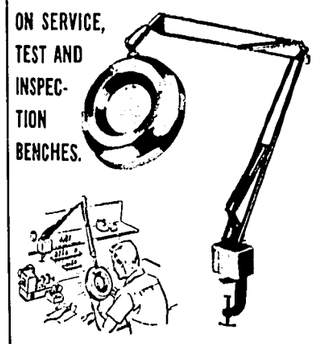


For printed circuits and all fine-hole drilling. Accurate, Durable, Sensitive. 1/10 H.P. Universal Ball-bearing Motor.

*Send for Illustrated Catalogs*
**MICO INSTRUMENT CO.**
79 Trowbridge St., Cambridge 38, Mass.
For details, circle #726 on Reader Service Card

# The LUXO MAGNIFIER

IDEAL FOR VISUAL ACCURACY ON SERVICE, TEST AND INSPECTION BENCHES.



Luxo's excellent magnification with cool shadow-free fluorescent light increases production and reduces the number of rejects.

Optically correct magnification also improves visual accuracy while working on miniature circuits and assemblies, reading of parts numbers, in terminal identification and inspection.

Built into every Illuminated Magnifier are the world-famous Luxo features—modern functional design, quality construction, flexibility, portability and serviceability.

Luxo Lamps are also available in Incandescent, Fluorescent and Combination models.

All UL approved.

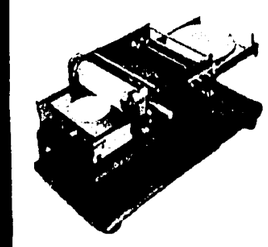
Order from your supplier or write:

**LUXO LAMP CORPORATION**
PORT CHESTER, N.Y.
San Francisco, Calif. • Montreal, Quebec
For details, circle #727 on Reader Service Card

# SPECIALIZED PRINTING EQUIPMENT For The ELECTRONIC INDUSTRY

- TERMINAL BOARDS
- CIRCUIT BOARDS
- TRANSFORMERS
- METER SCALES
- CONDENSERS
- CAPACITORS
- TUBES
- ETC

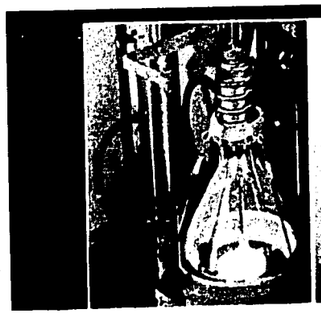
Model R1



Hand, Semi-Automatic
Automatic
1 & 3 color models

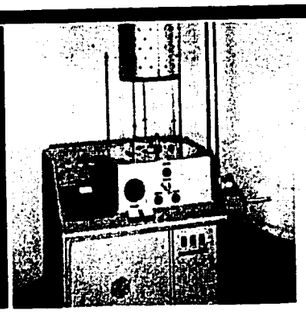
**INTERNATIONAL EASTERN CO.**
801 SIXTH AVENUE NEW YORK 1, N Y
ALgonquin 5-5222
For details, circle #728 on Reader Service Card

# HIGH and ULTRA-HIGH VACUUM EQUIPMENT



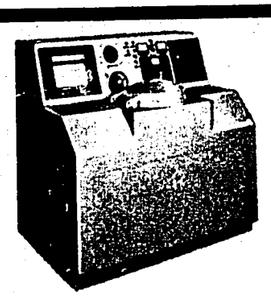
**CRYSTAL GROWING**

Low-cost resistance heated standard furnace for growing single crystals of silicon, germanium, and intermetallic compounds under inert gas or vacuum. Minimum maintenance. Top reliability.



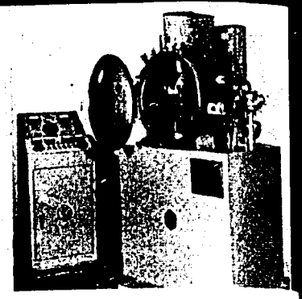
**VACUUM COATING**

Model 3144 is complete facility for single or multiple source deposition of films with thicknesses controllable from a few molecules to a few mils. Standard bell jar and tank coaters range from table-top to 84" I.D., operate to $10^{-5}$ mm Hg. Special units also available, including electron beam and ultra-high vacuum coaters operating at $10^{-9}$ mm Hg.



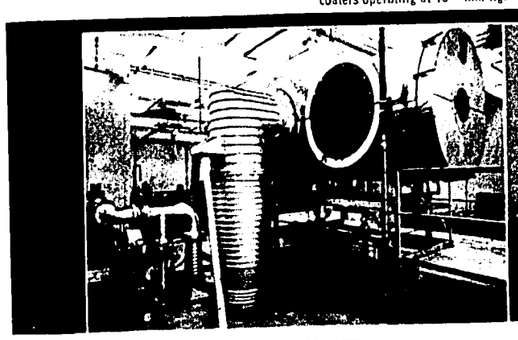
**TANTALUM SINTERING FURNACE**

Model 2915 is a high capacity, packaged, internal element furnace, featuring long-lived, 3 phase, 6"ID x 10" element — high speed heating and evacuation to 4400°F and $10^{-5}$ mm Hg. — graphic panel — automatic protective devices. Larger and smaller units also available.



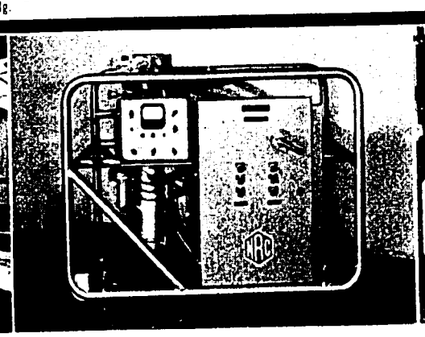
**ELECTRON BEAM WELDING**

Provides contamination-free, precision welding with minimum heat-affected zone and depth-width ratios to 4/1. Ideal for heat sensitive assemblies, evacuated units, and reactive and refractory metals.



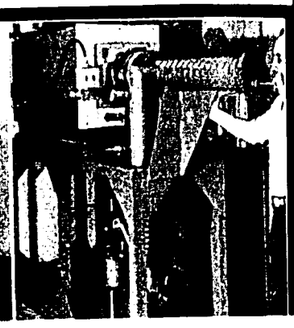
**SPACE CHAMBERS**

Standard and special systems to simulate the pressures and temperatures found at altitudes to above 400 miles. Available in sizes from 12" to 84" I.D., pressures to $10^{-10}$ mm Hg.



**PORTABLE PUMPING SYSTEMS**

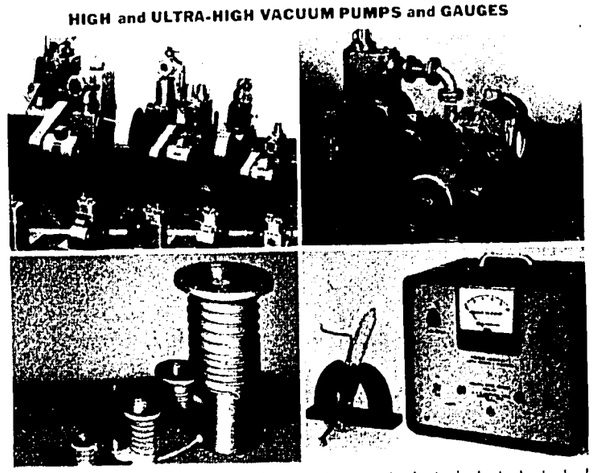
Highly flexible vacuum sources for production and research. Fast and efficient, can operate as low as $10^{-6}$ mm Hg. range. Available with 2, 4, 6 and 10" diffusion pumps. Self-contained, just plug in power and cooling water.



**HEAT TREATING AND OTHER VACUUM FURNACES**

Two-zone, 5" diameter muffle vacuum heat treating furnace. Others available from 2" to 54". Temperatures to 2200°F. Pressure to $10^{-5}$ mm Hg. Complete line of Vacuum Furnaces — induction, arc, and resistance — with capacities from 2 to 10,000 lbs. Also new Electron Beam Furnaces for ultimate in purity.

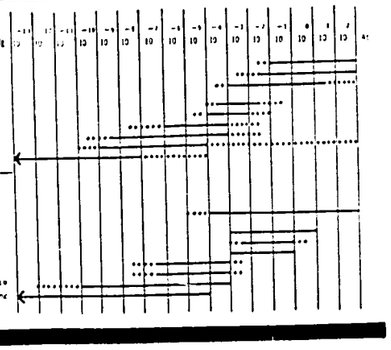
**HIGH and ULTRA-HIGH VACUUM PUMPS and GAUGES**





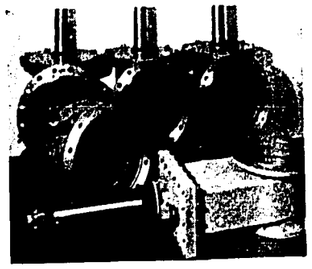
| Pumps | Capacity CFM | "Clean" Vacuum | Remarks |
|---|---|---|---|
| Rotary Lab Vacuum | | | |
| Single Stage | | | |
| Two Stage | | | |
| Mechanical Booster | | | |
| Booster Diffusion | | | |
| Mechanical Pump | | | |
| Diffusion — Unbaffled | | | |
| With Cold Trap | | | |
| Titanium Absorber | | | |
| Ion | | | |

| Gauges | Linear | Immune to Gas Press | Remarks |
|---|---|---|---|
| Alphatron® Ionization | | | |
| Log Alphatron® Ionization | | | |
| Thermocouple | | | |
| Pirani | | | |
| Ionization | | | |
| Si-Al Ionization | | | |
| Bellaphram Ionization | | | |
| Pressure | | | |



NEO-22

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**VACUUM VALVES**

Air release, ball, throttling, high conductance, angle, wye, globe, and slide valves. Manual and air operation. Bronze, mild and stainless steel, aluminum. Bellows and O-ring sealed. For all sizes of systems, from ⅛" to 36". ALSO seals, flexible connectors, cold traps, and accessories.

**ONE-STOP SOURCE FOR RELIABLE HIGH VACUUM EQUIPMENT**

NRC Equipment offers both high vacuum technology and a complete line of reliable high vacuum equipment. Together, they provide valuable "one-stop" source for all your high vacuum needs.
Send for complete specifications on any of the products shown above or application assistance on how to use them profitably.

NRC EQUIPMENT CORPORATION

DEPT. RE-A, 160 CHARLEMONT STREET
NEWTON 61, MASSACHUSETTS

*A Subsidiary of National Research Corporation*

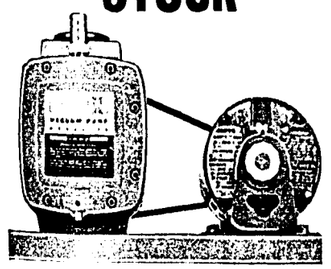


# Directory III. Materials & Services

## 96. Machinery & Tools.

Microwave Development Laboratories, Inc., Mass., 12 sc
Miller Co., L. C., Calif., 36sc, 38sc
Miller Dial & Name Plate Co., Calif., 16c
Miller Electric Manufacturing Co., Inc., Wis., 38sc
Millipore Filter Corp., Mass., Demineralizers sc
Milman Engineering Co., Inc., Calif., 12s
Milro Controls Co., Inc., N.J., 4c, 24c
Mitchell Industries, Inc., Texas, 22s
Modern Design, Div. of H. C. Schloer, Inc., N.Y., 12c, 36c
Modine Mfg. Co., Wis., Cooling Devices s, Heat Exchangers s
Moody Machine Products Co., Inc., R.I., 12 Hand Tools s
Morris Co., J. L., Mass., 12c
Murdoch Laboratories, Div. Blackstone Corp., N.Y., 28c
**N R C Equipment Corp., Dept. RE-A, 160 Charlemont St., Newton 61, Mass., 2c, 8s, 34s, 38s, Tel: DEcatur 2-5800**
See ad on page 676
National Standard Electronics, Inc., N.Y., 28c
National Ultrasonic Corp., N.J., 28sc
Nelson Vacuum Pump Co., Calif., 34s
**New Hermes Engraving Machine Corp., 154 West 14th St., New York 11, N.Y. 16s, 28s, Tel: WAtkins 4-7373**
See ad on this page
New Rochelle Thermatool Corp., N.Y., 38sc
**New York Air Brake Co., Kinney Mfg. Div., 3631 Washington St., Boston 30, Mass., 2c, 8c, 34s, Vacuum machinery and accessories, Tel: JAmaica 2-7300**
See ad on page 35
Nichols, Ltd., R.H., Canada, 4c, 6s
Nippon Electric Co., Ltd., Japan, 33
Noble & Westbrook Mfg. Co., Conn., 16sc
Norton Company, Mass., 12 Diamond Wheels sc
Numberall Stamp & Tool Co., N.Y., 1
Ohio Crankshaft Co., Ohio, 12sc, 38c
Olympic Instruments, Inc., Wash., 12 Lineal Wire Measurement s
**Opad Electric Co., 43-8 Walker St., New York 13, N.Y., 4sc, Tel: WOrth 6-0380**
See ad on page 483
Oryx Company, Calif., 22s
Ozalid Div., General Aniline & Film Corp., N.Y., 20s
Pam Associates, Inc., Md., 36c
Peck, Stow & Wilcox Co., The, Conn., 12sc
Pfaudler Permutit, Inc., Pfaudler Glass Lined Steel Equipment, N.Y., 28c, 30c
Pfister & Sons, Inc., N.Y., 26c
Precision Dynamics Corp., N.Y., 28c, 30c
Precision Lapping Co., Inc., N.Y., Lapping s
**Precision Scientific Co., 3749 W. Cortland St., Chicago 47, Ill., 34s, Tel: CApitol 7-2666**
See ad on this page

# RIGHT FROM STOCK



Model 25 Model 75 Model 150

## VACUUM PUMPS

A new series of two stage, internal vane vacuum pumps offering...guaranteed ultimate vacuum of 0.1 micron... compact design... modern styling... three sizes and 31 types ...Write today for Bulletin 610... 12 pages of information... Immediate delivery on all pumps... Contact us for the name of your nearest stocking distributor.

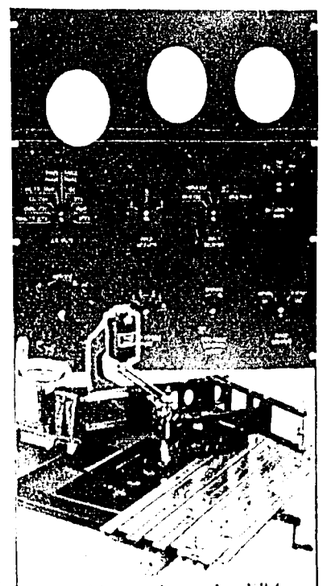
BUILT BY
3749 W. Cortland Street
Chicago 47, Illinois
PRECISION SCIENTIFIC CO

*Local Offices in: Chicago • Cleveland • Houston New York • Philadelphia • San Francisco*

For details, circle #730 on Reader Service Card

# *any size panels*

engraved in your own plant



**Engrave 1-inch nameplates or 6-foot panels by unskilled labor.**

**Spindle covers 18¼" x 6" in one set-up — more than any other machine of its kind.**

**Bench type model I-R—$685.**

*Send for complete catalog YR-4 illustrating other models from $325 up*

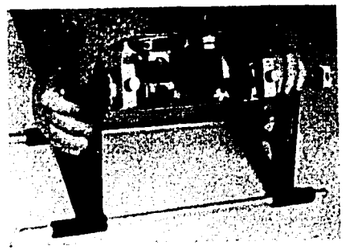
**new hermes ENGRAVING MACHINE CORP.**
154 WEST 14th STREET, NEW YORK 11, N.Y. IN CANADA: 359 St. James Street West, Montreal, P. Q.

For details, circle #731 on Reader Service Card



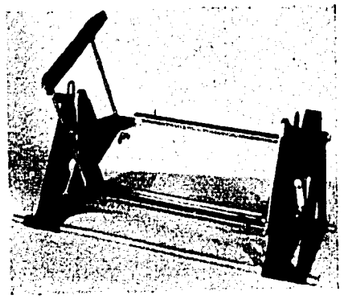
Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items, "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## PRODUCTION FIXTURES

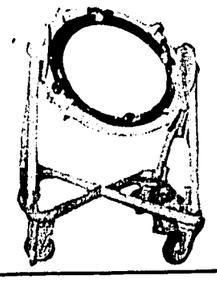


**Attention Methods Engineers**

Production Tool and Fixture assemblies save you time and money in your wiring and assembly departments. "Tiny-Fix," your third hand, positions miniature chassis, terminal boards and connectors in proper alignment which results in quicker and more efficient work.



The S-12-W above differs from our standard friction and index models in that it offers worm drive that gives positive positioning even under heavy stress. The PF-20-C floor model precision fixture is designed to level and rigidly support the bulky but delicate chassis assemblies required by recent developments in the missile and related industries. 36 inch height at pivotal centers permits the rotation of assemblies as wide as 50 inches through 360 degrees in two planes.



**Adapters similar to those shown in the assembly fixtures above are designed by our engineering staff to meet your specific requirements.**

*Write us for our catalog and current list of firms now using our equipment in the electronic industry.*

**PRODUCTION TOOL AND FIXTURE CO.**

**37 WEST MAIN STREET**
**OYSTER BAY, N.Y.**
**Telephone: OYster Bay 6-0009**

For details, circle #732 on Reader Service Card


Preis Engraving Machine Co., H. P., N.J., 16s

**Production Tool and Fixture Co., 37 W. Main St., Oyster Bay, L.I., N.Y., 12, Tel: OYster Bay 6-0009**
**See ad on this page**

Progressive Tool & Die Co., Mass., 18sc

Quick Charge Div., Line Scale Co., Inc., Okla., 4s

Radex Corp., Ill., Air Cleaners sc

Radio Development & Research Corp., Div. Bogue Elec. Mfg. Co., N.J., 4sc

**Radio Frequency Laboratories, Inc., Powerville Rd., Boonton, N.J., 14s, Demagnetizers s, Tel: DEerfield 4-3100**
**See ad on page 290**

Ramyr Mfg. Co., Calif., Plating Equipment s

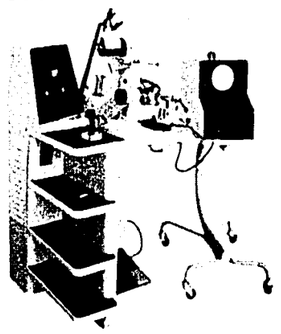
Rapid Electroplating Process, Inc., Ill., Plating Machinery sc

Ray-O-Vac Co., Wis., 12 Safety Apparel & Equipment sc

Raychem Corp., Calif., 12 Thermal s

Raytheon Co., Commercial Apparatus & Systems Div., Mass., 26s, 28s, 30s, 38s


## Now ONE Machine does the WHOLE job



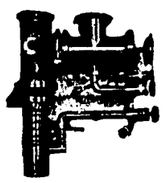
**. . . Toroidally winds #50-#16 AWG and down to .065" fin. I.D. DIRECTLY to desired inductance! Heads for precision winding also interchangeable**

This new Model "S" Toroidal Coil Winding machine with IC-601 Inductance Comparator surpasses all equipment of its type in production capacity. Send for literature on this unit and the complete line of Universal Winding and Taping Machines.

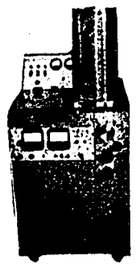
**UNIVERSAL MANUFACTURING CO., INC.**
1168 Grove St., Irvington 11, N. J.
ESsex 4-9800

For details, circle #733 on Reader Service Card

## HIGH VACUUM Equipment and Components Providing ULTIMATE PERFORMANCE



Model HVS-4000 All stainless steel construction



Model HVE-4000 Evaporator

- High Vacuum Valves
- Diffusion Pumps
- Pumping Systems
- Components
- Vacuum Gages

Vactronic Labs offer ultimate service, performance and flexibility in the design of functional vacuum equipment. Our many years of practical design experience provides the industry with trouble free, dependable systems.

. . . for • EVACUATION EQUIPMENT • GAS HANDLING • CATHODE COATING • VACUUM DISTILLATION • VACUUM MELTING • METAL EVAPORATOR • LEAK TESTING MANIFOLD

Send for Brochures to Department S-14

**VACTRONIC** Lab. Equipment Incorporated
21 Monmouth Court, East Northport, N.Y

MANUFACTURERS OF LABORATORY & PROCESSING EQUIPMENT AND COMPONENTS

For details, circle #734 on Reader Service Card





# Directory III. Materials & Services

## 96. Machinery & Tools.


Rea Magnet Wire Co., Inc., Ind., 6s, 24s

Red Point Corp., Calif., 12 Encapsulators, Impregnators s, 34s

Reeve Electronics, Inc., Ill., 8sc, 12sc, 18sc, 32sc, 40sc

Republic Aviation Corp., N.Y., 4sc

Rese Engineering, Inc., Pa., 12 Magnetic Core c

Research, Inc., Minn., 24c

**Rex Rheostat Co., 149 Babylon Tpke., Roosevelt, L.I., N.Y., 6s, Tel: FReeport 9-1030**
**See ad on page 531**

Richardson-Allen Corp., N.Y., 4c

Robinson Machine Co., Inc., N.J., 12 Metering Pumps sc

Robinson Technical Products, Inc., N.J., 34sc

Rollan Electric Co., Ill., 24s

Roller-Mike, Inc., N.Y., 12 Roller-Mike c

Rototest Laboratories, Inc., Calif., 36 Acoustic c

Rucker Co., The, Calif., Centrifuges sc

S & B Machine & Tool Co., Inc., N.J., 12c, 32c

Schaevitz Engineering, N.J., 6c, Centrifuges c

Schauer Mfg. Corp., Ohio, 4sc

Schmit Engineering Co., Calif., 12 Lead Bending sc, Hole Punching sc

Sciaky Bros., Inc., Ill., 38c

Scientific Engineering Laboratories, Calif., 32sc, 34sc

Segal, Edward, N.Y., 12 Eyelet s, 26 Tube Pin s

Sel-Rex Corp., N.J., 4c

Selas Corporation of America, Pa., 10

Serfass Corp., Div. Milton Roy Co., Pa., 34c

Sheffield Corp., The, Subsid. The Bendix Corp., Ohio, 12sc, 26sc

Sier-Bath Gear & Pump Co., Inc., N.J., 34

Sifco Metachemical Inc., Ohio, Electroplating machines

Sigma Engineering Service, Inc., Pa., Capper and spiralling machines

Southwest Products, Inc., Texas, 12c

Sperry Products Co., Div. Howe Sound Co., Calif., 12 X-ray Inspection c, 28 Inspection c

Sta-Warm Electric Co., Ohio, 12 Melting Tanks & Pots sc

Star Precision Devices, N.Y., 12s

Stephens Trusonic, Inc., Calif., 36sc

**Stevens Mfg Co., Inc., George, Pulaski Rd. at Peterson, Chicago 30, Ill., 6sc, Tel: JUniper 8-1300**
**See ad on this page**

Stevens Welding Tool Mfg. Co., 12, 28, 34

Stokes & Yuke Div., Magnetic Specialties Inc., Conn., 12 Electromagnetic Clutches, Brakes, Couplings s, 24s

Stromberg-Carlson Co., Fla., 12 Electronic Assemblies, 28

Technic, Inc., P.O. Box 965, Providence 1, R.I., 12 Electroplating s, Tel: ST 1-6100

See ad on page 439

Technical Devices Co., Calif., Inc., 26s, 28s

Technicraft Co., Mass., Inc., 22

Telecomputing Corp., Calif., Recorders, Data Logging s

Temperature Engineering Corp., N.Y., 8s, 36s, Dry Boxes sc

Templeton, Inc., Mass., 12 Tension Meters c

Thomas Instrument Co., N.Y., 12, 34sc

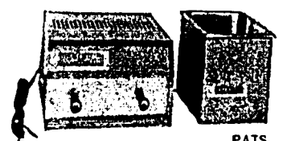
Thomson Mfg. Co., Judson L., Mass., 12sc

Townsend Co., Pa., 12 Rivet Setting sc

Trinity Equipment Corp., N.Y., Inc.

Tuck Mfg. Co., Mass., Hand Tools sc

**Turbo Machine Co., Ordnance & Electronic Dept., Lansdale, Pa., 12c, Tel: ULysses 5-5131**
**See ad on page 438**

**$99.95** PATS. PEND.

Not Pint Sized
Full ½ gal. capacity
Powerful 40 watt output
Stainless steel tank

We will pay all shipping charges to any point within the U.S. (except Alaska and Hawaii) if you enclose check with order.

**DI SON TEGRATOR ULTRASONIC CLEANER**

**FOR PRECISION CLEANING OF PRECISION COMPONENTS**

only Ultrasonic Industries offers:

- FREE 5 Day Trial with Money-Back Guarantee
- FREE 5 Year Service Policy
- Choice of Seven Colors
- FREE: 32 page Illustrated Users' Reference Guide
- Immediate delivery from stock

| SYSTEM NO. (INDICATES APX. POWER IN WATTS) | TANK CAPACITY GALS | TANK DIMENSIONS | COMPLETE PRICE | TYPICAL COMPETITIVE PRICE RANGE |
|---|---|---|---|---|
| 40 | ½ | 5¼"L x 5¼"W x 4"D | $99.95 | $187.50-350 |
| 80 | 1½ | 12"L x 6"W x 6"D | $199.95 | $340-597 |
| 270 | 5 | 14"L x 10"W x 9"D | $349.95 | $675-1040 |
| 520 | 15 | 20"L x 16"W x 10"D | $799.95 | $1325-1750 |
| 1040 | 30 | 24"L x 18"W x 16"D | $1699.95 | $2275-2500 |
| 3000 | 75 | 31"L x 31"W x 18"D | $3999.95 | $4450-4900 |

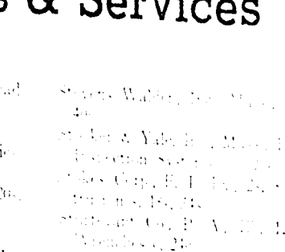
Send check with order to Dept. S7-IRED-60

ultrasonic industries
ALBERTSON [illegible]
Canada 1912 Eglinton Ave. West Toronto 10 Ont. Ru [illegible]

For details, circle #735 on Reader Service Card

## FRONT LOADING MULTIPLE HEADER BOBBIN WINDER
### Adjustable Length

Up to 4 heads easily handled by operator without shifting position. Each head winds random wound Bobbin Coils, Solenoids, Repeater Coils or Resistors up to 2½" long and up to 4" OD. Each head individually motorized and easily portable.




Note extreme compactness

Exclusive time-saving convenient front loading—spindle faces operator. Winding traverse infinitely adjustable—no cam changing.

Up to 7000 RPM winding speed. Exclusive features: 1) Slow-start eliminates wire breakage. 2) Extra economy positive stopping magnetic brake. 3) Instant automatic brake release.

Other time-saving features: 1) Instant re-setting automatic counter. 2) Faster gear changing - gear box handily located on top of head. 3) One motion by operator re-sets counter and starts machine—starting switch located directly opposite counter re-set lever. 4) No oiling necessary--all parts automatically lubricated. 5) Tension conveniently mounted below spindle.

Increase production, lower costs, lessen down time with Model 314-AM.

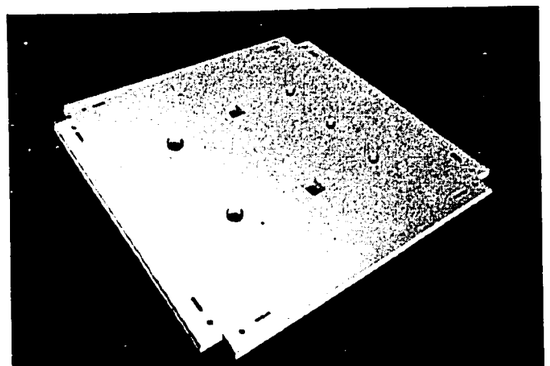
**GEO. STEVENS MANUFACTURING CO., INC.**
**Pulaski Rd. at Peterson, Chicago 30, Ill.**

**The most complete line of coil winding equipment made**

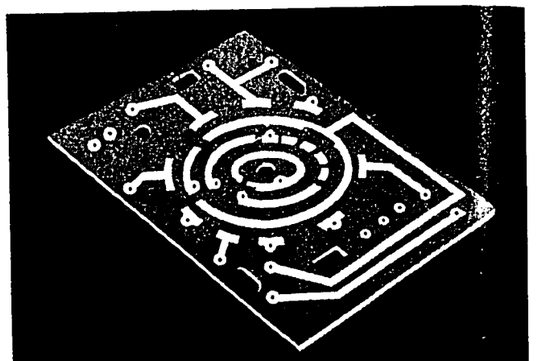
For details, circle #736 on Reader Service Card



Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items, "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.



**PRODUCTION TIME: 2.8 minutes.** Electronic chassis, with 23 holes and 4 notches. Takes 6.5 minutes to set up standard gauging. Punching requires only 2.8 minutes each.



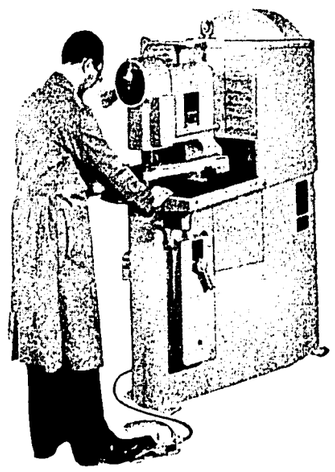
**PRODUCTION TIME: 1.97 minutes.** Printed circuit board, with 29 holes. Production time per piece is 1.97 minutes using exclusive STRIPPIT Duplicator and template method.

# STRIPPIT Fabricators cold-punch printed circuits and electronic chassis *FAST*

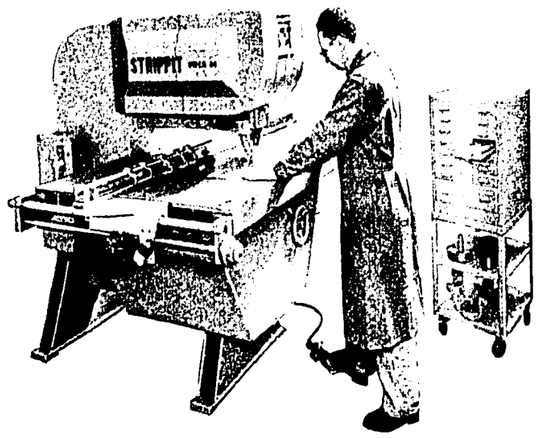
There is no more profitable way to punch, notch and nibble where limited volume will not support high tooling costs. STRIPPIT Fabricators feature an exclusive combination of quick-set, multiple-stop gauging and permanently aligned, self-stripping punch assemblies and die buttons that can be changed from one size to another in less than 20 seconds.

STRIPPIT Fabricators eliminate costly "in-between" tool designing and die making—let you go from drawing to finished part in a matter of minutes. Applications are almost limitless. STRIPPIT Fabricators will punch any sheet material up to ¼" thick and notch and nibble any sheet material up to ⅛" thick.

Write for catalogs describing the two models of STRIPPIT Fabricators. For a free demonstration at your plant, ask us to schedule a visit of the STRIPPIT Mobile Unit. It doesn't cost anything to get the complete STRIPPIT story.



STRIPPIT Model 15A contains the new STRIPPIT Electro-Hydra matic Head. Simplified design completely eliminates the need for pressurized air.




STRIPPIT Super "30" has integral Duplicator unit for medium production runs. Greater throat depth permits punching 30" from sides of work.

WALES **STRIPPIT** INC.

HOUDAILLE INDUSTRIES, INC.

**246 Buell Road • Akron, New York**

*In Canada: Strippit Tool & Machine Company, Brampton, Ontario*

*In Continental Europe: Raskin S.A., Lausanne, Switzerland* *In the British Isles: E. H. Jones (Machine Tools) Ltd., Hove, Sussex, England*



For details, circle #737 on Reader Service Card




Veeco

**HIGH VACUUM EQUIPMENT**

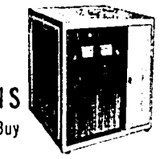


Helium Mass Spectrometer **LEAK DETECTORS**

Constant Sensitivity: $10^{-10}$ cc/sec.
1 part/10 million

High Vacuum **PUMPING STATIONS**

2" and Modular 4"...Buy as you need



| | |
|---|---|
| High Vacuum VALVES: | 1/8" to 4". Bellows sealed. Brass and Stainless Steel, pneumatic, manual and solenoid |
| High Vacuum DIFFUSION PUMPS: | 2" and 4" Air-Cooled and Water-Cooled • Highest Speed • Lowest Backstreaming • Highest Fore-pressure Tolerance |
| High Vacuum GAUGES & CONTROLS: | From 20mm to $2 \times 10^{-10}$ mm Hg • Type RG Ultra-Stable Ionization Gauge Control • Cold Cathode Discharge • Thermocouple |

Complete Range of ACCESSORIES & CONTROLS for High Vacuum Equipment
REPRESENTATIVES THROUGHOUT U.S. & CANADA

Veeco **VACUUM-ELECTRONICS CORP.**
Terminal Drive
Plainview, L.I., N.Y.

For details, circle #738 on Reader Service Card



**LINT FREE**



GLOVES
SHOE–COVERS
HEAD–COVERS
COVERALLS

**VICTOR GLOVES**

49 E. 21st St. • N. Y. 10, N. Y. • AL 4-7842

For details, circle #739 on Reader Service Card




# Directory III. Materials & Services

96. Machinery & Tools.


Ultrasonic Industries, Inc., Dept. IRE, [illegible] Ave., L.I., N.Y. Photocells

See ad on page [illegible]

Unholtz-Dickie Corp., [illegible] Ave., Hamden [illegible] AT [illegible]

See ad on page [illegible]



**LINT FREE**



GLOVES
SHOE–COVERS
HEAD–COVERS
COVERALLS

**VICTOR GLOVES**

49 E. 21st St. • N. Y. 10, N. Y. • AL 4-7842

For details, circle #740 on Reader Service Card



*Welch* **DUO-SEAL VACUUM PUMP**

TWO-STAGE CONSTRUCTION
with **VENTED-EXHAUST** PATENT

*Removes Vapors Speedily and Effectively*

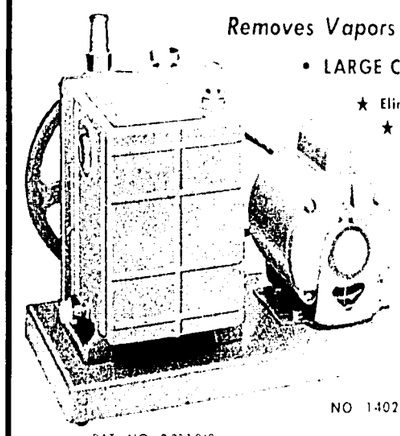
• LARGE CAPACITY • HIGH VACUUM

★ Eliminates Traps or Oil Separators
★ Reduces Number of Oil Changes
★ Lessens Pumpdown Time

• EXCELLENT DESIGN
• ENDURING
• DEPENDABILITY
• VERY QUIET RUNNING

GUARANTEED VACUUM

FREE AIR CAPACITY



NO. 1402-B

PAT. NO. 2,337,849

1402B. DUO-SEAL VACUUM PUMP, [illegible] Driven. For 115 Volts, 60 Cycles, A.C. Each, [illegible]

1402C. DUO-SEAL VACUUM PUMP, [illegible] Driven. For 230 Volts, 60 Cycles, A.C. Each, [illegible]

W. M. WELCH SCIENTIFIC COMPANY
DIVISION OF W. M. WELCH MANUFACTURING COMPANY
ESTABLISHED 1880
1515 Sedgwick Street, Dept. IRE, Chicago 10, Illinois, U. S. A.

For details, circle [illegible] on Reader Service Card


Code numbers shown after each firm refer to product or service groups classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# THE S. S. White INDUSTRIAL AIRBRASIVE® UNIT

## ...cool, shockless, precise way to cut...abrade...debur...clean hard, brittle materials

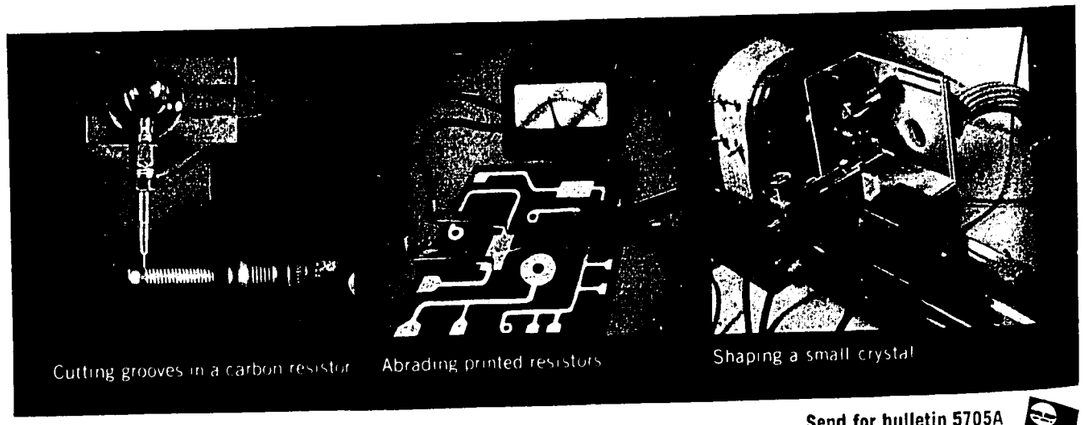


DIODES • CAPACITORS
STRIPPING POTENTIOMETERS
COATED RESISTORS
SHAPING GERMANIUM AND OTHER CRYSTALS
TRANSISTORS • GLASS
MICA • TUNGSTEN
DEBURRING STAINLESS STEEL
REMOVING METAL COATINGS, OXIDES
THERMOCOUPLES
ABRASION TESTING
PRINTED CIRCUITS
CALIBRATION
ETCHING • DRILLING FROSTING
...AND MANY OTHERS!

The Industrial Airbrasive is doing jobs that were previously thought impossible! By gas-propelling a precise stream of fine particles it gives a *fast, cool, shockless* cutting or abrading action. It is equally useful as a laboratory instrument or a mass-production tool. Every day new applications in the electronics field are being found.

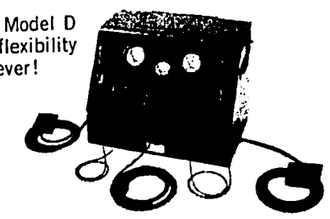
**Send us samples of your most difficult cutting problems and let us test them for you at no cost!**

1074



Cutting grooves in a carbon resistor. Abrading printed resistors. Shaping a small crystal.

New Dual Model D ...greater flexibility than ever!



**Send for bulletin 5705A ...complete information or—call collect!**

S. S. White®

S. S. White Industrial Division

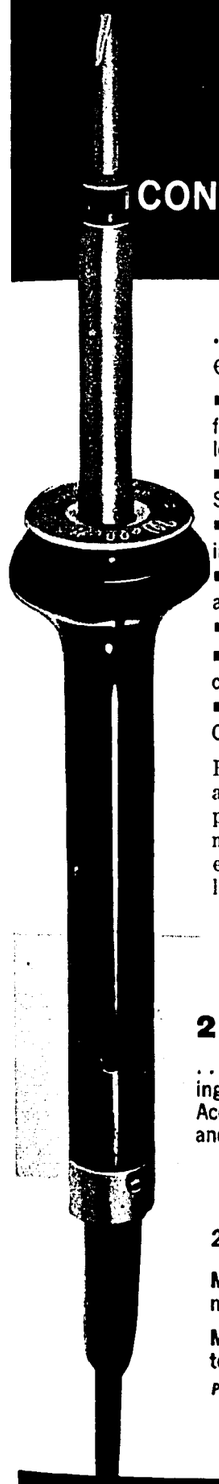
Dept. PR, 10 East 40th Street, New York 16, N. Y. (Phone: MU 3-3015)

For details, circle #742 on Reader Service Card



# Weller® MAGNASTAT®

## CONTROLLED TEMPERATURE SOLDERING IRONS



. . . with advanced features for greater efficiency, longer life.

- **VARIOUS TIP TYPES AVAILABLE.** Made of copper for fast heat transfer and premium iron plating for long life—with built-in Magnastat sensing device.
- **NEW TIP RETAINING NUT MINIMIZES FREEZING.** Seals tip receptacle from flux fumes.
- **NEW RUBBER SHOCK ABSORBER.** Also prevents iron from sliding off bench.
- **NEW, RUGGED, NON-ARCING SNAP SWITCH.** Guarantees continuous, reliable service.
- **PLASTIC HANDLE.** Extra strong—cooler handling.
- **ADVANCED CORD CONNECTION.** Locks cord securely in place, yet permits easy replacement.
- **2 or 3-WIRE CORDS NOW AVAILABLE** for all models. Cords are flexible and light in weight.

Remember, too, Weller Magnastat Soldering Irons automatically maintain the correct soldering temperature—never overheat. They weigh only half as much as uncontrolled irons and give greater heat efficiency with lower wattage. This means more reliable soldering, less down time.

Model TC-552 provides

**2 SOLDERING TEMPERATURES**

. . . low heat for heat-sensitive soldering . . . higher heat for regular work. Accomplished by interchanging high and low heat tips. 55 watts. **$9.00** list

**2 other Magnastat Soldering Irons are available**

**MODEL TC-602.** 60 watts, for light to medium electrical soldering. **$10.00** list

**MODEL TC-1202.** 120 watts, for medium to heavy electrical soldering. **$11.50** list

*Prices shown are for Magnastat Iron including tip and two wire cord.*

Send for NEW Magnastat Soldering Iron literature.

WELLER ELECTRIC CORP. [illegible] STONE S. CROSSING ROAD EASTON PA

For details, circle #743 on Reader Service Card



# Directory III. Materials & Services

## 96. Machinery & Tools.

[illegible] Co., [illegible]
Jobs; Drying Equipment, [illegible]
Equipment, Ovens
U. S. Tool Company, Inc., N.Y.C.
United Gear, Worm & [illegible] Co., [illegible]
St., Wallace
Universal Instruments Corp., N.Y., [illegible]
Lead Straightening & [illegible]
Universal Mfg. Co., Inc., 1168 Grove St., Irvington 11, N.J., 6sc, Tel: ESsex 4-9830

See ad on page 678

Univave, Inc., N.Y., 24
Utica Drop Forge & Tool, Div. Kelsey Hayes Co., N.Y., 3s, Hand Tools s
Vaco Products Co., Ill., 12s, 30s, Pliers s, Crimping & Removal Tools s
Vactronic Laboratory Equipment, Inc., 21 Monmouth Ct., East Northport, L.I., N.Y., 2sc, 8c, 32sc, 34sc, Tel: AN 1-2660

See ad on page 678

Vacuum Instrument Corp., N.Y., 34
Vacuum Specialties Co., Inc., Mass., 2c, 32c, 34c
Vari Corp., Minn., 22s
Varian Associates, Tube Div., 611 Hansen Way, Palo Alto 2, Calif., 34s, Vacuum Machinery & Accessories s, Tel: DAvenport 6-4000

See ad on pages 116-117

Veeco Vacuum-Electronics Corp., Terminal Drive, Plainview, L.I., N.Y., 34s, Vacuum Machinery & Accessories s, Tel: Pioneer 1-8300

See ad on page 681

Vickers, Inc., Electric Products Div., Mo., 38sc
Victor Gloves, Inc., 49 East 21st St., New York 10, N.Y., Gloves & Garments, Lint-free sc, Tel: ALgonquin 4-7842

See ads on page 681

Virginia Electronics Co., Inc., D.C., 22s
Vulcan Electric Co., Mass., 22s
Watage Electric, Inc., N.J., 12 Coating & Soldering Tanks c
Waldes Kohinoor, Inc., N.Y., 12 Hand Tools sc, Pliers sc
Wales-Strippit, Inc., Unit Houdaille Industries, Inc., 246 Buell Rd., Akron, N.Y., 12s, 20s, Hole Punching & Notching s, Tel: LH 2-5441

See ad on page 680

Wall Mfg. Company, P., Pa., 22s
Warren Components Div., El-Tronics, Inc., Pa., 18c
Wasco Electric Products Corp., Fla., 22s, 38s, 40s
Weighing & Controls, Inc., Pa., Electronic Weighing Equipment sc
Welch Scientific Co., W. M., Div. of W. M. Welch Mfg. Co., Dept. IRE, 1515 Sedgwick St., Chicago 10, Ill., 34s, Tel: MIchigan 2-2000

See ad on page 681

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

## 96. Machinery & Tools.

Weller Electric Corp., 601 Stone's Crossing Rd., Easton, Pa., 22 Controlled temperature & instant heat s, Tel: BLackburn 3-3521
See ad on page 683
Wells Industries Corp., Basic Electronic Controls Div., Calif., 10sc, 12sc
Western Electronic Products Co., Calif., 40s
Westinghouse Electric Corp., Semiconductor Dept., Pa., Cooling Devices sc
Wheelabrator Corp., Ind., 12 Metal Cleaning & Finishing c
Wheeler Automation Co., N.Y., 12c
White Industrial Div., S. S., Dept. PR, 10 East 40th St., New York 16, N.Y., 12 Abrasive & Cutting sc, Tel: MUrray Hill 3-3015
See ad on page 682
Whitney Metal Tool Co., Ill., 12s
Wickes Engineering & Construction Co., N.J., 4c
Wiedemann Machine Co., Pa., 12 Turret Punch Presses c, 20c
Wilder Mfg. Co., Inc., N.Y., Soldering Iron Holders sc
Winchester Electronics, Inc., Conn., Crimping & Removal Tools sc
Worklon, Inc., N.Y., Special Purpose Industrial Apparel sc
Wyle Mfg. Corp., Calif., 36sc
Wyreo Projects, Inc., N.Y., 20s
Xcelite, Inc., N.Y., 12sc, Hand Tools sc
Yardney Electric Corp., N.Y., 4s
Zagar, Inc., Ohio, 20sc
Zenith Optical Laboratory, N.Y., 26c
Zephyr Mfg. Co., Inc., Calif., 22sc

**Magnets:**
See class 57

**Magnetizers:**
See class 96

**Maintenance service, towers & antennas:** See class 39

**Manufacturers representatives:**
See class 105

**Markers & tags:**
See class 91

**Marking machines:**
See class 96

**Marking services:**
See class 89

**Mesh, wire:**
See class 85

**Metal stamping & spinning services:** See class 89

**Metallic powders for cores:**
See class 48

## 97. Metals.

5. Alloys
10. Copper
15. Ferrous
20. Metallic oxides
25. Non-ferrous, excluding copper
30. Powdered
35. Precious & rare

Accurate Specialties Co., Inc., N.Y., 5sc, 25sc, 30sc, 35sc
Allegheny Ludlum Steel Corp., Pa., 5c, 15c
Allied Chemical Corp., N.Y., 20s
Alloys Unlimited, Inc., N.Y., 5c, 25c, 35c
Alpha Metals, N.J., 5sc, 25sc, 30sc, 35s
Aluminum Co. of America, Pa., 25s, 30s
Aluminum Foils, Inc., Tenn., Aluminum foil
American Brasing Alloys Corp., N.Y., 5s, 10s, 15s, 25s, 35s
American Brass Co., N.Y., 5sc, 10sc
American Metal Climax, Inc., N.Y., 5s, 10s, 20s, 25s, 30s, 35s
American Platinum and Silver Div., Engelhard Industries, Inc., 231 New Jersey Railroad Ave., Newark 5, N.J., 25, 35, Tel: MArket 2-8035
See ad on page 685
American Silver Company, Inc., 36-06 Prince St., Flushing 54, N.Y., 5sc, 10sc, 15sc, 25sc, 30c, 35sc, Foil sc, Tel: FLushing 3-8012
See ad on page 685
Anchor Metal Co., Inc., N.Y., 5c, 10s, 25s, 30s, 35s
Antara Chemicals Div., N.Y., 30s
Anthony & Co., J. L., R.I., 5sc, 10sc, 15s, 25sc, 35sc
Associated Engineering & Mfg. Corp., N.J., 30s, Molybdenum s, Tungsten s
Attleboro Refining Co., Inc., Mass., 35sc
Avon Tube Div., Higbie Mfg. Co., Mich., 15sc
Baker Contact Div., Engelhard Industries, Inc., 207 Grant Ave., East Newark, Harrison P.O., N.J., 5, 30, 35, Tel: BIgelow 3-0300
See ad on page 170
Barium & Chemicals, Inc., Ohio, 20s
Beryllium Corp., The, Pa., 5sc
Bishop & Co., J., Pa., 5sc, 35sc
Bow Solder Products Co., Inc., N.Y., 5sc, 10sc, 25sc, 30sc
Brainin Corp., C. S., N.Y., 35c
Bram Metallurgical-Chemical Co., Pa., 5sc, 10sc, 25sc, 30sc, 35sc
Brooks & Perkins, Inc., Mich., 25c
Brush Beryllium Co., The, Ohio, 5sc, 20sc, 25sc, 30sc
Carborundum Co., The, N.Y., 5c
Carborundum Co., The, Refractories Div., N.J., 5c
Carpenter Steel Co., The, Pa., 5 Magnetic s, 15s
Channel Master Corp., N.Y., 25s
Chase Brass & Copper Co., Conn., 5s, 10s, 25s, 35s
Chemalloy Electronics Corp., Calif., 5c, 25c, 30sc
Cohn Corp., Sigmund, 121 S. Columbus Ave., Mount Vernon, N.Y., 35sc, Tel: MOunt Vernon 4-5300
See ad on page 699
Columbian Carbon Co., Mapico Iron Oxides Unit, 380 Madison Ave., New York 17, N.Y., 20s, Tel: MUrray Hill 7-2300
See ad on this page
Composite Industrial Metals, Inc., R.I., 5c, 25c, 35c
Consolidated Mining & Smelting Co. of Canada, Ltd., Canada, 5s, 25s, 30s, 35s


**Make your Ferrites with**

HIGH PURITY
**MAPICO®**
FERRIC OXIDES
**for TOP performance**

These reactive synthetic MAPICOS, some especially developed for ferrite manufacture, are over 99% pure $Fe_2O_3$. Choice of suitable characteristics is made easy—many variations in particle-size and shape are available. Careful control contributes to uniformity of packing and shrinkage. Our iron oxide production experience and our ferrite research can help you accomplish best results. Manufactured in modern plants by modern methods. Experienced Columbian technicians are ready to cooperate in any problem involving the use of iron oxides for ferrite manufacture. For full data write today. Samples for testing provided on request.

**COLUMBIAN CARBON COMPANY**
MAPICO IRON OXIDES UNIT
380 MADISON AVENUE, NEW YORK 17, N. Y.

For details, circle #744 on Reader Service Card






# Directory III. Materials & Services

## 97. Metals.

Consolidated Reactive Metals, Inc., 115 Hoyt St., Mamaroneck, N.Y., 5sc, 35sc, Tel: OWens 8-2300
See ad on page 609
Cross Company, H., 3229 Bergenline Ave., Union City, N.J., 5c, 25c, Tel: UNion 3-1134
See ad on this page
Crucible Steel Company of America, Pa., 5s, 15s
Dalweld Co., Inc., N.Y., 5s, 10s, 25s, 35s
Division Lead Co., Ill., 5s, 25s, 30s
Driver Company, Wilbur B., 1875 Mc-Carter Hwy., Newark 4, N.J., 5s, 10s, 15s, 25s, 35s, Tel: HUmboldt 2-5559
See ad on page 186
Driver-Harris Co., 201 Middlesex St., Harrison 7, N.J., 5s, Tel: HUmboldt 3-4800
See ad on page 165


**METALS FOR EXACTING ELECTRONIC REQUIREMENTS**

FOR TAPE RECORDING
All-Metal Recording Tape
Gap Foils (non-magnetic) in 18K White Gold and Platinum (as thin as .00004")

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Hyper-Pure Gold .99999 Fine
Doped Gold Alloys Solid or Clad
Tin-Clad Nickel Strip
Silver Brazing Alloys
Hyper-Pure Potassium Gold Cyanide

FOR TRANSFORMERS AND TUBES
Glass Sealing Alloys
High Permeability Alloys Strip-Tape-Foil
Nickel and Nickel Alloys
Copper Tape and Foil
Brazing Alloys (Gold, Silver, Platinum)

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INDUSTRIAL DIVISION
**AMERICAN SILVER COMPANY, Inc.**
36-06 PRINCE ST. FLUSHING 5, N.Y.

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Electro-Etch Corp., [illegible]
Electronic Parts Mfg. Co., [illegible] 5sc, 30sc, 35sc
Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 35s, 35s, Tel: BIgelow 2-2700
See ad on page 170
Fansteel Metallurgical Corp., North Chicago, Ill., 25s, 30s, 35s, Columbium s, Molybdenum s, Tantalum s, Tungsten s, Tel: DExter 6-4000
See ad on pages 130-131
Foote Mineral Co., Pa., 25s, 30s, 35s, 40s, 50s
General Communication Co., 677 Beacon St., Boston 15, Mass., 5c, Tel: COpley 7-6030
See ad on page 351
General Electric Co., Lamp Metals & Components Dept., Ohio, 5s, 15s, 25s, 30s, 35s
Gibson Electric Co., Pa., 15s, 30s, 35s
Goldsmith Bros. Div., National Lead Co., Ill., 25s, 30s, 35s
Grace Electronic Chemicals, Inc., Md., 35s
Hamilton Watch Co., Precision Metals Div., Pa., 5c, 10c, 15c, 25c
Handy & Harman, N.Y., 35sc


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OTHER METALS

**RIBBONS.....**
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TOLERANCES CLOSER THAN COMMERCIAL STANDARDS
Note: for highly engineered applications—strips of TUNGSTEN and some other metals can be supplied
*rolled down to .0003 thickness*

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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

# All that 'Quality' and 'Service' imply are yours with:




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Heat resistant 24Kt Acid Bright Gold, extremely low porosity, hard and ductile

OROSENE 999
24Kt Acid Bright Gold, tight grain, superior throwing and leveling power

HG BRIGHT GOLD
23+Kt Low Stress, Hard and Bright operates at room temperature, without free cyanide

INDUSTRIAL 24Kt GOLD
Ultra Pure Aqueous Potassium Gold Cyanide for soft stressless pure gold electroplates

RHODIUM SULPHATE T. P.
For High Purity, Low Stress fine grain Rhodium electroplating

RHENIUM-T
Available for experimental plating

INDIUM GOLD
For semi-conductor plating

ANTIMONY GOLD
For semi-conductor plating

GALLIUM GOLD
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Immersion Tinning at room temperature

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Anionic detergent for free rinsing and cleaning

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Custom engineered for all types of precious metal plating

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Quality controlled and custom packaged to suit your requirements

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**Technic inc** ST 1-6100

P.O.BOX 965 PROVIDENCE 1 R.I. 7001 NO. CLARK ST. CHICAGO 26 ILL.

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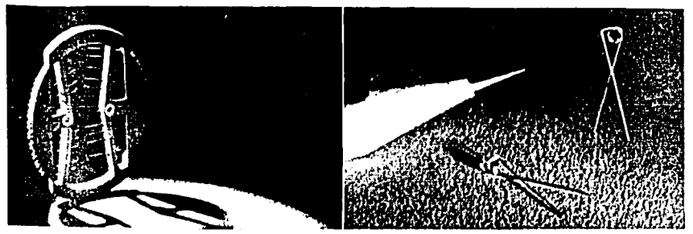
THAT'S WHY NEY MANUFACTURES
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- precious metal parts
- molded assemblies
- all under one roof

A manufacturer of precious metal products for over 148 years, The J. M. Ney Company offers unusually broad precious metal research experience and facilities. Ney is unique in that it controls production of Ney precious metal parts and assemblies *from the alloying of the metals themselves right through to the manufacture of finished part or assembly*. This control is reflected in the *extreme reliability* of Ney's standard molded brush assemblies and in the many assemblies made to customers' specifications.

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Ney products, either standard or made to customers' specifications (for low level contact applications), include molded contact assemblies particularly for use with rhodium or gold surface printed commutators, relay contacts, contacts for switching devices and switching assemblies, slip ring assemblies, small screw machine and headed contacts and precious metal resistance wire.

- Molded assemblies
- Fine wire (resistance)
- Precious metal wire and plate
- Fabricated parts and assemblies using precious metal with base metal blades
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- Small screw machine and headed contacts
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Write for your copy of our catalog or call our Engineering Department (Hartford, CHapel 2-2281)



**THE J. M. NEY COMPANY**

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Code numbers shown after each firm refer to product [illegible] beginning of each product classification. "s" indicates [illegible] built items. Complete addresses will be found in the Alphabetical [illegible]





# Directory III. Materials & Services

# EPOXY-RESIN SPECIALTIES

**BUSHING-ENCAPSULATED FILAMENT TRANSFORMERS**



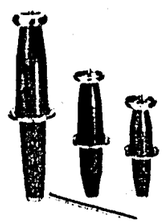
Filament transformer, rectifier-socket mount, and corona cap, all integrated into a neat single unit, combine rugged characteristics with low power losses. Three sizes cover most commonly used tubes. Isolation range for operation in air, oil, or vacuum runs from 40 to 200 kv peak. Filament transformers have accessible, adjustable taps.

**HIGH-VOLTAGE CABLE TERMINATIONS**

Tank-mounting units in standard types available for cable-to-air or cable-to-oil operation. All have exclusive internal stress control for uniform field distribution over surface. Standard units range from 75 kv to 150 kv. Types for special order go to 300 kv. RG-type cables are easily connected and disconnected.



**FEED-THROUGH BUSHINGS**



Corona-free high-voltage feed-through bushings for air and oil environment have 50, 75, 100, and 150 kv rms ratings. These are integrally cast with internal stress control for uniform field gradients.

**ENCAPSULATING SERVICES**

COMPONENTS maintains a special department for the custom epoxy encapsulation of electron tubes, delicate coils, and similar items. These are precisely cross-sectioned. Resulting imbedments can be used either for making detailed measurements and structural analyses for engineering and production evaluation or for educational or display purposes.



**STANDOFF INSULATORS**

Rugged standoffs for mounting high-voltage transformers and other equipment are produced by Components on special order to meet individual requirements.

COMPONENTS

for research inc

979 COMMERCIAL ST.

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For details, circle #750 on Reader Service Card




Ronson Metals Corp., N.J., 5s, 30s, 35s
Rubber & Asbestos Corp., N.J., 10c
**Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 5c, 10c, 15c, 25c, 35c, Tel: WHite Plains 9-4757**
**See ad on page 615**
Sel-Rex Corp., N.J., 35c
**Semi-Alloys, Inc., 550 S. Fulton Ave., Mount Vernon, N.Y., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc, 35sc, Tel: MOunt Vernon 4-2800**
**See ad on page 697**
Semi-Elements, Inc., Pa., 20s, 30s, 35c
Smith Mfg. Co., Inc., E. C., Pa., 35c
Sorensen Industrial Electronic Co., N.J., 30c
Standard Metals Corp., Mass., 5c, 10c, 35c
Steel Heddle Mfg. Co., Pa., 10c, 15c, 25c, Foil c
Stieh Chemicals, Inc., N.Y., 20c, 25c, Mercury c
Swift Textile Metalizing & Laminating Corp., Conn., 35s
Sylvania Electric Products Inc., N.Y., 5s, 25s, 30s
Sylvania Electric Products Inc., Chemical & Metallurgical Div., Pa., 25s, 30s
**Technic, Inc., P.O. Box 965, Providence 1, R.I., 5s Electroplating, 35s, Tel: ST 1-6100**
**See ad on page 686**
Technicraft Co., Mass., 30s
Tempel Steel Co., Ill., 15 Magnetic Laminations sc
Texas Instruments Incorporated, Metals & Controls Div., Mass., 5sc 10s, 15s, 20c, 25sc, 30c, 35c, Clad c
Tricon Mfg. Co., Ill., 35sc
Uniform Tubes, Inc., Pa., 5c, 10c, 15c, 35c
Union Carbide Corp., Haynes Stellite Co., N.Y., 5c, 25c
Union Carbide Corp., Linde Co., N.Y., 20c, 35c
Union Carbide Corp., Union Carbide Metals Co., N.Y., 5s, 15s, 20s, 25s, 30s
**United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 30c, 35sc, Tel: BEekman 3-8870**
**See ads on pages 533, 699**
United Shoe Machinery Corp., Mass., 15c
United States Steel Corp., Pa., 5s, 15s
Var-Lac-Oid Chemical Co., N.Y., 5, 20, 30, 35
Vitro Chemical Co., N.Y., 5sc, 20sc, 35sc
Wah Chang Corp., N.Y., 5sc, 20sc, 25sc, 30sc, 35 Columbium, Molybdenum, Tantalum, Tungsten sc
Warren Wire Co., Vt., 10sc
Western Gold & Platinum Co., Calif., 5s, 30s
Westinghouse Electric Corp., Lamp Div., N.J., 25sc, 30sc
Wildberg Bros. Smelting & Refining Co., Calif., 35sc
Wilkinson Co., The, Calif., 35sc
Williams & Co., C. K., Pa., 20s, 30s
**Williams Gold Refining Co., Inc., 2978 Main St., Buffalo 14, N.Y., 5sc, 25sc, 30sc, 35s, Foil sc, Tel: UNiversity 7204**
**See ad on this page**


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# ALL PRECIOUS METALS

Gold
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Indium
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Gallium
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# Directory III. Materials & Services

**Mica:**
See class 93

**Microwave hardware:**
See class 83

**Moisture-proofing coatings:**
See class 95

**Moisture-proofing services:**
See class 89

**Molded plastic cabinets:**
See class 84

**Molded plastic fabrication services:**
See class 89

**Molding machinery:**
See class 96

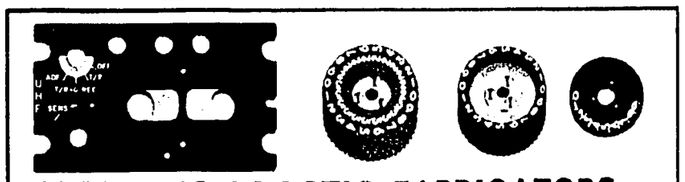
## 98. Molded Products.

**5. Insulators**
**10. Knobs & parts**
**15. Proprietary moldings**

A C Electronics, Inc., Calif., 15sc
AMP Incorporated, Pa., 5s, 15s
Accurate Electronics Corp., Ohio, 5c, 10c
Accurate Molding Corp., N.Y., 5c, 10c
Airtronics International Corp., Fla., 15c
**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 15c, Tel: JUniper 3-0160**
**See ad on page 496**
Allen Electric & Equip. Co., Mich., 10c
American Development Electronics Co., N.J., 5c
American Insulator Corp., Pa., 10c, 15c
**American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 5c, Tel: AMherst 5-3411**
**See ad on page 178**
**American Molded Products Co., 2723 W. Chicago Ave., Chicago 22, Ill., 5s, 15s, Tel: ARmitage 6-3235**
**See ad on page 639**
American Research & Mfg. Corp., Md., 15s
Anchor Plastics Co., Inc., N.Y., 5s
Argonne Electronics Mfg. Corp., N.Y., 5s, 10s
Aries Laboratories, Inc., Conn., 5c, 10c
Auburn Plastics, Inc., N.Y., 5c, 10c
Bacon Industries, Inc., Mass., 5c
Bastian Bros. Co., N.Y., 5s, 15c
Blinn Co., Inc., The Delbert, Calif., 10sc, 15sc
**Bodnar Products Corp., 238 Huguenot St., New Rochelle, N.Y., 10c, Tel: NEw Rochelle 6-4664**
**See ads on pages 598, 632**
Bolta Products, Div. General Tire & Rubber Co., Mass., 10c, 15s

## 98. Molded Products.

Bonny Mfg. Corp., The, Mass., 5c
Cambridge Thermionic Corp., Mass., 5c
Campro Products, Inc., Ohio, 10c, 15c
Ceramic Specialties Co., Inc., Ohio, 5
Channel Master Corp., N.Y., 5c
Chemo Products, Inc., R.I., 10s, 15c
Coilcraft, Inc., Ill., 15c
**Collectron Corp., 304 E. 45th St., New York 17, N.Y., 10c, 15c, Tel: MUrray Hill 9-7120**
**See ad on page 547**
Commercial Plastics Co., Ill., 15sc
**Components for Research, Inc., 979 Commercial Ave., Palo Alto 2, Calif., 15sc, Tel: DAvenport 1-5252**
**See ad on page 688**
Continental-Diamond Fibre Corp., Del., 5sc, 15sc
Cosmo Plastics Co., Ohio, 5s
Custom Components, Inc., N.J., 5c
Darrill Products Corp., Mass., 5c, 10c
Davies Molding Co., Harry, Ill., 10sc, 15s
Dayton Aircraft Products, Inc., Fla., 5sc, 15sc
Dell Optics Co., Ltd., N.J., 5c
Deutsch Co., The, Electronic Components Div., Calif., 15c
**Dimco-Gray Co., 212 E. 6th St., Dayton 2, Ohio, 10s, 15s, Tel: BAldwin 2-6703**
**See ad on page 641**
Dimick Mfg. Co., Ore., 5c, 10c
Eby Co., Hugh H., Pa., 5c, 10sc
Electric Autolite Co., The, Ohio, 15c
Electric Cords & Supply Corp., Calif., 15sc
Electronet Div., Rue Prods., Calif., 5s, 15s
Electronic Cable Corp., Mass., 15c
Electronic Mechanics, Inc., N.J., 5c
Electronic Production & Development, Inc., Calif., 15sc
Emeloid Co., Inc., The, N.J., 10c, 15c
Enflo Corporation, N.J., 5c
Epoxy Products, Div. Joseph Waldman & Sons, N.J., 15c
**Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa., 5c, 10c, Tel: GLendale 6-8592**
**See ad on pages 40-41**
Esco Mfg. Co., N.Y., 15c
Esco Products, Inc., Ore., 5c, 15c
Evans Plastics Co., Inc., N.Y., 5c, 10c, 15c
Excello Products, Inc., Pa., 5c, 15c
Fenton Corp., Ohio, 5c, 15c
Franklin Fiber-Lamitex Corp., N.Y., 10c
G-C Electronics Co., Div. Textron, Inc., 400 S. Wyman St., Rockford, Ill., 5s, 10s, Tel: WOodland 3-9662
See ad on page 640
GOE Engineering Company, Calif., 5c
Galaxy Engineering Corp., Calif., 15c
Garde Mfg. Co., R.I., 5sc, 15sc
Garlock Electronic Products, Garlock, Inc., N.J., 5c, 15c
General Products Corp., N.Y., 15c
General Radio Co., 22 Baker Ave., West Concord, Mass., 5s, 10s, Tel: EMerson 9-4400
See ad on Cover 4
Gries Reproducer Corp., 168 Beechwood Ave., New Rochelle, N.Y., 5sc, 10sc, 15s, Tel: NEw Rochelle 3-8600
See ad on page 643
Haveg Industries, Inc., Del., 5c, 10c, 15c
Hobson Bros., Inc., Ill., 5c
Hydro Molding Company, Inc., 100 Sharron Ave., Plattsburgh, N.Y., 5, 10 molded nylon, Tel: 2598
See ad on page 644
Hysol Corp., N.Y., 15c
Industrial Devices, Inc., N.J., 5sc, 10sc, 15sc
Industrial Electronic Rubber Co., Ohio, 5c, 15sc
Industrial Electronic Hardware Corp., N.Y., 15c
Insulation Manufacturers Corp., Ill., 15c
Insulation Products Co., Pa., 5c, 10c
International Electric Industries, Inc., N.Y., 15c
Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 5c, Tel: MIllington 7-0385
See ad on page 620

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**Edge-Lighted Panels • Knobs • Dials • Plastic Specialties**

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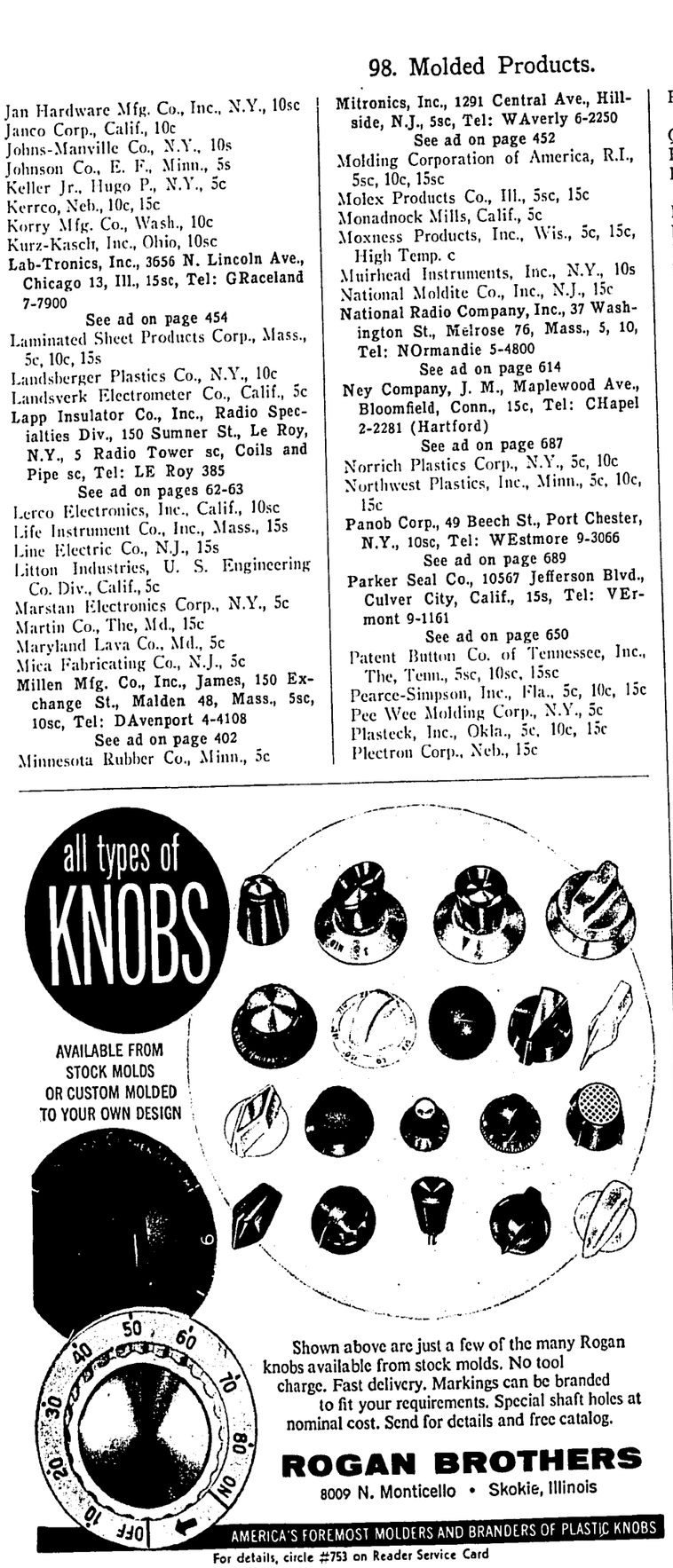

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items, "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

Jan Hardware Mfg. Co., Inc., N.Y., 10sc
Janco Corp., Calif., 10c
Johns-Manville Co., N.Y., 10s
Johnson Co., E. F., Minn., 5s
Keller Jr., Hugo P., N.Y., 5c
Kerrco, Neb., 10c, 15c
Korry Mfg. Co., Wash., 10c
Kurz-Kasch, Inc., Ohio, 10sc
**Lab-Tronics, Inc., 3656 N. Lincoln Ave., Chicago 13, Ill., 15sc, Tel: GRaceland 7-7900**
See ad on page 454
Laminated Sheet Products Corp., Mass., 5c, 10c, 15s
Landsberger Plastics Co., N.Y., 10c
Landsverk Electrometer Co., Calif., 5c
**Lapp Insulator Co., Inc., Radio Specialties Div., 150 Sumner St., Le Roy, N.Y., 5 Radio Tower sc, Coils and Pipe sc, Tel: LE Roy 385**
See ad on pages 62-63
Lerco Electronics, Inc., Calif., 10sc
Life Instrument Co., Inc., Mass., 15s
Line Electric Co., N.J., 15s
Litton Industries, U. S. Engineering Co. Div., Calif., 5c
Marstan Electronics Corp., N.Y., 5c
Martin Co., The, Md., 15c
Maryland Lava Co., Md., 5c
Mica Fabricating Co., N.J., 5c
**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 5sc, 10sc, Tel: DAvenport 4-4108**
See ad on page 402
Minnesota Rubber Co., Minn., 5c
**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 5sc, Tel: WAverly 6-2250**
See ad on page 452
Molding Corporation of America, R.I., 5sc, 10c, 15sc
Molex Products Co., Ill., 5sc, 15c
Monadnock Mills, Calif., 5c
Moxness Products, Inc., Wis., 5c, 15c, High Temp. c
Muirhead Instruments, Inc., N.Y., 10s
National Moldite Co., Inc., N.J., 15c
**National Radio Company, Inc., 37 Washington St., Melrose 76, Mass., 5, 10, Tel: NOrmandie 5-4800**
See ad on page 614
**Ney Company, J. M., Maplewood Ave., Bloomfield, Conn., 15c, Tel: CHapel 2-2281 (Hartford)**
See ad on page 687
Norrich Plastics Corp., N.Y., 5c, 10c
Northwest Plastics, Inc., Minn., 5c, 10c, 15c
**Panob Corp., 49 Beech St., Port Chester, N.Y., 10sc, Tel: WEstmore 9-3066**
See ad on page 689
**Parker Seal Co., 10567 Jefferson Blvd., Culver City, Calif., 15s, Tel: VErmont 9-1161**
See ad on page 650
Patent Button Co. of Tennessee, Inc., The, Tenn., 5sc, 10sc, 15sc
Pearce-Simpson, Inc., Fla., 5c, 10c, 15c
Pee Wee Molding Corp., N.Y., 5c
Plasteck, Inc., Okla., 5c, 10c, 15c
Plectron Corp., Neb., 15c
Polymer Corp. of Pennsylvania, The, Pa., 5c
Quality Components, Inc., Pa., 5c, 10c
Raychem Corp., Calif., 5s, 15s
Raytheon Co., Industrial Components Div., Mass., 10s
Remler Co., Calif., 5c, 10c, 15c
Robertson Electric Co., Inc., N.Y., 15c
Robins Industries Corp., N.Y., 15c
**Rogan Brothers, Inc., 8009 N. Monticello, Skokie, Ill., 10s, Tel: ORchard 5-1233**
See ad on this page
Rogers Mfg. Co., Dayton, Minn., 10c
Sillcocks-Miller Co., The, N.J., 10c, 15c
Smith, Inc., Herman H., N.Y., 5s, 10s, 15s
Sparta Mfg. Co., Div. U. S. Ceramic Tile Co., Ohio, 15c
Star Porcelain Co., The, N.J., 5c, 10c
Stevens Products, Inc., N.J., 5c
Superior Porcelain Co., W.Va., 5sc
**Switchcraft, Inc., 5561 N. Elston Ave., Chicago 30, Ill., 15c, Tel: SPring 4-1515**
See ad on page 554
Sylvania Electric Products Inc., Parts Div., Pa., 10c, 15c
Tapeswitch Corp. of America, N.Y., 15s
Tech-Art Plastics Co., N.J., 5c, 10c, 15c
Technical Ceramics & Lava Corp., N.J., 5
Technology Instrument Corp., Mass, 10s, 15c
**Telex, Inc., 1633 Eustis Ave., Teler Park, St. Paul 1, Minn., 10c, 15c, Tel: MIdway 6-7211**
See ads on pages 456, 556
Thor Ceramics, Inc., N.J., 5c
Topper Mfg. Co., Inc., N.Y., 10sc
U. S. Dielectric Products, Inc., Mass, 5c, 10c, 15sc
United States Electronics Corp., N.J., 5sc, 10c, 15s
U. S. Relay-Electronics, Calif., 15c
U. S. Stoneware Co., Alite Div., Ohio, 5s
Vemaline Products Co., N.J., 10sc
Waldom Electronics, Inc., Ill., 10s
Warren Components Div., El-Tronics, Inc., Pa., 5c, 10c, 15c
Waterbury Companies, Inc., Conn., 5sc, 10sc, 15sc
Wells Electronics Co., Ind., 10c, 15c
Western Coil & Electrical Co., Wis., 5c, 10c
**White Industrial Div., S. S., Dept. PR, 10 E. 40th St., New York 16, N.Y., 10 Protectors s, 15s, Tel: MUrray Hill 3-3015**
See ad on page 682
Whitso, Inc., Ill., 5sc, 10sc, 15s
Winslow Co., Inc., The, N.J., 5c, 10sc, 15c

**Motor brushes:**
See class 91

**Motors:**
See class 60

**Motors & generators, servo:**
See classes 30 & 60

For details, circle #753 on Reader Service Card








# Directory III. Materials & Services

**Mounts, pilot light:**
See class 62

**Nameplates:**
See class 91

**Neon lights:**
See class 62

**Numerical displays:**
See class 62

**Nuts:**
See class 91

**Ovens:**
See class 92

**Ovens, crystal:**
See class 49

**Oxides, metallic:**
See class 97

**Packaging materials:**
See class 91

**Packaging services:**
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**Panels, electroluminescent:**
See class 62

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See class 94

**Pins, vacuum tube:**
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**Plastic fabricating & molding services:** See class 89

**Plastic insulating materials:**
See class 93

## 99. Plastics.

[illegible] Extrusions [illegible] Laminated [illegible] Raw powders [illegible] Resins [illegible] Rods [illegible] Tubes [illegible]

American-Marietta Co., Adhesive, Resin & Chemical Div., 344 [illegible] 130th Ave., S.W., Seattle 4, Wash., 15c, Tel: MAin 3-3311
See ad on this page
American Plastic Products Co., N.Y., 5sc, 25sc
American Quartz Laboratories, Inc., N.Y., Bx., 30sc
American Research & Mfg. Co., N.Y., Bx.,
American Super-Temperature Wires, Inc., 10 W. Canal St., Winooski, Vt., 30c, Tel: UNiversity 2-0636
See ad on page 696
Anchor Plastics Co., Inc., N.Y., 5, 20, 30c
Apex Coated Fabrics Co., Inc., N.Y., 5,
Aries Laboratories, Inc., Conn., 15c
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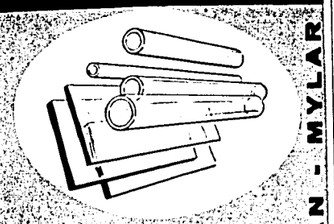
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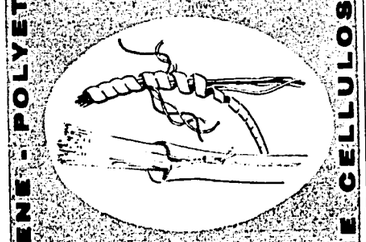
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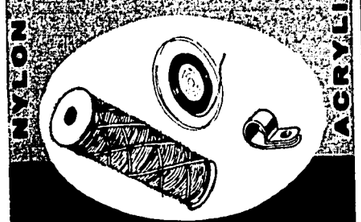
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Auburn Mfg. Co., Conn., 5c, 10c, 20c, 25s, 30c
Auburn Plastics, Inc., N.Y., 5c, 15c, 20sc, 25sc, 30sc
Baer Co., N. S., N.J., 10c
Barco, Inc., Wis., 15s
Bo Myte Co., The, Pa., 10sc, 25sc
Bolta Products, Div. General Tire & Rubber Co., Mass., 5c, 10c, 25sc
Bonny Mfg. Corp., The, Mass., 5sc, 20sc, 25sc, 30sc
Boonton Molding Co., N.J., 20c, 25c
Borden Chemical Co., The, N.Y., 5c, 30s
Brand-Rex Div., William, American Enka Corp., Mass., 30sc
Carmer Industries, N.J., 5sc, 20sc, 25sc, 30sc
Catalin Corp. of America, N.Y., 15s
Celanese Plastics Co., Div. Celanese Corp. of America, N.J., 15s, 25s
Channel Master Corp., N.Y., 5c
Chemfab Corporation, N.Y., 10c, 20c, 30c
Chemo Products, Inc., R.I., 5s, 20s, 25s, 30s
Cleveland Container Co., The, Ohio, 30sc
Columbia Products Co., S.C., 20c, 30c
Comco Plastics, Inc., N.Y., 10s, 20s, 25s, 30s
Commercial Plastics Co., Ill., 5sc, 20sc, 30sc
**Components for Research, Inc., 979 Commercial Ave., Palo Alto 2, Calif., 20c, 25c, 30c, Tel: DAvenport 1-5252**
**See ad on page 688**
Continental Can Co., N.Y., 10sc
Continental-Diamond Fibre Corp., Del., 5sc, 10sc, 20sc, 25sc, 30sc
Cortland Industries, Inc., Ill., 10c, 25c
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Franklin Fibre-Lamitex Corp., N.Y., 5sc, 10sc, 20sc, 25sc, 30sc
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General Electric Co., Laminated Products Dept., Ohio, 10s, 20s, 25s, 30s
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Haveg Industries, Inc., Del., 5c, 10c, 15c, 20c, 25c, 30c
Hermes Plastics, Inc., N.Y., 10s, 25s
Hysol Corp., N.Y., 20s, 25c, 30c
**Illumitronic Engineering, 680 E. Taylor St., Sunnyvale, Calif., 5sc, 10sc, 20sc, 25sc, 30sc, Tel: REgent 9-2395**
**See ads on pages 400, 692**
Industrial Plastic Fabricators, Inc., Mass., 5c, 20s, 25s, 30s
**Inso Electronic Products, Inc., 1200 Commerce Ave., Union, N.J., 30c, Tel: MUrdock 6-4258**
**See ad on page 612**
Insulating Fabricators of New England, Inc., Mass., 20sc, 25s, 30s
Insulation Manufacturers Corp., Ill., 5c, 20c, 25c, 30c, Wedges c
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Isochem Resins Co., R.I., 20c
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Koppers Co., Inc., Plastics Div., Pa., 15, Resins, Film
Marblette Corp., The, N.Y., 20sc, 25sc, 30sc
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**See ad on page 693**
Mesa Plastics Co., Calif., 15s
Mica Corporation, Calif., 10s
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**See ad on page 658**





# Directory III. Materials & Services

## 99. Plastics.

Mykroy, Inc., Ill., 20sc, 25sc, 30sc
**National Tel-Tronics Corp., 53 St. Casimir Ave., Yonkers, N.Y., 10s, Tel: YOnkers 8-6400**
**See ad on page 559**
National Vulcanized Fibre Co., Del., 5s, 10s, 20s, 25s, 30s
Natvar Corporation, N.J., 5s, 25s, 30s
New England Laminates Co., Inc., Conn., 10sc, 25sc
**New Hermes Engraving Machine Corp., 154 W. 14th St., New York 11, N.Y., 10c, Tel: WAtkins 4-7373**
**See ad on page 677**
Norrich Plastics Corp., N.Y., 20c, 25c, 30c
Northern Plastics Corp., Wis., 10c, 25c
Parkway Specialties Co., Mich., 20s, 30s
Paul & Stein Bros., Inc., F. H., N.Y., 30sc
Penn Fibre & Specialty, Co., Inc., Pa., 10c, 20c, 25c, 30c
Pennsylvania Fluorocarbon Co., Inc., Pa., 5sc, 20s, 30s
Permonite Mfg. Co., Ill., 20sc, 25sc, 30sc
Plasteck, Inc., Okla., 10c
Polymer Corp. of Pa., The, Pa., 5sc, 15s, 20sc, 25sc, 30sc
Precision Metal Products Co. of Malden, Inc., Mass., 20s, 25s, 30s
**Precision Paper Tube Co., 2062 W. Charleston St., Chicago 47, Ill., 30sc, Tel: ARmitage 6-5200**
**See ad on page 649**
Raybestos-Manhattan, Inc., Pa., 20c, 25c, 30c
Raychem Corp., Calif., 5s, 30 Shrinkable s
Reichhold Chemicals, Inc., N.Y., 15s
Republic Aviation Corp., N.Y., 10c
Resin Consultants & Mfg. Co., Inc., N.Y., 15s
Resinite Corp., Ill., 30c
Richardson Co., The, Ill., 10c, 20c, 25sc, 30c
Rosenberg Bros. & Co., N.Y., 5c, 15c, 20c, 25c, 30c
Shamban & Co. W. S., Calif., 5sc, 10sc, 15sc, 20sc, 25sc, 30sc
Silkcocks-Miller Co., The, N.J., 5c, 10c, 20c, 25c, 30c
Sparta Mfg. Co., Div. U. S. Ceramic Tile Co., Ohio, 5s, 20s, 25s, 30s
**Spaulding Fibre Co., 310 Wheeler St., Tonawanda, N.Y., 10c, 20c, 25c, 30c, Tel: JAckson 2000**
**See ad on page 657**
State Testing Laboratory, Inc., Conn., 20s, 25s, 30s
Stevens Products, Inc., N.J., 10c, 30s
Studebaker-Packard Corp., Gering Plastics Div., N.J., 5c, 15c, 20c, 25c, 30c
**Surprenant Mfg. Co., 172 Sterling St., Clinton, Mass., 30 Shrinkable sc, Tel: EMpire 5-6331**
**See ad on page 616**
Synthane Corp., Pa., 10sc, 20sc, 25sc, 30sc
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**See ad on page 654**
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Wilmington Fibre Specialty Co., Del., 10c, 20c, 25c, 30c
Winner Mfg. Co., Inc., N.J., 10c, Reinforced c
Wirekraft, Inc., Ind., 5c, 30c
Zenith Plastics Co., Subsid. Minnesota Mining & Mfg. Co., Calif., 10c
**Zippertubing Co., The, 752 S. San Pedro St., Los Angeles 14, Calif., 30sc, Tel: MAdison 4-6664**
**See ad on page 659**

**Plugs:**
**See class 55**

**Positioning equipment:**
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**Potting & sealing compounds:**
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**Powders, metallic:**
See classes 48 and 97

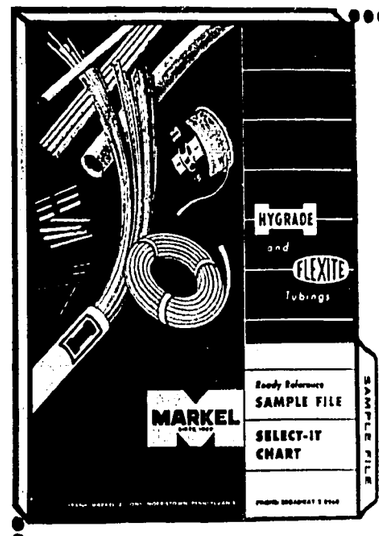
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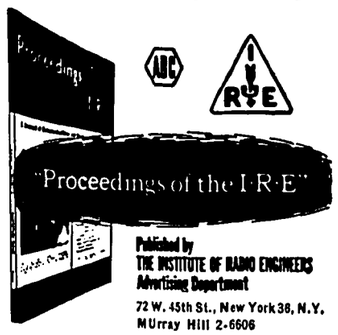

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See class 96

Programming devices, computer:
See class 9

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LEE: **STATISTICAL THEORY OF COMMUNICATION.** 1960. Approx. 504 pages. $16.75

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GATOS: **THE SURFACE CHEMISTRY OF METALS AND SEMICONDUCTORS.** 1960. In Press.

RALSTON-WILF: **MATHEMATICAL METHODS FOR DIGITAL COMPUTERS.** 1960. 293 pages. $9.00

GIBSON-BURGESS-KROGER: **PROGRESS IN SEMICONDUCTORS,** Vol. IV. 1960. 292 pages. $10.50

PARZEN: **MODERN PROBABILITY THEORY AND ITS APPLICATIONS.** 1960. 464 pages. $10.75

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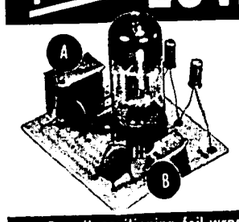
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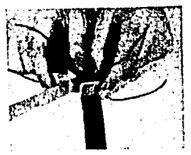
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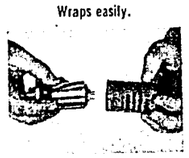
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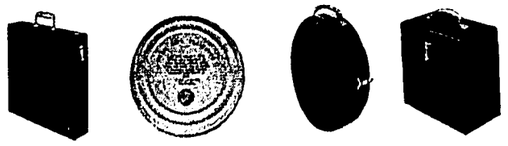
Shielding cables reduces magnetic radiation or pickup.



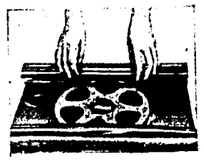
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Ace Engineering & Machine Co., Inc., Pa., 5sc, 15sc, Thermal sc
Aeroflex Corp., The, Aeroflex Laboratories Div., N.Y., Thermal s
Air-Maze Corp., Subsid. Rockwell-Standard Corp., Ohio, 15c

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Atkins & Merrill, Inc., Mass., 10c
Atomic Accessories, Inc., N.Y., 10s
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## 102. Shielding Materials.

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Marblette Corp., The, N.Y., 10sc

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Metavac, Inc., N.Y., 5, 15

**Millen Mfg. Co., Inc., James,** 150 Exchange St., Malden 48, Mass., 15sc, Tel: DAvenport 4-4108
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Pam Associates, Inc., Md., Acoustic c
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Penn Fibre & Specialty, Co., Inc., Pa., Acoustic s

**Perfection Mica Co., Magnetic Shield Div.,** 1322 N. Elston Ave., Chicago 22, Ill., Magnetic sc, Tel: EVerglade 4-2122
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Radar Design Corp., N.Y., 5s
Radiation Instrument Development Lab., Inc., Ill., 10c
Research Chemicals, Div. Nuclear Corp. of America, Calif., 10s
Schuyler Manufacturing Corp., N.J., 5sc, 10sc, 15sc

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| Cadmium | Indium | Palladium | Sulphur | Zinc |
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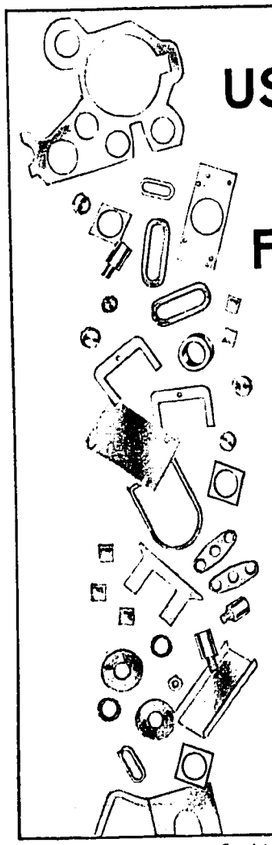
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**American Platinum & Silver Div., Engelhard Industries, Inc., 231 New Jersey Railroad Ave., Newark 5, N. J., 20, 25, Tel: MArket 2-8035**
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**See ad on page 685**

Anchor Metal Co., Inc., N.Y., 5s, 10s, 15s, 20s, 25s, 30s

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**Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 25c, Tel: HUmboldt 4-2100**
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Burnley Battery & Mfg. Co., Pa., 10s

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Consolidated Mining & Smelting Co. of Canada, Ltd., Canada, 20s, 25s

Dalweld Company, Inc., N.Y., 10s, 20s, 25s

Division Lead Co., Ill., 5s, 10s, 15s, 25s, 30s

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Eagle Electric Mfg. Co., Inc., N.Y., 10s

Electrovert, Inc., N.Y., 10s, 30s

**Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 10s, 20s, Tel: BIgelow 2-2700**
**See ad on page 170**

**Fairmont Chemical Co., Inc., Dept. ID, 136 Liberty St., New York 6, N.Y., 10s, Tel: BArclay 7-6375**
**See ad on this page**

Fusion Engineering, Ohio, 10sc, 25c

General Electric Co., Lamp Metals & Components Dept., Ohio, 10s

General Findings & Supply Co., Industrial Div., Mass., 25c

Gibson Electric Co., Pa., 25c

Goldsmith Bros. Div., National Lead Co., Ill., 20sc

Handy & Harman, N.Y., 20sc

**Indium Corp of America, The, 1679 Lincoln Ave., Utica 4, N.Y., 15s, 20c, 25c, Tel: SWift 7-1630**
**See ad on page 685**

Johnson Mfg. Co., Inc., Iowa, 5s, 10sc, 15sc, 25c

**Kester Solder Co., 4219 Wrightwood Ave., Chicago 39, Ill., 5s, 10s, 15s, 20s, 25s, 30s, Tel: BElmont 5-1601**
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LMB-Heeger, Inc., Calif., 10s

Leach & Garner Co., Industrial Div., Mass., 20c





# Directory III. Materials & Services

## 103. Solder.

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Multicore Sales Corp., N.Y., 10s, 30s

National Lead Co., N.Y., 5s, 10s, 15s, 25s, 30s

New York Solder Co., Inc., N.Y., 5s, 15s, 30s

**Ney Company, J. M., Maplewood Ave., Bloomfield, Conn., 20c, Tel: CHapel 2-2281 (Hartford)**
**See ad on page 687**

**Secon Metals Corp., 7 Intervale St., White Plains, N.Y., 10c, Tel: WHite Plains 9-4757**
**See ad on page 615**

**Semi-Alloys, Inc., 550 S. Fulton Ave., Mount Vernon, N.Y., 15sc, 20sc, 25sc, Tel: MOunt Vernon 4-2800**
**See ad on page 697**

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Staver Co., Inc., The, N.Y., 25c

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**Styli, playback:** See class 61

**Subminiaturization services:** See class 94

**Surplus dealers:** See class 105

**Switch seals:** See class 91

**Synchros:** See class 60

**Tags & markers:** See class 91

**Tape & cord, lacing:** See class 91

**Tape & wire, recording:** See class 65

**Tape splicing equipment:** See class 65

**Tapes & labels, adhesive:** See class 91

**Tapes, cotton & fiberglas:** See class 93

**Tension devices:** See class 96

**Terminals:** See class 73

**Test benches:** See class 84

**Test chambers, environmental:** See class 14

**Test clips, jacks & leads:** See class 55

**Testing & certifying organizations:** See class 94

**Timing equipment, automatic control:** See class 4

**Tools & machinery:** See class 96

**Toroid coils:** See class 45

**Toroid cores:** See class 48

**Towers:** See class 39

**Transistor sockets:** See class 71

**Transit cases:** See class 84

**Tube bases, caps, clamps & shields:** See class 104

**Tube machinery:** See class 96

**Tube parts:** See class 104

**Tube sockets:** See class 71

**Tube testers:** See class 14

**Tubing, cambric & fiberglas:** See class 93

**Tubing, cathode:** See class 104

**Tubing, metal:** See class 91

**Tubing, plastic:** See class 99

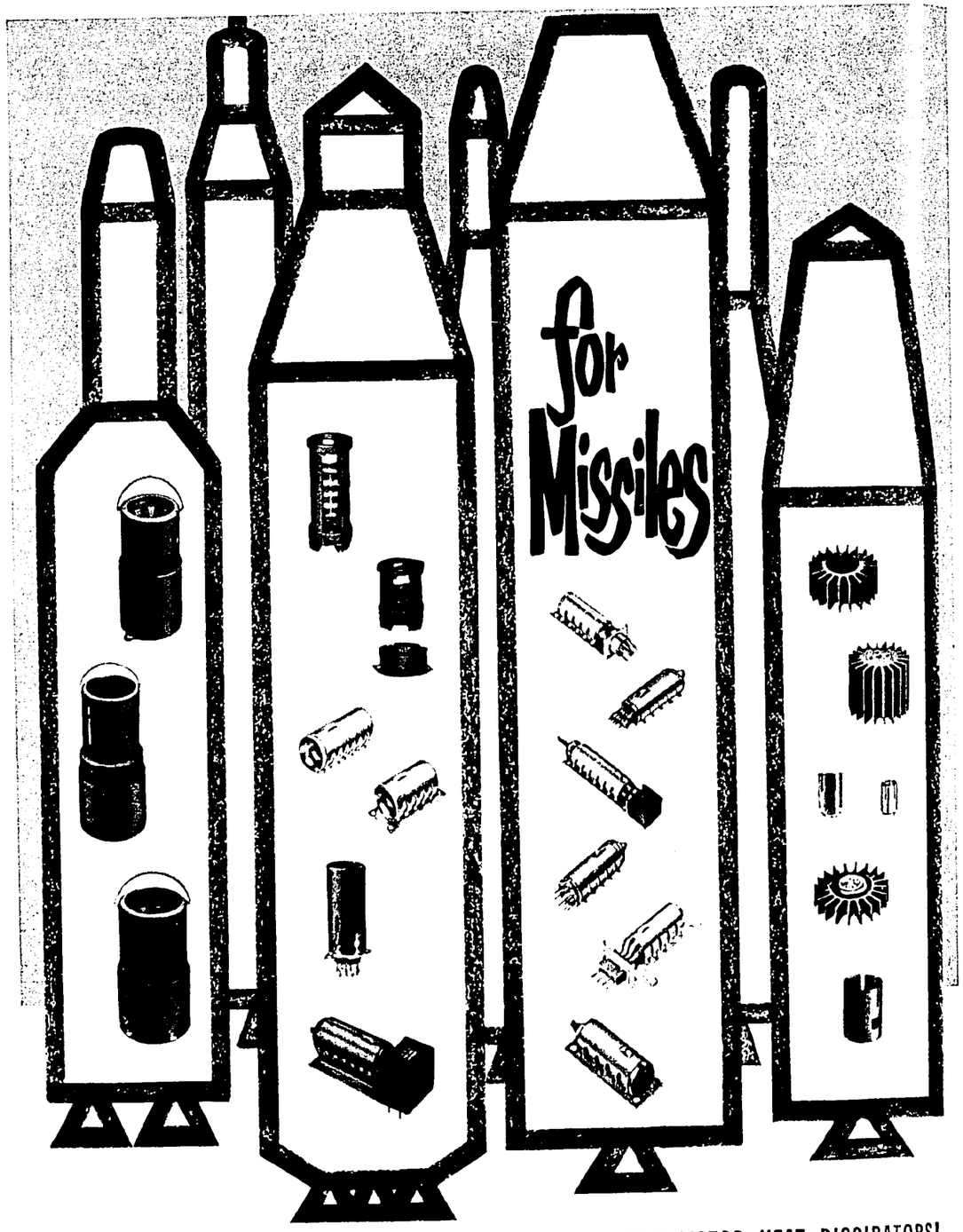
**Tuning forks:** See class 33

**Ultrasonic drills, cleaners, and solderers:** See class 96

**Vacuum controls:** See class 4

**Vacuum furnaces:** See class 92

Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.




**IERC HEAT DISSIPATING ELECTRON TUBE SHIELDS AND TRANSISTOR HEAT DISSIPATORS!**

IERC heat-dissipating components will improve your electronic equipment's electron tube and transistor reliability—plus greatly increasing useful operating life. The time and costs saved can only be assured through the use of IERC's complete, diversified types which meet applicable Military heat-dissipating tube shield specifications, MIL-S-9372C (USAF), MIL-STD-242 (NAVY), MIL-S-19786B (NAVY), SCL-6307/2 (Signal Corps.) and FAA-R-777D.

IERC *For complete literature and name of IERC representative nearest you, write:*
DIVISION Victoria 9-2481. TWX BQ9803.
INTERNATIONAL ELECTRONIC RESEARCH CORPORATION, 135 WEST MAGNOLIA BOULEVARD, BURBANK, CALIFORNIA
*Foreign manufacturers:* Europelec Paris, France. Garrard Mfg. & Eng. Co., Ltd., Swindon, England

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# Directory III. Materials & Services

**Vacuum gages:**
See class 14

**Vacuum pumps:**
See class 96

**Vacuum tube machinery:**
See class 96

## 104. Vacuum Tube & Semiconductor Parts.

5. Anodes
10. Envelopes, glass
15. Envelopes, metal
20. Getters
25. Grids & grid wire
30. Guns & gun parts
35. Heat sinks
40. Lead wires
45. Phosphors
50. Pins & prongs
55. Shaft locks
60. Spacers & insulators
65. Stampings
70. Tube bases
75. Tube caps
80. Tube clamps
85. Tube shields
90. Tubing—cathode

Accurate Spring Mfg. Co., Ill., 65c
Airdesign Corp., Pa., 40c
**Alden Products Co., 140 N. Main St., Brockton 64, Mass., 70s, 75s, 80s, Tel: JUniper 3-0160**
See ad on page 496
**Alpha Wire Corp., 200 Varick St., New York 14, N.Y., 40s, Tel: ALgonquin 5-5400**
See ad on page 604
American Brass Co., The, Fabricated Metal Goods Div., N.Y., 5c, 35c, 50c, 65c, 70c, 75c, 85c
American Insulator Corp., Pa., 70c
**American Lava Corp., Cherokee & Mfrs. Rd., Chattanooga 5, Tenn., 60c, 70c, Ceramic Envelopes c, Tel: AM 5-3411**
See ad on page 178
**American Silver Co., Inc., 36-06 Prince St., Flushing 54, N.Y., 70 Tabs sc, Tel: FLushing 3-8012**
See ad on page 685
Anton Machine Works, N.Y., 5c, 25c, 65c, 75c, 90c
**Art Wire & Stamping Co., 21 Boyden Pl., Newark 2, N.J., 5c, 25c, 30c, 40c, 50c, 65c, Tel: HUmboldt 4-2100**
See ad on this page
Asheville-Schoonmaker Mica Co., Va., 60c
Associated Engineering & Mfg. Co., N.J., 5c, 40c, 45s, 65c, 70s
Associated Spring Corp., Conn., 65c
Atlee Corporation, Mass., 85sc, Transistor Heat Sinks sc
Auburn Mfg. Co., Conn., 60c
**Augat Brothers, Inc., 31 Perry Ave., Attleboro, Mass., 70s, 80s, Tel: CAstle 2-2202**
See ad on page 543
Auto-Swage Products, Inc., Conn., 50c
Autoscrew Co., Inc., N.Y., 5c, 25c
**Bead Chain Mfg. Co., 6 Mountain Grove St., Bridgeport 5, Conn., 50s, Tel: EDison 4-4124**
See ad on page 453
Blinn Co., Inc., The Delbert, Calif., Transistor Mounts s
**Braun Tool & Instrument Co., Inc., 141 Fifth Ave., Hawthorne, N.J., 65c, 80c, 85c, Tel: HAwthorne 7-1773**
See ads on pages 449, 537, 547
Buckbee Mears Co., Minn., 25c, 65c
CBS Labs., Div. Columbia Broadcasting System, Inc., Conn., 30c
**CFI Corporation, Dept. IRE, Cottage Pl., Mineola, L.I., N.Y., 60c, Tel: PIoneer 6-0571**
See ad on page 619
Carroll Pressed Metal, Inc., Mass., 65c
Cetron Electronic Corp., Ill., 30sc
Connecticut Instrument Corp., Conn., 60c
**Consolidated Reactive Metals, Inc., 115 Hoyt St., Mamaroneck, N.Y., 25c, Tel: OWens 8-2300**
See ad on page 609
Coors Porcelain Co., Colo., Envelopes, Ceramic c
**Corning Glass Works, Corning Electronic Components, 550 High St., Bradford, Pa., 60s, Tel: FOrest 2-5571**
See ads on pages 390, 523
Corning Glass Works, Electrical Products Div., N.Y., 10s, 25s, 60s, 85s, 90s
D.K.E. Electronic Bases, Inc., N.J., 25c, 40c, 65c, 70c, 75c, 80c, 85c
Diamond Power Specialty Corp., Diamond Electronics Div., Ohio, 70sc
Driver Company, Wilbur B., 1875 Mt. Carter Hwy., Newark 4, N.J., 25s, 40sc, Tel: HUmboldt 4-5551
See ad on page 540
Ettel-McCullough, Inc., 501 Industrial Way, San Carlos, Calif., 65s, Tel: LYtell 1-1451
See ad on pages 80-81
Elco Corporation, Pa., 85c
Electronic Mfg. Co., 670-72 S. 17th St., Newark, N.J., 25, 40, 65, 70, 75, Tel: ESsex 4-7600
See ad on this page
Electronic Mechanics, Inc., N.J., 70c
Electronic Parts Mfg. Co., Inc., 5c, 25c, 40c, 65c
Electronic Tube Corp., Pa., 30sc, 70sc, 85sc, 90sc
Engelhard Industries, Inc., 113 Astor St., Newark 2, N.J., 5s, Tel: BIgelow 2-2709
See ad on page 170


**TUBE COMPONENTS**

- Tungsten Lead Wires, Hard Glass
  Also molybdenum, Kovar, nickel, with nickel clad copper or copper strand
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  Designed to your specifications
- Heater Elements
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**Stampings and spinnings for all inside parts of transmitter tubes.**

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NEWARK, N.J.
ESSEX 4-7600



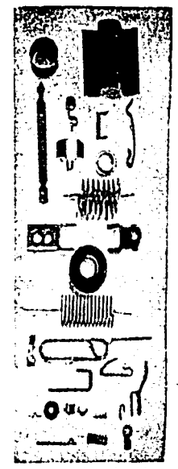
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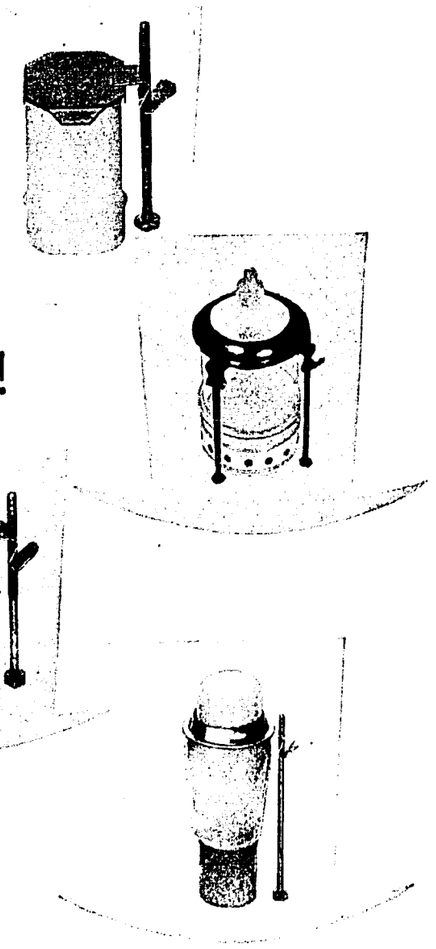
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Code numbers shown after each firm refer to product or service sub-classes listed at the beginning of each product classification. "s" indicates stock items; "c" indicates custom-built items. Complete addresses will be found in the Alphabetical Directory, pages 135-240.

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## 104. Vacuum Tube & Semiconductor Parts.

**Fansteel Metallurgical Corp., North Chicago, Ill., 5c, 20c, 25c, 35c, 85c, 90c, Tel: DExter 6-4900**
**See ad on pages 130-131**
Faradyne Electronics Corp., Affil. Mansol Ceramics, N.J., 25
Federal Electronic Prods., Inc., 30sc, 40c
**Federal Tool Engineering Co., 1400 Pompton Ave., Cedar Grove, N.J., 30sc, 65c, Tel: CLifford 6-5300**
**See ad on page 670**
Fischer & Porter Co., Pa., 10c, 60c, 70c
Ford Radio & Mica Corp., N.Y., 60s
GOE Engineering Company, Calif., 55c
General Electric Co., Lamp Metals & Components Dept., Ohio, 25s 40s, 45s, 60s, 65s
General Electric Co., Receiving Tube Dept., Ky., 5s, 65s
General Findings & Supply Co., Industrial Div., Mass., 40c, 65c, 80c, 85c
George Products Co., Inc., N.J., 65c
Getters Electronics, Inc., N.Y., 20s
Hanson-Gorrill-Brian, Inc., N.Y., 25c
Hercon Electronics Corp., N.J., Semiconductor Bases s
**Hermetic Seal Corp., 43 River Rd., North Arlington, N.J., 60sc, Tel: WYman 8-8080**
**See ad on page 450**
Hobson Bros., Inc., Ill., 75s
Hoffman Electron Tube Corp., N.Y., 70s, 85s
Howard Precision, Inc., N.J., 65sc, 75sc
Hunter Spring Co., Div. American Machine & Metals, Inc., Pa., 65c
**International Electronic Research Corp., IERC Div., 135 W. Magnolia Blvd., Burbank, Calif., 80s, 85s, Transistor Heat Dissipators s, Tel: VIctoria 9-2481**
**See ad on page 702**
**Isolantite Manufacturing Corp., 337 Warren Ave., Stirling, N.J., 70sc, Tel: MIllington 7-0385**
**See ad on page 620**
Jan Hardware Mfg. Co., Inc., N.Y., 65sc, 85sc
Johnson & Hoffman Mfg. Corp., N.Y., 5c, 30c, 65c
**Kahle Engineering Co., 3319 Hudson Ave., Union City, N.J., 10c, 40c, Tel: UNion 7-6500**
**See ad on page 672**
Kassel Industries, Inc., N.J., 5s, 15s, 20s, 25s, 40sc
Kemet Co., Div. Union Carbide Corp., Ohio, 20sc, 25sc
Kimble Glass Co., Subsid. Owens-Illinois Glass Co., Ohio, 10s, 90s
King Laboratories, Inc., N.Y., 20sc, 30c, 65c
Kirchberger & Co., Inc., M., N.J., 60c, 75c
Kulite Tungsten Co., N.J., 25c, 40c
Lancaster Glass Corp., Ohio, 10sc
Litton Industries, U. S. Engineering Co. Div., Calif., 55sc, 60sc, 65c, 80sc, 85c
Mackay, Inc., A. D., N.Y., 20s, 45s
**Magnetics, Inc., Dept. P-80, P.O. Box 391, Butler, Pa., 85s, Tel: 7-3787**
**See ad on page 424**
Mandex Manufacturing Co., Inc., Ill., 5s
Materials For Electronics, Inc., N.Y., 20s, 45s, 60s, Semiconductor Parts s





# Directory III. Materials & Services

## 104. Vacuum Tube & Semiconductor Parts.

Meller Co., Adolf, R. I., Windows s
Metal Findings Corp., N.Y., 65c, 80c, 85c
**Metal Textile Corp., Div. General Cable Corp., 647 E. First Ave., Roselle, N.J., 25c, 35sc, Tel: CHestnut 5-3000**
**See ad on page 552**
**Methode Manufacturing Corp., 7447 W. Wilson Ave., Chicago 31, Ill., 70s, 80s, 85s, Tel: UNderhill 7-9600**
**See ad on page 415**
**Millen Mfg. Co., Inc., James, 150 Exchange St., Malden 48, Mass., 55sc, 75s, 80s, 85sc, Tel: DAvenport 4-4108**
**See ad on page 402**
Miller Co., L. C., Calif., 35c
**Mitronics, Inc., 1291 Central Ave., Hillside, N.J., 60sc, 70c, Tel: WAverly 6-2250**
**See ad on page 452**
Monadnock Mills, Calif., 60s
Mosaic Fabrications, Inc., Mass., Faceplates, CRT c
National Research Corp., Metals Div., Mass., 20sc
Newcomb Spring Corp., N.Y., 65c
**Noesting Pin Ticket Co., Inc., 732 E. 136th St., New York 54, N.Y., 40c, Tel: MO 9-6465**
**See ads on pages 559, 647, 705**
Norrich Plastics Corp., N.Y., 5c, 50c, 70c
PEK Labs., Inc., Calif., 5sc, 10sc, 20c, 30c
Painton & Co., Limited, England, 85s
Paramount Products Co., Inc., N.J., 5c, 30c, 65c, 90c
Penn Fibre & Specialty Co., Inc., Pa., 65c
Philips Laboratories, Div. North American Philips Co., Inc., N.Y., 90c
Pix Manufacturing Co., N.J., 40c
Precision Tube Co., Inc., Pa., 90c
**Radio Corp. of America, Electron Tube Div., Section I-22-Q, 415 S. 5th St., Harrison, N.J., 5s, 20s, 30s, 45s, 60s, 65s, 75s, Tel: HUmboldt 5-3900**
**See ad on pages 54-55**
Radio Mfg. Co., Inc., Calif., 25sc
Raytheon Co., Receiving Tube Div., Mass., 5s, 35s
Remler Co., Calif., 80s
Resitron Laboratories, Inc., Calif., 10sc
Rimak, Inc., Calif., 85c
Ronson Metals Corp., Cerium Metals & Alloys Div., N.J., 20s
S & B Machine & Tool Co., Inc., N.J., 35c, 60c
Schuyler Manufacturing Corp., N.J., 25c, 35c
Scientific Electronic Labs., N.J., 5c, 10c, 40c, 70c, Button Stems c
**Semi-Alloys Inc., 550 S. Fulton Ave., Mount Vernon, N.Y., 40c, 65c, Tel: MOunt Vernon 4-2800**
**See ad on page 697**
Semi-Elements, Inc., Pa., 45sc
Sillcocks-Miller Co., The, N.J., 65c
Spincraft, Inc., Wis., 15c
Staver Co., Inc., The, N.Y., 25c, 30c, 35c, 60c, 65c, 75c, 80s, 85sc
Stewart Stamping Co., N.Y., 40sc
Stromberg-Carlson San Diego Div. General Dynamics Corp., Calif., 55sc
**Superior Steatite & Ceramic Corp., 89 West Forest Ave., Englewood, N.J., 60c, Tel: LOwell 8-4555**
**See ad on page 621**
Superior Tube Co., Pa., 5c, 60c
Sylvania Electric Products Inc., N.Y., 5sc, 25sc, 30sc, 40sc, 45sc, 70sc
Sylvania Electric Products Inc., Chemical & Metallurgical Div., Pa., 25s, 45s
Sylvania Electric Products Inc., Parts Div., Pa., 5s, 15s, 25s, 30s, 40s, 50s, 60s, 65s, 70s, 75s, 80s, 85s
Technical Ceramics & Lava Corp., N.J., 60, 70
Thermal American Fused Quartz Co., N.J., 60 Quartz sc
Thermal Wire of America, Vt., 40c
Thomas Electronics, Inc., N.J., 10s, 15s, 30s, 45sc, 70s
Thomas & Sons, Inc., William, N.J., 65c
Thor Ceramics, Inc., N.J., 70c
Torrington Co., The, Conn., 40c, CRT Inner Sleeves c
Trans-Tech, Inc., Md., 60c
Tricon Mfg. Co., Ill., 65s
Trought Associates, Inc., N.J., 35c, 80c
Union Carbide Corp., National Carbon Co., N.Y., 5c, 20c
**United Mineral & Chemical Corp., 16 Hudson St., New York 13, N.Y., 25c, 90c, Tel: BEekman 3-8870**
**See ads on pages 533, 699**
United States Radium Corp., N.J., 45s
U. S. Stoneware Co., Alite Div., Ohio, 60c
**Vector Electronic Co., Inc., 1100 Flower St., Glendale 1, Calif., 70s, Tel: CHapman 5-1076**
**See ad on page 544**
Victory Mica Mfg. Co., Inc., N.Y., 60s
Volkert Stampings, Inc., N.Y., 5sc, 30sc, 35sc, 65sc, 85sc
Wah Chang Corp., N.Y., 5sc, 20sc
Warren Components Div., El-Tronics, Inc., Pa., 70c, 75c
**Westinghouse Electric Corp., Electronic Tube Div., P.O. Box 284, Elmira, N.Y., 5s, 30s, 65s, 75s, Tel: REgent 9-3611**
**See ad on page 580**
Westinghouse Electric Corp., Lamp Div., N.J., 25sc, 70sc
**Westrex Corp., Div. Litton Industries, 540 W. 58th St., New York 19, N.Y., 80sc, Tel: JUdson 2-3030**
**See ad on page 704**
Wilmad Glass Co., Inc., N.J., 10c, 90c
Worcester Pressed Steel Co., Mass., 65c

**Vibration controls:**
**See class 81**

**Vibration exciters:**
**See class 96**

**Washers:** See class 91

**Welders & brazers:**
See class 96

**Wholesalers:** See class 105

**Wire & cable:**
See class 85

**Wire harnesses, pre-formed:**
See class 85

**Wire, magnetic recording:**
See class 65

**Wire marking machines:**
See class 96

**Wire mesh & wire braid:**
See class 85

**Wire strippers:** See class 96


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# WHERE SHARING PAYS OFF

**SOME YEARS AGO** we pointed out in "Proceedings of the IRE" that an amazing and unique characteristic of scientific men is their sense of responsibility to the past and to the future, expressed in their sharing with one another the new findings and discoveries of their science. The fact that engineers share information is a major contribution to the amazing growth of industrial progress and to our high standard of living.

***Design Engineers*** seem to have an impelling need to publish. It is important and fortunate that they have had magazines *in which to publish*. Of course, their articles make these magazines possible, just as the publishing organization's faith and courage gives them the vehicle for communication. A magazine is a three-way team of author, medium, and reader—mutually dependent.

***Such a contribution*** of one to the other is the vital service of the periodical. The thundering pace of radio-electronics and its expression in communications; glorious hi-fi music; the brilliant, full-color picture; and that same radio principle bringing in a new era in industrial controls which makes automation practical; the amazing time-and-effort-saving electronic computer; and new fabulous developments already being discovered in research which will be made practical by the radio engineer—all these *could not have been possible* without the publication as a means of collating and organizing information, and distributing it to those who needed it and *knew how to work with it*.

***These are generalities!*** But "Proceedings of the IRE" *is specific*. The Superheterodyne circuit, FM, TV, radar, the computer, color TV, the transistor, scatter propagation, solid state electronics (stereatronics) all were presented and developed *article by article* in the history-making issues of "Proceedings of the IRE." The impact on industry of this broad exchange of information among engineers has been enormous, creating new markets and even new ways of life.

***FM is an excellent*** illustration of this "sharing." Consider particularly the "lead out time" needed in FM. In December 1935, an article by Armstrong (an IRE Member) in "Proceedings of the IRE" proved conclusively to the engineering world that frequency modulation was an improvement *and practical*. (Today, FM is the audio side of every TV receiver.) This was the fourteenth article on frequency modulation *that had appeared in "Proceedings of the IRE,"* eight of them by Armstrong. It is now known that some of these articles which defined the weakness that had to be corrected, as well as some that amplified the discovery by further independent research, all helped make the final perfection possible.

***At that time,*** in all the world, only four other articles on the subject had appeared. These were condensations of the "discussion" in "Proceedings of the IRE." Yet the final "Proceedings" article was published six years before the first FM broadcasting station went on the air. Engineers needed every bit of this "lead-out time" to do their work. The early publication in "Proceedings of the IRE" gave them just that; and thousands of engineers, who had followed this series, knew in December, 1935 that a great change had come and that they must design and tool up for it. Armstrong shared, "Proceedings" published, and an industry profited!

***This is the traditional service*** of the "old-line" magazine. The author "shared"—the magazine "published"—the reader "studied" and industry progressed mightily through the three-way contribution. Truly, the reader contributes attention! This kind of publishing wins such attention, more than any other kind! It does the ground-work and sales-conviction building that comes years ahead of the final product news.

***Advertising shares!*** The informative "ad" follows exactly the same pattern with exactly the same results. Again and again, display copy in "Proceedings of the IRE" has announced new developments or highlighted the engineering usage of a staple item. Year-after-year, we have seen tiny businesses start sharing their helpful information with readers in "Proceedings of the IRE" and as a result reap orders, prosper and grow. Today in aggregate, they are the giant industry identified as "Electronics."

***It is said*** that the fundamental result of a magazine is to define a market. Since 1913, "Proceedings of the IRE" has defined an unfolding technical radio and electronics market by articles that stimulated the use of new products, and by presenting the manufacturers' stories of these new components, instruments and systems to engineers eager for as many new devices as would serve them well.

## Proceedings of the IRE

**Editorial Department:**
**1 East 79th St., New York 21, N.Y.**
**LEhigh 5-5100**

**Advertising Department:**
**72 West 45th St., New York 36, N.Y.**
**MUrray Hill 2-6606**






# Distributional Functions
## 105. Distribution

5. Export & Import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales and service
25. Surplus dealers

**The final section of the IRE DIRECTORY is the complement to manufacturing, which is distribution. It has proved to be a real service to IRE member engineers and executives to put into this book a list of annually checked jobbers, wholesalers, manufacturers representatives, and distributors. Many of these firms are identified further by the initials ERA, as members of the Electronic Representatives Association, NEDA as members of the National Electronic Distributors Association. Permission from these organizations to use their membership lists in order to make this section of the IRE DIRECTORY as complete as possible is gratefully acknowledged. For convenience in locating distributional firms the listings are arranged geographically under individual state names, the listings within each state being grouped by city names in alphabetical order, so that all firms located in any one city may be grouped together for quicker reference. Listings for foreign firms follow the listings for the United States.**

## ALABAMA

**Anniston**

Radio Distributors & Supply Co., 125-27 W. 10th St., Anniston, Ala., 10 (NEDA)

**Birmingham**

Chapman & Co., Cary, 2516 8th Court North, Birmingham, Ala., 15, FAirfax 3-5236, Branch: Atlanta, Ga.

Forbes Distributing Co., 2610 3rd Ave. South, Birmingham, Ala., 10 (NEDA)

Hayden Associates, Paul, P.O. Box 1931, Birmingham, Ala., 15, Branch: East Point, Ga.

Jesse Assoc., G. O., 1108 Fern Ave., Birmingham 9, Ala., 15, TRemont 9-6014 (ERA)

McCorvey Co., V. Avis, 2248 Third St. N.W., Birmingham 15, Ala., 15, VErnon 6-5769, Branch: Decatur, Ga.

Smith Co., Maitland K., 3133 Woodcliff Circle, Birmingham 13, Ala., 15, TRemont 9-7197, Branch: Atlanta, Ga.

Wallace Associates, Inc., Stanley K., 1453 Linda Vista Dr., Birmingham 9, Ala., 15, Branch: Lutz, Fla.

**Dothan**

Carmichael Wholesale Supply Co., 140 S. Foster St., Dothan, Ala., 10 (NEDA)

**Florence**

Electronic Distributors, 103 W. Tombigbee St., Florence, Ala., 10 (NEDA)

**Huntsville**

Highsmith & Co., James L., 3012 Acklen Dr. S.W., Huntsville, Ala., 15, JE 9-6734, Branch: Charlotte, N.C.

Joyner & Associates, J. E., 603 Tenth St., N.W., Huntsville, Ala., 15, Branch: Atlanta, Ga.

Lee Associates, Inc., S. S., Room 300, Utilities Bldg., Huntsville, Ala., 15, JEfferson 6-0631, Branch: Orlando, Fla.

Murphy & Cota, 250 Governor's Dr., Huntsville, Ala., 10, 15, JE 6-9121, Branch: Atlanta, Ga.

Scientific Sales Engineering Co., 3519 Gesman Place, Huntsville, Ala., 15, JEfferson 9-5552, Branch: Atlanta, Ga.

**Montgomery**

Wamble Sales Co., Fred, 3867 Sherwood Dr., Montgomery 9, Ala., 15, AMherst 2-1573

**Alco Electronic Prods., Autotron:** Automation controls. **Britton Electronics:** Semiconductors. **Caddell-Burns:** Coils & forms. **Central Transformer:** Transformers. **Harman-Kardon:** Hi Fi & stereo comps. **Ideal Precision:** Panel meters. **Int'l Electronics:** Mullard tubes. **Herb Kreckman:** Antennas. **Kurman:** Relays. **Middletown Mfg.:** Metal goods. **Moeller Inst.:** Power isolators. **Plastic Capacitors:** Capacitors. **Polytronics Labs.:** Citizen band equip. **Precise Mfg.:** Screw machine prods. **Prestole:** Fasteners. **Rek-O-Kut:** Recording & play-back equip. **Waldom Electronics. Westohm:** Wire-wound resistors.

**Opelika**

Southern Electronics Corp., P.O. Box 447, Opelika, Ala. 10 (NEDA)

## ALASKA

**Anchorage**

Yukon Radio Supply, Inc., 645 I St., P.O. Box 406, Anchorage, Alaska, 10 (NEDA)

## ARIZONA

**Phoenix**

Berman Co., Inc., Jack, 8146 N. First Ave., Phoenix, Ariz., 15, WH 5-9321, Branch: Los Angeles, Calif.

Hill Co., J. T., 318 W. State St., Phoenix Ariz., 10, 15, 20, WIndsor 3-7607, Branch: San Gabriel, Calif.

Hyde Electronics Co., 2902 W. Villa St., Phoenix, Ariz., 15, APplegate 8-22[illegible], Branch: Denver, Colo.

Knight Co., W. Bert, P.O. Box [illegible], Phoenix, Ariz., 15, YEllowstone 7-2060, Branch: Los Angeles, Calif.

McCarthy Associates, Inc., 111 W. Osborn Rd., Phoenix, Ariz., 15, Branch: Pasadena, Calif.

Mitchell Co., C. H., 3[illegible] W. Camelback Rd., Phoenix, Ariz., 15, AM 7-[illegible], Branch: Sherman Oaks, Calif.

Neely Enterprises, 6[illegible] E. Mc[illegible] Ave., Phoenix, Ariz., 15, CRestview 4-[illegible], Branch: North Hollywood, Calif.

O'Halloran & Associates, 1[illegible] E. Earll, Phoenix, Ariz., 15, CRestview 4-2[illegible], Branch: North Hollywood, Calif.

Radio Parts of Arizona, 214 S. 11th Ave., P.O. Box 6345, Phoenix, Ariz., 10 (NEDA)

Roberts & Associates, Inc., [illegible] N. First St., Phoenix, Ariz., 15, AL 2-[illegible], Branch: Los Angeles, Calif.

Southwest Wholesale Radio, Inc., 140 S. 2nd St., Phoenix, Ariz., 10 (NEDA)

Williams & Associates, Inc., 3033 N. Central Ave., Mayer Central Bldg., Suite 211, Phoenix, Ariz., 15, CRestwood 7-7477, Branch: Denver, Colo.

**Scottsdale**

Foley & Associates, E. J., 3840 N. Jokake Dr., Scottsdale, Ariz., 15, WHitney 5-4290

**Accurate Specialties:** Precision Stampings, Clad Metal Specialties. **Advance Stamping Co.:** Eyelet Machine & Precision Die Parts. **Bow Solder Products:** Solders & Fluxes. **Duramic Products:** Ceramic Parts & Ceramic Materials. **Epoxy Products:** Epoxy Cases, Headers, [illegible]. **H K Metalcraft:** Washers. **International Rectifier Corp.:** Rectifiers & Diodes. **Kern Co.:** Semiconductor grade chemicals, [illegible] supplies. **Metallizing Industries:** Metallized Ceramics. **Newcomb Spring Co.:** Springs, wire forms, special leads. **Nesor Alloy Products:** Fine Wire in base & pure metals. **Screw Corp.:** Cold headed parts. **Semi-Metals, Inc.:** Single crystal Germanium. **Tang Industries:** Single crystal Silicon. **Deutsch Fastener:** Pin-lock fasteners & blind rivets. **Eldema Corp.:** Miniature [illegible] indicator bulbs. **Handley, Inc.:** Potentiometers. **Mercury Transformer:** Transformers. **Poly-Scientific Corp.:** Slip rings and brushes.

French Co., Gene, 224 S. Hinton Ave., Scottsdale, Ariz., 15, WHitney 6-3504, Branch: Albuquerque, N.M.

Jewett Co., P.O. Box 172, Scottsdale, Ariz., 15, WHitney 5-9711, Branch: North Hollywood, Calif.

**Tucson**

Barstow & Doran, Inc., 647 Avenida Feliz, Tucson, Ariz., 15, MAin 2-6351, Branch: Los Angeles, Calif.

Elliott Electronics, Inc., 418 N. 4th Ave., P.O. Box 5081, Tucson, Ariz., 10 (NEDA)

Marshall Co., G. S., 2030 Broadway, Tucson, Ariz., 15, MAin 2-4719, Branch: San Marino, Calif.

Neely Enterprises, 232 S. Tucson Blvd., Tucson, Ariz., 15, MAin 3-2564, Branch: North Hollywood, Calif.

Standard Radio Parts, Inc., 827 S. Park Ave., Tucson, Ariz., 10 (NEDA)

## ARKANSAS

**Blytheville**

Teague Electronics, South Highway 61, Blytheville, Ark., 10 (NEDA)

**El Dorado**

Kay Sales Co., 314 Melrose, El Dorado, Ark., 20, Branch: Kansas City, Mo.

**Little Rock**

Crockett Sales Co., The, Plaza Towers, 6115 West Markham, Little Rock, Ark., 15, MO 6-0773, Branch: Dallas, Tex.

White Electronics, Inc., David, 1222 Main St., P.O. Box 408, Little Rock, Ark., 10 (NEDA)

**Paragould**

Martin Wholesale Radio Supply, Inc., 1207 W. Kingshighway, P.O. Box 16, Paragould, Ark., 10 (NEDA)

**Texarkana**

Lavender Radio & TV Supply Co., Inc., 520 E. 4th St., P.O. Box 1168, Texarkana, Ark., 10 (NEDA)

## CALIFORNIA

**Alhambra**

Moye Co., Robert G., 116 S. Stoneman Ave., Alhambra, Calif., 15, CU 3-1669

**Avon Gear & Engineering Co.:** Precision Gears. **Bridgeport Insulated Wire Co.:** Magnet & Litz Wire. **Chicago Gasket Co.** Teflon—Rod, Tube, Sheet, Tape, Machined Parts. **Davenport Mfg. Co.:** Power Supplies, High Voltage Test Equip., etc. **Federal Screw Products:** Electronic Hardware. **Freed Transformer Co.:** Transformers, Chokes, Filters, Test Instruments. **National Tel-Tronics, Inc.:** Terminals. **F. A. Scherma Mfg. Co.:** Relays and Components.

**Arcadia**

Wood Co., Ash, M., P.O. Box 1158, Arcadia, Calif., 15, CU 3-1201

**E-Z Hook Test Prods.:** Probes, insulated test clips. **Electrodyne:** Instrument switches, silver contacts, stepping switches. **Gen-Pro:** Terminal boards. **Great Eastern Mfg.:** Semiconductors & Rectifiers. **Illumitronic Engrg.:** Plastics. **Kilo Engrg.:** Turns counting dials, anodized aluminum knobs. **Littelfuse:** Fuses. **New England Instrument:** Precision wirewound potentiometers. **Nugent Electronics:** Miniature co-axial connectors. **Syatronic Instruments:** Deflection yokes. **Tansitor Electronics:** Tantalum capacitors.

**Bakersfield**

Valley Radio Supply, 1134 33rd St., Bakersfield, Calif., 10 (NEDA)

**Berkeley**

Electronics Suppliers, 2428 Shattuck Ave., Berkeley 4, Calif., 10 (NEDA)

Pacific Radio Supply, Inc., 2801 Shattuck Ave., Berkeley 5, Calif., 10 (NEDA)

**Beverly Hills**

Harmon Co., Walter S., 121 N. Robertson Blvd., Beverly Hills, Calif., 15, OLeander 5-6340 (ERA)

Moxon Electronics Corp., 489 S. Robertson Blvd., Beverly Hills, Calif., 15, BRadshaw 2-9311

**Alfred Electronics:** Microwave. **Clairex:** Photo cells. **Computer Measurements:** Counters. **Datran Electronics:** Strain gages. **DeMornay-Bonardi:** Microwave components. **Epsco:** Digital systems. **Harrison Labs.:** Power supplies. **Instruments for Ind.:** Amplifiers. **Marconi Instruments:** RF instruments. **Rutherford Electronics:** Pulse generators. **Scopes:** Oscilloscopes. **Vidar:** Voltage-freq. converter.

**Burbank**

Saxon & Associates, C. W., 1211 W. Magnolia, Burbank, Calif., 15, VIctoria 9-1494

**Ceramaseal:** Ceramic to metal seals. **Davale Tool:** Flexible couplings. **Galaxy Eng.:** Electronic Hardware. **Markal:** Heat & corrosion resistant coatings. **Precision Metal Prods.:** Electronic hardware.

Stern & Co. Inc., I. R., 4109 Burbank Blvd., Burbank, Calif., 15, VIctoria 9-1195

**Electro-Voice:** Speakers, microphones, PA speakers, horns. **Ferrodynamics:** Magnetic recording tape. **Harman-Kardon:** Hi fi tuners & amplifiers. **Koss:** Stereo headphones & accessories. **Rek-O-Kut:** Turntables, tone arms. **Royal Sound:** Baffles. **Viking:** Tape decks, record/playback amplifiers.

Weightman & Associates, 4029 Burbank Blvd., Burbank, Calif., 15, VIctoria 9-2435

**Allies' Products:** Carbon resistors. **Chicago Dynamic Industries:** Selector Switches, Thumb-Wheel Switches. **ESC Corp.:** Delay lines, transformers, filters. **Federal Stamping:** Metal forming and stamping. **Instrument Development Labs.:** Rotary Switches, Accelerometers. **Scientific Platers:** Chrome plating. **Sloan Co.:** Indicator lights, incandescent read-outs. **Stevens-Arnold, Inc.:** Choppers, Switches, Relays. **Technical Devices:** Wire stripping machines, component lead formers, circuit board fixture holders. **S. S. White (Industrial Div.):** Airbrasive units.

**Burlingame**

Long & Associates, 1210 Canterbury Dr., Burlingame, Calif., 15, 20, Branch: Redwood City, Calif.

Newnan Co., H. L., 1299 Bayshore Highway, Burlingame, Calif., 15, DIamond 2-7494

**Advance Relays:** Relays. **Carter Motor:** Converters, motors. **Continental-Wirt:** Precision resistors. **GC Electronics:** Components. **Vickers:** Selenium & silicon rectifiers. **Winston:** Test equip.

**Culver City**

Landis Associates, 8588 W. Washington Blvd., Culver City, Calif., 15, UP 0-8697

**Advanced Electronics:** Telemetry xmtrs., filters. **Calibration Standards:** Differential voltmeters, wheatstone br. **Del:** H.V. transformers. **Gyrex:** Frequency stds., tuning forks. **Industrial Test Equip.:** Phasemeter, power osc. **Magnetic Research, Armour Stablvolt Div.:** Transistor testers, power supplies. **Parabam:** Digital clock, function generators. **Waveforms:** Oscillators, V.T.V.M.'s.

Sodaro Co., 9400 Culver Blvd., Culver City, Calif., 15, UPton 0-6001

**Asquith:** Multi-turn counting dials, potentiometers. **Curtiss-Wright:** Distortion eliminating volt regulators, recorders, electrometers, wheatstone bridge, insulation tester, DC amplifiers, indicating controllers, multimeter, R-C meter. **E.M.I.:** Klystrons, magnetrons, CRT's, vidicons, orthicons, photomultipliers, storage tubes, oscilloscopes. **Ford Instrument:** Cams, differentials, rate generators, resolvers, servo motors, synchros (Telesyns), Oldham couplings. **Industrial Control:** Servo amplifier, multiplier, strain gage indicator, servo testers, DC millivoltmeter, null detector, analog modulator & demodulator, automatic capacitance bridge, memory storage unit. **Solid State Systems:** Transistorized plug-in modules, pulse generators, flip-flop units, trigger amplifiers, voltage amplifiers. **Tel-Instrument:** Frequency converter, 400 cycle power supplies, video sweep generator. **TT Electronics:** Filters, DC regulated transistorized power supplies. **Trad Electronics.**

Westates Electronics Corp., 11334 Playa St., Culver City, Calif., 10 (NEDA)

**Encino**

Spraggins Co., S. L., 16042 Ventura Blvd., Encino, Calif., 15, STate 8-6661

**Dinion Coil:** Transformers. **Forbes & Wagner:** Deflection components, power supplies, amplifiers, & special transformers. **Lear Elec. Mfg.:** Wire & cable. **Midland Mfg.:** Quartz crystals & crystal filters. **Stackpole Carbon:** Composition carbon resistors, volume controls, slide switches, contacts, ferrites.

**Eureka**

Dealers Electronic Supply Co., 800 Broadway St., Eureka, Calif., 10 (NEDA)

**Fresno**

De Jarnatt Wholesale Co., Inc., B. J., 223 Fulton St., Fresno 21, Calif., 10 (NEDA)

**Garden Grove**

Freeman Co., Maury, 11422 Tobie St. Garden Grove, Calif., 15, LEhigh 9-5574

**Crosby:** Madison-Fielding tuners, amplifiers, & speakers. **Dyna-Empire:** Fidelitone arms, turntables & cartridges. **Neshaminy:** High fidelity speakers. **Qualitone:** Phono needles & accessories. **Stephens Trusonic:** High fidelity speakers & cabinets. **Triton Tape:** Recording tape & accessories.

**Gardena**

Aerotron Supply Co., 13611 S. Normandie, Gardena, Calif., 10, 15, FAculty 1-5911

**Glendale**

Gates Co., Howard A., 1819 Harmon Pl., Glendale 8, Calif., 15, 20, CH 9-5360

**Formica Metal Products Co.:** Chassis, Enclosures, Cabinets. **Fortiphone Ltd.:** Subminiature transformers.

Weatherford Co., R. V., 6921 San Fernando Rd., Glendale 1, Calif., 10, (NEDA)

Western Electronic Supply Corp., 1214 S. Brand Blvd., Glendale 4, Calif., 10, (NEDA)

**Hollywood**

Ellis Sales Co., G. B., 6715 Hollywood Blvd., Hollywood, Calif., 15, HOllywood 2-6763, Branch: Mountain View, Calif.

Hollywood Radio Supply, Inc., 5606 Hollywood Blvd., Hollywood 28, Calif., 10 (NEDA)

Instruments For Measurements, 3455 Cahuenga Blvd., Hollywood 28, Calif., 15, HOllywood 9-7294

**Acton Labs.:** Phase measuring equip. **Alford:** Coaxial microwave equip. **Avco:** Hypervelocity instrumentation. **Digital Equip.:** Digital module bldg. blocks. **Dorsett:** Telemetry. **Jerrold:** Sweep generators. **Lumatron:** Millimicrosecond instrumentation. **Murphy & Miller:** Environmental test equip. **Perkin Engrg.:** DC power supplies, AC regulators. **Radio Frequency Labs.:** AC & DC calibration standards. **Systron:** Digital counting & timing instrumentation. **Technical Prods.:** Spectral density analyzers. **Waveline:** Microwave test equip.





# Distributional Functions



Key Electronics, Inc., 8533 Sunset Blvd., Hollywood 46, Calif., 15, OLeander 5-9140

**Anaheim Electronics:** Relay testers, adaptors. **Atohm:** Trim pots. **Bill Jack:** Motors. **Int'l Electronic Ind.:** Tantalum capacitors. **Monitor Prods.:** Crystals, ovens, oscillators. **Ohio Semiconductors:** Halltron devices. **Pacific Resistor:** Resistors, wirewound & power. **Southern Elect.:** Film capacitors. **Twin-Lock:** Terminal blocks. **Vanguard:** Coils, chokes, delay lines.

Miller Co., Gerald B., 1550 N. Highland Ave., Hollywood 28, Calif., 15, HOllywood 2-1195 (ERA)

Rye Sound Corp., 1113 N. El Centro, Hollywood, Calif., 5, 16, HO 3-0464, Branch: Mamaroneck, N.Y.

Shepard-Winters Co., 3193 Cahuenga Blvd. West, Hollywood 28, Calif., 10, 15, 20, HOllywood 6-2171

**Amperex:** Semicond. & Tubes. **Astron:** Capacitors, RF noise filters. **Automatic Metal Prods.:** Co-axial connectors, relays & filters. **Calif. Magnetic:** Transformers, filters: power supplies. **Cima Resistor & Tech-Ohm:** Power resistors. **Digital Dev.:** Drums. **Elcor:** Alternators, inverters. **Electrix:** Terminals, Crimping machines. **Ferroxcube:** Ferrite cores, planes & stacks. **GB Components:** Wire wound resistors, net works, reference bridges & amplifiers. **Harman Kardon:** Digital modules. **Premier Instrument:** Waveguide switches & components. **Shockley Transistor:** Silicon switching diodes. **Skottie:** Ceramic capacitors. **Trak:** Increductors, cavities, search & lock receivers, multicouplers, panoramic receivers.

Snyder Co., Lee Grant, 1418 N. Highland, Hollywood 28, Calif., 15, HO 9-6278 (ERA)

**Inglewood**

C & H Supply Co., 415 E. Beach Ave., Inglewood 3, Calif., 10, ORegon 8-4181

**EverReady Label, Jonergin & Co., Malby & Sons:** Nameplates, Circuitry plates.

Cook Electronics, 210 E. Hardy, Inglewood 1, Calif., 10 (NEDA)

Newark Electronics Corp., 4747 W. Century Blvd., P.O. Box 4217, Inglewood, Calif., 10, OREgon 8-0441, Branch: Chicago, Ill. (NEDA)

**Lawndale**

Stevens Co., Inc., Thomas L., 15222 S. Grevillea Ave., Lawndale, Calif., 15, SPring 2-1466

**Corson Electric:** Pulse forming networks & high voltage capacitors. **Dale Prods.:** Resistors & trimmer potentiometers. **Etchomatic:** Chemicals & equip. for printed circuits. **Metal Textile:** Knitted materials for RF shielding. **New England Laminates:** Copper clad materials. **Torwico:** 400 cycle transformers, toroids, inductors, & magnetic amplifiers.

**Long Beach**

Hall of California, R. C. & L. F., 4686 Long Beach Blvd., Long Beach 5, Calif., 10 (NEDA)

**Kierulff Electronics, Inc., 415 Long Beach Blvd., Long Beach, Calif., 5, 10, 15, 20, HEmlock 5-9552, Branch: Los Angeles, Calif.**

See ad on page 710

Scott Radio Supply, Inc., 266 Alamitos Ave., Long Beach 2, Calif., 10 (NEDA)

**Los Altos**

Rupp Co., V. T., 1182 Los Altos Ave., Los Altos, Calif., 15, WHitecliff 8-1483, Branch: Los Angeles, Calif.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Strassner Co., Richard A., 126 Third St., P.O. Box 927, Los Altos, Calif., 15, WHitecliff 8-3334, Branch: Los Angeles, Calif.

Van Groos Co., 1178 Los Altos Ave., Los Altos, Calif., 15, WHitecliff 8-7266, Branch: Woodland Hills, Calif.

**Los Angeles**

Alderson Co., Wes, 3050 Overland Ave., Los Angeles 34, Calif., 15, UPton 0-1669

**Argos Products:** Baffles. **Barker & Williamson:** Test. **Calif. Chassis:** Metal Racks. **Continental-Wirt:** Precision resistors, potentiometers, switches. **Potter Co.:** Radio noise filters, teflon & mylar capacitors. **Quam-Nichols:** Loud speakers.

Avnet Corp., 5877 Rodeo Rd., Los Angeles 16, Calif., 10, UPton 0-6141 (NEDA)

**Bendix-Scintilla:** Electrical connectors. **General Tire:** Vibrex Fasteners. **Robertson:** Splice & Connector cases. **Sprague:** Capacitors.

Barstow & Doran, Inc., 1406-08 S. Grand Ave., Los Angeles 15, Calif., 15, RIchmond 8-6191

**Best Prods.:** Tubes. **Hirschmann Radio-Technisches Werk:** Plugs, sockets. **James Electronics:** Vibrators. **Luxo Lamp:** Lamps. **McGregor:** Speakers. **Merco Recording:** Radio AM-FM. **Nortronics:** Recording & erase heads. **David Reimer:** Audio components. **Rye Sound:** Earphones. **Schauer Mfg.:** Battery chargers, eliminators. **Setchell-Carlson:** TV, AM, FM receivers. **Tandberg of America:** Tape recorders. **Tenna Mfg.:** Antennas, connectors. **Terado:** Mobile power convertors. **Tri-Ex:** Towers. **United Condenser:** Capacitors. **United Electronic Mfg.:** Capacitors. **Wright Zimmerman:** Speakers.

Becker Co., Herbert, 1140 Crenshaw, Los Angeles 19, Calif., 15, WEbster 1-1257 (ERA)

Berman Co., Inc., Jack, 1141 S. La Cienega Blvd., Los Angeles 35, Calif., 15, OLeander 5-8920

**British Industries, Bud Radio, Central Resistor, Columbus Electronics, Dialight, Elco, JB Electronic Transformers, Jensen Ind., National Co., Pyramid Electric, Radio Materials, Shure Bros., Silicon Transistor, Solar Systems, Tru-Ohm.**

Bray & Carter, 2234 West 11th St., Los Angeles 6, Calif., 15, DUnkirk 9-3173

**Anko Mfg.:** Tube Testers. **Clevite:** Headphones. **Clevite-Walco:** Phono Needles & Recording Accessories. **Continental Mfg.:** AM & FM Intercoms. **Garlock Packing:** Teflon Tube Sockets. **Grayhill:** Miniature Switches. **JFD:** TV Antennas & Hardware. **Line Electric:** Relays, Buzzers. **Oaktron Industries:** Loudspeakers. **Patton-MacGuyer Co.:** Terminals. **Phalo Plastics:** Wire & Cable. **Sun Electric:** Panel Meters. **Texas Capacitor:** Capacitors. **Walsco Electronics:** Hardware, TV Antennas. **Wen Products:** Electric Hand Tools.

Arizona
Arkansas
California

California Electronic Sales Co., 5117 S. Main St., Los Angeles 37, Calif., 15, DUnkirk 5-1005 (ERA)

Cohu Sales Co., S. H., 92 S. Marengo Ave., Los Angeles 26, Calif., 15, WEbster 3-5147 (ERA)

Colmar & Assoc., Eddie, 15 I.S. Main, Los Angeles 15, Calif., 15, RIchmond 9-3941 (ERA)

Costello & Co., 2740 S. La Cienega Blvd., Los Angeles 34, Calif., 15, UPton 0-8537

**Barnes Eng.:** Infrared instrumentation. **Bradley Semiconductor:** Resistors. **Electro-Flex:** Heating blankets & elements. **Electri-Flex Heat:** Heating elements and heat tapes. **Fabricast:** Slip ring assemblies. **FabriTek:** Magnetic core memories. **W. L. Gore & Assoc.:** Teflon tubing and tape. **Kollmorgen:** Optical electro-mechanical equip. **Penn-Keystone:** Aircraft panel instruments & ball relays. **Thermax Wire:** Teflon insulated hook-up wire & cable. **Transistor Electronics:** Computer control panel components.

Davis Sales Co., George, 2119 S. Atlantic Blvd., Los Angeles 22, Calif., 10 15, AN 8-7231

**J. W. Davis:** Radios. **E-Z-Way Towers:** Communication towers. **Fiberglas Eng. & Supply:** Sound absorbing materials. **Hallicrafters:** Communication equip. **Hy-Gain Antenna Products:** Antennas. **Pennwood Numechron:** Digital clocks. **Standard Coil Prods.:** TV Tuners.

Erlanger Sales Co., 4217 W. Jefferson Blvd., Los Angeles 16, Calif., 10, 15, RE 1-2238

**Antenna Designs:** TV FM & UHF antennas. **Atlantic Wire & Cable:** Wire. **Electronic Instrument:** Test equipment. **Fibre Glass Evercoat:** Acoustic insulation. **Jersey Specialty:** Television wire. **Wellcor:** Radios.

Federated Purchaser, Inc. of Calif., 11275 W. Olympic Blvd., Los Angeles, Calif., 10 (NEDA)

Feldman Co., Henry, P.O. Box 66367, Los Angeles 66, Calif., 15, RIchmond 9-8803

**Barker Products:** Audio component cables. **DeWald Mfg.:** High Fidelity amps & tuners, citizen-band transmission. **Edw. E. Gurian:** Speakers. **Jayell Mfg.:** Radios. **Radec Electronic Prod.:** Magnetic recording tape. **Rogers Electronic:** Flyback X-formers, yokes, coils. **Weller:** Soldering guns, irons.

Freeman Sales Co., 4354 Melrose Ave., Los Angeles 29, Calif., 15, NOrmandy 4-1971

**Artizans, Audio Empire, Audio Times, Brand Products, Crosby, Madison Fielding, Neshaminy, Qualitone, Stephens Trusonic, Triton Tape.**

Geist Co., W. K., 3177 Glendale Blvd., Los Angeles 39, Calif., 15, NOrmandy 5-1195

**Burr-Brown:** Transistorized equip., AC decade amplifiers, square wave generators, AC millivoltmeters, low distortion audio oscillator, differential DC amplifiers. **Clough-Brengle:** IF sweep generator, beat frequency oscillator, audio oscillator, transmission measuring sets, R.F. signal generators, capacitance-inductance-resistance bridge. **Crosby-Teletronics:** Signal generator, SSB, germanium and silicon diode test-

*(listing continued on page 710)*



"Distribution" listings are arranged alphabetically by states and by cities within each state.
For names and addresses of manufacturing firms, see Alphabetical Directory, pages 135-240.

ers, pulse timer, wide band electronic switch, transistorized frequency meters. **Curtiss-Wright:** Strip chart recorders, distortion eliminating line regulators, electrometers. **Designers for Industry:** Airborne secondary frequency standards—transistorized, missile launch programmers. **Elasco:** Packaged AC-DC and DC-DC voltage regulated transistorized power supplies. **Electro Precision:** Analog & digital test instrumentation modules. **Epic:** Radiation pyrometers, immersion pyrometers, optical pyrometers. **Eppley Laboratory:** Standard cells, thermopiles, pyrheliometers, infra-red equip. **Holt Instrument Labs.:** Regulated AC power supplies, audio voltage standard, audio oscillators, thermal transfer voltmeter, audio amplifiers, AC voltage monitors. **Houston Instrument:** X-Y recorders, differential transformer recording systems, DC amplifiers. **Mira Co.:** Miniature AC data amplifiers, amplifier-demodulator (converter), airborne miniature DC regulated power supplies. **Navagation Computer:** Transistorized digital logic systems. **Physics Research Labs.:** Otto Wolff standard resistors, decade boxes, ratio sets, wheatstone bridges, potentiometers, voltage dividers, C. P. Goerz meters. **Rohde & Schwarz Sales:** Voltmeters, receivers, field strength meters, amplifiers, etc. **H. H. Scott:** Audio amplifiers, AC decade amplifiers, sound level meters, random noise generators.

Gilbert Co. Inc., M. B., 7923 Emerson Ave., Los Angeles 45, Calif., 15, ORegon 8-3418

**Airtronics Int'l.:** Communication test equipment, memory drums, gear trains. **Alto Scientific Co.:** Solid-state timing equipment & switches, filters, telemetering receivers, command modulators, pulsers, modulators & power supplies for backward wave tubes, square wave generators, transistor transient protectors, time delay relays. **Central Transformer:** Transformers, reactors. **Cole Elec.:** Ball & socket connector, self-aligning & quick-disconnect connectors, missile umbilical and interstage connectors, printed circuit connectors, hermetic sealed & power switches. **Dwyer Engrg.:** Teflon printed circuit cables, printed circuits, tape resistors, microwave absorbing material, transformers, miniaturized phase comparators. **Electronic Assistance:** Radar altimeters, communication equipment, ultrasonic, phase converter networks. **Pioneer Electronic:** Ceramic High Voltage Vacuum switches, special purpose tubes. **Precision Line:** Precision potentiometers.

Hamilton Electro Sales, 12308 Wilshire Blvd., Los Angeles 25, Calif., 15, 20, BRadshaw 2-8453

**Applied Research:** Amplifiers, antenna accessories, attenuators, communication equip., converters, filters, microwave accessories. **Astrosystems:** Synchro test equip. **Bamford Corp.:** Potentiometers. **Clevite Transistor Prods.:** Transistors & diodes. **Conrad-Carson:** Resistors. **Fairchild Semiconductor:** Transistors & diodes. **General Electric:** Capacitors, panel instruments, relays. **Ralph M. Parsons:** Delay Lines. **Westinghouse:** Rectifiers, transistors & diodes. **Zell:** Headers.

Heeger, Inc., 2528 W. 9th St., Los Angeles 6, Calif., DUnkirk 7-6955 (ERA)

Heim & Scheer, Inc., 11168 Santa Monica Blvd., Los Angeles 25, Calif., 15, GR 7-3208

**Alloys Unlimited:** Precious metal dots, pellets, preforms. **Crocker Burbank Papers:** Capacitor tissue. **Hermetic Seal Transformer:** Components. **Imtra:** Synthetic Jewels. **Mitronics:** Metallized ceramics. **F. H. Paul & Stein:** Alum. Foil imported from Germany. **Secon Metals:** Precious metal wire. **Stewart Stamping:** Disc & lead assemblies, bare tabs. **Thor Ceramics:** Ceramic, epoxy bobbins, coil forms. **Truelove & MacLean:** Heat sinks & transistor cans. **Veritron West:** Glass-to-metal hermetic seals.


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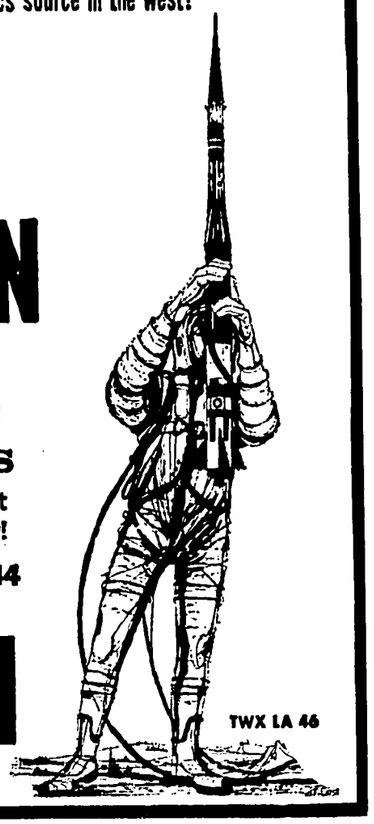
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Holmes Co., Carl E., 107 N. Avenue 64, Los Angeles 42, Calif., 15, CLinton 6-2255

**Deringer Metallurgical:** Contacts. **Detroit Controls:** Tyni-switches. **Fenwal:** Thermistors. **Firth Sterling:** Heavy metal. **Isotronics:** Glass-to-metal seals. **Kidco:** Resistors. **E. V. Naybor Labs.:** Time delay relays. **No. American Philips:** Tungsten & molybdenum. **George Rattray:** Potentiometers. **Scientific Radio Prods.:** Quartz crystals. **Syntron:** Silicon & selenium rectifiers. **Technamentals, Inc.:** Powder metal parts. **Union Switch & Signal:** Miniature relays & readout instruments.

J. S. H. Electronics Co., 1108 Venice Blvd., Los Angeles 15, Calif., 10, Tubes & Semiconductors

Jurin Co., Syd, 1628 S. Bentley Ave., Los Angeles 25, Calif., 10, 15, GRanite 7-7768

**Audax:** Speakers. **B & K Mfg. Co.:** Test equip. **Midwest Audio:** Paging Systems. **Pageant Needles:** Needles & Accessories. **Rockford Special Furniture:** Enclosures & Cabinets. **Space Communication:** Closed-circuit TV. **Webster Productomatic:** Intercoms.

**Kierulff Electronics, Inc., 820 W. Olympic Blvd., Los Angeles 15, Calif., 5, 10, 15, 20, RIchmond 8-2444 (NEDA)**

**See ad on this page**

**Advance:** Relays. **Amperex:** Tubes. **Ampex:** Recorders, duplicators. **Amphenol:** Connectors. **Belden:** Wire & cable. **Bourns:** Trimmer potentiometers. **Bud Radio:** Cabinets. **Burgess:** Batteries. **Calif. Chassis:** Cabinets. **Centralab:** Controls, capacitors. **Cinch-Jones:** Connectors. **Cornell-Dubilier:** Capacitors. **Dale:** Power resistors, trimmer pots. **Daven:** Potentiometers. **Daystrom Pacific:** Trimmer potentiometers. **Ersin Multicore:** Solder. **Fairchild:** Semiconductors. **GE:** Tubes & Semiconductors. **General Transistor:** Semiconductors. **Grayhill:** Switches. **Heath:** Heathkit. **Hetherington:** Switches. **Hickok:** Test equip. **Hoffman:** Semiconductors. **Hughes:** Semiconductors. **Intnl. Rectifier:** Semiconductors. **Lerco:** Hardware. **Littelfuse:** Fuses. **Machlett:** Tubes. **Mallory:** Mercury Batteries. **Merit:** Xformers. **Mirodot:** Connectors. **Minn.-Honeywell:** Semiconductors. **Motorola:** Semiconductors. **National Semiconductor, Ohmite:** Resistors. **Pacific Semiconductors:** Semiconductors. **Philco:** Semiconductors. **Potter-Brumfield:** Relays. **RCA:** Tubes, Semiconductors. **Raytheon:** Tubes, semiconductors. **Sarkes Tarzian, Sigma:** Relays. **Simpson:** Panel meters. **Spectrol:** Pots. **Stancor:** Transformers. **Superior Electric:** Powerstats. **Triad:** Transformers. **Triplett:** Test equip. **Tung-Sol:** Semiconductors, tubes. **USECO:** Hardware. **Westinghouse:** Tubes. **Weston:** Panel meters.

King Engineering Co., 5321½ Hollywood Blvd., Los Angeles 27, Calif., 10, 15, HO 4-7166

**Electro Prods. Labs.:** Magnetic speed transducer, proximity detecting & switching systems, transistorized tachometers. **Electrovert:** Flowsolder, insuloid-wiring harness devices. **Natel Engrg.:** F.M. Discriminitors, time delay relay. **Rese Engrg.:** Magnetic core memory storage units, pulse generators. **Shepherd Industries:** Magnetic recording drums. **White Avionics:** Pressure transducers.

Kittleson Co., 416 La Brea Ave., Los Angeles 36, Calif., 15, WEbster 3-7371 (ERA)

Knight Co., W. Bert, 10377 W. Pico Blvd., Los Angeles 64, Calif., 15, BRadshaw 2-0101, Electronic Components

Koessler Sales Co., 818 N. Fairfax Ave., Los Angeles 46, Calif., 15, OLive 3-1605

**American Microphone Mfg.:** Microphones & accessories. **Apparatus Development:** Antennas & accessories. **Audio Devices:** Tape & discs. **Barker Prods.:** Cables. **R. T. Bozak Sales:** Loudspeakers & enclosures. **Electro-Sonic Labs.:** Pick-ups, cartridges, microphones. **Fisher Berkeley:** Intercommunication equip. **Fourjay Industries:** Industrial speaker baffles. **Magna-Cine Int'l.:** Pre-recorded tapes. **Magnecord Div., Midwestern Instruments:** Tape recorders. **McIntosh Lab.:** Amplifiers, tuners, pre-amplifiers. **Meissner Lab.:** Mixers. **Thorens Co.:** Turntables, record changer & players. **Worner Electronic Devices:** Burglar alarm systems & photo-electric cells.



# Distributional Functions



**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Lynch & Son, C. R., 3307 Glendale Blvd., Los Angeles 39, Calif., 15, NOrmandy 3-8236 (ERA)

Marsh Co., J. W., 4216 W. Jefferson Blvd., Los Angeles 16, Calif., 15, REpublic 2-0145 (ERA)

Marshank Sales Co., 7422 Melrose Ave., Los Angeles 46, Calif., 15, WEbster 8-2591

**Barco:** Capacitors. **Bogen-Presto:** Intercoms, p.a. amplifiers. **Bramco:** Reed relays. **Federated Electronics:** Crystal ovens. **H&M Research & Dev.:** Capacitors. **Kemtron Electron Prods.:** Diodes. **Penn-Tran:** Yokes, transformers. **Reeves Soundcraft:** Recording tape & discs. **Solitron Devices:** Rectifiers. **Spectrol:** Precision pots. **Turner:** Microphones. **U.S. Relay Electronics:** Relays.

Mueller Electronic Sales, 3225 Exposition Pl., Los Angeles, Calif., 15, AXminster 5-3239

**Arco:** Capacitors. **Eric Engineering:** AM & FM Tuners. **Fairchild Recording Equip.:** Turntables, arms, cartridges. **General Cement Mfg.:** Components, tools, Hardware, switches, plugs, jacks, knobs, chemicals, etc. **Globe Electronics:** Ham Gear & Citizen band communications. **Jensen Industries:** Cartridges. **Lance Antennas:** Antennas. **Vaco Prods.:** Hand tools.

Olander & Co., Roland, 6313 Santa Monica Blvd., Los Angeles 38, Calif., 15, HOllywood 9-6313

**Consolidated Avionics:** Transistorized power supplies, checkout systems. **D&R Ltd.:** Flutter meters, alternators, power supplies, magnetic amplifiers. **Ferranti:** Delay lines, memory drums, transformers, tubes, punched tape readers, digital systems. **Fisher Radio:** High fidelity amplifiers, tuners, loudspeakers. **Killvolt:** High voltage power supplies. **Offner:** Oscillographs, multichannel recorders, DC amplifiers, data amplifiers. **Pickering:** Phono & stereo cartridges, turntables. **James E. Scott:** Allscott doppler radar noise measurement equip.

Owens Co., Lee H., 1102 S. Western Ave., Los Angeles 6, Calif., 15, REpublic 5-0203

**Bogen-Presto:** Disc Recorders, Tape Reproducer. **Gerator:** Frequency Converters & Generators. **Gibbs Mfg. & Res.:** Frequency Standards, Spectro computer. **McCoy:** Quartz Crystals & filters. **Measurements:** Test Equipt. **Morrow Radio Mfg.:** Communications Equipt. **Taurus:** Punched card sensor, terminals. **Technical Appliance:** Military, Commercial, & TV Antennas. **Transco:** Blank Discs.

Pacific Electro-Sales, Inc., 6053½ Whittier Blvd., Los Angeles 22, Calif., 15, RAymond 3-3396

**Con-Elco:** Miniature trimming potentiometers. **Cook Electric:** Relays, pressure switches, solid state conversions. **Exact Eng. & Mfg.:** Reduction units, servomechanisms. **Helco Prods.:** Precision potentiometers. **Hermetite:** Glass to metal seals. **Poly-Scientific:** Brush assemblies & slip rings. **Standard Rectifier:** Silicon rectifiers.

Perlmuth Electronic Associates, 5057 W. Washington Blvd., Los Angeles 16, Calif., 10, 15, 20, WEbster 1-1041

**Alpha Wire:** Wire. **Amco Engrg.:** Fasteners. **Autotronics:** Brakes & clutches. **California Technical Industries:** Special instruments. **Carter Motor:** Rotary power supplies. **Clarostat:** Resistors. **Donner Scientific:** Angular Accelerometers. **Eastern Air Devices:** Miniature motors. **Frequency Standards:** Microwave hardware, systems. **Gulton:** Transducers. **Hudson Wire:** Industrial wire. **Magnetic Shield Div.:** Shielding. **Manson Labs.:** Modulators, power supplies. **Phoenix:** Transformers. **Raytheon:** Tubes. **Schjeldahl Co.:** Mylar Tape. **Speidel Corp:** Miniature recorders. **Waterman:** Oscilloscopes.

Radio Products Sales, Inc., 1501 S. Hill St., Los Angeles 15, Calif., 10 (NEDA)

Roberts & Associates, Inc., E. V., 5068 W. Washington Blvd., Los Angeles 16, Calif., 15, WEbster 8-2541

**ADC:** Transformers, chokes. **Bethlehem Foundry:** Test chambers. **Cambridge Thermionic:** Electronic hardware. **Daystrom:** Servo Motors & Potentiometers. **Honeywell:** Meters. **Industrial Timer:** Synchronous timers. **Marion Div., Minneapolis-Honeywell:** Meters. **Sigma Instruments:** Sensitive relays. **Telex:** Acoustic devices. **Vicon:** Closed circuit TV.

Ross & Co., Malcolm, 1623 S. La Cienega, Los Angeles 35, Calif., 15, BRadshaw 2-3103

**Amerelay Corp.:** Relays. **Elcon:** Capacitors. **Escon:** Connectors. **Essex Electronics:** Delay Lines, chokes, coils, inductors. **Semicon:** Silicon Rectifiers. **Subminiature Inst.:** Potentiometers. **United Components:** Silicon Diodes.

Rupp Co., V. T., 307 Parkman Ave., Los Angeles 6, Calif., 15, DU 7-8224

**Analab:** Oscilloscopes, cameras. **Beckman-Berkeley Div.:** Analog computers, counters, timers, digital instrumentation. **Kepco:** Transistorized regulated power supplies. **Precision Instrument:** Instrumentation tape recorder-reproducer. **Resdel:** Cavity amplifiers, VHF-UHF wide-band amplifiers, space instrumentation equip. **Wiancko:** Pressure & force measuring equip.

Rush and Assoc., C. B., 3757 Wilshire Blvd., Los Angeles 5, Calif., 15 (ERA)

Saul & Assoc., Howard M., 5015 San Vicente Blvd., Los Angeles 19, Calif., 15, WEbster 8-3591

**J-B-T Instruments, Shurite Meters, Triplett Electrical Instrument**

Scope Distributors, Inc., 815 E. Rosecrans Ave., Los Angeles 59, Calif., 10, (NEDA)

Shallway International Corp., 1301 N. Benton Way, Los Angeles 26, Calif., 5

Snitzer Co., T. Louis, 5354 W. Pico Blvd., Los Angeles 19, Calif., 15, WEbster 8-2074 (ERA)

Stolaroff Co., M. A., 4422 W. Slauson Ave., Los Angeles 43, Calif., 15, AXminster 5-4221

**Beattie-Coleman:** Instruments & components. **Bircher Corp:** Indicators. **Clarostat:** Resistors. **Comar Elec:** Relays. **Dakota Inc.:** Thin blade switches. **Dakota Inc.:** Cable clamps. **Daven:** Attenuators, switches, potentiometers. **Electro-Mec:** Relays. **GV Controls:** Timers. **Intimex:** Miniature & Electromechanical timers. **W. L. Maxson:** Accelerometers, switches, etc. **Merkle-Korff Gear:** Precision gears. **HP Geared motors. Sage Electronics:** Switches, power resistors. **Unimax Switch:** Switches. **Wells Industries:** Precision potentiometers, terminal pins.

Stone Associates, Inc., Carl V., 8971 National Blvd., Los Angeles 34, Calif., 15, UPton 0-7771

**Ad-Yu:** Phase meters, delay lines, fixed amp. relays. **Ballantine Labs.:** AC electronic tube voltmeters, direct reading capacitance meter, AC/DC linear converter. **Empire Devices:** Noise & field intensity meters, coaxial components, AM frequency meter, power supplies, AM modulation meter. **Panoramic Radio Prods.:** Spectrum analyzers, power density analyzers, telemetering indicators & calibrators. **Radio Condenser:** Variable air condensers, trimmer elements, air trimmers. **Shielding:** RF shielded enclosures, anechoic chambers, dust free rooms. **Sullivan & Griffiths:** Precision lab standards.

Stone Sales Co., R. L., 8971 National Blvd., Los Angeles 34, Calif., 15, UPton 0-5973 (ERA)

Strassner Co., Ellard E., 1805 N. Western Ave., Los Angeles 27, Calif., 15, HOllywood 2-4946

**Audiogersh:** Record players & changers. **Kingdom Prods:** Hi fi speakers & systems. **Pace Electrical Instruments:** Panel meters. **Paco Electronics:** Kit test equip. **Precision Apparatus:** Lab & TV test equip. **Herman H. Smith:** Hardware. **United Transformer:** Transformers.

Strassner Co., Richard A., 1557 N. Western Ave., Los Angeles 27, Calif., 15, HOllywood 3-5694

**General Resistance:** Resistors. **IMC Magnetics:** Miniature motors & blowers. **Kulka:** Terminal blocks & toggle switches. **Magnecraft:** Telephone type relays. **Microtran:** Miniature transformers. **N'tl. Union Electric:** Special purpose tubes. **North American Electronics:** Semiconductors. **Plastic Capacitors:** Hi-voltage capacitors, power packs. **Sealectro:** Teflon terminals, miniature RF connectors & patchboards.

Thorson Co., The, 7361 Melrose Ave., Los Angeles 46, Calif., 15, WEbster 4-1191 (ERA)

Ungar Sales Associates, 9925 Venice Blvd., Los Angeles 34, Calif., 10, 15, UPton 0-6116

**American Elite:** Telefunken tubes. **Milwaukee Resistor:** Wire wound resistors. **Osborne:** Portable walkies, Citizen Band Talkie. **Raypar:** Chokes, H.V. Sockets. **Ungar:** Soldering Irons. **United Mineral:** Deposited carbon resistor sockets, terminals. **Waldom Electronics:** Terminals.

Universal Radio Supply Co., 1729 S. Los Angeles St., Los Angeles 15, Calif., 10 (NEDA)

Wallace & Wallace, 1206 Maple Ave., Los Angeles 15, Calif., 15, RIchmond 7-0401

**Academy Industries:** Nameplates. **Amperite:** Thermostatic Delay Relays & Ballast Tubes.

*(listing continued on page 712)*

**Conant Labs.:** Copper Oxide & Selenium Instrument Rectifiers. **L. M. Ericsson:** 10,000 hr. Warranty Electronic Tubes. **General Crystal:** RF Crystals. **E. F. Johnson Co.:** Transmitters, Capacitors, Inductors, Plugs, Jacks, Sockets, Insulators, Knobs, Dials, Pilot Lights, Hardware. **Erik A. Lindgren:** Screen Rooms. **Motorola:** Voltmeters. **Oregon Electronics:** DC Power Supplies. **Radar Design:** Waveguide Components. **Radiation Counter Labs.:** Nuclear Instrumentation. **Standard Electrical Products:** Transformers. **Telerad:** Waveguide Components. **Trimm:** Headphones, Jacks, Plugs, Jack Panels & Patch Cords. **Universal Transistor Products:** Power Supplies, Nuclear Monitoring Instruments.

Weber Co., Wedge, 1217 Venice Blvd., Los Angeles, Calif., 15, DUnkirk 7-2111 (ERA)

**Wesrep Corp., 2022 S. Sepulveda Blvd., Los Angeles 25, Calif., 15, BRadshaw 2-3757 (ERA)**

**See ad on this page**

**Al-Con Chemical Co.:** Fungus preventatives. **B-H Electronics:** Trimmer Potentiometers. **Chemalco:** Transformers, Inductors, Coils, Mag. Amps., Reactors, Power Supplies, Solid State Inverters & Converters, Amplifiers. **Dial Products Co.:** Magnetic Clutches & Brakes. **M. and M. Machine Shop:** Fabricated & Drawn Cans. **Orell, Inc.:** High Temp. Potting Compounds. **Pacific Electronic Controls, Electropot Div.:** Potentiometers. **Precision Specialties, Inc.:** Tape Punch Machines, Vulcanized Fibre, Mylar & Paper Tape. **Richmont, Inc.:** Torque Control System.

Westron Sales & Engineering, 7407 Melrose Ave., Los Angeles 46, Calif., 15, WEbster 3-7276 (ERA)

Wiley Co., Paul F., 1632 Silverlake Blvd., Los Angeles 26, Calif., 15, NOrmandy 3-8028 (ERA)

**Menlo Park**

Ault Associates, 120 Santa Margarita, Menlo Park, Calif., 15, DAvenport 6-1760

**Abtronics:** High speed electronic cameras, image tubes. **Cascade Research:** Ferrite components. **Donner:** Analog Computers & Accessories, Lab. Insts. **Invar:** Transistorized power supplies. **Landis & Gyr:** Sodeco Impulse Counters. **PRD Elec.:** Microwave Test equipt. & Components. **Potter & Brumfield:** Relays. **Shockley:** Four-layer Silicon switching diodes, zener diodes. **Systron:** Digital in-line counters, digital voltmeters, miniature strip-chart recorders.

Holmes Co., Carl E., P.O. Box 543, Menlo Park, Calif., 15, DAvenport 6-3762, Branch: Los Angeles, Calif.

McCarthy Associates, Inc., 635 Oak Grove, Menlo Park, Calif., 15, DA 6-7937, Branch: Pasadena, Calif.


**WESREP CORPORATION**

Manufacturers' Representatives

Calif. — Nev. — Ariz. — N.M.

**Potentiometers — Resistors — Magnetic Cores — Magnetic and Mechanical Clutches — Flexible Couplings — High Temperature Potting Compounds — Fabricated and Drawn Cans — Tape Punch Machines and Tape — Fractional Horsepower Motors — Relays — Solenoids — Timers — Torque Tools and Analyzers — Vibration Absorbent Materials.**

WESREP CORPORATION
2022 S. Sepulveda Blvd.,
Los Angeles 25, California
Phone: BRadshaw 2-3757
Teletype: WLA 6708

For details, circle #772 on Reader Service Card


McKnight Co., 1436 El Camino Real, Menlo Park, Calif., 15, 20, DA 6-3762

**Accurate Specialties:** Semiconductor Preforms, high-purity alloys. **Ace:** Precision potentiometers & trimmers. **Alliance Mfg.:** Fractional horsepower motors. **A.P.M.:** High pressure seals and fasteners, power connectors. **Atlas:** Connectors. **Axel:** Pulse forming networks, noise suppression capacitors & filters, energy storage & low inductance capacitors. **Dearborn:** Capacitors. **Fenwal:** Thermistors & thermistor probe assemblies. **G M Nameplate:** Names plates, dials. **Hamlin:** relays & switches. **Hufco:** Relays. **Isotronics:** Glass-to-metal vacuum seals. **Kidco:** Resistors. **Licon:** Snap-action switches, actuators, lighted push-botton panel switches, environment-free switches. **North Amer. Philips:** Tungsten & Molybdenum. **Pacific Resistor:** Resistors. **Scaico Controls:** Thermostats. **Scientific Radio Prods.:** Quartz Crystals. **Syntron:** Selenium & Silicon Rectifiers. **Union Switch & Signal:** Relays, Readall Readout instruments. **United Transformer:** Transformers, reactors, magnetic amplifiers, electric wave filters. **Webster Electronics:** Light sockets, indicator lights, plugs, jacks.

Weightman & Associates, 1436 El Camino Real, Suite 5, Menlo Park, Calif., 15, DAvenport 6-3797, Branch: Burbank, Calif.

**Modesto**

Inland Electronics Suppliers, 1518 Ninth St., Modesto, Calif., 10 (NEDA)

**Monterey**

Zackit Corp. of Monterey, 259 Alvarado St., Monterey, Calif., 10 (NEDA)

**Mountain View**

Ellis Sales Co., G. B., 2316 E. Camino Real, Mountain View, Calif., 15, YOrkshire 7-5531

**Amphenol-Borg:** Cables, connectors, TV accessories. **Blackhawk:** Filters, crystals. **Industro Transistor:** Germanium & silicon transistors. **Insl-X Prods.:** Fungus & impregnant spray & dips. **Magnetic Devices:** Relays. **Northern Eng. Labs.:** Crystals & ovens. **Seal-A-Metic:** Glass to metal seals. **Sightmaster:** Fuses. **Southern Electronics:** Capacitors. **U.S. Engineering:** Terminals, terminal boards, electronic hardware & printed circuit boards.

**North Hollywood**

Edwards Co., Jackson, 4101 Lankershim Blvd., North Hollywood, Calif., 15

**Ace Electronics:** Precision potentiometers, trimmers. **Cox & Co.:** Heating elements. **Filtors:** Sub-miniature relays. **J-V-M Microwave:** Cavities. **Kanthal:** Resistance wire. **Microlab:** Coaxial components. **Sanders Assoc.:** Flexible printed circuit cables & wiring. **Schaevitz Engrg.:** Accelerometers, differential transformers, centrifuges. **Scientific Components:** Flush printed circuit commutators. **Sealtron:** Hermetically sealed connectors, headers. **Servo-Dynamics:** Servo motors. **Welwyn Int'l.:** Deposited carbon resistors. **Whitso:** Terminals.

Gordon Enterprises, 5362 N. Cahuenga Blvd., North Hollywood, Calif., 5, 15, 20, PO 6-3725

**Arriflex, Bausch & Lomb, Fairchild Camera, Mole-Richardson.**

Jewett Co., 13111 Ventura Blvd., North Hollywood, Calif., 15, STate 9-8103

**Bowmar:** Counting devices, speed reducers, gear assemblies, servo systems. **Communication Accessories:** Toroids, filters, transformers, magnetic amplifiers, saturable reactors, power supplies, & discriminators. **Dage Electric:** RF connectors. **Good-All:** Mylar, ceramic discs, electrolytic & paper capacitors. **Hastings-Raydist:** Vacuum indicators & controllers, air velocity meters. **Microsecond Electronics:** Delay lines & pulse transformers. **Printronics:** Printed circuits. **Roanwell:** Microphones, headsets. **Sheroid Crystals:** Quartz crystals, oscillators & ovens. **Viking Ind.:** Connectors, voltage reference standards, power supplies & servo amplifiers.

Markham Co., R. Mark, 4260 Lankershim Blvd., North Hollywood, Calif., 15, TRiangle 7-3368

**British Audio Prod:** Cartridges. **Chemtronics:** Chemical. **Collaro:** Changers (Rockbar Corp.). **Dynaco:** Amp, preamp kits & transformers. **Goodman:** Speakers. **Gotham Audio:** Neumann & Beyer mikes. **Gramer-Halldorson:** Transformers & coils. **Gray Mfg.:** Turntables & tone arms. **I.H. Mfg.:** Radio & TV accessories. **International Electronic Sales:** Mullard Tubes. **Lab-Tronics:** Connecting cables. **H. H. Scott:** Amps, tuners & preamps. **Service Instrument:** Sencore Time Saver test equip. **Webster Mfg.:** Marine Electronics.

Neely Enterprises, 3939 Lankershim Blvd., North Hollywood, Calif., 15, TRiangle 7-0721

**Baldwin-Lima-Hamilton:** Strain Gages. **Bomac Labs:** Microwave Components. **Dymec Div.:** Digital Systems, Microwave Simulators. **Hewlett-Packard:** Laboratory Test Equipment. **Kin Tel:** DC Instrumentation, Closed Circuit TV. **Sanborn:** Oscillographic Recorders. **Varian Assoc.:** Microwave Systems, Tubes, High Vacuum Equip.

O'Halloran & Associates, John Francis, 11636 Ventura Blvd., North Hollywood, Calif., 15, TRiangle 7-0173

**Boonton Electronics:** DC microvoltmeters, RF voltmeters. **Electronic Assoc.:** XY plotter & digital voltmeters. **Electronic Measurements:** Solid state regulated power supplies. **Huggins Labs.:** Traveling wave tubes. **Levinthal:** High power electronics. **Menlo Park Eng.:** TWT amplifiers. **Narda Microwave:** Microwave components & instruments. **Optimized Devices:** Automatic test equip. **Statham Development:** Environmental test. **Weinschel:** Coaxial attenuators & attenuation measuring equip.

Simonite-Lewis & Assoc., 10636 Burbank, North Hollywood, Calif., 15, 20, TR 7-1674

**Climax Electronics:** Changers **Electro Prod.:** Grilles & connectors. **International Electronics:** Speakers. **Kinematix:** F.M. Tuners. **L.I. Electro-Labs.:** Solder irons. **Peerless Prod.:** Antennas. **Saxton:** Wire. **Seco:** Test equipment. **Stag Electronics:** Parts. **Tecraft:** Mobile Ham equipment. **Texas Crystals:** Crystals. **Waber Electronics:** Accessories. **Webster Electric:** Tape recorders.

**North Sacramento**

California Radio & Television Supply Co., 2454 Del Paso Blvd., North Sacramento 15, Calif., 10 (NEDA)

**Oakland**

Elmar Electronics, 140 11th St. at Madison, Oakland 7, Calif., 10 (NEDA)

Wenger Co., E. C., 1450 Harrison St., Oakland 12, Calif., 10 (NEDA)

**Oceanside**

Electronic Products Supply Co., 1023 S. Cleveland, Oceanside, Calif., 10 (NEDA)

**Orange**

**Kierulff Electronics, Inc., 430 S. Main St., Orange, Calif., 5, 10, 15, 20, KElogg 2-4714. Branch: Los Angeles, Calif.**

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**Palo Alto**

Brainard, Bill, 715 Hamilton Ave., Palo Alto, Calif., 15, DA 6-5421 (ERA)

Components Sales California, Inc., Palo Alto, Calif., 15, 20, DAvenport 6-5317, Branch: Sherman Oaks, Calif.

Costello & Co., 535 Middlefield Rd., Palo Alto, Calif., 15, DAvenport 1-3745, Branch: Los Angeles, Calif.

Hamilton Electro Sales, 941 Charleston Rd., Palo Alto, Calif., 15, 20, DAvenport 1-7451, Branch: Los Angeles, Calif.



# Distributional Functions



Mauldin Co., C. W., 441 W. California, Palo Alto 80, Calif., 15, DAvenport 6-5291 (ERA)

Nickerson-Gray & Associates, Inc., P.O. Box 295, Station A, 2434 Park Blvd., Palo Alto, Calif., 15, DAvenport 6-0152

**Calif. Magnetic Corp.:** Transformers, Amplifiers, Power Supplies. **Chicago Gasket Co.:** Teflon "O" Rings, Tape, Sheet. **Grayhill, Inc.:** Sub-miniature pushbutton & rotary switches. **Grayhill Moldtronics:** Miniature Custom Plastic Moldings. **Industrial Condenser Corp.:** Electrolytic, Oil-Paper Capacitors. **JFD Electronics:** Miniature Piston Capacitors, LC Tuners, Delay Lines.

O'Halloran & Associates, John Francis, 825 San Antonio Rd., Palo Alto, Calif., 15, DAvenport 6-1493, Branch: North Hollywood, Calif.

Perlmuth Electronic Associates, 941 Charleston Rd., Palo Alto, Calif., 10, 15, 20, DAvenport 1-5064, Branch: Los Angeles, Calif.

Rudat & Ewing, 626 Waverly St., Palo Alto, Calif., 15, DAvenport 2-5232

Transformers, relays, racks & panels, wire, connectors, teflon, time switches, rectifiers, coils & antennas & accessories.

Shallway International Corp., 1450 University Ave., Palo Alto, Calif., 5, DA 6-5920, Branch: Los Angeles, Calif.

Stone Associates, Inc., Carl A., 825 N. San Antonio Rd., Palo Alto, Calif., 15, DAvenport 1-2724, Branch: Los Angeles, Calif.

Tompkins & Co., Wm. W., 3944 El Camino Real, Palo Alto, Calif., 15, DAvenport 6-7940

**Collins Electronics:** Choppers. **Dage Electric:** RF connectors, seals & headers. **Electronic Transistors:** transistors. **G-V Controls:** Thermal time delays, thermostats. **Nt'l. Coil:** RF coils. **Prototype Transformer:** Transformers. **Resistors:** Wire wound resistors. **Rotating Components:** Motors, blowers. **Unimax Switch:** Snap action switches. **U.S. Relay-Electronics:** Electro-magnetic relays.

Vaughan Co., G. H., P.O. Box 1253, Palo Alto, Calif., 15, DAvenport 1-1347, Branch: Pasadena, Calif.

White & Co., 788 Mayview Ave., Palo Alto, Calif., 15, DAvenport 1-3350

**Acton Labs:** Phase meters, standards, attenuators. **Ameray:** Nuclear shielding. **EMI-Hoffman Electron Tube:** Photo-multipliers, klystrons, magnetrons. **Electronic Contractors:** Analog computers, AC & DC network analyzers. **Empire Devices:** Noise & field power supplies. **Levinthal:** Scintillation crystals. **Oregon Elect. Mfg.:** Regulated DC power supplies. **Radiation Counter Labs.:** Nucleonic Instr. & accessories. **Sanders Electronics;** Microwave instruments & accessories.

**Pasadena**

A-F Sales Engineering, Inc., 385 E. Green St., Pasadena, Calif., 15, MUrray 1-5631

**Accurate Instrument:** Audio-frequency generators. **Eldema:** Miniature indicator lights **Genisco:** Centrifuges, vibration equipment, accelerometers. **Iron Fireman:** Relays and gyroscopes. **Quan-Tech:** Transistorized power supplies and instruments. **Transistor Specialties:** Transistorized counter-timers. **Trio Labs.:** Vacuum tube voltmeters for panel mounting.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Electronic Supply Corp., Affil. Allied Radio Corp., 2085 E. Foothill Blvd., Pasadena, Calif., 10, MU 1-5291 (NEDA)

**Aerovox, Agastat, Akro Mils,** Alpha Wire, **American Electrical Heater, Amperite, Amperex Industrial Tubes, Amphenol, Atco, Arrow-Hart-Hegeman, Atohm,** Audio Devices, **Babcock Relays, Belden, Bud, Burgess, Calif. Chassis, Cannon, Centralab, Chatham, CTS, Chicago Std. Transformer, Cinch-Jones, Columbus,** Dialco, Delevan, **Elco, Elmenco, Erie, Ersin, GC-Textron, General Insts., Grayhill,** Greenlee, Hetherington, Illinois, IRC, JBT, E. F. Johnson, **Kings, Kraeuter, Krylon, Kurz-Kash, Licon, Littelfuse, Luxo, Mallory, Millen,** J. W. Miller, **Milwaukee Resistor,** Mueller, National Co., National Electronics, Ohmite, **Oryx,** Osborne, **Pacific Semiconductors, Pomona, Pyramid Elec.,** Sage, Sargent, **Simpson,** H. H. Smith, Sola, Stancor, Superior Elec., Switchcraft, Sylvania, Techohm, Triad, Triplett, Tung-Sol, Ungar, **Useco, Vector, V-M, Walsco, Welwyn,** Weston, **Wyco, Xcelite.**

Ellender Enterprises, 408 S. Rosemead Blvd., Pasadena, Calif., 15, MUrray 1-3419

**Curtiss-Wright:** Printed Circuits, Electrical Ceramics. **Electronic Components Corp.:** Electro-mechanical Assemblies. **Paro Plastics:** Edge Lighted Panels & Knobs. **Western Markings:** Panels. **Windman Brothers:** Molding.

Empire Electronic Distributors, Inc., 37 E. Union St., Pasadena 1, Calif., 5, 10

**Aerovox:** Capacitors. **Amphenol:** Connectors. **Cannon:** Connectors. **Centralab:** Resistors. **Cinch-Jones:** Connectors. **General Cement:** Hardware. **General Electric Co.:** Tubes, transistors, **I.R.C.:** Resistors. **Raytheon:** Tubes, transistors. **H. H. Smith Co.:** Hardware. **Sprague:** Capacitors. **Standard Elect. Prods.:** Voltage reg. transformers. **Thordarson:** Transformers. **U.T.C.:** Transformers. **Ward-Leonard:** Resistors. **Wyco Metal:** Chassis.

Luscombe Engineering Co., 1020 S. Arroyo Pkwy., Pasadena, Calif., 15, MUrray 2-3386

**Cunningham:** Crossbar switches, scanners. **Diehl:** Servo motors, tachometers, resolvers. **Electric Specialty:** Motor alternators & generators. **Electro-Optical Inst.:** Kerr Cell cameras & accessories. **Julie:** Binary-Decimal resistance sets, resistors, voltage dividers, voltage current potentiometers. **Owen Labs.:** Transistor testers, strain gage power supplies, bridge balance systems, AC-DC voltage references. **Theta Instrument:** Synchro & Resolver bridges, phase generators, angular dividers, dial assemblies. **Voltron Products:** AC & DC voltmeters, frequency meters, voltage-frequency modulation meters.

McCarthy Associates, Inc., 1055 E. Walnut St., Pasadena, Calif., 15, MUrray 1-7411

**Cubic:** Digital systems. **Daytronic:** Differential transformers. **Emerson & Cuming:** Plastics. **John Fluke Mfg.** Meters, power supplies. **Hamner Electronics:** Nuclear test equip. **Hughes Aircraft:** Memory oscilloscopes. **Massa:** Recorders, rectilinear. **Millivac:** Voltmeters, amplifiers. **Sensitive Research Instrument:** Indicating instruments. **Sorensen:** Power supplies & regulators. **Wayne Kerr:** Precision measuring.

**California**

Nuriches Co., Paul, 2800 E. Foothill Blvd., Pasadena, Calif., 15, SYcamore 6-5822

**Aetna:** Servo resolvers. **Bliss Electronic:** Commutators & [illegible] **Carson:** Wire [illegible] **Conrad:** Magnetic Reed [illegible] **Gordon:** [illegible] **Molecular Electronics:** [illegible] **Motor-Response Meter. Pomona Electronics:** [illegible] Leads & Lab accessories. **Power Designs:** Transistorized power supplies. **Transistor Devices:** Packaged [illegible] **Vectrol Engineering:** [illegible] supplies. **Vectrol Engineering:** [illegible] units for [illegible] **Western Electronic Prods.:** [illegible] sters & Impedance [illegible]

Vaughan Co., G. H., 2800 E. Foothill Blvd., Pasadena, Calif., 15, MUrray 1-4511

**Brocker Labs:** Square wave generators, microwave power regulators. **Dynatran:** Transistor testers, millimeter meters. **Dytronics:** Phase meters, shifters, attenuators, band pass filters. **Industrial Instruments:** Bridges, automatic component testers, decade boxes. **Mid-Eastern Electronics:** Transistorized power supplies, bridges. **North Hills:** Constant Current supplies. **Pacific Electro-Kinetics:** LVDT Transducers, converters. **Solid State Electronics:** Transistorized oscillators & choppers, tone telemetry system.

Wesco Electronics, 1715 E. Colorado Blvd., Pasadena, Calif., 10 (NEDA)

Yarborough Sales Co., 192 E. Glenarm St., Pasadena, Calif., 15, MUrray 2-3331

**Accurate Specialties:** Alloys for semiconductors. **American Molded Prod.:** Nylon bobbins. **Glass-Tite Industries:** Hermetic Seals. **Noesting:** Special wire forms. **Semimetals:** Germanium single crystals. **Solid State Research:** Microwave ferrites. **Superior Steatite & Ceramic:** Coil forms & insulation. **Tang Industries:** Silicon single crystals. **Thermal Wire of America:** Teflon magnet wire & lead wire. **Thomas & Skinner:** Magnets, transformer laminations & wound cores. **Zierick Mfg.:** Solder terminals. **Zophar Mills:** Waxes & potting compounds.

**Redwood City**

Cerruti & Associates, 116 Cypress St., P.O. Box 509, Redwood City, Calif., 15, EMerson 9-3354

**Cubic Corp.:** Digital systems, amplifiers. **Data Technology:** Weighing systems. **Delta Design:** Temperature chambers. **Eldema:** Panel indicators. **Exact Eng.:** Gearheads & Electromechanical assemblies. **Induction Motors of Calif.:** Stepper motors, synchros & resolvers. **Lockheed Electronics:** Electronic ferrites. **Perkin Eng.:** Power supplies. **Spectrol:** Commutators, controls, converters, counters, dials. **Technique Assoc.:** Pyrometers. **Topatron:** Shielded Rooms. **Trio Labs:** Transistorized VM's, phasemeters, voltage comparators. **Westronics:** Strip chart recorders.

Heaton Co., James S., 413 Lathrop St., Redwood City, Calif., 15, EMerson 9-5278 (ERA)

Long & Associates, 505 Middlefield Rd., Redwood City, Calif., 15, 20, EMerson 9-3324

**Acoustica:** Ultrasonics. **Alto Scientific:** Consoles. **Breeze Ind.:** Slip rings. **Chicago Dynamics:** Rotary switches. **Erie-Pacific:** Counters, timers. **John E. Fast:** Capacitors. **Globe Ind.:** Motorized devices. **IRC-Circuit Insts. Div.:** Pots. **Miratel:** CCTV Monitors. **Phillips Controls:** Relays. **Riggs Nucleonics:** Beta Gamma Insts. **Trygon:** Power supplies. **Wacline:** Meters. **Warren Wire:** High temp. wire. **Winchester:** Connectors.

Marshall Co., G. S., 2015 El Camino Real, Redwood City, Calif., 15, EMerson 6-8214, Branch: San Marino, Calif.

Peninsula Associates, 1345 Hancock St., Redwood City, Calif., 15, EMerson 9-1226

**Ad-Yu:** Phase meters, delay lines, mag. amp. relays. **John Chatillon & Sons:** Force, thrust & torque gages, dynamometers. **Di/An:** Analog computers, simulators. **Itemco:** Environmental test. **Rapid Elec.:** Industrial rectifiers, cathodic protection systems. **Semi Elements, Inc.:** Single crystals. **Slaughter Co.:** Voltage leakage test sets. **Sonex:** Transistor testers, curve tracers, custom test equipment. **Trepac Co.:** Solid state relays. **Wallson Associates:** Diode & transistor test sets, power supplies and analyzers.

**Richmond**

Ramage & Miller, Inc., 3221 Florida Ave., Richmond, Calif., 5, 15, 25, BEacon 4-7061

**CWS Waveguide Corp.:** Waveguide components.

**Riverside**

Electronic Supply Riverside, Inc., 2486 3rd St., Riverside, Calif., 10 (NEDA)

**Kierulff Electronics, Inc., 6035 Magnolia Ave., Riverside, Calif., 5, 10, 15, 20, OVerland 6-7031, Branch: Los Angeles, Calif.**

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**Sacramento**

Neely Enterprises, 1317 15th St., Sacramento 14, Calif., 15, GIlbert 2-8901, Branch: North Hollywood, Calif.

White & Co., Sacramento, Calif., 15, ENterprise 1-0208, Branch: Palo Alto, Calif.

**San Carlos**

Dalton Assoc., C. R., 1037 Laurel St., P.O. Box 487, San Carlos, Calif., 15, LYtell 1-2654

**Aero Electronics:** Potentiometers. **Raymond Atchley:** Servovalves, amplifiers. **Christie Electric:** DC power supplies. **Control Switches:** Solenoid switches, rotary switches. **Dressen-Barnes:** DC power supplies. **Grant Pulley:** Chassis slides. **Holtzer-Cabot:** Industrial motors. **Kingston-Conley:** Industrial motors. **Ledex:** Rotary solenoids, stepping switches. **Leland-Ohio Electric:** Industrial motors. **Moran Instrument:** DC power supplies. **New England Laminates:** Phenolic paper & glass, epoxy paper & glass. **Pyronetics:** Explosive valves. **Valcor Engineering:** Solenoid valves. **Western Gear:** Motors, Gear Trains.

Eichorn & Melchior, Inc., 932 Terminal Way, San Carlos, Calif., 10, 15, LYtell 1-7383

**American Electronics:** Static power supplies, motor alternators, fractional hp motors, resolvers, servo & stepper motors. **Carborundum:** Kovar Metal, ceramics. **Connector Seals:** Hermetically sealed connectors. **Hevi-Duty:** Power, control & auto transformers, saturable reactors. **Industrial Prods-Danbury Knudsen:** Coaxial relays & switches, fittings, rf connectors. **Int. Rectifier:** Rectifiers, diodes, zeners, solar cells. **Lenz:** Single & multi-conductor cables. **R-B-M Controls:** Relays & contactors. **Stackpole Carbon:** Ferrite cores, permanent magnets, fixed & variable resistors, capacitors, slide switches. **Struthers-Dunn Inc.:** Relays & timers.

Hill Co., J. T., 1682 Laurel St., San Carlos, Calif., 10, 15, 20, LYtell 3-7693, Branch: San Gabriel, Calif.

Neely Enterprises, 501 Laurel St., San Carlos, Calif., 15, LYtell 1-2626, Branch: North Hollywood, Calif.

Pflieger Co., Inc., Robert L., 1652 Laurel St., San Carlos, Calif., 15, LYtell 1-0396 (ERA)

Roberts & Associates, Inc., 1560 Laurel St., San Carlos, Calif., 15, LY 3-7878, Branch: Los Angeles, Calif.

Ross Co., David H., 534 El Camino Real, San Carlos, Calif., 15, LYtell 1-4411

**Augat:** Tube clamps, transistor clips, test point jacks. **Bud Radio:** Cabinet racks, variable capacitors. **Cinema Engineering Div.:** Precision wirewound resistors, equalizers, attenuators, instrument switches, amplifiers, degaussers, toroids. **Comar:** Relays & solenoids, special coils. **Electric Mfg.:** Plastic molding. **Erie Resistor:** Ceramic capacitors, germanium diodes, deposited carbon resistors. **Fansteel:** Tantalum capacitors, silicon rectifiers, selenium rectifiers. **Foster Transformer:** Transformers & chokes. **Gavitt Wire:** Hook-up wire, loop antennas, cable harness & cordage. **Girard-Hopkins:** Oil capacitors. **Gremar:** UG connectors, coaxial & triaxial connectors. **LMB:** Aluminum & steel box chassis. **Lerco:** Turret lugs, stand-offs, knobs, eyelets, terminal boards. **Molon Motors:** Fractional H.P. motors. **Standard Electrical Prods.:** Variable transformers, automatic voltage regulators, rotary switches. **Switchcraft:** Plugs, Jacks, switches, connectors, cable assemblies. **Technical Appliance:** Parabolic & helical antennas, ruggedized yagi antennas. **Tru-ohm Div.:** Silicone coated wire-wound resistors, rheostats.

**San Diego**

Hamilton Electro Sales, 1862½ Bacon St., San Diego 7, Calif., 15, 20, ACademy 4-3451, Branch: Los Angeles, Calif.

Hill Co., J. T., 1864 Bacon St., San Diego, Calif., 10, 15, 20, ACademy 3-7133, Branch: San Gabriel, Calif.

Instruments For Measurements, 3150 El Cajon Blvd., San Diego, Calif., 15, JUniper 3-1972, Branch: Hollywood, Calif.

Luscombe Engineering Co., 3150 El Cajon Blvd., San Diego, Calif., 15, ATwater 3-2081, Branch: Pasadena, Calif.

Marshall Co., G. S., 3525 5th Ave., San Diego 3, Calif., 15, CYpress 8-8234, Branch: San Marino, Calif.

McCarthy Associates, Inc., 3460 Ingraham St., San Diego 9, Calif., 15, BR 4-1100, Branch: Pasadena, Calif.

Moxon Electronics Corp., 4434 Ingraham St., San Diego, Calif., 15, HUdson 8-2901, Branch: Beverly Hills, Calif.

Neely Enterprises, 1055 Shafter St., San Diego 6, Calif., 15, ACademy 3-8106, Branch: North Hollywood, Calif.

Nystrom Brothers Co., 2426 Fourth Ave., San Diego 3, Calif., 10 (NEDA)

O'Halloran & Associates, John Francis, 3949 Clairmont Dr., San Diego, Calif., 15, BRoadway 3-5500, Branch: North Hollywood, Calif.

Pacific Electro-Sales, Inc., P.O. Box 9344, Pacific Beach Station, San Diego, Calif., 15, BElmont 3-3341, Branch: Los Angeles, Calif.

Perlmuth Electronic Associates, P.O. Box 6077, San Diego 6, Calif., 10, 15, 20, ACademy 4-1717, Branch: Los Angeles, Calif.

Radio Parts Co., 2060 India St., San Diego 1, Calif., 10 (NEDA)

Roberts & Associates, Inc., 4379 Thirtieth St., San Diego, Calif., 15, AT 3-2149, Branch: Los Angeles, Calif.

Rupp Co., V. T., 3445 5th Ave., San Diego, Calif., 15, CYpress 8-9835, Branch: Los Angeles, Calif.

Southland Electronics, Inc., 3610 University Ave., San Diego 4, Calif., 10 (NEDA)

Telrad Electronics, 3453 University Ave., San Diego 4, Calif., 10 (NEDA)

**San Francisco**

Belchamber & French, 1485 Bayshore Blvd., San Francisco 24, Calif., 15, JUniper 6-0406

**Antenna Designs:** TV & FM antenna. **Colman Electronic Products:** Knobs, coils, kits, chemicals. **Electric Switch:** Mercury switches, time cycle controllers. **Oaktron Ind.:** Speakers. **Ohmite:** Rheostats, resistors, variable transformers, chokes, tap switches, tantalum capacitors, diodes, relays. **Pomona Electronics:** Patch cords, plugs, test sockets, cable assemblies. **Premax Products:** Marine antenna. **Standard Coil Prod.:** TV tuners.

Berman Co., E. L., 450 Ninth St., San Francisco 3, Calif., 15, UNderhill 3-0317

**Bogen-Presto:** Amplifiers, tuners, tape & disc recorders, PA systems. **Delevan:** Molded choke & variable inductor coils. **Elco:** Tube sockets & shields, connectors. **Gudeman:** Capacitors. **Hill Electronics:** Frequency sources, & crystals. **I.T. & T.:** Rectifiers, diodes. **Magnecraft:** Relays. **Mercury Transformers:** Transformers. **Radio Materials:** Disc capacitors. **Shure Brothers:** Microphones, cartridges & needles. **Solar Systems:** Solar cells, converters. **Ungar:** Soldering irons. **University Loudspeakers:** Hi-Fi & PA speakers. **Webster Mfg.:** Antennas, depth sounders, citizen band radios.

Brandt Co., E. W., 1122 Folsom St., San Francisco 3, Calif., 15, HEmlock 1-7710 (ERA)

Eber Electronic Supply, Inc., 2355 Market St., San Francisco 14, Calif., 10 (NEDA)

Edisco-Electronic Dist. Co., 5901 Mission St., San Francisco 12, Calif., 10 (NEDA)

Fortune Electronics, Inc., 1321 Mission St., San Francisco 3, Calif., 10 (NEDA)

Gray Co., Hugh, 2166 Market St., San Francisco 14, Calif., 15, KLondike 2-1777

**Bendix:** Voltage controlled oscillators, viscosity & density gauges. **Circo Ultrasonic:** Ultrasonic cleaners. **Del:** High voltage supplies & transformers. **Electronic Development:** DC to DC converters, voltage sources. **General Measurements:** Lab. instruments. **Hyten:** Attenuators, mixers, broadcast equip. **Missouri Research Lab:** Radar test equip. **North American Philips:** Magnet wire. **Quan-Tech:** Transistor power supplies, decade & isolation amplifiers. **Sage Electronic:** Power resistors.

King Engineering Co., 1878 Union St., San Francisco 23, Calif., 10, 15, WEst 1-2168, Branch: Los Angeles, Calif.

Koessler Sales Co., 676 Fulton St., San Francisco 2, Calif., 15, JOrdan 7-0622, Branch: Los Angeles, Calif.

Lebell-Warren Associates, 1485 Bayshore Blvd., San Francisco 24, Calif., 15, JU 6-7711

**Austin Craft:** Battery holders, clips. **Beede Electrical Instrument;** Panel meters, ammeters, voltmeters. **Chicago Condenser:** Capacitors. **Phalo Plastics:** Wire & Cable. **Premier Metal Prods.:** Cabinets. **Herman H. Smith:** Electronic Hardware. **United Transformer:** Transformers, filters, high Q coils, reactors, magnetic amplifiers.



# Distributional Functions



Logan Sales Co., 150 8th St., San Franciso 3, Calif., 15, HE 1-0692

**ATR:** Inverters & vibrators. **Centralab:** Cap. switches, controls. **Calif. Chassis:** Cabinets & racks. **Cletron:** Speakers, duotone-needles. **Globe:** Relays. **E. F. Johnson:** Pilot lights, RF components. **Lectrohm:** Resistors. **Lyn-Tron:** Hardware. **J. W. Miller:** Coils. **U.S. Components:** Connectors.

Logan & Stone Co., 1485 Bayshore Blvd., P.O. Box 107, San Francisco 24, Calif., 15 DElaware 4-1200

**CTS:** Variable resistors. **Continental Connector:** Connectors. **General Instrument:** Semiconductors. **Illumitronic Eng.:** Plastics. **International Resistance:** Resistors. **Micamold:** Capacitors. **Radio Receptor:** Selenium rectifiers. **Trolex:** Rotary switches.

Meyer & Ross, 113 Tenth St., San Francisco 3, Calif., 15, HEmlock 1-0652

**Aerovox:** Cacapictors, resistors. **Argos Prods:** Baffles. **Audiotex:** Hi Fi cables & accessories. **Audio Devices:** Recording tape discs. **Electro-Voice:** Microphones, cartridges, needles, sound equip. **Marantz:** Amplifiers & preamplifiers. **Viking of Minneapolis:** Tape decks, amplifiers. **Walsco:** Chemicals.

Moulthrop Co., F. W., 575 Tenth St., San Francisco 3, Calif., 15, MArket 1-0722 (ERA)

Moulthrop & Hunter, 165 11th St., San Francisco 3, Calif., 15, UNderhill 3-7880 (ERA)

Nott & Co., L. A., 1061 Howard St., San Francisco 3, Calif., 15, HEmlock 1-4738

**Alac:** Hardware. **Allied Research & Eng.:** Electroforming. **Automatic Metal Prods:** Coax connectors. **Electramics:** Capacitors. **Midland Mfg.:** Quartz crystals. **Phaostron:** Panel Meters. **Premier Inst.:** Microwave plumbing. **Radio Development & Research:** Transistor. **Sangamo:** Capacitors.

Pacific Wholesale Co., 1850 Mission St., San Francisco 3, Calif., 10 (NEDA)

Purdy Co., William J., 312 Seventh St., San Francisco 3, Calif., 15, UNderhill 3-3300

**Allied Control:** Relays. **Amco Engineering:** Modular cabinets. **Amperex:** Transmitting, special purpose tubes, diodes, transistors. **Ashland Electric Prod.:** Motors, blowers. **Bourns Labs.:** Precision miniature potentiometers, trimpots. **Thomas A. Edison:** Time delay relays, thermostats. **Ferroxcube:** Ceramic ferrite materials, toroids, cup cores, rods, recording heads. **Littelfuse:** Fuses, circuit breakers. **Metal Textile:** R. F. Shielding materials, gaskets. **Simpson:** Panel meters, meter relays. **Sprague:** Ceramic, paper, electrolytic & transmitting mica capacitors, pulse transformers, pulse forming networks, noise filters, resistors, magnet wires, transistors.

Radio Parts Supply Co., 281 Ninth St., San Francisco 3, Calif., 10 (NEDA)

San Francisco Radio & Supply Co., 1282-84 Market St., San Francisco 2, Calif., 10 (NEDA)

Sinai-Johnson Inc., 845 Jessie St., San Francisco 3, Calif., 15

**Arco Capacitors, B & K Mfg., Birnbach Radio, Consolidated Wire, I.H. Mfg., Waldom Electronics, Weller.**

Smith & Co., Inc., Harold G., 1645 Market St., San Francisco 3, Calif., 10 (NEDA)

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Sodaro Co., 329 Clay St., San Francisco 11, Calif., 15, DOuglas 2-0616, Branch: Culver City, Calif.

Strassner Co., Ellard E., 1485 Bayshore Blvd., San Francisco 24, Calif., 15, JUniper 6-7711, Branch: Los Angeles, Calif.

Wresco, 1116 Folsom St., San Francisco 3, Calif., 10 (NEDA)

Zack Electronics, 1424 Market St., San Francisco 2, Calif., 10 (NEDA)

**San Gabriel**

Hill Co., J. T., 420 S. Pine St., San Gabriel, Calif., 10, 15, 20, ATlantic 7-9633

**Adage:** Voltage to digital converters, decimal & binary. **Associated Engineering:** Connecting leads. **Curtiss-Wright:** Thermal time delay relays, solid state relays, stepping motors, rotary solenoids, ultrasonic delay lines. **Du Mont Lab.:** Oscilloscopes, cameras, pulse generators, VTVM's. **Dynamics Inst.:** DC & AC amplifiers, electronic filters. **E-H Research:** Pulse generators, electrometers, transistor rise & fall time meters. **Edgerton, Germeshausen & Grier:** Scopes, hydrogen thyratrons, xenon flash tubes. **Norwood Unit-Detroit Controls:** Strain gage pressure transducers. **Scientific-Atlanta:** Antenna plotters, positioners, towers. **Sperry Microwave:** Frequency, impedance, power & attenuation measurement, klystron power supplies, peak power meters, SWR indicators, microwave solid state devices, field test sets. **Technibilt:** Scope carts, electronic & industrial handling equip. **Tru-Connector:** RF coaxial & waveguide connectors. **United Electronics:** High vacuum & gas filled diodes & triodes, vacuum capacitors. **Waters Mfg.:** Miniature precision potentiometers, shaft locking devices, tunable coil forms, 3" rack mounting oscilloscope.

Rissi, Al. J., 8417 E. Las Tunas Dr., San Gabriel, Calif., 15, CUmberland 3-7614

**Aerovox:** Capacitors, resistors, decade boxes. **Austin-Craft:** Battery holders. **Birnbach:** Wire, cable, tubing, hardware. **R. L. Drake:** High & low pass filters, sideband receivers. **Hamilton-Hall:** Resistors. **Pomona Electronics:** Patch cords, cable assemblies, test socket adapters, single & double plugs. **Premier Metal Prod.:** Consoles. **Utah Radio & Electronics:** Speakers, baffles, and enclosures.

**San Jose**

Peninsula Electronic Supply, 656 S. First St., San Jose 13, Calif., 10 (NEDA)

Quement Electronics, 161 W. San Fernando St., San Jose, Calif., 10 (NEDA)

Schad Electronic Supply, Inc., 499 S. Market St., San Jose 13, Calif., 10 (NEDA)

**San Marino**

Marshall Co., G. S., 2065 Huntington Dr., San Marino, Calif., 15, MUrray 1-6781

**California**

Beckman Systems Div.: [illegible] Electric Indicator Co.; Electro-Physics Labs: [illegible] Helipot Div., Beckman; [illegible] Industrial Electronic Engineers; Electro Research Corp.: [illegible] International James Knights Co.: [illegible] Mexico, Inc.; [illegible] F. L. Moseley Co.; [illegible] NJE Corp.; [illegible] Non-Linear Systems: [illegible] Penta Labs; [illegible] Potter & Brumfield; [illegible] Schmit Engineering Co.; [illegible] Solid State Products: [illegible] Tensolite Insulated Wire; [illegible]

**San Mateo**

Harriss-Koethe Sales Co., 24 E. Hillsdale Blvd., San Mateo, Calif., 15, FIreside 1-2009

**Carter Parts:** Plastic racks. **Cherry Elect. Prod.:** Snap-action switches. **Grigsby:** Rotary switches. **J-B:** Transformers. **Molectronics:** Socket relay checkers. **Micamold:** Capacitors. **Radio Receptor:** Silicon & selenium rectifiers. **Seco Electronics:** Tube checkers. **Utah Radio & Electronics:** Speakers.

Luscombe Engineering Co., 130 N. B St., San Mateo, Calif., 15, DIamond 2-7057, Branch: Pasadena, Calif.

Moxon Electronics Corp., 15 41st Ave., San Mateo, Calif., 15, FIreside 5-7761, Branch: Beverly Hills, Calif.

Sinai-Johnson, Inc., 895 W. Hillsdale Blvd., San Mateo, Calif., 15, FIreside 5-5084, Branch: San Francisco, Calif.

**San Rafael**

Abbett Co., E. B., 345 Francisco Blvd., San Rafael, Calif., 10 (NEDA)

**Santa Ana**

Airtronic Sales, Inc., 2685 Halladay St., Santa Ana, Calif., 10 (NEDA)

**Santa Barbara**

Dalton Assoc., C. R., 1233 State St., Santa Barbara, Calif., 15, WOodland 2-0300, Branch: San Carlos, Calif.

**Santa Monica**

Wesco Sales Co., 2837 Wilshire Blvd., Santa Monica, Calif., 15 (ERA)

**Santa Rosa**

Space Communication, Inc., Tel Electro Consulting Div., 2331 Fourth St., Santa Rosa, Calif., 15, 20, LIberty 2-7857

**Action:** Inter-coms. **Adler:** TV translators. **Budelman:** Microwave. **Creed:** Teleprinters. **Foto-Video:** Closed circuit TV. **Intelex:** Teleprinters. **Lorenze:** Teleprinters. **Varioplex:** Dial systems.

**Sherman Oaks**

Barron Co., Bert, 15166 Ventura Blvd., Sherman Oaks, Calif., 15, STate 4-7800

**Adams-Russell:** Telemetry diplexer, tunable cavity filters, power dividers, transmitting antennas. **Cleveland Container:** Phenolic tubing. **Davis Electric:** Relays. **Jettron Prod.:** Electronic tube sockets, magnetron connectors. **Permonite:** Hardware. **TELvision Labs:** TV yokes. **Warren Wire:** Teflon wire & cable.

Components Sales California, Inc., 4626 Van Nuys Blvd., Sherman Oaks, Calif., 15, STate 8-4550

**Computer Insts.:** Precision film potentiometers & pressure transducers. **Digitronics:** Perforated tape readers & digital indexing clutches. **General Devices:** Mechanical & electronic sampling switches, subcarrier oscillators, multi-channel telemetry systems. **Metron Inst.:** Miniature fixed & variable speed changers, tachometers. **Millitest:** Precision indexing head, null indicator, resistance deviation bridge. **Precision Mechanisms:** Servo breadboards.

Mitchell Co., C. H., 13804 Ventura Blvd., Sherman Oaks, Calif., 15, TRiangle 3-4874

**Aerolite:** Hardware & Components. **Anchor Metal:** Solder. **Alpar Mfg.:** Aluminum towers. **Components Corp.:** Toroidal coil applications, band pass filters, transformers, magnetic amplifiers, saturable reactors. **Illinois Condenser:** Capacitors. **Herb Kreckman:** Ground antennas. **Kurman:** Relays. **Maryland Ceramic & Steatite:** Lava parts, hard plastic bobbins. **Oryx:** Soldering irons. **Petersen Radio:** Crystals. **Pipestone Sales:** Towers. **Rogan Bros.:** Knobs.

**South Gate**

Mac's Radio Supply, 8320-22 Long Beach Blvd., South Gate, Calif., 10 (NEDA)

**South Pasadena**

Emmet Co., Frank A., 1810 Fair Oaks Ave., South Pasadena, Calif., 15, MUrray 2-3721

**American Semiconductor:** Diodes & regulators. **American Television & Radio:** Vibrators. **Bodnar:** Plastic lighting plates. **Glaseal Prods.:** Headers, connectors, terminations. **Imtra:** Stepping switches, storage drums. **Lumen:** Magnetic amplifiers, position indicator systems. **Phaostron:** Meters, relays, resistors. **Radio Industries:** IF transformers, coils & capacitors. **Reon Resistor:** Variable resistors & potentiometers. **Rohn:** Towers & accessories. **Staver:** Tube shields. **Times Wire & Cable:** Wire, coaxial cable. **U. S. Components:** Connectors. **Wright Electronics:** Ovens, crystals.

Osborne, R. E. (Dick), 1757 Garfield Ave., South Pasadena, Calif., 15, MUrray 2-3175

**Globe Electrical:** Relays. **International Rectifier:** Semi-conductors. **J. W. Miller:** R. F. Coils. **Philmore Mfg.:** Components—Kits.

**Stockton**

Dunlap Electronics, Inc., 27 S. Grant St., Stockton, Calif., 10 (NEDA)

**Studio City**

**Kierulff Electronics, Inc., 12123 Ventura Blvd., Studio City, Calif., 5, 10, 15, 20, POplar 3-7315, Branch: Los Angeles, Calif.**

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**Sunnyvale**

Avnet Corp. of Northern California, 1262 N. Lawrence Stn. Rd., Sunnyvale, Calif., 10, REgent 6-0300, Branch: Los Angeles, Calif.

Instruments For Measurements, 251 S. Murphy Ave., Sunnyvale, Calif., 15, REgent 6-8680, Branch: Hollywood, Calif.

Theisner & Co., William, 405 S. Sunnyvale, Sunnyvale, Calif., 15, REgent 9-6460

**Belleville-Hexem:** D.C. Test instruments. **Burr-Brown:** Amplifiers. **Lindgren & Assoc.:** Screen rooms. **McKenna Labs.:** Ultrasonic Cleaning. **Mid-Eastern Electronics:** Power supplies & resistance stds. **Navigation Computer:** Digital systems. **Northeast Scientific:** Hi Voltage power supplies.

**Van Nuys**

Kennematt Co., The, 14637 Bessemer St., P.O. Box 2007, Van Nuys, Calif. 15, STate 5-1503

**All American Tool & Mfg.:** Vibration testing equip. **Audio Instrument:** Logger amplifiers, intermodulation measuring equip., protectors, bridges, magnetic tape delay units, miniature preamplifiers, condenser microphones. **Baird-Atomic:** Counting tubes, Direct read-out tubes. **Circo Ultrasonic:** Ultrasonic cleaning. **Dyna-Empire:** Gaussmeters, demagnetizers, hydrophones. **Embree Electronics:** Analog computers, chopper & operational amplifiers. **Intercontinental Dynamics:** Random signal generator. **Kay Electric:** Sweeping oscillators, frequency markers, noise generators, carrier generators, sound & vibration analysis equip., video amplifiers, attenuators, transistor test equip. **Matthew Labs.:** DC power supplies. **The Newton Co.:** Differential switches, digital shaft pulsers, filters, DC amplifiers. **Herman H. Sticht:** Megohmeters, wheatstone bridges, tachometers, vibrating reed frequency meters. **Unholtz-Dickie:** Vibration test.

Tim-Co Sales, 6845 Louise Ave., Van Nuys, Calif., 15, DIckens 4-7803

**Analogue Controls:** Precision potentiometers. **Electronic Transistors Corp.:** Transistors. **General Applied Science Labs.:** Pulse generators. **National Resistance Corp.:** Precision wirewound resistors. **Sterling Transformer:** Transformers. **WacLine Inc.:** Panel meters & indicators.

**West Covina**

Podolece Sales Co., W. M., 315 N. Leland Ave., West Covina, Calif., 15, EDgewood 7-8146 (ERA)

**Woodland Hills**

Van Groos Co., 21051 Costanso St., Woodland Hills, Calif., 15, DI 0-3131

**Belleville-Hexem:** EIR meters. **Bird Electronic:** UHF power measure, RF impedance measure. **Boonton Radio:** Sig. generators. **Electro-Logic:** Digital meters, low-level transponders. **Emcor:** Modular cabinetry. **Krohn-Hite:** Low freq. osc., filters, high reg. power supplies. **Markline:** Chassis slides. **McLean Engineering Labs.:** Cooling equip., fans, blowers. **Northeastern Eng.:** Counters, printers. **Osborne:** Volt dividers. **Shallcross:** Resistors & switches, bridges, decades. **Smith-Florence:** Potentiometric voltmeters, cable fault-finders. **Specific Prods.:** Speed chassis, WWV receivers.

## COLORADO

**Aurora**

Golliher, W. B., 1559 Chester St., Aurora 8, Colo., 15, EMpire 6-0208

**Globe:** Ham and two-way communications equip. **Hy-Gain Antenna Prods:** Antennas. **Perma Power:** Radio control door openers. **Pomona Electronics:** Electronic test. **Rayline:** Solder. **Rohn Mfg.:** Communications towers. **Saxton:** Wire & cable. **Walsco:** Radio chemicals, tools & hardware.

**Colorado Springs**

D & M Electronic Supply, 717 N. Weber St., Colorado Springs, Colo., 10 (NEDA)

Peyser & Co., 1501 N. Weber, Colorado Springs, Colo., 15, MElrose 4-3401

**Astron:** Capacitors. **Columbia Wire & Supply:** Wire & cable. **Grigsby:** Switches & electrical devices. **Gerald K. Heller:** Motor controls. **Hurst Tool & Mfg.:** Synchronous motors. **Methode:** Sockets & printed circuits. **Microtran:** Miniature transformers. **Phaostron:** Meters. **Sarkes Tarzian:** Rectifiers, silicon & selenium. **Thermal Wire of America:** Teflon magnet wire. **Terado:** Micro relays. **Utah Radio:** Speakers, baffles.

**Denver**

Bowen Co., Inc., R. G., 721 S. Broadway, Denver 9, Colo., 15, RAce 2-4641

**Amphenol-Borg, Audio Devices, Bud Radio, Chicago-Standard Transformer, Fidelitone, Harman-Kardon, Jensen Mfg., J. W. Miller, Potter & Brumfield, Raytheon, Howard W. Sams, Simpson Electric, Sprague Electric, Webcor.**

Cluphf & Assoc., Stan, 75 S. Cody St., Denver 15, Colo., 15, BElmont 3-6025 (ERA)

Connors Co., W. H., 375 Birch St., Denver, Colo., 15, DExter 3-7628

**Aerovox, Astatic, Clarostat, James Electronics, Merit Coil & Transformer, Seco, Vocaline, Waldom Electronics., Ward Prods., Weller Elec.**

Electronic Parts Co., 20 West 13th Ave., Denver 4, Colo., 10 (NEDA)

Fistells Electronic Supply Co., 1001 Bannock St., Denver, Colo., 10 (NEDA)

French Co., Gene, 1480 Hoyt St., Denver 15, Colo., 15, MAin 3-1458, Branch: Albuquerque, N.M.

Hyde Electronics Co., 888 S. Lipan St., Denver 23, Colo., 15, WEst 6-3456

**Advance:** Relays. **Alpha:** Wire & cable. **Avco. Bliley:** Crystals & delay lines. **Bourns:** Precision potentiometers. **Carter Motor:** Frac. h.p. motors. **Curtiss-Wright:** Solid state relays, transducers. **Dialight:** Pilot light assemblies. **Electro Products. Franklin. General Inst.:** Diodes & rectifiers. **GOE Engineering:** Terminals, hardware. **Hughes Aircraft:** Special purpose tubes. **Industrial Timer:** Timers. **Industro Transistor:** Transistors. **JVM. Ledex:** Rotary solenoids, switches, digital motors. **Marion Inst.:** Panel meters. **Metrolog. Molectronics. National Radio:** Knobs, dials, chokes. **Oxford Electric:** Loudspeakers. **Pyramid Electric:** Capacitors. **Quan-Tech. Radiation Counter Labs. Resistance Prod:** Resistors. **Rohde & Schwarz. Sanders Assoc.:** Flexprint cabling and circuits. **Schaevitz. Technique Assoc. Thordarson-Meissner:** Transformers & coils. **Unimax:** Snap-action. **U. S. Components:** Connectors. **Welwyn:** Small resistors.

Hytronic Measurements, Inc., 1295 S. Bannock St., Denver 23, Colo., 15, PEarl 3-3701 (ERA)

Koether-Cox Co., The 1325 S. Inca St., Denver 23, Colo., 15, PEarl 3-5561

**Amco Engineering, Electro-Mechanical Instrument, P. R. Mallory, Herman H. Smith, Inc., Technical Appliance Corp., Ungar Electric Tools.**

Longstreet-Smith Assoc., Inc., 1013 15th St., Denver, Colo., 15, KE 4-5091 (ERA)

McLloud & Raymond Co., 5403 E. Evans, Denver 22, Colo., 15 SKyline 6-1589

**British Industries. Centralab. Eitel-McCullough. Elco. Gavitt Wire. General Transistor. E. F. Johnson. Littelfuse. Microdot. Ohmite. Polarad. Reeves Soundcraft. Triad Transformer. Standard Rectifier. Wyco Metal Prods.**

Nelson Co., 710 E. Louisiana Ave., Denver 10, Colo., 15, PE 3-5528 (ERA)

Pearson & Co., Mel, 1860 S. Acoma St., Denver 23, Colo., 15, SPruce 7-7878

**Amperex:** Electronic tubes, semiconductors. **High Fidelity:** Components, commercial sound equip. **North American Philips.**

Terry & Co., Ward, 70 Rio Grande Blvd., P.O. Box 869, Denver 1, Colo., 10 (NEDA)

Walker Radio Co., L. B., 300 Bryant St., Denver 19, Colo., 10 (NEDA)



# Distributional Functions



Williams & Associates, Inc., 2261 S. Albion St., Denver 22, Colo., 15, SKyline 6-9403 (ERA)

**Baldwin-Lima-Hamilton:** Strain gages. **Beckman/Berkeley:** E-put meters & counters. **Cannon:** Plugs & connectors. **Dressen/Barnes:** Power supplies. **Empire Devices:** Noise & field intensity meas. devices. **Erie:** Resistors & capacitors. **Globe:** Motors, miniaturized. **Helipot:** Potentiometers. **Int'l Rectifier:** Rectifiers. **Kin Tel:** Amplifiers & closed circuit TV. **S.I.E.:** Voltmeters. **Sanborn:** Recorders. **Sierra Electronics:** Line fault analyzers, frequency selective voltmeters. **Sigma:** Relays.

**Englewood**

Gates Co., F. Y., 3395 S. Bannock, Englewood, Colo., 15, SUnset 1-8566, Branch: Salt Lake City, Utah

**Greeley**

Moss Electronics, Inc., Gordon, 1530 13th Ave., Greeley, Colo., 10, 15, ELgin 3-1452

**Allied Decals:** Name plates. **Alphaloy:** Solders, fluxes, alloys. **Atlas Sound:** Public address & paging speakers. **Augat:** Component clamps. **B.F.C.:** Steel shelving. **F. W. Bell:** Gaussmeters. **Bell Sound Div.:** Public address amplifiers, hi fidelity amplifiers, tape recorders. **Continental Carbon:** Resistors, slide switches, wire wound controls. **Cornell-Dubilier:** Fixed capacitors, vibrators, converters. **Cousino:** Continuous play tapes. **Fanon Electronic Sales:** Intercoms. **Forest City Prod.:** Molded rubber, urethane foams, metallized sheet mylar. **General Industries:** Fractional horsepower motors. **Hickok:** Electronic test equip., panel meters. **Manger Electric:** Custom wire-stripping. **Premax Products:** Industrial marking equip., communication & police antennas. **Rek-O-Kut:** Record turntables, arms, speakers, disc recording equip. **Switchcraft:** Lever & push switches, plugs, jacks, cables. **Turner:** Microphones. **Ward-Leonard:** Wire wound resistors, controls, relays, rheostats. **Worner Electronic Devices:** Photo-electric relays, counters.

**Lakewood**

Inland Associates, 1480 Hoyt St., Lakewood, Colo., 15, BElmont 7-6681, Branch: Mission, Kan.

**Pueblo**

Walker Radio Co., L. B., 100 N. Victoria Ave., Pueblo, Colo., 10 (NEDA)

## CONNECTICUT

**Andover**

Seyd, Ernest, 5, Long Hill Rd., Andover, Conn., 15, (ERA)

**Berlin**

White Sales Co., Inc., P.O. Box 122, Berlin, Conn., 15, BAldwin 4-0423, Branch: Needham, Mass.

**Bridgeport**

Electrical Supplies, Inc., Park & Railroad Avenues, Bridgeport, Conn., 10, EDison 6-2535, Branch: Hartford, Conn.

Representatives Corp., The, 797 Washington Ave., Bridgeport, Conn., 15, EDison 5-6772, Branch: Boston, Mass.

Westconn Electronics, 195 Colorado Ave., Bridgeport, Conn., 10 (NEDA)

Yeweil Associates Inc., 1101 E. Main St., Bridgeport, Conn., 15, FOrest 6-3456, Branch: Burlington, Mass.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

**Canaan**

Hathaway Electronics, Inc., Glenn M., Ducillo Bldg., Canaan, Conn., 15, TAylor 4-7215, Branch: Cambridge, Mass.

**Danbury**

Kaelber & Mack, 11 Ridge Rd., W. Ter., Danbury, Conn., 15, PIoneer 8-7677, Branch: Manhasset, N.Y.

**Fairfield**

Akeroyd, Arthur E., P.O. Box 84, Fairfield, Conn., 15, EDison 3-6252, Branch: Chestnut Hill, Mass.

**Greenwich**

Hammond Inc., John S., 34 Lincoln Ave., Greenwich, Conn., 15, NOrmandy 1-9410

**Carlton Aviation Co.:** Switches, Transducers, Vacuum & Pressure Relief Valves, Pressure Regulating Valves. **Hamlin, Inc.:** Switches, Potentiometers, Relays.

**Guilford**

Whitehead & Co., The John F., P.O. Box 177, Guilford, Conn., 15, GL 3-3855 (ERA)

**Hamden**

DeVeer Sales Engineering Co., Inc., 1165 Dunbar Hill Rd., Hamden, Conn., 15, ATwater 8-4842, Branch: Needham, Mass.

Eltron Engineering Sales Co., Inc., 2345 Whitney Ave., Hamden, Conn., 15, ATwater 8-9276, Branch: Newtonville, Mass.

Purinton, Inc., Richard, 2647 Whitney Ave., Hamden, Conn., 15, CHestnut 8-4260, Branch: Lexington, Mass.

**Hartford**

Coldwell, Inc., Michael S., 289 Fairfield Ave., Hartford 6, Conn., 15, JAckson 2-5832 (ERA)

Electrical Supplies, Inc., 225 Walnut St., Hartford 1, Conn., 10, JAckson 7-7111

**Alpha Wire — Amphenol — Cinch-Jones — Clarostat — Cornell Dubilier — Gen. Transistor — Mallory — Ohmite — Potter-Brumfield — Premier Metal — Sarkes Tarzian — Simpson: Meters — Sola — Superior Elec. — Thordarson — UTC: Transformers — Westinghouse: Tubes — Weston: Meters.**

Instrument Associates, Inc., 734 Asylum Ave., Hartford 6, Conn., 15, CHapel 6-5686, Branch: Arlington, Mass.

Sceli Electronics, Inc., 78 Maple Ave., Hartford 14, Conn., 10 (NEDA)

**Kensington**

Modern Radio Supply Co., 1224 Farmington, Kensington, Conn., 10 (NEDA)

California
Colorado
Connecticut

**Manchester**

MacDonald-Wadman Co., Inc., Manchester, Conn., 15, Mitchell 3-5514, Branch: Newton Upper Falls, Mass.

**Meriden**

Lavin Associates, Inc., Henry, P.O. Box 196, Meriden, Conn., 15, BR 7-3527

Dage Electric: RF [illegible] Electronics Co.: G-L Electronics: Mallory Controls: [illegible] Phaostron: Panel Meters. Plastic Capacitors: [illegible] Premier Metal: [illegible] Radio Materials Corp.: [illegible] Resin Industries. Insulation Sleeving. Silicon Transistor: Semiconductor. Torotel: [illegible] Filters.

**Milford**

Drew Associates, Inc., P.O. Box 432, Milford, Conn., 15, UNiversity 3-4215, Branch: Bedford, Mass.

**New Haven**

Ammrad Co., 834 Grand Ave., New Haven 11, Conn., 10, UN 5-4508

**Aerovox, Belden, Clarostat, Cletron, EICO, IRC, IT&T, Littelfuse, Merit, Radiart, Tung-Sol, Union Carbide, Webster Elec., Weller, Xcelite.**

Boeing Co., Inc., John E., 265 Church St., New Haven 10, Conn., 15, STate 7-0115, Branch: Lexington, Mass.

Broger Instrument Sales Co., Inc., 31 Broadway, P.O. Box 2017, New Haven Conn., 15, SPruce 7-6279, Branch: Brookline, Mass.

Equipment Sales Co., Inc., P.O. Box 6098, New Haven 17, Conn., 10, CHestnut, 8-5581

**American Machine & Foundry:** Spin testers, centrifuges. **Avco, Res. & Advanced Dev.:** Shock machines, acoustic noise generators, plasma generators. **Chadwick-Helmuth:** Electronic & strobe synchronizers. **Columbia Research:** Accelerometers, shock & vibration monitoring, cathode followers. **Int'l. Radiant:** Environmental **Larson Instrument:** Inkless recorders, contact meters. **Lindgren:** RF screen rooms. **MB:** Vibration test.

Gerber Sales Co., Inc., P.O. Box 2017, New Haven, Conn., 15, SPruce 7-6279, Branch: Brookline, Mass.

Radio Shack Corp. of Conn., 230 Crown St., New Haven, Conn., 10, STate 7-7121, Branch: Boston, Mass.

**New London**

Aikins Electronic Suppliers, Inc., 531 Broad St., New London, Conn., 10 (NEDA)

**Newtown**

Milo Electronics Corp., 18 Button Ball Dr., Newtown, Conn., 10, GArden 6-2546, Branch: New York, N.Y.

Sales Engineering Co., Sugar Lane, Newtown, Conn., 15, GArden 6-4434

**Airtron:** Waveguide. **Bristol Motors:** Motors, timers, gear trains, elapsed time indicators, time delay relays. **Hugh H. Eby:** Sockets, tube shields, binding posts, terminal strips, jacks, plugs & connectors. **Electro Autolite:** Name plates. **Guardian:** Relays, solenoids, switches, controls. **Howard Industries:** Motors, gear reducer units. **International Resistance:** Poly-strip cable, printed wiring cable. **Johnson & Hoffman:** Transistor stampings, [illegible] miniature parts. **M.E.C.:** Miniature electrolytic capacitors. **National Semiconductor:**

*(Listing continued on page 718)*

PNP silicon alloy transistors, NPN silicon mesa transistors. **Philadelphia Insulated Wire:** Insulated wire and cable. **Precision Metal Prod.:** Terminals, rack & panel handles. **Richmond Engineering:** Transformers, dc reactors or chokes, ac reactors. **Sealectro:** Feed thrus, stand offs, jacks, plugs, sub-miniature r.f. connectors.

**Norwalk**

Light Metals Associates, Inc., P.O. Box 936, Norwalk, Conn., 15, VI 7-2750

**Standard Metals:** Microwave tubing, laminated slip rings & contacts.

**Norwich**

Aikins Electronic Suppliers, Inc., 98 Water St., Norwich, Conn., 10 (NEDA)

**Ridgefield**

Abbett & Hustis, P.O. Box 52, Ridgefield, Conn., 15, IDlewood 8-3200, Branch: Needham, Mass.

**Riverside**

Palioca, Inc., Wayne B., P.O. Box 78, Riverside, Conn., 15, NEptune 7-3766, Branch: Lexington, Mass.

**Stamford**

Electronic Applications, Inc., 194 Richmond Hill Ave., Stamford, Conn., 5, DA 5-1575

**AKG, Vienna:** Microphones, headsets. **EMT:** Prof. audio & industrial test equipment. **Klar & Bellschmidt:** Ceramic hardware. **NAGRA:** Prof. audio and recorders. **Schomandl:** Active/passive frequency decades. **Siemans & Halske:** Communications & industrial test equip.

**Sun Radio & Electronics Co., Inc., 308 Bedford St., Stamford, Conn., 10, 15, DAvis 5-4336, Branch: New York, N.Y.**

**See ad on page 748**

**Stratford**

Instrument Dynamics, Inc., 2385 Main St., Stratford, Conn., 15, DRexel 8-0435, Branch: Wakefield, Mass.

**Tolland**

Stockwell Technical Sales Co., P.O. Box 118, Tolland, Conn., 15, TRemont 5-5414

**Bentley Harris Mfg.:** Insulated sleevings and tubing. **Globe Industries:** AC and DC motors, fans, blowers, clutches, gear units, actuators, accelerometers.

**Trumbull**

Perron & Co., Inc., Ray, 36 Louis St., Trumbull, Conn., 15, AMherst 8-9631, Branch: Boston, Mass.

**Wallingford**

Adams-McGregor Associates, 16 Ridgewood Circle, Wallingford, Conn., 15, CO 9-5816, Branch: Lincoln, R.I.

New England Area Representatives, Inc., (NEAR, Inc.), P.O. Box 184, Yalesville, Wallingford, Conn., 15, COlony 9-9932, Branch: Somerville, Mass.

**Waterbury**

Bond Radio Supply, Inc., 439 W. Main St., Waterbury 2, Conn., 10 (NEDA)

Laurel Electronics, Inc., 25 Hill St., Waterbury 6, Conn., 10 (NEDA)

**Watertown**

Gray, Inc., Robert W., 47 De Forest St., Watertown, Conn., 15, CRestwood 4-2363, Branch: Wellesley, Mass.

**West Hartford**

Hatton & Co., Arthur T., 1000 Farmington Ave., West Hartford 7, Conn., 15, AD 3-3613

**Barton Electronics:** Classifiers. **Capitol Machine:** Switches. **Hopkins Eng.:** Capacitors. **Owen Labs.:** Power supplies. **Panduit:** Ducts. **Penn Resistor:** Resistors. **Schmit Eng.:** Machines.

Pettigrew & Co., Inc., R. S., 10 N. Main St., West Hartford 7, Conn., 15

**Advanced Vacuum Prod.:** Hi temp metallized ceramics & glass seals. **Cadre Industries:** Wire Harnesses. **Cleveland Container:** Coil-forms, paper tubes. **Furane:** Epoxy resins & adhesives. **Hammarlund:** Variable capacitors, ham receivers, remote tone control gear. **Malco:** Stamped terminals, solder lugs. **Sheffco Mfg.:** Stampings. **Sibley:** Printed circuitry, code discs, flush commutators.

Todino Engineering Sales, Inc., 1007 Farmington Ave., West Hartford 7, Conn., 15, ADams 2-9532, Branch: Needham Heights, Mass.

**Westport**

Nief Assoc., P. W., 8 Oak St., Westport, Conn., 15, CApital 7-3834 (ERA)

**Woodbridge**

Bahr Sales Co., Spring Valley Rd., Woodbridge, Conn., 15, FUlton 7-8712

**Atlantic Transformer:** Transformers. **Gavitt:** Wire & cable. **Jeffers Electronics:** Coils. **Secon:** Precious metal wire. **Speer:** Carbon resistors. **Trolex:** Rotary switches. **Wirecraft:** Teflon wire.

## DELAWARE

**Newark**

Carmine Co., Ferrell S., 14 Knickerbocker Dr., Newark, Del., 15, ENdicott 8-7603 (ERA)

**Wilmington**

Delaware Electronics Supply Co., Inc., 220 W. 4th St., Wilmington 1, Del., 10, OLympia 4-7932

**Alpha Wire, Amphenol, Burgess Battery, CBS, Conant, Eby, Elco, Electro-Voice, Elmenco, Good-All, Hoyt, Int. Resistance, Jackson, E. F. Johnson, Kester Solder, Krueter, Littelfuse, J. W. Miller, Minnesota Mining & Mfg., Mueller, National Radio, Orradio, Petersen, Phaostron, Sarkes Tarzian, Sprague, Switchcraft, Triad, Ungar, Xcelite.**

Radio Electric Service Co., 3rd & Tatnall St., Wilmington, Del., 10 (NEDA)

Wholesale Electronics, Inc., 901 West 5th St., Wilmington 5, Del., 10 (NEDA)

## DISTRICT OF COLUMBIA

**Washington**

A & M Associates, Inc., 1145 19th St., N.W., Washington 6, D.C., 15

**Eldorado Electronics:** Instrumentation. **Era:** Solid state power supplies, diode & Transistor test equipment. **FXR:** Microwave instrumentation, modulators, transmitters & power supplies. **ITT Industrial Products Div.:** Closed-circuit television systems & components.

British Radio Electronics Ltd., 1833 Jefferson Place N.W., Washington 6, D.C., 5, MEtropolitan 8-1520

**Burlingame Associates, 8218 Wisconsin Ave., Washington, D.C., 15, OLiver 4-6400, Branch: Mount Vernon, N.Y.**

**See ads on pages 245, 247, 257, 273, 274, 283, 288, 293, 294, 305, 311, 313, 327, 354, 365, 417, 439, 465, 475, 481, 489, 491, 569, 583**

Cerf & Co., Art, Washington, D. C., 15, EXecutive 3-7159, Branch: Newark, N.J.

Domestic Distribution Department, 1615 H. St., N.W., Washington 6, D.C., 10 (NEDA)

Electronic Wholesalers, Inc., 2345 Sherman Ave., N.W., Washington 1, D.C., 10 (NEDA)

Houser Associates, 734 15th St., N.W., Washington 5, D.C., 15, MEtropolitan 8-0084, Branch: Perth Amboy, N.J.

Jodon, Inc., F. R., 8510 Beech Tree Rd., Washington 14, D.C., 15, EM 5-1515

**Coleman Electronics:** Digitizers. **Dressen-Barnes:** Power supplies. **Engineered Electronics:** Plug-in-modules. **ITT Industrial Prod. Div.:** Instruments. **Leach:** Hi-G tape recorders. **Magnecord:** Tape recorders. **Midwestern Inst.:** Oscillographs. **Millivac:** Amplifiers & DC Meters.

MacDonald, Inc., Samuel K., 3308 14th St. N.W., Washington, D.C., 15, COlumbia 5-3938, Branch: Philadelphia, Pa.

Satterthwaite, W. F., 2647 Connecticut Ave. N.W., Washington, D.C., 15, NOrth 7-6660, Branch: Havertown, Pa.

Shilt, Noble C., 3308 14th St., Washington 10, D.C., 15 (ERA)

Silberne Radio & Electronics Co., 3400 Georgia Ave. N.W., Washington 10, D.C., 10 (NEDA)

## FLORIDA

**Bradenton Beach**

Fausett & Co., Floyd, 4500 Gulf Dr., Bradenton Beach, Fla., 15, BRadenton Beach 9-3131, Branch: Atlanta, Ga.

**Clearwater**

Smith Co., Maitland K., 117 N. Keystone Dr., Clearwater, Fla., 15, CLearwater 39-8021, Branch: Atlanta, Ga.

**Hialeah**

Chapman & Co., Cary, 301 E. Tenth Ave., Hialeah, Fla., 15, TUxedo 5-2519, Branch: Atlanta, Ga.

Sanders Electronics Co., 1002 East 24th St., Hialeah, Fla., 10 (NEDA)

Wallace Associates, Inc., Stanley K., 3761 E. 8th Ave., Hialeah, Fla., 15, Branch: Lutz, Fla.

**Indialantic**

**Schweber Electronics, 425 8th Ave., Indialantic, Fla., 15, PArkway 3-4461, Branch: Mineola, L.I., N.Y.**

**See ads on pages 395, 407, 517, 521, 541**

**Jacksonville**

Barnhart Co., L.E., 1003 Gunka Rd., Jacksonville 11, Fla., 15, RAymond 4-0987

**Electronic Specialties Mfg.:** Converters, GC **Electronics:** TV, electronic components. **Wm. A. Holmin:** Voice guns. **Ivel-x Products:** Industrial chemicals. **Kedman:** Tools. **Lyn-Tron:** Sub-miniature terminals. **Milwaukee Resistor:** Wire-wound resistors. **Mobil Electronics:** Chassis & panels. **Permadyne Div.:** Earphones. **TT Electronics:** Low pass filters.



# Distributional Functions



Peard Electronic Supply Co., 535 Washington St., Jacksonville 2, Fla., 10 (NEDA)

**Largo**

Sturdy Co., Inc., R. H., 2238 Duncan Dr., Largo, Fla., 15, JUniper 4-3745, Branch: Newton, Mass.

**Lutz**

Wallace Associates, Inc., Stanley K., P.O. Box 67, Lutz, Fla., 15, JAckson 3-6109

**Aerovox, Columbus Electronic, Curtiss-Wright, Electronic Instrument, Garlock, Lenz, Lowell, Merit, Ohmite, Sonotone.**

**Maitland**

Millar Associates, James, P.O. Box 96, Maitland, Fla., 15, MIdway 4-0390, Branch: Atlanta, Ga.

**Melbourne**

Electronic Supply, 1301 Hibiscus Blvd., P.O. Box 1655, Melbourne, Fla., 10 (NEDA)

**Miami**

Certified Radio TV Supply, Inc., 675 N.W. 11th St., Miami 36, Fla., 10 (NEDA)

East Coast Radio & Television Co., Inc., 1900 N.W. Miami Court, Miami 36, Fla., 10 (NEDA)

Herman Electronics, Inc., 1365 N.W. 23rd St., P.O. Box 358, Allapattah Station, Miami 42, Fla., 10 (NEDA)

Hollingsworth & Still, 7300 N.E. 8th Ave., Miami, Fla., 15, PL 7-9793, Branch: Atlanta, Ga.

Miami Electronics Distributor, Inc., 419 N.W. 79th St., Miami, Fla., 10 (NEDA)

Radio TV Parts Distributors, Inc., 2611 N.W. 21st Terrace, Miami 42, Fla., 10 (NEDA)

Vance Baldwin, Inc., 7700 N.W. 7th Ave., Miami, Fla., 10 (NEDA)

Walder Radio & Appliance Co., 1809 N.E. Second Ave., Miami 32, Fla., 10 (NEDA)

**Miami Beach**

Geartner Co., Jack, 235 Lincoln Rd., Miami Beach, Fla., 15, JEfferson 1-0200

**Clevite:** Transistors, diodes. **Hugh H. Eby, Inc.:** Sockets, terminal strips. **Electrical Inds.:** Hermetic Seals, headers, closures. **Eldema:** Miniature indicator lites. **General Ceramics;** Ferrites, memory planes. **Grayhill:** Sub-min. switches. **Indiana Steel:** Magnets. **Kings Electronics:** UG & RF Connectors. **Spectrol:** Precision potentiometers, transistorized power supplies. **Tensolite:** Teflon wires. **U. S. Components:** Multi-pin connectors. **U. S. Engrg.:** Terminals, hardware.

**North Miami Beach**

Benz Sales Co., P.O. Box 178, North Miami Beach 62, Fla., 15, WIlson 5-4284

**Beede:** Panel meters. **C.T.S.:** Potentiometers. **Columbus Semiconductors:** Silicon Rectifiers. **Fast, John:** Capacitors. **Industro Transistor:** Transistors. **Intl. Electronic Industries:** Tantalum Capacitors. **Phillips Control:** Relays. **Radio Materials:** Ceramic Capacitors. **Speer Carbon.** Resistors, RF Chokes. **Transistor Electrs.:** Display lamps, readouts. **Unimax:** Snap-action switches.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Cartwright & Bean, 20100 N.E. 25th Court, North Miami Beach, Fla., 15, WIlson 5-2962, Branch: Memphis, Tenn.

Hayden Associates, Paul, 1060 N.E. 180th Terr., North Miami Beach, Fla., 15, WI 5-5793, Branch: East Point, Ga.

**Orlando**

Atcheson & Adams, P.O. Box 138, Fern Park, Orlando, Fla., 15, MIdway 4-2082, Branch: Greensboro, N.C.

Bohman Co., G. F., 711 Magnolia Ave., Orlando, Fla., 15, GArden 5-6800 (ERA)

Cartwright & Bean, 2505 Nancy St., P.O. Box 583, Orlando, Fla., 15, GArden 5-8284, Branch: Memphis, Tenn.

Geartner Co., Jack, 711 Magnolia Ave., Orlando, Fla., 15, GArden 4-3926, Branch: Miami Beach, Fla.

Hammond Electronics, Inc., 533 W. Central Ave., P.O. Box 3671, Orlando, Fla., 10 (NEDA)

Henry Associates, Bill, 35 E. Princeton Ave., Orlando, Fla., 15, GA 2-2972, Branch: Charlotte, N.C.

Holliday-Hathaway Co., Inc., 224 East Colonial Dr., Orlando, Fla., 15, GArden 4-5744, Branch: Rutherford, N.J.

Hollingsworth & Still, 807 N. Summerlin St., Orlando, Fla., 15, GA 5-6808, Branch: Atlanta, Ga.

Lee Associates, Inc., S. S., 718 W. Smith Ave., Orlando, Fla., 15, CHerry 1-4445

**Acton Labs.:** Instruments. **Airborne Instruments:** Instruments. **B & K:** Instruments. **Computer Measurements:** Instruments. **Edgerton, Ger.:** Commercial Line. **Electronic Assoc.:** Small analog computer & Readout devices. **Hughes Aircraft:** Memoscope & Crystal filters. **Kepco, Massa-Cohu:** Recorders & Accelerometers. **MB, Marconi Instruments, Packard Bell Computer, Rutherford.**

McCorvey Co., V. Avis, 708 San Juan Blvd., Orlando, Fla., 15, CRestwood 7-1866, Branch: Decatur, Ga.

Murphy & Cota, 2319 E. South St., Orlando, Fla., 10, 15, GA 4-2167, Branch: Atlanta, Ga.

Scientific Sales Engineering Co., 1851 Oak Lane, Orlando, Fla., 15, GArden 4-0730, Branch: Atlanta, Ga.

Wallace Associates, Inc., Stanley K., 2705 Catalina Dr., Orlando, Fla., 15, Branch: Lutz, Fla.

**Ormond Beach**

Smith Co., Maitland K., 322 Riverside Dr., Ormond Beach, Fla., 15, ORange 7-2298, Branch: Atlanta, Ga.

Connecticut
Delaware
District of Columbia
Florida
Georgia

**Pensacola**

Grice Electronics, Inc., 30 E. Wright St., Pensacola, Fla., 10 (NEDA)

**St. Augustine**

Superior Marine Radio Co., 139 St. George St., St. Augustine, Fla., 10, VA 9-8191

**Bendix, Bludworth, Hudson-American, Jefferson, Kaar, Metal Marine Pilot, Pearce-Simpson, R.C.A.**

**St. Petersburg**

Cooper Radio Co., 165 13th St. North, P.O. Box 1040, St. Petersburg 33, Fla., 10 (NEDA)

Hardy Associates, Norman, 2411 Covina Way, St. Petersburg, Fla., 15, Tel: 5-5505, Branch: Wyncote, Pa.

**Sarasota**

Radio Accessories Co. of Sarasota, Inc., P.O. Box 3590, 667 Scholl Ave., Sarasota, Fla., 10 (NEDA)

**Tampa**

Joyner & Associates, J. E., P.O. Box 13126, Tampa 11, Fla., 15, Branch: Atlanta, Ga.

Kinkade Radio Supply, Inc., 1719 Grand Central Ave., Tampa 6, Fla., 10 (NEDA)

Leader Electronic Distributors, Inc., 3411 S. Dale Mabry Highway, Box 13486, Tampa 11, Fla., 10 (NEDA)

Radio Accessories Co. of Tampa, Inc., 417 E. Platt St., Tampa 9, Fla., 10 (NEDA)

Taylor Co., Morris F., 4304 Corona St., Tampa 9, Fla., 15, TAmpa 02-4071, Branch: Silver Springs, Md.

Thurow Electronics, Inc., 121 S. Water St., Tampa 3, Fla., 10 (NEDA)

Wallace Associates, Inc., Stanley K., 207 W. Alfred St., Tampa, Fla., 15, Branch: Lutz, Fla.

**West Palm Beach**

Goddard Distributors, Inc., 1309 N. Dixie, West Palm Beach, Fla., 10 (NEDA)

**Winter Haven**

Taylor Co., Morris F., 940 Lake Elbert Dr., Winter Haven, Fla., 15, CYpress 4-2941, Branch: Silver Spring, Md.

**Winter Park**

Aironic Accessory Co., Inc., 2300 Coldstream Dr., Winter Park, Fla., 15, MIdway 7-2251, Branch: Brightwaters, N.Y.

Florida Wholesalers Association, P.O. Box 375, Winter Park, Fla., 10 (NEDA)

## GEORGIA

**Atlanta**

Adair Co., The Clark, 1426 High Point Pl. N.E., Atlanta 6, Ga., 15, TRinity 5-3979 (ERA)

Aironic Accessory Co., Inc., 3179 Maple Dr., Room 112, Atlanta 5, Ga., 15, CEdar 7-0788, Branch: Brightwaters, N.Y.

Atcheson & Adams, P.O. Box 4867, Atlanta, Ga., 15, DRake 8-2807, Branch: Greensboro, N.C.

Bean, Everett P., 3223 Cains Hill Pl., Atlanta 5, Ga., 15 (ERA)

Burwell Co., Henry W., 422 Ponce De Leon Ave., N.E., Atlanta 8, Ga., 15, TRinity 4-2127 (ERA)

Cartwright & Bean, 3223 Cains Hill Place, N.W., Atlanta, Ga., 15, CEdar 7-2273, Branch: Memphis, Tenn.

Chapman & Co., Cary, 600 Trusco Way, Atlanta 10, Ga., 15, Tel: 758-4506

**CBS Electronics:** Tubes & semiconductors. **Royal Electric:** Coaxial cable. **Utica Communications:** Citizen-band radios.

Duckett Sales Co., Grady, P.O. Box 11657, Atlanta 5, Ga., 15, CE 3-5308 (ERA)

Fausett & Co., Floyd, 777 Pinehurst Ter. S.W., Atlanta 10, Ga., 15, PLaza 3-3104

**Allied Control:** Relays. **Augat:** Sub-miniature tube cradles. **Carter Motor:** Gearmotors. **Electra:** Film resistors. **Freed:** Transformers, instruments. **National Union Elec.:** Voltage regulators. **Petersen Radio Co.:** Quartz Crystals. **Tru-Ohm:** Resistors & rheostats.

Hayden Associates, Paul, 682-B Lindbergh Dr., Atlanta, Ga., 15, CE 3-4743, Branch: East Point, Ga.

Hollingsworth & Still, 508 Whitehead Bldg., Atlanta 3, Ga., 15, MU 8-5878

**Amphenol-Borg:** Connectors & cable. **Astatic:** Mikes & cartridges. **Audio Devices:** Discs & tape. **Bogen-Presto:** Hi-Fi & P.A. amplifiers. **Chicago Standard:** Transformers. **Gen. Transistor:** Transistors & diodes. **Hickok:** Meters & testers. **Int'l Resistance:** Controls & resistors. **Howard W. Sams:** Reference publications. **University Loudspeakers:** Hi-Fi & P.A. speakers. **Weller:** Soldering tools.

Jackson Electronic Supply Co., Inc., 840 Marietta St. N.W., Atlanta 18, Ga., 10 (NEDA)

Joyner & Associates, J. E., P.O. Box 10821-Station A, Atlanta 10, Ga., 15, PLaza 8-7496

**Ampex, Antenna Specialist, C. P. Clare, Eitel-McCullough, General Instrument, Gremar, Radio Receptor.**

Kennon Co., W.N., 7 Camden Rd. N.E., Atlanta 9, Ga., 15, TRinity 4-5566

**All Channel Prods, Steelman Phonograph & Radio.**

Marchbanks Co., Ray, 4824 Northside Dr. N.W., Atlanta, Ga., 15 (ERA)

Millar Associates, James, 1036 Peachtree St. N.E., Atlanta 9, Ga., 15, TR 6-0919

**Alpha:** Wire. **Amperex:** Tubes. **Clarostat:** Controls. **Cornell-Dubilier:** Capacitors. **JBT Instruments:** Test Equipment. **E. F. Johnson Co.:** Transmitting Equipment. **Multicore:** Solder. **Par-Metal:** Metal Goods. **Sola:** Transformers. **Shure Brothers:** Microphones. **Trimm, Inc.:** Headphones, plugs. **Triplett:** Test Equipment. **United Transformer:** Transformers.

Murphy & Cota, 2110 Peachtree Rd. N.W., Atlanta 5, Ga., 10, 15, TRinity 6-3020 (ERA)

Electronic instrumentation and components, calling on industries and jobbers.

Scientific Sales Engineering Co., 2162 Piedmont Rd. N.E., Atlanta 9, Ga., 15, TRinity 3-2475

**Alfred Electronics, Analab Instrument, Ballantine Labs., CBS Labs., James Cunningham, Diehl, Elgin Labs., Epsco, Erie-Pacific, Grant Pulley, Hermes, Norden Div., Polytechnic Research & Development, Precision Instrument, Scientific-Atlanta, Servo Corp. of America.**

Smith Co., Maitland K., 208 14th St. N.W., Atlanta 13, Ga., 15, TRinity 5-8031

**B&K Mfg.:** Test equip. **Chasis-Trak:** Chassis slides. **Comar:** Relays. **Electro-Voice:** Microphones, speakers, enclosures, receivers. **Globe Industries:** Fractional H.P. motors. **James Knights:** Crystals & ovens. **Magnecord:** Tape recorders. **Phaostron:** Meters. **Quan-Tech:** Test equip. **Rauland-Borg:** Amplifiers & intercom equip. **Rauland Corp.:** TV picture tubes. **Sherwood Electronic Labs.:** Amplifiers & tuners. **Sprague:** Capacitors, resistors, transistors. **Standard Rectifier:** Silicon rectifiers. **Thordarson-Meissner:** Transformers & coils. **Ward:** Antennas. **Wyco:** Racks.

Southeastern Radio Parts Co., 400 W. Peachtree St. N.W., Atlanta 8, Ga., 10 (NEDA)

Specialty Distributing Co., Inc., 763 Juniper St. N.E., Atlanta 8, Ga., 10 (NEDA)

Wallace Associates, Inc., Stanley K., 715 Flamingo Dr. S.W., Atlanta, Ga., 15, Branch: Lutz, Fla.

**Augusta**

Prestwood Electronics Co., 1445 Greene St., Augusta, Ga., 10 (NEDA)

**Columbus**

Radio Sales & Service Co., 2000 12th Ave., Columbus, Ga., 10 (NEDA)

**Decatur**

McCorvey Co., V. Avis, 105 W. Howard Ave., Decatur, Ga., 15, DRake 7-6167

**Air-Marine:** Motors & blowers. **ARRA:** Microwave components. **Bourns:** Trimpot potentiometers. **Cosmo Plastics:** Nylon bobbins & washers. **Decco:** Transformers. **Diamonite:** Ceramic parts. **King:** Ceramic capacitors. **LineMaster:** Foot switches. **N'tl. Radio:** Knobs, hardware, chokes, sockets, dials. **Regdon:** Solenoids, coils. **Sealtron:** Connectors, terminals. **Times Wire & Cable:** Coaxial cables.

Nickerson Co., Frank C., 626 Medlock Rd., Decatur, Ga., 15, MElrose 6-2752 (ERA)

**East Point**

Hayden Associates, Paul, P.O. Box 331, East Point, Ga., 15, PO 6-0261

**Astron:** Capacitors. **Continental-Wirt:** Resistors, slide switches, suppressors. **Gen. Control:** Lever type switches. **Mohawk:** Wire & cable. **Sightmaster:** Fuses. **Sarkes Tarzian:** Semiconductors. **Zoron:** Plugs, jacks.

Southern Electronics Corp., 216 Main St., East Point, Ga., 10 (NEDA)

Taylor Co., Morris F., 2396 Connally Dr., East Point, Ga., 15, POpular 1-5353, Branch: Silver Spring, Md.

**Elberton**

McCorvey Co., V. Avis, 211 Highland Dr., Elberton, Ga., 15, ELberton 1390, Branch: Decatur, Ga.

**Savannah**

Kings Appliance & Electronics, Inc., 666 Indian St., P.O. Box 548, Savannah, Ga., 10 (NEDA)

## HAWAII

**Honolulu**

Arva, Inc., P.O. Box 135, 832 S. Queen St., Honolulu, Hawaii, 15, HOnolulu 506-096, Branch: Seattle, Wash.

Barstow & Doran, Inc., 1253 S. King St., Honolulu, Hawaii, 15, HOnolulu 504-138, Branch: Los Angeles, Calif.

Burcham Co., Don H., P.O. Box 2845, Honolulu 3, Hawaii, 15, HOnolulu 64-488, Branch: Portland, Ore.

Easy Appliance Co., 91 S. King St., Honolulu, Hawaii, 10 (NEDA)

Electrical Equipment Co., Ltd., 656 S. Queen St., Honolulu, Hawaii, 10 (NEDA)

Hastin Sales Co., Jim, 235 Cooke St., P.O. Box 2098, Honolulu, Hawaii, 15, HOnolulu 99-8910 (ERA)

Kentron Hawaii, Ltd., 1140 Waimanu St., Honolulu 14, Hawaii, 5, 10, 15, 20

**Ampex Data Prods.:** Magnetic tape prods. **Collins Radio:** Communications equipt. **Dage Television:** Closed circuit television. **Eclipse-Pioneer:** Flight & navigation instrument repair & calibration. **Harrison Labs.:** Transistorized power supplies. **Hewlett-Packard:** Test equip. repair & calibration service. **Motorola:** Two-way mobile radio & microwave systems. **RIDL:** Radiation counters, scalers, & associated devices. **Radio Frequency Labs.:** Instrument standards, magnet chargers, variable-frequency power supplies.

Nylen Brothers & Co., Ltd., 820 S. Beretania St., Honolulu 2, Hawaii, 10 (NEDA)

Piety Factors, Inc., Gene, 2030 Homerule St., Honolulu, Hawaii, 15, HOnolulu 837-185

**American Telev. & Radio, CBC Elec., Clear Beam Antenna, Columbia Wire & Supply, Hickok, International Rectifier, General Cement, Gramer-Halldorson, Kenwood Engineering, Kester, Mosley Electronics, National Radio, Penta, John F. Rider Pub., Shure Bros., Sound Craft Systems, Sprague, Soundolier, Tevco.**

Precision Radio Ltd., P.O. Box 2573, Honolulu 3, Hawaii, 10 (NEDA)

Radio-Television Corp., Ltd., 777 Ala Moana, P.O. Box 3920, Honolulu, Hawaii, 10 (NEDA)

Radio Wholesale & Supply Co., 610 Ward Ave., P.O. Box 3768, Honolulu 14, Hawaii, 10 (NEDA)

Technical Factors, Ltd., Honolulu, Hawaii, 5, 15, Branch: Tokyo, Japan

## IDAHO

**Boise**

Kopke Electronics Co., 3113 Roschill St., Boise, Idaho, 10 (NEDA)

**Idaho Falls**

Schwendiman Distributing Co., 910 E. Lincoln Rd., Idaho Falls, Idaho, 10 (NEDA)

Seatronics, Inc., P.O. Box 2126, Idaho Falls, Idaho, 15, JAckson 2-7992, Branch: Seattle, Wash.

**Lewiston**

A & J Distributing Co., 0119 9th St., Lewiston, Idaho, 10 (NEDA)

**Twin Falls**

United Electronics Wholesale, 328 Third St. East, Twin Falls, Idaho, 10 (NEDA)



# Distributional Functions



## ILLINOIS

**Aurora**

Smith Associates, Dwight, 9 S. River St., Aurora, Ill., 15, TWinoaks 7-5752

**Amperex: Tubes, transistors. Dyna-Empire:** Gaussmeters. **Gen. Crystal:** Frequency crystals. **Gyra:** Instm'ts, counters. **Kooltronic:** Fans, blowers. **Norelco:** Speakers, sound equip. **Pomona:** Patch-cords. **Tri-Tronics:** Photo relay systems. **Vocaline:** Two-way radio.

**Belleville**

Knaggs Co., H. W., 7503 Melba Lane, Belleville, Ill., 15, EXpress 7-2398 (ERA)

Lurtz Electric Co., 219-221 N. Illinois St., Belleville, Ill., 10 (NEDA)

**Benton**

Lampley Radio Co., 452 E. Church St., Benton, Ill., 10 (NEDA)

**Berwyn**

B-B & W, Inc., 6634 W. Cermak Rd., Berwyn, Ill., 10 (NEDA)

**Bloomington**

Alverson Sales Co., 217 E. Front St., Bloomington, Ill., 10 (NEDA)

Suter TV Supply, Inc., 1009 N. Park St., Bloomington, Ill., 10 (NEDA)

**Blue Island**

Delta Distributing, 2357 York St., Blue Island, Ill., 10 (NEDA)

**Champaign**

Electronic Parts Co., 905 S. Neil, Champaign, Ill., 10 (NEDA)

**Chicago**

**Allied Radio Corp., Dept. 106-1, 100 N. Western Ave., Chicago 80, Ill., 5, 10, HAymarket 1-6800**

**See ad on page 162**

**Acme, Acoustic Research, Acoustone, Acro Switch, Advance, Aerovox, Akro-Mils, Agastat, All-Channel, Alliance, Alpha Wire, Altec-Lansing, AMP, American Beauty, Amglo, Amperex, Amperite, Ampex, Amphenol, Arco, Astatic, Atlas, ATR, Audio-Devices, Audiotape, Autotron, Barber-Colman, Barker-Williamson, Belden, B&K, Billey, Blonder-Tongue, Bogen, Borg, Bozak, Brown, Bud, Burgess, Buss, Camblock, Cambridge Thermionic, Cannon, Centralab, Century, Chemtronics, Chicago Transformer, Cinch-Jones, Clairex, Clare, Clarostat, Clevite, Collins Radio, Conant, Condenser Products, Consolidated Wire, Continental Carbon, Continental Electric, Cornell-Dubilier, Croname, CTS-IRC, Cutler-Hammer, Dalohm, Daven, Dialco, Dow-Key, Drake Electric, Drake Mfg., Dumont, Duotone, Dutch Brand, Eby, Echo Wire, EICO, Eimac, Elco, Electrons, Electro-Products, Electrostrip, Electro-Voice, Emerson & Cuming, Equipto, Ersin, Eveready, E-Z Way, Fairchild, Fanon, Federal Electronics, Federal Switch, Federal Tel. & Radio, Fedtro, Fenwall, Fisher, Fisher-Pierce, Flexo, Garrard, Genalex, General Cement, General Control, G.E., General Radio, Gonset, Goodman, Guardian, Hallicrafters, Hamilton, Hammarlund, Harman-Kardon, Harvey Hubbell, Harvey Wells, Hickok, Hoffman, Hughes, Hunter, I.D.E.A., Illinois Condenser, Illumitronic, Industrial Timer, Int'l. Rectifier, IRC, ITT-FTR, James B. Lansing, JBT, Jensen Industries, Jensen Mfg., Jerrold, JFD, E. F. Johnson, M. C. Jones, Kepco, Knight, Knight-Kit, Knights, Krylon, KTV Towers, Mallory, Marantz, Meissner, Microcircuits, Microtran, Millen, J. W. Miller, Minnesota Mining, Monitoradio, Moody, Mosley, Mueller, Mullard, National Co., National Electronics, National Union, North American Philips, Ohmite, Oryx, Pacific Semiconductor, Peco, Penta, Pentron, Perma-Power, Phaoston, Philco, Potter & Brumfield, Precise Development, Precision Apparatus, Pyramid, Quam-Nichols, Raypar, Raytheon, RCA, Reeves, Remcon, Rider, Rome Cable, Sams Pubs., Sangamo, Sarkes-Tarzian, Seco, Sigma, Simpson, H. H. Smith, Sola, Sonotone, Sony, Spaulding, Specific, Sprague, Stackpole, Stancor, Standard Coil, Standard Electric, Superex, Superior, Switchcraft, Sylvania, Taco, Tandberg, Tapemaster, Telex, Telrex, Terado, Texas Instruments, Thermosen, Thomas & Betts, Thor, Thorens, Thordarson, Transistor Electronic, Triad, Trimm, Triplett, Tung-Sol, Ungar, Unimax, United Electronics, University, UTC, Vector, Vibroplex, Victoreen, Viking, Vitramon, Vocaline, Waico, Waldom, Walsco, Ward, Waterman Prods., Webcor, Weller, Wen, Westinghouse, Weston, Wheeler, Wirt, Xcelite.**

Anderson & Associates, Inc., Burt, 6414 W. Higgins Ave., Chicago 31, Ill., 15, SPring 4-4174

**Autotronics:** Electro-magnetic sub-miniature brakes & clutches. **Cook Electric (Diaphlex Div.):** Pressure switches, bellows, relays, time delays, sealed components & special devices. **Elcon:** Film capacitors. **Fairchild Controls:** Precision potentiometers, pressure transducers, gyros. **JFD:** Capacitors, tuners, delay lines & antennas. **Kelvin Sales:** Precision wire-wound resistors. **Lab. for Electronics:** Test equip. & instruments. **Superior Mfg. & Instrument:** Precision gears, gear trains. **Transformer Technicians:** Transformers.

Angel & Co., Jay C., 2743 W. Peterson Ave., Chicago 45, Ill., 15, UPtown 8-0653

**ADC:** Transformers, filters, chokes, toroids, jacks, plugs, saturable reactors, telephone coils. **Bristol Motor Div.:** Synchronous motors & timers. **John Chatillon & Sons:** Precision springs. **Gen. Control:** Lever switches, push-button. **Gries Reproducer:** Zinc die castings. **King Electronics:** Ceramic capacitors. **Kupfrian:** Power supplies, flexible shafts. **Omega Electric Div.:** Relays. **Shallcross:** Precision resistors, switches, test instruments. **Taylor Electric:** Wiring ducts & extrusions. **Technical Wire Prods.:** RF shielding.

Arpio Sales, Inc., 4305 N. Lincoln Ave., Chicago 18, Ill., 10 (NEDA)

Bacher & Associates, Louis G., 4216 W. Division St., Chicago 51, Ill., 15, BEImont 5-6601

**Columbia Technical:** Protective coatings & delay lines. **Douglas Microwave:** Microwave components & test equip. **Gremar:** R.F. co-ax cable connectors. **Oaktron Industries:** Loudspeakers. **Syncro Corp.:** Dry electrolytic capacitors. **U.S. Sonics;** Ceramic transducer elements.

Baker, Leicester N., 35 E. Wacker Dr., Chicago, Ill., 10 (NEDA)

Bauman & Bluzat, 2753 W. North Ave., Chicago 47, Ill., 10, 15, 20, HUmboldt 6-6809

Automatic Control Equip., Antennas, Blowers, Fixed Capacitors, Coils, Connectors, Crystals, Environmental Test, Filters, Power Supplies, Rectifiers, Relays, Resistors, Semiconductors, Switches, Transformers, Waveguides & Accessories.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Georgia
Hawaii
Idaho
Illinois

Barnes Sales Co., Robert H., 7625 N. Keystone, Chicago, Ill., 30, KE 9-3108, Branch: Fort Wayne, Ind.

Baer Co., Leo, 4754 W. North Ave., Chicago 39, Ill., 15, BRidgeport 7-2424

Conant Labs., Dale: [illegible] General Ind. [illegible] GlassTite: [illegible] Leach: [illegible] Marion Inst.: Panel meters. Mueller Electric: [illegible] clips. National Radio: [illegible] Pickering: [illegible] Victory Eng.: [illegible]

Bierhaus-Ballborn Sales, Inc., 7185 W. Armitage Ave., Chicago 35, Ill., 15, TU 9-5611

**Consolidated Electrodynamics:** [illegible] **G-V Controls:** Hermetic time delay relays, thermostats. **Hurst Mfg.:** Synchronous timing motors. **Ledex:** Solenoids & timing motors. **Nytronics:** R.F. [illegible] variable inductors, delay lines, pulse transformers. **Potter & Brumfield:** Relays. **Planet Mfg.:** Electrolytic capacitors. **Transco Prod.:** Coaxial switches, microwave components & antennas. **Welwyn:** Precision carbon film & metal oxide resistors.

Blaker Co., S. C., 2353 N. California Ave., Chicago 47, Ill., 15, 20, BR 8-4221

**Advanced Electronics:** Telemetering transmitters & oscillators, RF filters, mixers. **Carter Mfg.:** Precision potentiometers & trimmers. **Dearborn:** Capacitors. **Forest Electric:** Transformers. **Fred Goat:** Telephone relays. **Frenchtown Porcelain:** Alumina porcelain parts. **Kidco:** Precision carbon deposit resistors. **Permadyne:** Dynamic headsets & microphones. **Valor Instruments:** Delay lines, pulse transformers, transistorized power supplies, transistorized voltage regulators, transistor checkers.

Bluzat Co., Claude R., 5306 W. Lawrence Ave., Chicago 30, Ill., 15, KI 5-0244

**J.E.T.Co.:** Japanese made electronic parts, radio & TV, tape recorders. **Melody Master:** Dynamic headphones.

Booth & Assoc., Claude, 4000 W. North Ave., Room 317, Chicago 39, Ill., 15, CApitol 7-2810 (ERA)

Bowman & Co., J. G., 221 W. 79th St., Chicago 20, Ill., 10 (NEDA)

Bruning Co., A. H., 1758 W. Lawrence Ave., Chicago 40, Ill., 15, EDgewater 4-0989 (ERA)

Burgoyne Co., William, 7001 N. Clark St., Chicago 26, Ill., 15, HOllycourt 5-2112 (ERA)

Caine Electronic Sales Co., 4120 W. Lawrence Ave., Chicago 30, Ill., 15, SP 7-4022

**Burnell:** Toroidal coils, audio & crystal filters. **A. W. Haydon:** Electronic & electro-mechanical timers, timing motors, stepping devices, encoders. **Haydon Switch:** Snap, lighted pushbutton, pressure, & barometric switches. **Technical Electronics:** Automatic Hipot, Continuity, impedance & voltage comparators.

Chauncey's, Inc., 4740 W. Chicago Ave., Chicago, Ill., 10 (NEDA)

Cole Co., G. Mc L., 6514 W. Higgins Rd., Chicago 31, Ill., 15, SPring 4-3535

**Bureau of Engraving:** Printed circuits. **Continental-Wirt:** Switches, resistors, potentiometers, suppressors. **Eastern Air Devices:** Motors, servos, fans. **Hallicrafters:** Amateur equip. **Midland Mfg.:** Quartz crystals. **Phaostron:** Meters, relays.

Crossley Associates, Inc., 2501 W. Peterson Ave., Chicago 45, Ill., 15, BRoadway 5-1600

**Baldwin-Lima-Hamilton:** Strain gages. **Bomac:** Klystrons, Magnetrons, ATR & TR Tubes. **Boonton Radio:** Signal Generators & "Q" Meters. **Dymec:** Digital Data Handling Systems. **Electro Products Labs.:** Transducers. **Hewlett-Packard:** Electronic Test Instruments. **Kin Tel:** Amplifiers & Digital Voltmeters. **F. L. Moseley:** X-Y Recorders. **Sanborn:** Direct Writing Recorders. **Technology Instrument:** Precision Potentiometers. **Varian Associates:** Klystrons, Recorders, Vacuum Pumps.

Cumming & Associates, Inc., Bruce, 6029 W. Belmont Ave., Chicago 34, Ill., 15, MErrimac 7-3770

**Atlas Sound:** Commercial sound. **Bud Radio:** Sheet Metal Prods. **Clarostat:** Potentiometers, wire wound deposited carbon resistors. **Quam-Nichols:** Cone speakers. **Resistance Prods.** Precision wire wound high voltage resistors. **Weller:** Soldering guns & irons. **Xcelite:** Pliers.

Darnold, D. Hale, 5865 N. Lincoln Ave., Chicago 45, Ill., 15, LOngbeach 1-9839, Branch: Racine, Wis.

Devonshire Electronics, Inc., 15 E. 11th St., Chicago 28, Ill., 10 (NEDA)

Diethert Co., Russ, 2030 W. Montrose, Chicago 18, Ill., 15, LO 1-7627

**Dilectrix Corp:** Teflon film. **Glasseal:** Compression seals & headers. **Instrument Specialty Co.:** Beryllium copper & contact rings. **Moxness Prods.:** Silicone & fluorocarbon prods. **Northwest Plastics:** Custom plastics. **Raychem Corp.:** Wire, cable, tubing. **Sanders Assoc.:** Flexprint wiring. **Schweitzer:** Kraft capacitor tissue. **Sealectro:** Teflon terminals, RF connectors. **Sexton Can Co.:** Fabricated cases. **Steel Heddle Mfg.:** Capacitor tab stock. **Worcester Pressed Aluminum:** Drawn aluminum cans.

Dolin Sales, D., 3553 W. Peterson, Chicago 45, Ill., 15, JUniper 8-3738 (ERA)

Doyle Co., Wm. J., 2600 W. Touhy Ave., Chicago 45, Ill., 15, BRoadway 4-6685

**Antenna Specialists Co.:** Antennas. **Astatic:** Cartridges & microphones. **Bell Sound Div.:** Amplifiers, tuners, PA, tape decks. **Clevite-Brush:** Headphones. **Combined Electronics:** Printed Circuit boards. **Electro-Laminates:** Grip-line test connectors. **I.T.T.:** Rectifiers, contact protectors, pkge. power. **Kaar Eng.:** Radio-telephones, transmitters, receivers. **Portable Electric Tools:** Soldering guns & irons. **United Audio Prods.:** Turntable/changer. **Utah Radio Prods.:** Speakers, baffles, enclosures. **Wells Electronics:** I.F. Coils.

Ellinger Sales Co., W. H., 6571 N. Olmstead Ave., Chicago 31, Ill., 15, ROdney 3-4154 (ERA)

Ellinger Sales Corp., 6540 N. Northwest Highway, Chicago 31, Ill., 15, ROdney 3-1570

**Aerovox-Hi-Q:** Ceramic capacitors & resistors. **Atlee:** Vibration component holders. **Collins Electronics:** Choppers. **GOE Engineering:** Terminal lugs, boards & hardware. **Ideal Precision Meter:** Meters. **E. F. Johnson:** Amateur equipment, variable capacitors, pilot lights, plugs & jacks, sockets, insulators, inductors. **Ken-Tron:** RF Connectors, telephone plugs & jacks. **Times Wire & Cable:** Wire & cable, teflon covered wires. **Triad:** Transformers. **Waldom Electronics:** Knobs, dials, fasteners, pressurized paint.

Engineered Sales Co., Inc., 3592 Milwaukee Ave., Chicago 41, Ill., 15, PEnsacola 6-0555

**Ballastran:** Transformers, reactors, iron core devices. **Bogart:** Microwave components, antennas. **Cable Designs:** Teflon magnet & lead wire, specialty cables. **Cascade Research:** Ferrite isolators, modulators & circulators. **Gamewell:** Precision potentiometers. **Globe Industries:** Miniature AC & DC motors, gear heads, blowers, timers, actuators. **Jonathan:** Ball bearing chassis slides, hardware. **Precision Metal Prods.:** Terminals. **Vernitron:** Synchros & Resolvers.

Engle Co., Inc., Karl D., 4724 N. Sheridan Rd., Chicago 40, Ill., 15, UPtown 8-6363 (ERA)

Felleisen, Theodore E., 5841 W. Montrose Ave., Chicago 34, Ill., 15, SPring 7-1060 (ERA)

Fitzsimmons Assoc., Inc., 6124 Milwaukee Ave., Chicago 30, Ill., 15, NEwcastle 1-7660 (ERA)

Friedman Co., Morton L., 2814 W. Balmoral Ave., Chicago 25, Ill., 10, 15, LO 1-4257

**Arkay International:** Kits. **Bel Canto:** Prerecorded tape. **Electronic Devices:** Rectifiers. **Hi-Lo Mfg.:** Antennas. **Illinois Cond. Co.:** Condensers. **Javex:** Wall plates. **Jersey Specialty:** Wire. **Mellotone, Inc.:** Plastic materials. **Shell:** Test equipment. **Sidco:** Soldering tips & handles. **T.V. Development Corp.:** Knobs. **Technical Tape Corp.:** Tape. **Vidaire:** Components.

Gassner & Clark Co., 6644 N. Western Ave., Chicago 45, Ill., 15, ROgers Park 4-6121

**Bourns:** Trimming potentiometers. **Components Corp.:** Toroidal components. **DuMont Labs:** Cathode ray tubes. **HI-G:** Relays. **Industrial Prod.-Danbury Knudsen:** RF Connectors & relays. **International Instruments:** Meters. **James Knights:** Quartz crystals, frequency control devices. **Microwave Assoc.:** Diodes, magnetrons, tubes, waveguide components. **Rotron:** Fans & blowers. **Vitramon:** Capacitors.

Gebhard Co., Harry W., 5129 W. Devon Ave., Chicago 46, Ill., 15, ROdney 3-3636

O.E.M. and test equipment.

Gene F. Sales Co., 5306 W. Lawrence Ave., Chicago 30, Ill., 15, KIldare 5-5562

**Barco:** Subminiature electrolytics. **Ferranti:** Transformers. **General Mfg. Co.:** Screw Machine terminals. **Mamco:** F.H.P. Motors & plastic blower wheels. **Wilco:** R.F. & peaking coils.

Gianaras Sales Co., 5435 Northwest Hwy., Chicago 30, Ill., 15, SPring 4-4600

**Davis Elec.:** Relays. **McCoy Elec.:** Quartz crystals & crystal filters. **Micamold:** Capacitors. **Radio Materials Corp.:** Disc capacitors. **Raypar:** Coils, harnesses, transformers, flybacks, picture tube sockets. **Russell Speaker:** Loudspeakers. **Transformer Mfrs.:** Transformers & chokes.

Gormak Co., The, 7001 N. Clark St., Chicago 26, Ill., 15, ROgers Park 4-6366

**Allegheny Plastics:** Teflon Prods., laminated nameplates & diagrams. **Bamford Corp.:** Miniature Prec. Trimming potentiometers. **Breeze Corp.:** Bellows, slip rings, shielding. **Crown Elec. Prods.:** Switches & relays. **Minitone:** Miniature DC motors. **Motordyne:** Sub-Fractional motors. **Remsel Industries:** Fans & blowers. **Ripley Co.:** Miniature blowers. **Torotel:** Toroid coils, filters, magamps.

Green & Associates, Loren F., 5218 W. Diversey Ave., Chicago 39, Ill., 15, AVenue 6-6824

**Behlman:** Power oscillators & amplifiers. **Dressen-Barnes Corp.:** D.C. Power supplies. **Epsco:** Data processing equipment. **Genisco:** Centrifuges, vibration systems. **Gyrex:** Frequency resonators & standards. **Industrial Test Equipment:** Phase & Null meters, impedance comparators. **Kay Electric:** Sweeping oscillators, noise generators. **Millivac:** Transistorized VTVM's, low noise amplifiers. **Missimers:** Environmental chambers. **Narda Microwave:** Waveguide & coaxial instruments & equipment. **Polarad:** Microwave Instrumentation. **Spencer-Kennedy:** Wide Band Chain Amplifiers, variable filters.

Grove Electronic Supply Co., 4103 W. Belmont Ave., Chicago 41, Ill., 10 (NEDA)

Halinton Engineering Co., Harry, 6400 N. Leoti Ave., Chicago 46, Ill., 15, ROdney 3-2131

Electronic components. Epoxy resins.

Hamilton Co., W. F., 5517 N. Elston Ave,. Chicago 30, Ill., 15, SPring 5-2288

**Bay:** Fractional horsepower motors & related components. **Co-Engineering Co.:** Hermetically sealed shafts, shaft locks, tape transport. **Delevan:** Choke & variable inductor coils, coil forms. **Jettron:** Tube sockets & cable assemblies, micromodule element test sockets. **Livingston:** Hermetically sealed tube sockets, time delay relays, custom variable condensers. **Rule:** Screw Machine products.

Higgins Co., Royal J., 10105 S. Western Ave., Chicago 43, Ill., 15, BE 3-7388

**Barker & Williamson:** Coils, transmitters, test equipment. **Electronic Products Co.:** Microphones, transistor radios, amplifiers. **Oryx:** Solding irons. **Petersen Radio:** Crystals. **Tennalab:** Antennas. **Vibroplex:** Keys, semiautomatic. **Waterman:** Test equipment.

Howard Electronic Sales, 4140 Archer Ave., Chicago 32, Ill., 10 (NEDA)

Hunter Assoc., Thomas B., 4441 W. Irving Park Rd., Chicago 41, Ill., 15, SPring 7-2500 (ERA)

Hutmacher Assoc., Inc., Ray R., 6647 N. Oliphant Ave., Chicago 31, Ill., 15, NEwcastle 1-3248 (ERA)

Joseph, Inc., Irving, 5959 W. Fullerton Ave., Chicago 39, Ill., 10 (NEDA)

KaDell Sales Assoc., Inc., 5875 N. Lincoln Ave., Chicago 45, Ill., 15, LOngbeach 1-3042

**Chemtronic Corp.:** Sub-miniature electrolytic capacitors. **Cleveland Electronics:** Loudspeakers. **San Fernando:** Paper & foil capacitors. **Sarkes Tarzian:** Selenium & Silicon rectifiers, air trimmer capacitors, television tuners.

Karet-Margolin, Inc., 1803 Belle Plaine Ave., Chicago 13, Ill., 15, WEllington 5-4642 (ERA)

Key-Man Sales, Inc., 5500 N. Menard, Chicago 30, Ill., 15, SPring 4-1444 (ERA)

Kielty, Dechert & Hampe, Inc., 36 S. Wabash Ave., Chicago 3, Ill., 10 (NEDA)

Knoblock & Malone, Inc., 1603 N. Newland Ave., Chicago 35, Ill., 15, NAtional 2-4005 (ERA)

Krueger Co., Ringland M., 4738 N. Harlem Ave., Chicago 31, Ill., 15, UN 7-7100

**Ace Electronic:** Precision potentiometers. **Airpax:** Choppers, components, magamps. **Allied Control:** Relays, valves. **Augat:** Hardware. **Chassis Trak:** Slides. **Chester Cable:** Insulated Wire, cables. **Onondaga Electronics:** Printed circuit cables. **Technical Devices:** Wire strippers. **Western Devices:** Cabinets.

Lang, Claeson & Associates, 6733 N. Olmsted, Chicago 31, Ill., 15, SPring 4-3610 (ERA)

**Amco:** Enclosures. **Ballantine:** AC Vacuum tube voltmeters. **Burroughs-Electronic Tube Div.:** Beam switching tubes & nixies. **Donner-Systron:** Analog computers, digital voltmeters, frequency counters. **Deutsch:** Quick release panel fasteners. **Hughey & Phillips:** Obstruction lighting. **Keithley:** DC Measuring Instruments. **Kepco:** DC regulated power supplies. **Librascope:** XY platters.

Langhaus-Levy Assoc., 5317 Cottage Grove, Chicago 15, Ill., 10, 15, DO 3-5344

**Arco Electronics, Automatic Radio Mfg., Dutrex Industries, International Rectifier, J. W. Miller, New-Tronics, Tru-Ohm, Turner Co., Walsco.**

Leff Associates, Arnold, 1046 Wilson Ave., Chicago 40, Ill., 15, LOngbeach 1-6831 (ERA)

Levin-Sacks & Assoc., 2639 Peterson, Chicago 45, Ill., 15, LO 1-7290 (ERA)

Lightner Assoc., 6322 N. Milwaukee Ave., Chicago 46, Ill., 15, SPring 4-1500

**Aladdin:** Coils, pulse transformers, chokes. **Britton:** Rectifiers & Diodes. **Cedar Eng.:** Motor tachometers & servo devices. **Film Capacitors:** Fixed condensers. **Gulton:** Batteries. **International Elec. Ind.:** Miniature electrolytics & tantalum condensers. **Inso:** Teflon, wire, cable & tubing. **Perkin-Elmer:** Vernistats & AC potentiometers. **Pyrofilm Resistor:** Glass sealed resistors, precision networks. **Schaevitz:** Transducers, differential transformers.

Linz & Associates, William M., 6322 N. Cicero Ave., Chicago 46, Ill., 15, MU 5-2022

**Cletron:** Speakers. **Electronic Chemical:** Chemicals. **Globe Electronics:** Citizens' band & ham gear. **Hy-Gain:** Citizen band antennas. **Kraeuter:** Pliers. **Pomona:** Patch cords, socket adapters. **Service Instruments:** Test equipment. **Ward Prods.:** Antennas. **Wen Prods.:** Electric tools.

Lukko Sales Corp., 4900 N. Elston Ave., Chicago 30, Ill., 10 (NEDA)

Magnuson Assoc., 3347 W. Irving Park Rd., Chicago 18, Ill., 15, KEystone 9-7555 (ERA)

Magnuson Co., Edward, 3349 W. Irving Park Rd., Chicago 18, Ill., 15, JU 8-2613 (ERA)

**Automatic Process Control:** Resin dispensing machines for electronic assemblies. **Green Instrument:** Pantograph engravers. **Harrel:** Proportional temperature controllers. **Mechtronics:** Bellows & diaphrams. **Reeves Instrument:** Analog computers, gyros, resolvers, gyro & resolver test equip. **Rowe Industries:** Miniature d.c. motors (commercial type). **Skydyne:** Reusable transit cases.

McCarthy Co., L. C., 7117 Addison St., Chicago 34, Ill., 15, KIldare 5-7976 (ERA)

Memac Sales Co., 4740 N. Austin Ave., Chicago 30, Ill., 15, KIldare 5-1033 (ERA)

Merquip Co., 5904 W. Roosevelt Rd., Chicago 50, Ill., 10 (NEDA)

Meter-Makers, Inc., 1101 W. Armitage, Chicago 14, Ill., 10, 20, LI 9-5252

**Triplett Instruments.**

Meyers Co., Kenneth W., 6713 N. Oliphant Ave., Chicago 31, Ill., 15, SPring 4-6440

**Alfred:** Sweeping oscillators, levelers, TWT amplifiers, power supplies in microwave freq. **Boonton Electronics:** RF voltmeters, cap. and induct. bridges. **Christie:** Lo-voltage, high current silicon rect. supplies. **Industrial Instruments:** Instruments for automated process testing. **Microphase:** RF





**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

filters. **PRD:** Microwave test [illegible] **Tel Instrument:** Voltage regulator, [illegible] converters. **Tempo Instrument:** Solid [illegible] time delays, flashers, programmers.

Mulay Co., Sam J., 1717 W. 74th St., Chicago 36, Ill., 15, GRovehill [illegible] (ERA)

Nack, Sophie, 203 N. Wabash Ave., Chicago 1, Ill., 10 (NEDA)

Nagel, Inc., Arthur, 918-925 E. 55th St., Chicago 15, Ill., 10 (NEDA)

Nation Wide Radio Co., 572 W. Randolph St., Chicago 6, Ill., 10 (NEDA)

Newark Electronics Corp., 223 W. Madison St., Chicago 6, Ill., 10, STate 2-2944 (NEDA)

Items carried in stock for 500 manufacturers.

Olson Radio Corp. of Chicago, 4181 Milwaukee Ave., Chicago 41, Ill., 10 (NEDA)

Pilgrim Distributing Co., 1230 E. 53rd St., Chicago 15, Ill., 10 (NEDA)

Pivan Engineering Co., 3542 W. Peterson, Chicago 45, Ill., 15, KE 9-4838

**Computer-Measurements:** Electronic counters, digital printer. **Data Control Systems:** Voltage controller oscillators, sub-carrier discriminators, **E-H Research:** Pulse generators, electrometers. **Hermes:** Digital timing generators, Magnetic tape search unit. **Litton:** Precision potentiometers, automatic linearity checker. **Offner:** Transistorized oscillograph, convertible rectilinear & curvilinear recording. **Packard Bell Computer:** Analog to digital converters, digital modules. **Performance Measurements:** Direct digital readout, digital ratiometers. **Precision Instrument:** Magnetic recorders. **Scientific-Atlanta:** Antenna pattern recorders. **Servo Corp. of America:** Servoscopes. **Sierra Electronic:** Frequency selective voltmeters, wave analyzers. **Sorensen:** AC regulators, DC Sources, high voltage power supplies. **Tally Register:** Paper tape reader perforator, tape verifier.

Quam, Helen S., 5000 S. Cornell, Chicago, Ill., 10 (NEDA)

Radio Television Supply Corp., 4343 W. Armitage Ave., Chicago 39, Ill., 10 (NEDA)

Ridley Associates, 1551 N. Austin Blvd., Chicago 51, Ill., 15, TUxedo 9-2940 (ERA)

Rose & Associates, Irving W., Space 6-126 Merchandise Mart, Chicago 54, Ill., 15, SU 7-5246

**Atlantic:** Wire & Cable. **Audiotex:** Hi-fi phono & tape recording. **Gray Mfg.:** Turntables & arms. **Lansing Sound:** Loudspeakers. **Nortronics:** Magnetic tape heads. **Superscope:** Sony tape recorders & [illegible] phones. **United Scientific Labs.:** Amplifiers & tuners, citizen band transceivers.

Rossi Sales Co., Charles, 2429 N. 72nd Ave., Chicago 35, Ill., 15 (ERA)

Rozner-Rinaldi Sales Corp., 4705 N. Central Ave., Chicago 30, Ill., 15, AVenue 3-0022 (ERA)

Illinois

Ryan, S. [illegible] 2501 N. Peterson Ave., Chicago 45, Ill., 15, BR 4-5729

Avco: [illegible] Columbus Electronics; Forbes & Wacker [illegible]

[illegible] Metalmasters [illegible] Regton; [illegible] Tech Labs. [illegible]

[illegible] Watten Components [illegible]

Saltzer, A. [illegible] 5501 N. Ravenswood Ave., Chicago 25, Ill., 15, [illegible]

Acton Labs: [illegible] Breeze [illegible] Elite [illegible] Gray Inst. [illegible] Perkin Eng.: [illegible] Sensitive Research Inst.: [illegible] Standard Elec. Prod.: [illegible] Sterling Mfg.: [illegible]

Sarkes, Inc., Henry, 3414 N. Western Ave., Chicago 18, Ill., 15, KEystone 1-3774

**Clarostat:** Controls, [illegible] tors. **Pyramid Elec.:** [illegible] tors.

Smith Co., Oren H., 221 W. Hubbard St., Chicago 10, Ill., 15, SUperior 7-7909

**Grommes-Phillips:** [illegible] **Par-Metal:** Hardware. **Racon Electric:** Speakers, outdoor type. **Shure Bros.:** Microphones, tone arms, cartridges.

Star Electronic Distributors, Inc., 7739 S. Halsted St., Chicago 20, Ill., 10 (NEDA)

Stemm, Inc., R. Edward, 5681 W. Lake St., Chicago 44, Ill., 15, ESterbrook 9-2700

**Autotron:** Control equip. **Axel:** Filters, capacitors. **Electronic Measurements:** Power supplies. **Empire Devices:** Test instruments & microwave components. **Engineered Electronics:** Modules. **Franklin Electronics:** Digital voltmeters. **IRC:** Transducers, pressure transmitters. **Lavoie:** Test equip. **Marconi Instruments:** Test. **Microdot:** Miniature coax connectors & cable, transformers & switches. **Shielding:** Shielded enclosures. **Telecomputing:** Data insts.

Stemm, Royal A., 21 E. Van Buren St., Chicago 5, Ill., 15, WEbster 9-4840

**Austin-Craft:** Battery holders. **E-Z Hook:** Test probes, adapters. **Insl-X-Products:** Insulating materials & protective coatings. **Jackson:** Solderless terminals & connectors. **Lerco:** Terminals, standoffs, eyelets. **Terado:** Converters & battery chargers. **Ungar:** Soldering tools. **Zophar Mills:** Impregnating & potting waxes, end seals.

Stolz-Wicks, Inc., 8116 S. Western Ave., Chicago 20, Ill., 10 (NEDA)

Swinke & Co., W. F., 541 Diversey Pkwy., Chicago 14, Ill., 15, BIttersweet 8-4343

**Astron:** Capacitors. **Foster:** Transformers. **Maico:** Recording heads. **Milwaukee Resistor:** Resistors. **Skottie:** Capacitors.

Tatro & Associates, Frank B., 6022 N. Rogers Ave., Chicago 46, Ill., 15, KEystone 9-4535

**Arber Mfg.:** Shield cans. **Crowley-Smith:** Iron cores, ferrites, magnets. **E. T. C.:** Electric terminals & connectors. **Electrix:** Terminals in strip form. **Garron Aircraft Supply:** Fasteners. **Heldor:** Transformer cans, terminals, bushings, cabinets, chassis, hardware. **Moloney Elec.:** Tape wound transformer cores. **Reliable:** Screw machine parts. **Stevens, George:** Coil winding machinery.

Taylor Co., Robert F., 308 W. Washington St., Chicago 6, Ill., 15, ANdover 3-1808 (ERA)

Twist Co., John G., 5222 W. Diversey Ave., Chicago 39, Ill., 15, SPring 7-2250

**Advance:** Relays. **Controls Co. Amer.:** Solenoids, timers. **Daven:** Switches, attenuators, inverters. **Gudeman:** Capacitors, filters, pulse transformers. **ITT-Components:** Selenium & silicon rectifiers, tantalum capacitors. **Michigan Magnetics:** Tape heads. **Norden:** Analog-digital converters. **Paktron:** Capacitors & electronic modulators. **Quam:** Speakers. **Sage:** Wirewound resistors. **Scientific Radio Prods.:** Quartz crystals. **Sonotone:** Rechargeable batteries. **Victor Elec. Wire & Cable:** Line cords & cable assemblies.

U.S. Radio & Television Suppliers, Inc., 6346 S. Ashland Ave., Chicago 36, Ill., 10 (NEDA)

Walker-Jimieson, Inc., 311 S. Western Ave., Chicago 12, Ill., 10 (NEDA)

Whitmore & Assoc., R. C., 520 N. Michigan Ave., Chicago 11, Ill., 15, MOhawk 4-1904

**Airtron:** Microwave components. **Bradley:** Semi-cond. & rectifiers. **Bulova:** Frequency control devices. **Cambridge Thermionic:** Radio hardware. **Daystrom-Pacific:** Precision potentiometers. **Daystrom-Transicoil:** Servo motors. **Deutsch:** Electrical connectors. **Plastoid:** Insulated wire. **Price Electric:** Relays. **U.S. Components:** Connectors. **United Transformer:** Transformers.

Withers, Ropek & Cahill, Inc., 5439 W. Division St., Chicago 51, Ill., 15, AU 7-7292

**Amerac:** Microwave components. **Boston Insulated Wire:** Wire & cable. **Control Div.:** Magnetic amplifiers. **Dietz Design:** Filters. **Electro-Mechanical Inst.:** Panel meters. **Filtors:** Micro-miniature relays. **Gulton:** Ceramic capacitors & thermistors. **Hopkins Engrg.:** Film type capacitors. **Nife:** Nickel-cadmium batteries. **Solid State Prods.:** Silicon control rectifiers & switches, trigistors. **Transformer Technicians:** Transformers. **Wood Elec.:** Circuit breakers & connectors.

**Chicago Heights**

Warner Co., Dayton L., 815 MacArthur Dr., Chicago Heights, Ill., 15, SKyline 4-0028

**Continental Electronics & Sound:** RF bridges & accessories. **Dow-Key:** Coaxial relays. **Heeger:** Metal boxes & chassis. **Illumitronic:** Air inductors, plastics. **Lenk Mfg.:** Soldering irons, torches. **Moran Products:** Antenna rotators. **Tecraft Sales:** Amateur Equip.

**Danville**

Bud Electronic Supply Co., 114 E. North St., Danville, Ill., 10 (NEDA)

**Decatur**

York Radio & Television Co., 518 E. Prairie, Decatur, Ill., 10 (NEDA)

**Deerfield**

Ritter Sales Co., P.O. Box 64, Deerfield, Ill., 15, WIndsor 5-1400 (ERA)

**Evanston**

**Allied Radio Corp., 602 Davis St., Evanston, Ill., 5, 10, SH 3-6233, Branch: Chicago, Ill.**

**See ad on page 162**

**Glen Ellyn**

Kleker Co., Jerome H., 177 Sunset Ave., Glen Ellyn, Ill., 15, HOpkins 9-2297

**Calcon Mfg.:** Wire & cable. **Gap Instrument:** Servo systems. **Lowell Mfg.:** Baffles. **Metalworks:** Cabinets & consoles. **Microtran:** Miniature transformers. **Molectronics:** Test instruments. **Radar Measurements:** Microwave instruments & components. **Skiatron:** Storage oscilloscope, alphadyne character generator.

Rockford Controls Co., 324 Woodstock Ave., Glen Ellyn, Ill., 15, HOpkins 9-6016

**Counter & Control:** Recycling counters. **Detroit Coil:** Solenoids. **Electro Mechanical Specialties:** Relays. **General Products:** Terminal blocks. **Gordos:** Mercury & magnetic reed switches. **Licon:** Snap switches. **Tri-Tronics:** Photoelectric controls. **Wheaton Engineering:** Time delay relays.

**Highland Park**

Neiman, S. I., 891 Pleasant, Highland Park, Ill., 10 (NEDA)

Rose & Co., J. K., 1116 Linden Ave., Highland Park, Ill., 15, BRoadway 3-2230

**Chemtronics:** Electronic chemicals. **Electronic Instrument:** "EICO" kits & wired units. **IE Mfg.:** TV roof mounts. **Radion:** Indoor antennas. **Sonotone:** Phono, cartridges, microphones. **Switchcraft:** Plugs, jacks, switches, adapters.

**Kankakee**

Radio Doctors Supply House, Inc., 892 W. Station St., Kankakee, Ill., 10 (NEDA)

**Lombard**

Bauman Sales Co., Robert H., 210 S. Lodge Lane, Lombard, Ill., 20, MA 7-7388

**Connector Corp.:** Tube sockets, connectors, jacks. **Lectroloid:** Line cords, wire assemblies. **Quincy:** Speakers.

**Mattoon**

Mattoon Radio & Television Supply Co., 212 N. 20th St., Mattoon, Ill., 10 (NEDA)

**Oak Park**

Haskell Associates, 202 N. Marion, Oak Park, Ill., 15, EUclid 6-5741

**Hamilton-Hall:** Resistors. **I H Mfg.:** Radio & TV components. **P. Wall Mfg.:** Electric soldering irons. **Webster Electric:** Tape recorders, decks, amplifiers, converters, inverters, crystal cartridges.

Hill-Gray, Inc., Ralph M. & Gordon E., 41½ Harrison St., Oak Park, Ill., 15, EU 3-0373 (ERA)

Marsh & Associates, Walter F., 244 Chicago Ave., Oak Park, Ill., 10, 15, 20, EUclid 6-1782

**Airborne Instruments:** Parametric amplifier receiving system, semiconductor thickness tester, plug-in diode noise generator, power oscillator, transistorized RF power bridge, integrating amplifier, frequency stability test set, I-F attenuator, microwave crystal test set, polar pattern recording system. **Adage:** Analog to digital converters, digital to analog converters, digital voltmeters. **Armour:** Transistorized power supplies, AC line voltage regulators, transistor testers. **California Technical Ind.:** Automatic circuit testers, tape readers, VSWR measuring systems, X-band klystron oscillator, automatic radome boresight-error measuring system, three-axis flight simulator. **D&R:** Flutter & wow meters, generators, toroidal inductors, filters, magnetic amplifiers, transistor power supply. **Delta-F:** Crystal & tuning fork oscillators. **Erie-Pacific:** Frequency counters, universal counter-timer. **Esco:** Power systems. **Julie:** Primary standard resistors, decade resistance-standard sets, operational amplifier summing networks, primary standard absolute voltage reference, bridges. **Lumatron:** Diode recovery test sets, millimicrosecond sampling converter, pulse generator. **Penn Resistor:** Deposited carbon resistors. **Permaluster:** Aluminum oxide insulated wire. **Potter Instruments:** Digital magnetic & perforated tape transports, high speed printers. **Sage Labs.:** Coaxial crystal holders, mixers, hybrids, couplers, coaxial attenuators, terminations, filters, rotary joints, slotted lines, adapters. **Telefunken:** Receiving tubes, diodes. **World Magnetics:** Magnetic record & erase heads.

Melvin Electronics, Inc., 541 Madison St., Oak Park, Ill., 10 (NEDA)

Racine & Co., L. S., 6617 W. North Ave., Oak Park, Ill., 15 (ERA)

Rubin Co., Ben Z., 607 N. Grove, Oak Park, Ill., 15, EUclid 3-0171, Branch: Detroit, Mich.

**Peoria**

Klaus Radio & Electric Co., 403 E. Lake St., Peoria, Ill., 10 (NEDA)

Warren Radio Co., 308 Oak St., Peoria, Ill., 10 (NEDA)

Yeomans Distributing Co., 401 N. East Rock Island, Peoria, Ill., 10 (NEDA)

**River Forest**

Petitt Co., Inc., George, 349 N. Ashland Ave., River Forest, Ill., 15, FOrest 9-8940

**British Industries:** Multicore solder. Widney-Dorlec metal racks & cabinets. **Capco:** Capacitors. **Furane:** Epoxy resins, adhesives. **Genelex:** Special purpose tubes. **Miratel:** TV monitors & tuners, Conelrad equip., voice operated relays. **Reeves Soundcraft:** Magnetic tape. **University:** Loudspeakers.

Roussey & Associates, Inc., Ralph F., 7709 W. Lake St., River Forest, Ill., 15, FO 9-6523

**Electronic Components Corp.:** Laminated transformers & chokes. **Electronic Transistors Corp.:** Transistors. **Isotronics:** Glass to metal seals. **Lumen:** Magnetic amplifiers, toroidal coils. **Model Engrg.:** Precision machining of magnesium, electro-mechanical assemblies. **Superite Insts.:** Differentials, gears. **Tricon:** Precious metal contacts.

**Riverside**

McBride Sales Co., J. J., 328 E. Burlington St., Riverside, Ill., 15, HIckory 7-8131 (ERA)

**Roselle**

Sisson Sales Co., D. L., Box 226, Roselle, Ill., 15, TWinbrook 4-3837 (ERA)

**Skokie**

Cozzens & Cudahy, Inc., 125 Old Orchard Arcade, Skokie, Ill., 15, ORchard 5-6700

**Edison Industries:** Time delay & ultra sensitive relays, servo-motors. **Emerson & Cuming:** Plastics. **Fluke Mfg.:** Differential voltmeters, power supplies. **Georator:** Rotary converters. **Huggins Labs.:** Traveling wave tubes. **Measurements:** Laboratory signal generators & test insts. **Menlo Park Engrg.:** Traveling wave tube amplifiers & oscillators. **Penta Labs.:** Vacuum tubes, transmitting & special purpose. **Shockley:** Transistors, diodes. **Weinschel:** RF attenuators, attenuator calibrators.

**Springfield**

Bruce Electronics, 1120 E. Capitol Ave., Box 115, Springfield, Ill., 10 (NEDA)

Kathrinus & Co., Norman W., 1728 Watch St., Springfield, Ill., 15, LA 2-7890, Branch: St. Louis, Mo.

Suter TV Supply, Inc., P.O. Box 1148, Springfield, Ill., 10 (NEDA)

United Television Co., 217 E. Washington St., Springfield, Ill., 10 (NEDA)

Wilson Electronics Supply Co., Inc., 108 W. Jefferson St., Springfield, Ill., 10 (NEDA)



# Distributional Functions



**West Chicago**

**Relay Sales, Inc., P.O. Box 186-IR, West Chicago, Ill., 5, 10, 20, 25, Tel: West Chicago 1100**

**See ad on page 517**

**American Monarch, Automatic Electric, C. P. Clare, Collins Electronics, Ebert Electronics, Electro-Mechanical Specialties Co., Elgin National Watch-Advance Relay Div., Guardian Electric, G-V Controls, Kurman, Leach, Monitor Relays, Inc., Phillips Control, Potter & Brumfield, RBM, Struthers-Dunn, Terado:** All products pertaining to relays.

**Westchester**

Brouillette & Associates, W. G., 1558 Newcastle Ave., Westchester, Ill., 15

**Central Electr. Mfrs.:** High voltage tubes & ionization gauges. **Croven:** Crystals & ovens. **Dage Elec.,** RF Connectors. **General Prods.:** Condensers & molded plastics. **Lakewood Controls:** Relays. **Mini-Rad:** Pulse width discriminators. **PCA:** Delay lines, pulse transformers.

**Wheaton**

Batha Co., Henry J., 310 S. Dorchester Ave., Wheaton, Ill., 15, MOntrose 8-7085

**F.B.C. Instruments:** Meters. **Hermetic Seal:** AN connectors, terminals. **National:** Wire & cable. **Transistor Electronics:** Indicator lites, nixie drivers, transistor-diode tester.

Hausten Co., The Dave, 607 E. Willow Ave., Wheaton, Ill., 15, MOntrose 8-7312

**Acromag:** Magnetic amplifiers, frequency detectors. **Applied Research:** UHF wideband amplifiers, converters, multiplexers, bandpass filters, impedance transformers. **Dalmotor-Yuba:** Electro-mechanical devices & special motors. **Magtrol:** Friction & hysteresis clutches, dynamometers. **Monitor Products:** Low frequency crystal oscillators, crystals, and crystal ovens. **New England Instruments:** Conductive plastic potentiometers. **U.S. Semiconductor:** Zener diodes, silicon retifiers. **Walkirt:** Encapsulated transistorized circuit modules.

**Wheeling**

Mykroy, Inc., 645 Wheeling Rd., Wheeling, Ill., 10 (NEDA)

## INDIANA

**Angola**

Clancy & Co., Inc., Joe, P.O. Box 269, Angola, Ind., 15, ANgola 793

**Antenna Designs:** Antennas. **Audiotex:** Tape audio accessories. **Eric Engineering:** Amplifiers & tuners. **Oaktron Industries:** Speakers & enclosures. **Orr Industries:** Recording tape. **Pace:** Meters. **Paco:** Kits. **Precision Apparatus:** Test equip. **Rauland:** Receiving & picture tubes. **Spaulding Prods.:** Towers & masts. **V-M Corp.:** Amplifiers, speakers, tape recorders, phonographs, record changers. **Walsco:** Chemicals, hardware, TV antennas. **Webster Electric:** Amplifiers, cartridges, power converters, timers.

Southern Sales Co., 105 Lakeshore Rd., Angola, Ind., 15, ANgola 777 (ERA)

**Elkhart**

Electronic Parts, Inc., 1003 S. Main St., Elkhart, Ind., 10 (NEDA)

**Fort Wayne**

Bieberich & Sons, Walter W., 2817 Plaza Dr., Fort Wayne 5, Ind., 15, KEnmore 2928

**Colman Electronics:** TV accessories, coils, knobs. **Delevan:** Choke coils. **Drake Mfg.:** Miniature lighting assemblies. **Illinois Condenser:** Subminiature & electrolytic capacitors. **J.B.T.:** Switches, elapsed time & vibrating reed frequency meters. **James Electronics:** Coaxial choppers, subminiature transformers. **Milwaukee Resistor:** Wire wound resistors. **Shurite:** Meters. **Triplett:** Test equip., panel meters. **U.S. Transistor:** PNP germanium transistors. **P. Wall Mfg.:** Pencil type irons, soldering guns.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Ellinger Sales Corp., 5214 Forest Ave., Fort Wayne, Ind., 15, TRinity 3-4833, Branch: Chicago, Ill.

Hoemig Sales Co., 3405 Butler Court, Fort Wayne, Ind., 15, ANthony 2083

**Amphenol-Borg:** Micropots, microdials, instrument motors, frequency standards. **Cramer Controls:** Miniature motors, electrical timing devices. **James Knights:** Crystals, filters, oscillators. **Licon:** Switches. **Magnecraft:** Relays. **Taurus:** Teflon terminals, sensors.

Homsher Co., Burton F., 2018 Jessie Ave., Fort Wayne 7, Ind., 15, EAstbrook 4920 (ERA)

Meily Co., William A., 4017 S. Harrison, Fort Wayne 6, Ind., 15, KEnmore 2461

**Accurate Electronics:** Terminal boards. **Aeronautical Elect.:** Lamp holders, indicator lamp assemblies. **Bradford Components:** Wirewound resistors. **El-Rad Mfg.:** R.F. & I.F. coils. **Midwest Coil & Transf.:** Transf., reactors, toroids. **Pyramid Elect.:** Capacitors. **Trolex:** Rotary switches, electro-mechanical devices. **Victor Electric Wire & Cable:** Wire cable cord sets. **World Magnetics:** Magnetic tape heads.

Menze Sales Co., 729 W. Packard, Fort Wayne, Ind., 10, 15, KEnmore 3171

**Callins Industries:** Aluminum electrolytic capacitors. **Cherry Elec. Products:** Snap action switches. **Maurey:** Prec. wirewound potentiometers. **Miller Elec.:** Cord sets & insul. wire. **Reon Resistor:** Carbon potentiometers, prec. wirewound resistors. **Tru-Ohm:** Power rheostats, fixed resistors.

Midwest Electronics Supply Co., 2016 Webster St., Fort Wayne, Ind., 10 (NEDA)

Needler Sales Co., Station C, P.O. Box 2407, Fort Wayne, Ind., 10, 15, HArrison 9726

**Astron:** Capacitors & filters. **William Brand-Rex Div.:** Wire & cable, sleeving & tubing. **Campbell Inds.:** Deposited carbon resistors. **Clarostat:** Variable & fixed resistors. **Skottie:** Ceramic capacitors. **Triad:** Industrial transformers. **Utrad:** Industrial transformers.

Valentine, Inc., Forrest C., 511 Ft. Wayne Bank Bldg., Fort Wayne, Ind., 15, ANthony 9122

**A.P.M.:** Toggle switch, push button & shaft seals. **Burton-Rogers:** Hoyt panel meters. **Cable Designs:** Teflon insulated wire, magnet, hook-up cables. **Curtis Dev. & Mfg.:** Terminal blocks. **Dynamic Instrument:** Electro-magnetic clutches & brakes. **Gap Instrument:** Precision built systems. **Gulton:** Thermistors, ceramic capacitors, transducers, miniature toroids, printed circuits. **Industrial Timer Corp.:** Synchronous motor-driven interval timers. **Iron Fireman:** Gyros. **Jan Hardware:** CRT shields, shock testers, radial drives. **Ohmite:** Rheostats, resistors, tap switches, R.F. chokes, variable transformers, tantalum capacitors, germanium diodes. **Panduit:** Wiring duct.

Illinois
Indiana

Indianapolis

Bland & [illegible], 1[illegible] Ave., Indianapolis 5, Ind., 15, CLifford 1-[illegible]

American Model Products, Electro Voice, Ferrocube, Lectrohm, Pilot Radio, Rider, George Stevens Mfg., Waters Conley.

Bryan Electronics Co., 3[illegible] Ave., Indianapolis 5, Ind., 15, [illegible]

Clarke & Co., [illegible] St., Indianapolis 20, Ind., 15, [illegible] 1-7209, Branch: Atlanta, Ga.

Crossley Associates, Inc., 5420 N. College Ave., Indianapolis 20, Ind., 15, CLifford 1-9255, Branch: Cincinnati, O.

Delta Sales, Inc., 2136 E. 52nd St., Indianapolis 5, Ind., 15, CLifford 1-3561 (ERA)

**Chicago Dynamics Inds.:** Rotary switches, instrument counters. **Filtors:** Hermetically sealed subminiature relays. **Handicraft:** Cutting & grinding tools. **International:** Wire & cable. **Jensen Inds.:** Phono needles, cartridges. **Jerrold:** Television distribution systems. **JFD:** Antennas & accessories. **Krylon:** Protective coating. **Matthew Stuart:** Portable tape recorders. **National Radio:** Communication receivers & components. **Osborne Electronic Sales:** Portable transceivers. **Premier Metal Prods.:** Metal housings. **Howard W. Sams:** Technical Publications. **Sprague:** Capacitors, resistors, transistors. **Talk-A-Phone:** Intercommunications equip. **Thordarson-Meissner:** Transformers & coils. **Torotel:** Toroid coils, transformers, filters, magnetic amplifiers. **World Wide:** Teflon wire.

DeVoe Co., Leslie M., 4010 Washington Blvd., Indianapolis 5, Ind., 15, ATwater 3-1395

**Amphenol-Borg:** Connectors, R.F. cable, sockets. **Centralab:** Variable resistors, ceramic capacitors, printed electronic circuits. **Daven:** Precision fixed resistors, switches, attenuators. **Littelfuse:** Fuses & holders. **Sarkes Tarzian:** Silicon conductors. **Sigma:** Sensitive relays. **Superior Resistor:** Fixed power resistors. **Virginia Electronics:** Programming switches.

Fishman & Assoc., 1836 Nottingham Dr., Indianapolis 20, Ind., 15, VIctor 6-8221

**Alliance:** Motors. **Clevite-Brush:** Headphones. **Clevite-Walco:** Phono needles. **Dow-Key:** Coaxial relays. **Dutrex:** Dummy receiving tubes. **Electro Products Labs:** Power supplies. **Globe Electronics:** Amateur equip. **Hickok:** Test equip., meters. **Hy-Gain:** Antennas. **Norelco:** Hi-Fi components, tape recorders. **Precision Elec.:** Amplifiers. **Sidco:** Soldering irons. **Tenna:** Antennas. **TV Development Corp.:** TV knobs. **Wen:** Solder guns.

Macnabb, Schroeder & Loomis, 820 E. 64th St., Indianapolis 20, Ind., 15, CL 5-6770 (ERA)

Morris-Cunningham & Assoc., 6208 N. College Ave., Indianapolis 20, Ind., 15, CL 1-3222 (ERA)

Pivan Engineering Co., 10302 North College, Indianapolis, Ind., 15, VIctor 6-1532, Branch: Chicago, Ill.

Scheffler Co., Charles, 1133 Navajo Trail, R.R. 14, Indianapolis 8, Ind., 15, CLifford 3-6337 (ERA)

Schulz Co., Edwin A., 721 Sherwood Dr., Indianapolis 20, Ind., 15, CL 5-1993

**Alcor:** Switches. **Astatic:** Microphones, cartridges. **British Industries:** Electronic equip. **Erie Resistor:** Capacitors. **J. W. Miller:** Coils. **Pyramid Electric:** Capacitors. **Sargent:** Switches. **Sherwood:** Amplifiers. **Sightmaster:** Fuses. **Warren:** Components. **Workman TV Products:** Resistors.

Thomas & Sukup, Inc., 5226 N. Keystone Ave., Indianapolis 20, Ind., 15, CLifford 1-4574

**Advance:** Relays. **Alpha:** Wire products. **Amperex:** Electron tubes. **Glass-Tite:** Hermetic seals. **Hallicrafters:** Communication equipment. **Quam-Nichols:** Loudspeakers. **Reeves-Soundcraft:** Magnetic recording products. **Simpson:** Panel meters & test equipment. **Switchcraft:** Jacks, plugs, jack switches. **Technical Appliance:** Commercial type antennas. **Unimax:** Snap action switches.

Van Sickle Radio Supply Co., 4131 N. Keystone Ave., Indianapolis, Ind., 10 (NEDA)

Weber Agency, Jack L., 9007 El Rico Rd., Indianapolis 20, Ind., 15, VIctor 6-0504 (ERA)

Whitesell & Associates, Robert O., 6620 E. Washington St., Indianapolis 19, Ind., 15, FLeetwood 9-5374

**Airtron:** Microwave components. **Bourns:** Trimpots. **Burroughs:** Special tubes. **Carling Electric:** Switches. **Cletron:** Speakers. **Controls Co. America:** Solenoid timers. **Electrical Industries:** Glass to metal seals. **Globe Industries:** Precision motors. **Good-All:** Capacitors. **Potter & Brumfield:** Relays. **U.T.C.:** Transformers.

**Jeffersonville**

Moakler Electronic Supplies, 500 E. Chestnut, P.O. Box 508, Jeffersonville, Ind., 10, BU 2-4311 (NEDA)

**Allen-Bradley:** Resistors. **Alpha:** Wire. **Astatic:** Crystals & microphones. **CBS:** Tubes. **Cannon:** Plugs & connectors. **Clarostat:** Controls & resistors. **Continental:** Picture tubes. **Dunwell:** Knobs. **Garrard:** Changers. **Hallicrafters:** Short wave equipment. **Hexacon:** Soldering irons. **Jensen:** Needles. **Masco:** Amplifiers & intercoms. **Pyramid:** Condensers. **Quam-Nichols:** Speakers. **RMS:** Indoor antennas. **Radion:** Indoor antennas. **Raytheon:** Rec., Spec. Purp. & picture tubes. **Sams:** Schematics & books. **Switchcraft:** Plugs, connectors. **Tenna:** Antennas. **Thordarson-Meissner:** Transformers & coils. **University:** Speakers. **Vaco:** Tools. **Vocaline:** Transceivers. **Walsco:** Hardware. **Weller:** Soldering irons. **Xcelite:** Tools.

**La Fontaine**

Kirsch Sales Co., 107 Wabash Ave., La Fontaine, Ind., 15, YUkon 1-2801 (ERA)

Radio-Television-Electronics-Audio components & accessories.

**Syracuse**

Roussey & Associates, Inc., Ralph F., R.R., Syracuse, Ind., 15, Branch: River Forest, Ill.

**Valparaiso**

Bowman & Associates, Jess, 253 W. Lincolnway, Valparaiso, Ind., 10 (NEDA)

## IOWA

**Cedar Rapids**

Deeco, Inc., 618 First St. N.W., Cedar Rapids, Iowa, 10, EMpire 4-2493

**Aerovox, Bourns, Bud, Centralab, Chicago Transformer, Cinch-Jones, Daven, Elco, Electra, Erie-Corning, General Inst., Hughes, Hoffman, IRC, International Rectifier, Industrial Timer, Motorola, Ohmite, Phaostron, Potter & Brumfield, RCA, Sarkes Tarzian, Sealectro, Sprague, Stancor, Sylvania, Triad, Tung-Sol, Texas Instrument, U.T.C., Vitramon.**

Iowa Radio & Supply Co., Inc., 719 Center Point Rd., Cedar Rapids, Iowa, 10 (NEDA)

Vrbik Co., Jerry, 419 3rd St., S.E., Cedar Rapids, Iowa, 10, 15, EMpire 5-0461

**Aemco:** Relays. **Amperex:** Power tubes, special purpose tubes, semiconductors. **Bliley:** Crystals, filters, ovens, delay lines, packaged oscillators. **Centralab:** Ceramic capacitors, switches, potentiometers, ceramics & alumina for industry. **Chemtronic:** Electrolytic capacitors. **Daven:** Attenuators, precision resistors, switches, LC filters. **Eastern Air Devices:** Blowers, motors, servos, motor tachometers. **Electro Assemblies:** RF & IF coils, coilforms. **Ferroxcube:** Ferrites, pot cores, memory planes. **E. F. Johnson:** Ham equip., variable air capacitors, pilot lights, inductors, tube sockets. **Sage Electronics:** Resistors. **Spectrol:** Precision potentiometers.

**Clarion**

Ellinger Sales Corp., 309 4th Ave., S.E., Clarion, Iowa, 15, CLarion 351-J, Branch: Chicago, Ill.

**Council Bluffs**

World Radio Laboratories, 3415 W. Broadway, Council Bluffs, Iowa, 10 (NEDA)

**Davenport**

TCR Distributors, 1205 East River, Davenport, Iowa, 10 (NEDA)

**Des Moines**

Gifford-Brown, Inc., 1400 Walnut St., Des Moines 7, Iowa, 10 (NEDA)

Iowa Radio Corp., 1212 Grand Ave., Des Moines 9, Iowa, 10 (NEDA)

Kay Sales Co., 2702 41st St. Place, Des Moines, Iowa, 20, Branch: Kansas City, Mo.

Mid-State Distributing Co., 1201 Grand Ave., Des Moines 9, Iowa, 10 (NEDA)

Radio Trade Supply Co., 1224 Grand Ave., Des Moines 9, Iowa, 10 (NEDA)

**Marion**

Inland Associates, 1575 Henderson, Marion, Iowa, 15, DRake 7-3317, Branch: Mission, Kan.

**Sioux City**

Dukes Radio Co., P.O. Box 1227, 209 6th St., Sioux City 1, Iowa, 10 (NEDA)

Molstad Distributing Co., Inc., 701 Fifth St., Sioux City 2, Iowa, 10 (NEDA)

## KANSAS

**Dodge City**

Interstate Electronic Supply Corp., 414 Military, Dodge City, Kan., 10, HUnter 3-6772, Branch: Wichita, Kan.

**Hays**

Interstate Electronic Supply Corp., 122 West 9th, Hays, Kan., 10, MArket 4-4328, Branch: Wichita, Kan.

**Hutchinson**

Interstate Electronic Supply Corp., 325 West 4th, Hutchinson, Kan., 10, MOhawk 2-7941, Branch: Wichita, Kan.

**Kansas City**

Kathrinus & Co., Norman W., 4206 Cambridge, Kansas City 3, Kan., 15, JOhnson 2-4108, Branch: St. Louis, Mo.

**Lawrence**

Sutton & Co., Fred E., 928 Massachusetts Ave., Lawrence, Kan., 10 (NEDA)

**Merriam**

Zimmer Sales Co., 5620 Woodward Ave., Merriam, Kan., 15, HEdrick 2-1121 (ERA)

**Mission**

Halgin Sales, 5920 Nall, Room 311, Mission, Kan., 15 (ERA)

Inland Associates, 6047 Howe Dr., Mission, Kan., 15, ENdicott 2-2366

**Aircom:** Waveguide components. **Branson:** Thermal time delay relays. **General Components:** Hardware. **Industrial Prods.—Danbury Knudsen:** Coaxial RF connectors, switches & relays. **Magnetics:** Tape wound, bobbin & powder cores, laminations. **Micamold:** Capacitors. **National Semiconductor:** PNP silicon & mesa transistors. **North Electric:** Miniature & telephone relays, crossbar switches. **Printronics:** Printed circuitry. **Rawco Instruments:** Sub-miniature choppers. **Safeway Heat Elements:** Instrument heaters. **Stevens Mfg.:** Thermostats. **Tech-Ohm:** Power & precision resistors. **Times Wire & Cable:** Coaxial cable, teflon wire.

**Prairie Village**

McGrade Co., E. W., P.O. Box 8876, Prairie Village 15, Kan., 15, RAndolph 2-0758 (ERA)

**Salina**

Radio Supply Co., Inc., 1809 S. Broadway, Salina, Kan., 10 (NEDA)

**Topeka**

Acme Radio Supply, Inc., 412 E. 10th St., Topeka, Kan., 10 (NEDA)

Carroll Radio & TV Supply, 1123 W. 6th St., Topeka, Kan., 10 (NEDA)

Signal Radio Supply, 115 Kansas Ave., Topeka, Kan., 10 (NEDA)

**Wichita**

Excel Distributors, 345-47 N. Water St., Wichita, Kan., 10 (NEDA)

Interstate Electronic Supply Corp., 230 Ida, P.O. Box 2018, Wichita 1, Kan., 10, HObart 4-6317 (NEDA)

**Aerovox:** Capacitors. **Alpha:** Wire. **Amphenol:** Coax, MS connectors. **Belden:** Wire: **Bud:** Metal cabinets. **Bussmann:** Fuses. **Dale Products:** Resistors. **General Electric:** Tubes, Semiconductors. **Micro Switch:** Switches. **Ohmite:** Resistors. **Premier:** Metal cabinets. **Raytheon:** Industrial products. **Sprague:** Capacitors. **Stancor:** Transformers. **Sylvania:** Tubes, Semiconductors. **Triplett:** Instruments. **UTC:** Transformers.

Kay Sales Co., 400 N. Emporia, Wichita, Kan., 20, Branch: Kansas City, Mo.

Radio Supply Co., Inc., 115 Laura, Wichita, Kan., 10 (NEDA)

Roes & Co., H. A., 421 S. Main, Wichita, Kan., 15, AMherst 2-1454, Branch: Kansas City, Mo.

## KENTUCKY

**Ashland**

Ashland Radio Supply Co., 2125 Winchester Ave., Ashland, Ky., 10 (NEDA)

**Bowling Green**

Crescent Radio Supply, 212 W. 10th St., Bowling Green, Ky., 10 (NEDA)

**Hopkinsville**

Randolph & Hale, Inc., 729 E. 4th St., Hopkinsville, Ky., 10 (NEDA)

**Lexington**

Radio Equipment Co., Inc., 480 Skain St., Lexington, Ky., 10 (NEDA)

Tel-Rad Electronics, Inc., 1401 Delaware Ave., Lexington, Ky., 10 (NEDA)



# Distributional Functions



**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

**Louisville**

Archy Electronics, 540 E. Gray St., Louisville 2, Ky., 10 (NEDA)

Cobb Sales Co., 220 Breckinridge, Louisville 4, Ky., 15, JU 4-6094

**Merit:** Transformers & coils. **Proto Tool:** Hand tools.

Delta Sales, Inc., 1126 Broad Fields Dr., Louisville 7, Ky., 15, TW 3-7609, Branch: Indianapolis, Ind.

Peerless Electronic Equipment Co., 2210 S. 7th St., Louisville 8, Ky., 10 (NEDA)

Whitesell & Associates, Robert O., 400 N. 38th St., Louisville, Ky., 15, SPring 6-2024, Branch: Indianapolis, Ind.

**Paducah**

Warren Radio Co., 455 S. 31st St., Paducah, Ky., 10 (NEDA)

**St. Matthews**

Southern Distributors, 3802 Lexington Rd., St. Matthews 7, Ky., 10 (NEDA)

## LOUISIANA

**Alexandria**

Central Radio Supply Co., Inc., P.O. Box 1688, 601 N. Third St., Alexandria, La., 10 (NEDA)

**Baton Rouge**

Electronic Supply Co., Inc., 1753 Scenic Hwy., Baton Rouge, La., 10 (NEDA)

**Lafayette**

Lafayette Radio Equipment, Inc., 1023 Simcoe St., Lafayette, La., 10 (NEDA)

Ralph's, 3304 Cameron St., Lafayette, La., 10 (NEDA)

**Lake Charles**

Wholesale Radio Equipment, Inc., 1722 Common St., Lake Charles, La., 10 (NEDA)

**Monroe**

Hale's, 421 Walnut St., P.O. Box 23, Monroe, La., 10 (NEDA)

**New Orleans**

Bell Radio Supply Co., 2625 Tulane Ave., New Orleans 19, La., 10 (NEDA)

Cartwright & Bean, 821 Pontalba St., New Orleans 24, La., 15, HUnter 8-2264, Branch: Memphis, Tenn.

Chapman & Co., Cary, 213 S. Front St., New Orleans, La., 15, TUlane 5184, Branch: Atlanta, Ga.

Columbia Radio & Supply Co., Box 13127, 3940 3rd St., New Orleans 25, La., 10 (NEDA)

Crescent Electronic Supply, Inc., 537 S. Claiborne Ave., New Orleans, La., 10 (NEDA)

Crockett Sales Co., The, 6851 Argonne, New Orleans, La., 15, EX 5-2517, Branch: Dallas, Tex.

Electronic Parts Corp., 223-225 N. Broad St., New Orleans 19, La., 10 (NEDA)

Lieberman & Associates, Inc., Hank, 6o Airline Hwy., New Orleans, La., 15, Branch: Dallas, Tex.

Southern Radio Supply Co., 1909 Tulane Ave., New Orleans 16, La., 10 (NEDA)

Texport Co., The, 501 N. Jefferson Davis Pkwy., New Orleans 19, La., 15, HUnter 2-9564, Branch: Dallas, Tex.

**Opelousas**

Opelousas Radio Equipment Co., 240 N. Court St., Opelousas, La., 10 (NEDA)

**Shreveport**

Koelemay Sales Co., Inc., 2530 Linwood Ave., Shreveport, La., 10 (NEDA)

Ports Electronics Parts Co., 2423 Southern, Shreveport, La., 10 (NEDA)

Yount Co., Jack, 3033 Sandra Dr., Shreveport, La., 15, MElrose 1-3693, Branch: Dallas, Tex.

## MAINE

**Auburn**

Radio Supply Co., Inc., 26-28 Cross St., Auburn, Me., 10 (NEDA)

**Augusta**

Powell Radio Supply, 337 Water St., Augusta, Me., 10 (NEDA)

**Bangor**

Maine Electronic Supply Corp., 494 Broadway, Bangor, Me., 10 (NEDA)

**Portland**

Maine Electronic Supply Corp., 148 Anderson St., Portland, Me., 10 (NEDA)

## MARYLAND

**Baltimore**

Aironic Accessory Co., Inc., 518 Virginia Ave., Baltimore 4, Md., 15, VAlley 3-3350, Branch: Brightwaters, N.Y.

American Distributing Co. of Baltimore, Inc., 1200 N. Fulton Ave., Baltimore 17, Md., 10 (NEDA)

Berman Co., Inc., Henry O., 10-12 E. Lombard St., Baltimore 2, Md., 10 (NEDA)

**Burlingame Associates, 15, ENterprise 9-6400, Branch: Mount Vernon, N.Y.**

**See ads on pages 245, 247, 257, 273, 274, 283, 288, 293, 294, 305, 311, 313, 327, 354, 365, 417, 439, 465, 475, 481, 489, 491, 569, 583**

Friedman & Assoc., Martin, 1805 Hillenwood Rd., Baltimore 14, Md., 15, HDelwood 5-5872, Branch: Bala-Cynwyd, Pa.

Holliday-Hathaway Co., Inc., 511 N. Charles St., Baltimore, Md., 15, SAratoga 7-8090, Branch: Rutherford, N.J.

Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland

Hofman Associates, Inc., [illegible] Spring Lane, Baltimore 12, Md., 15, [illegible] Branch: [illegible]

Jay Co., The, [illegible] 9467-7, Branch: [illegible]

Jordan, Inc., E. H., [illegible] Baltimore 14, Md., 15, Northfield 8-1933, Branch: Washington, D.C.

Kann-Ellert Electronics, Inc., [illegible] ard St., Baltimore 1, Md. (for NEDA)

MacDonald Inc., Samuel K., 2 E. Wilford Rd., Baltimore 14, Md., 15, HIllwood 5-1700, Branch: Philadelphia, Pa.

Radio Electric Service Co. of Baltimore, Inc., 5 N. Howard St., Baltimore 1, Md., 10 (NEDA)

Randall Co., Ken, 1303 McHenry Ave., Baltimore 28, Md., 15, RI 7-5200, Branch: Philadelphia, Pa.

Spartana Co., Inc., 239 N. Gay St., Baltimore, Md., 10 (NEDA)

Stemler Associates & Co., 511 N. Charles, Baltimore 1, Md., 15, PLaza 2-5211

**American Semiconductor:** Zeners, rectifiers, transistors, diodes, packages. **National Coil:** RF & IF chokes & coils. **Solid State Electronics:** Solid state choppers, oscillators, & telemetering equipment. **Subminiature Instruments Corp.:** Subminiature precision rotary potentiometers, trimmers. **Tempo Instruments:** Time delay relays, static timers, voltage sensors, counters, programmers. **Tronex:** Glass to metal seals.

Taylor Co., Morris F., 9500 Buckhorn Rd., Baltimore 34, Md., 15, NOrthfield 8-9054, Branch: Silver Spring, Md.

Wholesale Radio Parts Co., Inc., 308 W. Redwood St., Baltimore 1, Md., 10 (NEDA)

**Bethesda**

**Be-Esco Sales Corp., 9131 Hollyoak Dr., Bethesda 14, Md., 15, EMpire 5-1670, Branch: Yonkers, N.Y.**

**See ad on page 751**

Rosen & Associates, Inc., Gene, 9501 Wadsworth Dr., Bethesda 14, Md., 15, OLiver 6-6300 (ERA)

**Bladensburg**

Lowery, Inc., L. D., 4508 Annapolis Rd., Bladensburg, Md., 15, UNion 4-4722, Branch: Wynnewood, Pa.

**Cumberland**

Zimmerman Wholesalers, 162 Bedford St., Cumberland, Md., 10 (NEDA)

**Ellicott City**

Nelson-Platt Sales, 145 Ligon Rd., Macalpine, Ellicott City, Md., 10, 15, HOward 5-2621, Branch: Erlton, N.J.

**Hagerstown**

Stoddard Supply Co., 354 S. Cannon Ave., Hagerstown, Md., 10 (NEDA)

Zimmerman Wholesalers, 114 E. Washington St., Hagerstown, Md., 10 (NEDA)



"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 135-240.

**Hyattsville**

Andco Sales-Engineering, Inc., 5118 Baltimore Ave., Hyattsville, Md., 15, APpleton 7-4342, Branch: Philadelphia, Pa.

**Lutherville**

Lee Associates, Inc., S. S., P.O. Box 205, Lutherville, Md., 15, Branch: Orlando, Fla.

Newson & Associates, Inc., C. H., 17 Croftley Rd., Lutherville, Md., 15, VAlley 3-0431, Branch: Philadelphia, Pa.

**Riverdale**

Massey Associates, 6607 Riverdale Rd., Riverdale, Md., 15, APpleton 7-1023, Branch: Narberth, Pa.

**Rockville**

Horman Associates, Inc., 941 Rollins Ave., Rockville, Md., 15, HAzelwood 7-7560

**Acromag, Baldwin-Lima-Hamilton, Bomac, Dymec, John Fluke Mfg., Gertsch, Hewlett-Packard, Kin Tel, Sanborn, Sensitive Research Instrument, Sorensen-Raytheon, Varian, Weinschel.**

**Salisbury**

Standard Electronics Supply Co., 301 Snow Hill Rd., Salisbury, Md., 10 (NEDA)

**Silver Spring**

**Gawler-Knoop Co., 8732 Flower Ave., Silver Spring, Md., 15, JUniper 5-7550, Branch: Roseland, N.J.**

**See ad on page 737**

Lienau Co., Charles, 9427 Georgia Ave., Silver Spring, Md., 15, JUniper 7-5888, (ERA)

Rothenheber & Co., Inc., 4222 Ivy Glen Rd., Silver Spring, Md., 15, WHitehall 6-4488, Branch: Ardmore, Pa.

**Schweber Electronics, Perpetual Bldg., 8710 Georgia Ave., Silver Spring, Md., 15, JUniper 5-7023, Branch: Mineola, L.I., N.Y.**

**See ads on pages 395, 407, 517, 521, 541**

Taylor Co., Morris F., 9431 Georgia Ave., P.O. Box 111, Silver Spring, Md., 15, JUniper 9-4002, WHitehall 6-3569

**American TV & Radio:** Inverters, vibrators, battery chargers. **Guardian:** Relays. **R.N. Hunter Sales:** Tools. **Jensen Mfg.:** Loudspeakers. **Newcomb Audio Prods.:** Amplifiers. **Pickering:** Cartridges. **Pace:** Panel meters. **Paco:** Electronic instrument kits. **Precision Apparatus:** Test equip. **Progressive Electronics:** TV picture tubes. **Herman H. Smith:** Hardware. **Turner Co.:** Microphones. **Ungar:** Soldering tools. **Vanguard Electronics:** Coils. **Westinghouse (Electronic Tube Div.):** Entertainment & industrial tubes.

**Towson**

Barnhill & Associates, R. B., P.O. Box 6892, Towson 4, Md., 15, VAlley 5-3431

**Aladdin:** IF, R.F. pulse transformers & inductors. **Control Prods.:** Thermal switches. **General RF Fittings:** TM & TNC connectors. **National Union:** Special purpose tubes. **Pyramid Electric:** Capacitors. **Teleradio:** Capacitors. **Twin Lock:** Terminal blocks. **Union Switch & Signal:** Relays & indicators. **Vernitron:** Servo components.

Dickison Sales Co., Inc., 107 York Rd., Towson, Md., 10, 15, VAlley 3-0923, Branch: Erlton, N.J.

**Gawler-Knoop Co., 807 E. Seminary Ave., Towson 4, Md., 15, Branch: Roseland, N.J.**

**See ad on page 737**

J-H Electronic Sales Co., P.O. Box 6844, Towson 4, Md., 15, VA 5-4440

**Eastern Air Devices:** Motors & blowers. **Hermetic Seal Transformer:** Power supplies, transformers, coils. **Microwave Electronic Tube Co.:** Microwave components. **Microwave Electronics Corp.:** Traveling wave tubes. **Price Electric:** Relays, coils, contact assemblies. **Sarkes Tarzian:** Silicon & selenium rectifiers. **Suflex:** Sleeving & Tubing.

Maguire & Co., J. A., 29 Alleghany Ave., Towson, Md., 15, VAlley 5-3836, Branch: Camden, N.J.

Wilkinson, Inc., Robert L., 707 Stevenson Lane, Towson 4, Md., 15, DRexel 7-7800

**Bristol Motor Div.:** D.C. Syncro motors. **Cannon:** R.F. connectors, D.C. solenoids. **Dale Products:** Resistors, potentiometers, hysteresis motors, printed circuit boards. **Ferroxcube:** Ferrite materials, potcores, cokes, recording heads, memory planes. **Globe Industries:** Miniature motors, blowers, fans, timers, gear reductions.

**Wheaton**

Lee Associates, Inc., S. S., 2521 Ennalls Ave., Wheaton, Md., 15, LOckwood 5-3066, Branch: Orlando, Fla.

## MASSACHUSETTS

**Arlington**

Instrument Associates, Inc., 30 Park Ave., Arlington 74, Mass., 15, MIssion 8-2922

**Analab:** Oscilloscopes, cameras. **Boonton Radio:** Q motors, signal generators, RF bridges. **E-H Research Labs.:** Pulse generators, electromotors. **Gertsch:** Frequency meters, null detectors. **Gray Instrument:** Resistance bridges, laboratory potentiometers. **Harrison Labs.:** DC power supplies. **Laboratory for Electronics:** Microwave & pulse equip. **F. L. Moseley:** X-Y plotters, strip chart recorders. **Offner:** Oscillograph recorders, DC amplifiers. **Precision Instrument:** Tape recording assemblies.

**Ashland**

Muddle Co., John V., 74 Union St., Ashland, Mass., 15, TR 3-7091 (ERA)

**Bedford**

Chamberlin, Harold A., Hanscom Field Air Terminal, Bedford, Mass., 15, CRestview 4-0044

**Aeronautical Electronics:** Two-way radio communications. **Ampex:** Magnetic recording tape. **Antenna Specialists:** Antennas. **Astatic:** Microphones, cartridges, needles. **Atlas Sound:** P.A. loudspeakers, microphone stands. **Trlex Tower:** Towers.

Drew Associates, Inc., 56 The Great Road, Bedford, Mass., 15, CRestview 4-7232

**Airpax:** Choppers, magnetic amplifiers, magmeters, circuit breakers. **Air-Shields:** Dust hood covers. **General Prods.:** Terminal Boards, barrier strips. **Good-All:** Capacitors, allied connectors. **Microdot:** Cable & connectors, micro-miniature. **Servo Dynamics:** Servo motors, tach generators & gearheads. **Taber Instrument:** Transistorized amplifiers. **Waters:** Precision potentiometers, torque watch gauges.

**Beverly**

Kelly Co., Wm. T., 77 Lovett St., Beverly, Mass., 15, WA 2-0065 (ERA)

**Boston**

Anderson Sales Co., 177 State St., Boston, Mass., 15, CApitol 7-2980

**Gonset:** Amateur & citizen band transmitters & receivers, FM mobile tuners, amateur & marine converters. **Jerrold:** Amplifiers, converters, field strength meters. **Mark Simpson:** AM & FM tuners & amplifiers. **Sherwood:** AM & FM tuners.

Cramer Electronics, Inc., 811 Boylston St., Boston 16, Mass., 10 (NEDA)

De Mambro Radio Supply Co., Inc., 1095 Commonwealth Ave., Boston 15, Mass., 10 (NEDA)

Electro Sales Co., Inc., 50-58 Eastern Ave., Boston 9, Mass., 10, CApitol 7-3456

**Aerovox:** Capacitors. **Alpha:** Wire. **Amperex:** Tubes. **Barber-Colman:** Motors & reducers. **Bendix:** Synchros. **Birnbach:** Wire. **Bodine:** Motors & reducers. **Bussman:** Fuses. **Consol. Wire:** Wire. **Eclipse-Pioneer Div.:** Autosyncs. **Eitel-McCullough:** Tubes. **Electrons, Inc.:** Tubes. **Fasco Industries:** Blowers & motors. **General Electric:** Motors & reducers. **Hallicrafters:** Radio Rec. & Trans. **Gerald K. Heller:** Speed controllers. **Hoyt Elec.:** Meters. **ITT:** Tubes. **Janette Elec.:** Motors & reducers. **Merkle Korff:** Motors & reducers. **Marion:** Meters. **Minark Elec.:** Speed controllers. **National Electronics:** Tubes. **Redmond Elec.:** Blowers & motors. **Switchcraft:** Plugs, jacks. **Wagner Elec.:** Transformers.

Gerber Radio Supply Co., Inc., 1900 Columbus Ave., Boston 19, Mass., 10 (NEDA)

Keene Sales Co., 25 Tremont St., Boston 8, Mass., 15, RIchmond 2-0466 (ERA)

Lafayette Radio Electronics Corp., 110 Federal St., Boston, Mass., 5, 10, HU 2-7850, Branch: Jamaica, N.Y.

Mayer Co., A. W., 895 Boylston St., Boston 15, Mass., 10 (NEDA)

O'Donnell Electronics Supply Corp., 1123 Commonwealth Ave., Boston 15, Mass., 10 (NEDA)

Pacent Engineering Corp., 20 Providence St., Boston, Mass., 15, HAncock 6-2248, Branch: Great Neck, N.Y.

Perron & Co., Inc., Ray, 1870 Centre St., Boston 32, Mass., 15, FAirview 3-1008

**Beede:** Panel Meters. **Essex Wire:** Coils, Transformers. **Ferroxcube:** Ferrite Cores. **Gould-National:** Nicad Batteries. **Humphrey, Inc.:** Accelerometers & Gyros. **Industrial Condenser Corp.:** Capacitors. **International Resistance:** Resistors & Precision Potentiometers. **Kepco Laboratories:** Power Supplies. **Magnecraft:** Relays. **Measurements Corp.:** Laboratory Standard Instruments. **Donald P. Mossman:** Pushbutton & Lever Switches. **Peschel:** High Voltage Test Sets. **Semicon:** Silicon Diodes. **Victory Engineering:** Thermistors, Varistors.

Radio Shack Corp., 730 Commonwealth Ave., Boston 17, Mass., 10, REgent 4-1000

Representatives Corp., The, 10 High St., Boston 10, Mass., 15, HAncock 6-0341

**Ark-Les Switch:** Switches, terminals, terminal boards. **Electric Autolite:** Wire & cable. **Hindle:** Transformers. **Stevens Mfg.:** Thermostats.

Segel Co., Charles, 1262 Commonwealth Ave., Boston 34, Mass., 15, BEacon 2-4334 (ERA)

Sturgeon, Inc., Paul R., 25 Huntington Ave., Boston 16, Mass., 15, COmmonwealth 6-7705 (ERA)

Tee-Vee Supply Co., 3211 Washington St., Boston 30, Mass., 10 (NEDA)

Thal Plastics, Bernard, 791 Tremont St., Boston 18, Mass., 15, 20, COmmonwealth 6-1236

**Bolta Prods.:** Plastic custom molding. **Crystal Thermoplastics:** Plastic forming. **Holden Plastics:** Custom compression plastic moldings. **Maynard Plastics:** Plastic Extrusions.

**Brockton**

Ware Radio Supply Co., 913 Centre St., Brockton 11, Mass., 10 (NEDA)



# Distributional Functions



**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

**Brookline**

Broger Instrument Sales Co., Inc., 48 Pearl St., Brookline 47, Mass., 15, BEacon 2-4804

**Abtronics:** Hi speed cameras. **Berkeley/Beckman:** Counting Instruments. **Daytronic:** Gaging instruments. **GPL:** Industrial TV. **Industrial Test Equipment:** Phasemeters, impedance comparators, power oscillators. **Millivac:** Sensitive AC & DC VTVM'S, low noise amplifier. **Robertshaw:** Process control instruments, DC amplifiers. **Rutherford:** Pulse generators. **Sierra:** UHF power measurement. **Westronics:** potentiometric recorders & indicators. **Wiancko:** Digital pressure transducers.

Brown, Co., Kenneth L., 54 Atherton Rd., Brookline 46, Mass., 15, BEacon 2-3969 (ERA)

Eastern Electronic Sales Co., 145 University Rd., Brookline, Mass., 15, ASpinwall 7-5675 (ERA)

Gerber Sales Co., Inc., 48 Pearl St., Brookline 47, Mass., 15, BEacon 2-2425

**Aerovox:** Resistors, RF capacitors, filters. **Alpha:** Wire, cable, tubing, harnesses. **Amperex:** Electron tubes, semiconductors. **Bourns:** Lead screw actuated potentiometers. **Chicago Miniature Lamp Works:** Lamps. **Drake:** Dial light assemblies. **Grigsby:** Switches. **IMC Magnetics:** AC-DC motors, blowers, servos, synchros, tube sockets. **Industrial Electronic Hardware:** Term. strip. **Kurman:** Relays. **Millen:** Delay lines. **Sarkes Tarzian:** Silicon & selenium devices. **Spectrol:** Precision potentiometers. **Thomas & Betts:** Electrical fittings. **United Transformer:** Filters, transformers.

Segel Co., Inc., Henry P., 386 Washington St., Brookline 46, Mass., 15, BEacon 2-7525

**Bud:** Metal racks, cabinets & Chassis. **Britton:** Selenium & Silicon rectifiers. **Campbell Indus.:** Carbon film resistors. **Clarostat:** Precision & Standard potentiometers, molded carbon & wire, precision & power resistors. **Film Capacitors:** Capacitors, high voltage power supplies. **Freed:** Transformers, magnetic amplifiers, transistor power supplies. **Garde Mfg.:** Barrier terminals, coil forms, headers, printed circuit connectors. **Kooltronic:** Fans. **Rust Industrial:** Miniaturized automatic chart recorder. **Sightmaster:** Cartridge & Grasshopper type fuses.

**Burlington**

Yewell Associates, Inc., Middlesex Turnpike, Burlington, Mass., 15, BRowning 2-9000

**Baldwin-Lima-Hamilton, Bomac Labs, Dymec, Hewlett-Packard, Sanborn, Sensitive Research Instrument, Sorensen, Varian Associates.**

**Cambridge**

Components Sales Corp., Cambridge, Mass., 15, UN 4-1727, Branch: Hartsdale, N.Y.

Ealing Corp., The, 33 University Rd., Cambridge 25, Mass., 5, KIrkland 7-5760

**W. G. Pye & Co. Ltd., Cambridge, England:** Low Resistance, Instrument Switches, Sacalamp Galvanometers, Electrostatic Voltmeters, Microvoltmeters, D-C Amplifiers, Milli-microammeters.

Electrical Supply Corp., 205 Alewife Brook Parkway, Cambridge 38, Mass., 10 (NEDA)

**Greene Organization, Inc., The Dan, P.O. Box 124, Cambridge 38, Mass., 15, UNiversity 4-2220 (ERA)**

**See ad on this page**

**Atohm Electronics:** Precision trimmer potentiometers, catalog & custom designed. **Birtcher:** Tube & component retention & heat dissipating devices. **Chicago Dynamic:** Replaceable wafer rotary switches & binary or digital thumbwheel switches, precision instrument counters. **Globe Electrical:** Relays-industrial, miniature, sub-miniature, sensitive, rotary, micro-switch, solenoid, terminals. **Howell Instrument:** Galvanometers, verni-dials. **Midland Mfg.:** Crystal filters, quartz crystal, quartz. **Rimak:** Microminiature parts for breadboarding & circuit assembly, chassis. **Standard Components:** Coils, yokes & deflection units. **Standard Rectifier:** Silicon rectifiers. **Stepper Motors Div. Land-Air:** Automatic pulse timers, synchro-positioners, rotary solenoids. **Triad Transformer:** Toroidal inductors, pulse transformers, filters, transistors, geoformers. **Utrad:** Transformers, pulse transformers & reactors. **Zero:** Cases & containers.

Hathaway Electronics, Inc., Glenn M., 238 Main St., Cambridge 42, Mass., 15, KIrkland 7-0380 (ERA)

Stockwell Technical Sales Co., 44 Walker St., Cambridge, Mass., 15, TRowbridge 6-5115, Branch: Tolland, Conn.

**Chestnut Hill**

Akeroyd, Arthur E., 70 Reservoir Rd., Chestnut Hill 67, Mass., 15, REgent 4-2433

**Airdesign:** Transformers, reactors, filter networks. **Astron:** Capacitors, noise filters. **Bureau of Engraving:** Printed circuits. **Raytheon:** Electronic tubes. **Regency Div.:** UHF converters, citizen band transceivers, transistor radios.

**Chicopee**

Bahr Sales Co., 462 Granby Rd., Chicopee, Mass., 15, LY 2-3213, Branch: Woodbridge, Conn.

**Danvers**

Equipment Sales Co., Inc., 5 Elm St., Danvers, Mass., 10, SPring 4-2400, Branch: New Haven, Conn.

**Dorchester**

Aironic Accessory Co., Inc., 35 S. Munroe Terr., Dorchester, Mass., 15, TAlbot 5-3288, Branch: Brightwaters, N.Y.

**East Longmeadow**

Gerber Sales Co., Inc., 6 N. Main St., East Longmeadow, Mass., 15, LAurel 5-3059, Branch: Brookline, Mass.

Maryland
Massachusetts

**Fitchburg**

Young & Young of Fitchburg, Inc., 372 Water St., Fitchburg, Mass., 10, DIamond 3-3078, Branch: Springfield, Mass.

**Hamilton**

Gyson Associates, 75 Bay Rd., Hamilton, Mass., 15, WAlker 2-5776

**Amerac:** Microwave components. **Astron Electro-Dynamics:** [illegible] **Burmac Electronics:** Pulse [illegible] **R. F. Simmons:** [illegible]

**Holyoke**

Rodgers Associates, 717 Main St., Holyoke, Mass., 15, REpublic 3-8428 (ERA)

**Lawrence**

Young & Young of Lawrence, Inc., 148 Broadway, Lawrence, Mass., 10, MUrdock 7-7171, Branch: Springfield, Mass.

**Lexington**

Boeing Co., Inc., John E., P.O. Box 235, Lexington 73, Mass., 15, VOlunteer 2-2500

**ACDC:** Regulated power modules, chokes. **Ballastran:** Transformers. **Bradley:** Diodes, rectifiers. **Consolidated Electronics:** Connectors. **EFCON:** Plastic & tantalum capacitors. **Harowe:** Servo motors, motor generators, synchros. **Hi-G:** Relays. **Mepco:** Precision resistors. **New England Instrument:** Conductive plastic & wire wound potentiometers. **Torwico:** Toroidal coils, transformers. **Vitramon:** Porcelain capacitors.

Palioca, Inc., Wayne B., 1787 Massachusetts Ave., Lexington, Mass., 15, VOlunteer 2-7224

**ADC Inc.:** Filters, transformers, power supplies, jacks, transistor transformers. **Automatic Metal Prod.:** Connectors, coaxial relays & switches. **Diodes:** Miniature silicon rectifiers. **John E. Fast:** Capacitors. **Huyck Systems:** Miniature servo computer components. **Kinetic Inst.:** Precision gear heads, speed reducers & gear motors. **Monitor Prods.:** Quartz crystals, oscillators, ovens. **Portchester Instrument:** Wave guide. **Premier Instrument:** Waveguide components. **Victoreen Instrument:** Voltage regulators, electrometer & cold cathode trigger tubes, resistors. **Willrite:** Resistors.

Purinton, Inc., Richard, 11 Muzzey St., Lexington 73, Mass., 15, VOlunteer 2-8300

**Amphenol-Borg, Barker & Williamson, Bliley Electric, Borg Equipment Div., CTS, North Electric, Oak Manufacturing.**

The DAN GREENE Organization INC.

P. O. Box 124, Cambridge 38, Massachusetts • Tel: UNiversity 4-2220

*Representing in the Six New England States:*

**Triad Transformer Corporation**
Catalog and custom-engineered Transformers and Reactors, MIL and commercial specs. Geophysical Transformers. Transistor Transformers. Toroidal Inductors. Wave Filters. Pulse Transformers.

**Zero Manufacturing Company**
Military Transit Cases. Catalog and custom Precision Deep-Drawn Instrument Cases, containers, and cans of *aluminum* or *magnesium*.

**Midland Manufacturing Company, Inc.**
Manufacturers of Quartz Crystals for Electronic Frequency Control, Crystal Filters.

**Stepper Motors Corporation**
Stepping Motors, Automatic Pulse Timers, Synchro-Positioners.

**Birtcher Corporation (Industrial Division)**
Tube and Component Retention and Cooling Devices, Transistor or Diode Heat Radiators

**Chicago Dynamic Industries, Inc.**
Binary and Digital Thumb Wheel Switches, Rotary Selector Switches with Removable Wafers. Precision Instrument Counters.

**Atohm Electronics Inc.**
Precision Subminiature Wire Wound Potentiometers.

For details, circle #773 on Reader Service Card

**Marblehead**

Willson Sales Co., 6 Mohawk Rd., Marblehead, Mass., 15, NEptune 1-4016

**Concord Electronics, D & R Co., Dutone, Dynaco, Electrophono & Parts, Harman-Kardon, Jensen Mfg., Webster Mfg., Welwyn Int'l.**

**Melrose**

MacInnis, Norman R., 53 Youle St., Melrose 76, Mass., 15, NOrmandy 5-0879 (ERA)

**Natick**

Bahr Sales Co., 16 Westfield Rd., Natick, Mass., 15, OL 3-9291, Branch: Woodbridge, Conn.

Pettigrew & Co., Inc., R. S., 45 Main St., Natick, Mass., 15, OLympic 3-6480, Branch: W. Hartford, Conn.

**Needham**

Abbett & Hustis, 1253 Highland Ave., Needham 92, Mass., 15, HIllcrest 4-5470 (ERA)

De Veer Sales Engineering Co., Inc., 1492 Highland Ave., Needham 92, Mass., 15, HIllcrest 4-4200

**Aladdin:** Transformers, inductors. **C. P. Clare:** Relays & stepping switches, transistors. **Northern Eng. Labs.:** Low frequency quartz crystals & ovens. **Power Sources:** Power supplies, inverters. **Trans-Sil:** Diffused silicon power rectifiers.

Harris Co., Stanley A., 1241 Highland Ave., Needham 92, Mass., 15, HIllcrest 4-4780 (ERA)

Lavin Associates, Inc., 82 Curve St., Needham, Mass., 15, HIllcrest 4-3446, Branch: Meriden, Conn.

Mosher & Peyser Co., 945 Great Plain Ave., Needham 92, Mass., 15, HIllcrest 4-1400 (ERA)

White Sales Co., Inc., 945 Great Plain Ave., Needham 92, Mass., 15, HIllcrest 4-3676

**Allies' Products:** Precision carbon deposited resistors. **Autotron:** Photoelectric & Electronic controls. **Barber-Colman:** Relays & DC motors. **Electronic Eng. of Calif.:** Time code generators, data handling equip., tape search & control systems, power supplies. **Engineered Electronics:** Packaged circuit modules. **Farmer Electric:** Electronic relays & timers. **Hamlin:** Switches & electrolytic potentiometers. **Industrial Timer:** Timers. **Jelliff Mfg.:** Resistance alloys. **Leach:** Relays. **Line Electric:** Relays. **Resistors:** Wire-wound resistors. **Simmons:** Fasteners. **Sun Electric:** AC & DC meters.

**Needham Heights**

Todino Engineering Sales, Inc., 50 Kearney Rd., Needham Heights 94, Mass., 15

**G-V Controls:** Thermal relays, transistorized time delays. **General Instrument:** Semiconductors, silicon rectifiers & diodes, germanium diodes. **Hi-Spec:** Miniature magnetic relays. **Magnetics Research:** Shift registers, magnetic logic. **Micamold:** Capacitors. **Rotating Components:** Motors, fans, blowers & servos. **Sage Electronics:** Precision resistors. **F. W. Sickles:** Coils, chokes, delay lines, air trimmers.

**Newton**

Greene-Shaw Co., Inc., 341 Watertown St., Newton 58, Mass., 10 (NEDA)

Sturdy Co., Inc., R. H., 103 Morse St., Newton 58, Mass., 15, WAlnut 6-0808

**C & K Components:** Magnetic shift registers, logic modules, transistorized indicator lights. **Collins Radio:** Mechanical & crystal filters. **Pulse Engineering:** Pulse Transformers, filters, toroids. **Western Transistor:** Silicon transistors.

**Newton Highlands**

Coakley Inc., Tim, 148 Needham St., Newton Highlands 61, Mass., 15, DEcatur 2-4800

**Amer. Microphone:** Microphones. **Argos:** Baffles. **Eitel-McCullough:** Power tubes, klystrons. **Elgin Advance:** Relays. **Hallicrafters:** Communications equip. **Hy-Gain:** Antennas. **Petersen Radio:** Crystals. **Reeves Soundcraft:** Recording tape. **Webcor:** Phonographs, tape recorders.

**Newton Lower Falls**

Grossman Sales Co., M. C., 30 Ithaca Circle, Newton Lower Falls, Mass., 15, DE 2-7481 (ERA)

**Newton Upper Falls**

MacDonald-Wadman Co., Inc., 1213 Chestnut St., Newton Upper Falls, Mass., 15

**Allied Control:** Relays, Toggle Switches, Solenoid Valves. **Lewis Engineering:** High-temp wires, Multi-conductor cables, Thermocouple wires. **Taylor Electric:** Plastics.

**Newtonville**

Eltron Engineering Sales Co., Inc., 246 Walnut St., Newtonville 60, Mass., 15, DEcatur 2-6975

**Beckman Systems Div.:** Instrumentation amplifiers, digital voltmeter, timing equip. **Consolidated Avionics:** Transistorized power supplies. **Digital Equip.:** Digital test equip., analog computers. **Feedback:** Gearheads & servo motors, devices. **Filtron:** RF interference filters, delay lines, capacitors. **Helipot:** Servo motors, panel meters, precision potentiometers. **Shallcross:** Precision wire wound resistors, rotary switches. **U.S. Semcor:** Semiconductors, tantalum capacitors.

Hatton & Co., Arthur T., 246 Walnut St., Newtonville, Mass., 15, DEcatur 2-2021, Branch: W. Hartford, Conn.

Schuft, Co., Inc., The Howard J., 815 Washington St., Newtonville, Mass., 15, LA 7-5304

**Applied Dynamics:** Microwave spectrum analyzers. **Ballantine Labs.:** A.C. Voltmeters. **Curtiss-Wright:** Recorders, line regulators. **E.G.&G.:** TW scope, thyratrons, strobes. **Ind. Instr.:** Hi-Pot, testers, bridges. **Non-Linear Systems:** Digital voltmeters, comparator accessories. **Oregon Electronics:** D.C. regulated power supplies. **Southwestern Ind. Electronics:** Voltmeters, oscillators, bridges, audio response plotters. **Technibilt:** Oscilloscope & inst. carriers. **Technical Prods.:** Wave analysis equip. **Waveline:** Microwave test equip. & components.

**Northampton**

C & I Distributors, Inc., 228 Pleasant St., Northampton, Mass., 10 (NEDA)

**Norwood**

Pierce Assoc., Stanley B., 583 Neponset St., Norwood, Mass., 15, NOrwood 7-3164 (ERA)

**Pittsfield**

Welch Electronics, Inc., 111 West St., Pittsfield, Mass., 10 (NEDA)

**Quincy**

Pilgrim Electronic Supply Corp., 26-28 School St., Quincy 69, Mass., 10 (NEDA)

**Scituate**

Hendrickson Co., W. A., 291 First Parish Rd., Scituate, Mass., 15, LInden 5-0652

**Audiotex:** HiFi accessories. **Blonder-Tongue:** Antenna equip., TV cameras. **J. W. Miller:** Coils. **Radion:** Antennas, indoor. **Sonotone:** Cartridges, tubes, tape heads, speakers, microphones. **TACO:** Antennas. **Walsco:** Hardware & chemicals. **Workman TV:** Resistors.

**Somerville**

New England Area Representatives, Inc., (NEAR, Inc.), 99 Highland Ave., Somerville 43, Mass., 15, PRospect 6-2262

**Amatom:** Electronic Hardware. **American Capacitor Co.:** Ceramic disc capacitors. **Autotronics:** Electromagnetic brakes & clutches. **Cleveland Electronics:** Speakers. **Fairchild Controls:** Precision Potentiometers, Accelerometers, Gyros. **Filtors:** Miniature Rotary Relays. **Fleetwood Labs.:** Relay test sets. **Glasseal Products:** Glass to metal seals, Connectors. **Gudeman:** Capacitors. **Middletown Mfg.:** Chassis, Racks & Panels. **United Mineral & Chemical:** Mica, high purity metals, carbon deposited resistors.

**Springfield**

Cushing, Inc., T. F., 1026 Bay St., Box 2049, Springfield 1, Mass., 10 (NEDA)

Soundco Electronic Supply Co., Inc., 147 Dwight St., Springfield 3, Mass., 10 (NEDA)

Sydlee Electronic Supply Corp., 453 Worthington St., Springfield 5, Mass., 10 (NEDA)

Young & Young of Springfield, Inc., 169 Spring St., Springfield 5, Mass., 10, RE 4-1138

**CBS:** Receiver Tubes. **General Electric:** Receiver Tubes. **Merit:** Transformers. **RCA:** Receiver Tubes. **Sprague:** Capacitors & Resistors. **Stancor:** Transformers. **Sylvania:** Receiver Tubes. **TACO:** Antennas. **Sarkes Tarzian:** Rectifiers. **Triad:** Transformers. **Winegard:** Antennas.

**Wakefield**

Instrument Dynamics, Inc., 11 Albion St., Wakefield, Mass., 15, CRystal 6-5100

**Acton Labs.:** Phase meas. inst. **Amco Eng.:** Custom modular equip. enclosures. **Baird-Atomic:** Transistor test equip. **Burroughs:** Beam switching & nixie display tubes. **Calif. Technical Ind.:** Test inst. & systems. **Computer Meas.:** Counters. **Hermes:** Crystal filters, digital timing equip. **Philbrick Researches:** Analog computers & components. **Power Designs:** Transistorized power supplies. **Trio Labs.:** Panel mounted VTVM's.

Jappe Co., Howard C., 37 Hilcrest Rd., Wakefield, Mass., 15, CRystal 6-4816 (ERA)

**Dale Prods.:** Wire wound power & precision resistors, trimming potentiometers, networks, printed circuits. **Jettron Prods.:** Tube sockets & connectors. **Phalo:** Wire, cable, harness assemblies. **Reeves-Hoffman Div.:** Quartz crystals, crystal & LC filters, ovens. **Thomas & Skinner:** Transformer laminations, wound cores, permanent magnets.

Kaelber & Mack, 37 Hillcrest Rd., Wakefield, Mass., 15, CRystal 6-4816, Branch: Manhasset, N.Y.

**Waltham**

**Burlingame Associates, 974 Main St., Waltham, Mass., 15, TWinbrook 4-1955, Branch: Mount Vernon, N.Y.**

**See ads on pages 245, 247, 257, 273, 274, 283, 288, 293, 294, 305, 311, 313, 327, 354, 365, 417, 439, 465, 475, 481, 489, 491, 569, 583**

Cirolia, Le Blanc Sales Co., Inc., 885 Main St., Waltham 54, Mass., 15, TW 4-2977

**Air-Marine:** Motors, fans, blowers. **Anderson Labs.:** Lump delay lines. **Dearborn:** Capacitors. **DeJur-Amsco:** Potentiometers, meters. **Eastern Reproduction Corp.:** Printed circuits. **Kidco:** Carbon-istors & metal-istors. **Kings Electronics:** RF connectors. **Lieco:** Microwave. **Mystic:** Transformers. **Network Industries:** Toggle switches.



# Distributional Functions



Saunders & Co., 8 Prospect St., IRE, Waltham 54, Mass., 15, TWinbrook 4-6071

**Ad-Yu:** Phase meas. & time delay insts. **Arnhold Ceramics:** Resistors, isophon, speakers. **Arthur Ansley:** Printed circuit boards, plus module. **Davenport Mfg.:** Prototype design. **Delta Design Engineers:** Temp. chambers. **Development Engineering:** Environmental test chambers. **Epic:** Lab. meters, recorders, controllers, bridges. **Gyra:** Electrometers. **Molectronics:** Digital voltmeters, oscilloscopes, VTVM's. **Orbit Instrument:** Magnetic clutches & clutch brakes, gearheads & miniature differentials. **Remanco:** Radar target, IF & video, microwave target simulators, pulse & multiple pulse delay generators. **Solid State Electronics:** Micro-miniaturized choppers. **Stereatronics:** Solid state device applications. **Teltronics:** Modular transistor amplifiers, telemetry, ultrasonics. **Vicon:** Closed circuit TV equip.

Surrell Distributors, Inc., 922 Main St., Waltham 54, Mass., 10 (NEDA)

**Watertown**

Schley Co., 70 Coolidge Hill Rd., Watertown 72, Mass., 15, WAlnut 6-0235 (ERA)

**Wellesley**

Gray, Inc., Robert W., 572 Washington St., Wellesley 81, Mass., 15, CEdar 5-0191

**Arch:** Precision gears, Electro-mechanical instrumentation. **Arduini Mfg.:** Sheet metal fabricating. **Dielectric Prods. Engineering:** Communications antennas & accessories. **Electro Tec:** Slip rings, commutators, switches. **Hannel:** Relays. **Kellogg Switchboard:** Components. **Ken-Tron:** Connectors, plugs, jacks. **L. Frank Markel & Sons:** Sleevings, tubings, teflon high temperature lead wire.

**Wellesley Hills**

Pray Sales, W. B., 44 Washington St., Wellesley Hills 81, Mass., 15, CE 4-3199 (ERA)

Scott Co., Inc., Michael, 336 Washington St., Wellesley Hills 81, Mass., 15, CEdar 5-0102

**Camblock:** Terminal strips. **Chicago Standard:** Transformers & coils. **Con Elco:** Precision potentiometers, var. res. **Electronic Inst.:** Instruments, kits. **Erie Resistor:** Corning resistors, capacitors. **Grayhill:** Switches, hardware. **Grayhill Moldtronics:** Molded products. **International Rectifier:** Semiconductors. **Multicore:** Ersin multicore solder. **National Radio:** Knobs, hardware. **Telex:** Headsets.

**West Acton**

Wilder & Co., L. P., 277 Central St., West Acton, Mass., 15, 20, COlonial 3-5882

**Coil Specialty:** Coils. **Hampden Mfg.:** Plastic parts. **Pierce Electronics:** Custom Assembly. **Red Fox:** Engraving.

**West Newton**

Ingber Co., L. K., 41 Cross St., West Newton 65, Mass., 15, DEcatur 2-5874

**Algo:** Metal housings & modification work. **Anchor Alloys:** High purity elements. **Anchor Metal:** Solders & fluxes. **CerMac Div. Shaw Instr.:** Metallized ceramic assemblies. **Chemical Development:** Conductive & nonconductive epoxies. **Continental Prec. Prods.:** Precision screw machine parts. **Dakota Engrg.:** Wire clamps, ties, hangers. **Glass Beads:** Glass pre-forms, jigs. **North Hills:** Coils, filters, wide band transformers, toroids, constant current sources, voltage standards. **Oryx:** Miniature soldering irons.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Schweber Electronics, 1191 Washington Ave., West Newton, Mass., 15, DEcatur 2-8500, Branch: Mineola, L.I., N.Y.

See ads on pages 395, 407, 517, 521, 541

**Weston**

Cole & Co., 21 Radcliffe Rd., Weston 62, Mass., 15, CEdar 5-3197 (ERA)

Connectronics Co., 669 South Ave., Weston 93, Mass., 15, 20, CEdar 5-2165

**Carpenter Mfg. Co.:** Wire Stripping Machines. **Contact, Inc.:** Soldering & Wire Stripping Equipment. **Design Tool:** Component Preparation Equipment. **Eubanks:** Wire Measuring, Cutting & Stripping Machines. **Ewald:** Welding heads and power supplies.

**Winchester**

Hooker, Inc., Samuel C., 397 Highland Ave., Winchester, Mass., 15, WInchester 6-2745 (ERA)

**Worcester**

Radio Maintenance Supply Co., 80 Thomas St., Worcester 8, Mass., 10 (NEDA)

## MICHIGAN

**Ann Arbor**

Wedemeyer Electronic Supply Co., 215 N. 4th Ave., Ann Arbor, Mich., 10 (NEDA)

**Battle Creek**

Warren Radio Co., 93 W. Bidwell, Battle Creek, Mich., 10 (NEDA)

**Birmingham**

Nordstrom & Co., R. C., 218 Briggs Bldg., Birmingham, Mich., 15, JOrdan 4-6128

**Amphenol-Borg:** Connectors, cable & wire. **Mucon:** Sub-miniature capacitors. **Precision Metal Prods.:** Terminals & boards. **Pyramid Electric:** Capacitors. **Resistance Prods.:** Resistors.

Rockford Controls Co., 312 E. Brown, Birmingham, Mich., 15, MIdwest 4-5200, Branch: Glen Ellyn, Ill.

**Cheboygan**

Straits Distributors, Inc., 412 N. Main, Cheboygan, Mich., 10 (NEDA)

**Dearborn**

Anger Associates, 13126 Michigan Ave., Dearborn, Mich., 15

**Avco Res. & Advance Development Div.:** Hypervelocity Instrumentation, Environmental test equipment, plasma-guns. **Atlantic Pyrometers:** Pyrometers, thermocouples. **Industrial Instruments:** Test equipment, automated component bridges, electrolytic conductivity instrumentation, gas analyzers, process control. **Vacuum Instrument:** Leak detectors, ionization gauges, high vacuum equip.

Massachusetts
Michigan

West Side Electronics & TV Supply, 7321 Woodward Ave., Detroit 2, Mich., TRinity 1-5313

Detroit

NEM Supply Co., 2611 Penobscot Bldg., Detroit 26, Mich., WOodward 2-1984

Newark Electronics Corp., 223 W. Madison, Chicago 6, Ill., Branch: Detroit 26, Mich., 15, WEst 2-1242, Branch: Milwaukee, Wis.

Bertel Co., Wayne, 132 [illegible] Detroit 27, Mich., 15, VAlley 2-[illegible] (ERA)

Burstein-Applebee Co., 2725 Grand River Ave., Detroit 26, Mich., 15, WOodward 3-7700

**Dale Prods.:** [illegible] **DeJur-Amsco—Continental:** Meters & [illegible] meters, resistors & [illegible] **Rust Industrial:** [illegible] recorder. **Standard Rectifier:** [illegible] & power rectifiers. **Times Wire & Cable:** [illegible] axial, RG & [illegible] **Victory Engineering:** [illegible] matrices, [illegible]

Butchart Co., Rod, 1667 E. Warren, Detroit 24, Mich., 15, HAzelwood 2-[illegible]

**Antenna Specialists:** [illegible] **Hamfort:** Trimpots. **Cleveland Electronics:** [illegible] **Electro Prod. Labs.:** Power supplies. **Fairchild Rec. Equip.:** Controllers, [illegible] **International Rectifier:** Rectifiers. **National Radio:** Components. **Orr Industries:** Magnetic Recording Tape. **H. H. Scott:** Custom tuners & amplifiers. **South River Metal Products:** TV antenna hardware. **Talk-A-Phone:** Intercom. **Tandberg of America:** Tape recorders. **United Audio Prod.:** Turntables.

Central Electronic Sales Co., 19305 Fairport St., Detroit 5, Mich., 15, LAkeview 6-5841 (ERA)

Clark Co., Nelson J., 17136 E. Warren Ave., Detroit 24, Mich., 15, TUxedo 5-1723

**Brand Electronic Components:** Ferrites, capacitors, transistors, diodes. **Brand-Rex Div.:** Wire cable, electrical insulation, tubing, sleeving. **Miller Dial & Name Plate:** Electroluminescent panels. **U.S. Components:** Subminiature connectors.

Ferguson Electronics, Inc., 2306 Puritan, Detroit 38, Mich., 10 (NEDA)

Glendale Electronic Supply Co., 12956 Woodward Ave., Detroit 3, Mich., 10 (NEDA)

Henschen, Jensen & Co., 2842 W. Grand Blvd., Detroit 2, Mich., 15, TRinity 1-0308

Electronic components & equip.

K.L.A. Laboratories, Inc., 7375 Woodward Ave., Detroit 2, Mich., 10 (NEDA)

Kochler-Pasmore Co., 11833 Hamilton Ave., Detroit 3, Mich., 15, TOwnsend 8-3322

**Bureau of Engraving:** Printed circuits. **CTS of Elkhart:** Variable resistors. **Dialight:** Pilot lights. **Grayhill:** Small switches, binding posts. **ITT Components Div.:** Semiconductors. **Licon Div.:** Precision snap switch. **International Resistance:** Resistors, precision potentiometers. **Marion Instrument Div.:** Meters. **Vitramon:** Capacitors.

Kurtz Co., Paul, 18212 James Couzens Hwy., Detroit 35, Mich., 15

**British Audio Prods., Cousino Electronics,**

*(Listing continued on page 732)*

**Distributors Group, Fibre Glass-Evercoat Co., Fisher Radio, Int'l. Electronics Sales, No. American Philips Co., Parker Metal Goods, Perma-Power Co.**

Lee & Hale Co., 10432 W. McNichols Rd., Detroit 21, Mich., BRoadway 2-0606 (ERA)

Liddle Co., Edwin F., 18925 Grand River Ave., Detroit 23, Mich., 15, VErmont 7-5310 (ERA)

Lohmann Co., R. S., 12730 Fenkell, Detroit 27, Mich., 15, UNiversity 2-9465

**Astron:** Capacitors. **Custom Components:** Powdered iron cups, cores & ferrite antenna rods. **Daven:** Attenuators, switches, precision resistors, lab. equip. **Hardwick, Hindle:** Resistors & rheostats. **Kurman:** Relays. **Permonite:** Laminated phenolic prods. **Skottie:** Ceramic capacitors. **Sun Electric:** Panel meters.

Merchant & Co., Inc., R. C., 18411 W. McNichols, Detroit 19, Mich., 15, KEnwood 5-6000

**All-Star Prods.:** Condensers. **Centralab:** Switches, ceramics, capacitors. **Chicago-Standard Transformer:** Transformers. **Electrocraft:** Switches. **General Prods.:** Terminal boards. **Illinois Condenser:** Condensers. **Littelfuse:** Fuses. **North American Electronics:** Rectifiers, diodes. **Reeves-Soundcraft:** Recording discs & tapes. **Resistor Wholesalers':** Resistors. **Simpson:** Meters (panel & test equip.). **Technical Appliance:** Antennas. **Tru-Ohm:** Resistors. **Union Switch & Signal:** Relays.

Milsk Co., Robert, 19371 James Couzens Hwy., Detroit 35, Mich., 15, BRoadway 3-3652

**Aerovox, Astatic, Atlas Sound, Clarostat, Crest Transformer, Harman-Kardon, JFD, Howard W. Sams, Soundolier, Setchell-Carlson, Ungar, U.S. Transistor.**

Moore Sales Co., Howard W., 401 Margaret W., Detroit 3, Mich., 15, TUlsa 3-0218

**Beamco Assoc.:** Battery chargers, test equip. **Delta:** Coils & inductors. **Injectorall:** Chemicals. **Jayem Sales:** Cabinets. **Mercury Electronics:** Tube clkrs. **Peerless Prod. Ind.:** Antennas. **Petely Enterprises:** Transistorized tape recorders. **Rye Sound:** Earsets, plugs, sockets, terminals. **Rytel Prods.:** Switches, controls, speaker kits. **United Scientific Labs.:** DeWald hi-fi components, citizens band radios. **Winston:** Test equip. & marine radio telephones, depth-meters.

Norwest Electronics, 20926 Schoolcraft, Detroit 23, Mich., 10 (NEDA)

Odell Co., M. P., 10531 W. McNichols Rd., Detroit 21, Mich., 15, UNiversity 2-1573, Branch: Westlake, Ohio

Radio Supply & Engineering Co., Inc., 90 Selden Ave., Detroit 1, Mich., 10 (NEDA)

Rathsburg Assoc., Jack, 4140 Van Dyke Ave., Detroit 14, Mich., 15, WAlnut 5-8850 (ERA)

Rubin Co., Ben Z., 16130 Meyers Rd., Detroit 35, Mich., 15, UNiversity 4-4958

**Anton Elec. Labs.:** Nuclear Instruments. **Automation, Inc.:** Nuclear instruments. **Computer Systems:** Analog computers. **Del:** HV Power supplies. **Eldorado:** Nuclear Instruments. **Hamner:** Nuclear Instruments. **Instruments for Industry:** Wide band amplifiers. **Radiation Dynamics:** Electron accelerators. **Technical Associates:** Nuclear Instruments. **U. S. Nuclear:** Nuclear Instruments.

Shaffer Co., Grant, 14241 Fenkell Ave., Detroit 27, Mich., 15, BRoadway 3-5390 (ERA)

**Borg Equip.:** Micropots, microdials, instrument motors. **Cetron:** Phototubes, lead sulfide, thyratron & rectifier tubes. **Chicago Dynamics:** Thumb wheel, wafer, rotary switches. **Continental-Wirt:** Resistors, potentiometers, slide switches. **Drake:** Pilot Light assemblies, lamp holders. **Garlock:** Molded parts. **Hudson Lamp:** Miniature lamps. **JB:** Transformers. **James Knights:** Crystals, oscillators, ovens, frequency standards. **Norden Div.:** Synchros, servos, gyros, ADC equip. **Phaostron:** Panel & frequency meters. **Powertron Ultrasonics:** Ultrasonic cleaning equip. **Sage Electronics:** Precision resistors. **Sangamo:** Capacitors. **Sarkes Tarzian:** Silicon & selenium semiconductors. **U. S. Sonics:** Transducers.

Sterling Co., S., 15310 W. McNichols, Detroit 35, Mich., 15, 20, BRoadway 3-2900

**Baldwin-Lima-Hamilton:** Strain gages. **Data-Control Systems:** Complete telemetry & data reduction facility components. **Daytronic:** Electrical measurement of extremely small motion or displacement. **Dymec:** Building block approach to data handling problems. **Elgin Metalformers:** Modular enclosure system. **Ellis Assoc.:** Strain indicators, fatigue test monitors. **Empire Devices:** Noise & field intensity meters. **Gertsch.:** Precision ratio transformer, frequency measuring equip., complex ratio bridges, phase reference standards, signal generators. **Hewlett-Packard:** All products. **Kin Tel:** DC instrumentation, power supplies, amplifiers, meter calibrators & voltmeters, television camera systems. **Kistler Instrument:** Pressure gages. **F. L. Moseley:** X-Y recorders. **Sanborn:** AC & DC amplifiers, galvanometers, oscillographic recorders, strain gage amplifiers, X-Y recording systems. **Schaevitz:** Differential transformers, rotary accelerators & slip rings. **Sensitive Research Instrument:** Laboratory standard meters. **Sorensen:** AC voltage regulators, DC nobatrons, frequency changers. **Varian:** Microwave power equip., potentiometer recorders. **Waugh:** Turbine flowmeters.

Thorpe, Jack M., 640 Hidden Lane, Detroit 36, Mich., 15, TU 4-4360

**Amperex:** Electronic tubes. **Bud:** Sheet metal prods. **Erie Resistor:** Capacitors. **Gonset Div.:** Communication equipment. **IT&T:** Rectifiers. **Merit:** Coils & transformers. **Oxford Components:** Speakers. **Pace:** Panel meters. **Paco:** Test instrument kits. **Precision Apparatus:** Test instruments. **Spaulding Prods.:** Radio towers. **Standard-Kollsman Ind.:** TV tuners. **Tenna Mfg.:** Antennas.

Tiby Co., The, 18222 James Couzens Highway, Detroit 35, Mich., 15, UNiversity 4-9298, Branch: Cleveland, Ohio

Zaffina Co., Lawrence F., 7351 Gratiot Ave., Detroit 13, Mich., 15, WAlnut 1-2885 (ERA)

**Ferndale**

Erickson's Electronic Wholesale, Inc., 1201 Woodward Heights, Ferndale 20, Mich., 10 (NEDA)

Shalco, Inc., 23525 Woodward, Ferndale 20, Mich., 15, LI 7-4771

**Alpha:** Wire, cable, sleeving. **American Recording Tape:** Tape. **Hugh H. Eby:** Hookup hardware. **Int. Electronics:** Speaker systems. **James:** Electro-mechanical prods. **Newcomb Audio Prod.:** Transcription players, amplifiers, public address eqpt. **Peerless Electrical Prod.:** Transformers, chokes, power supplies. **Relay Sales:** Relays. **Saber Prods.:** Sealectro hook-up hardware, Deltime delay lines. **Trimm:** Headfones, fone plugs & jacks, patch cords.

**Flint**

Lifsey Distributing Co., 1409 N. Saginaw, Flint 3, Mich., 10 (NEDA)

Shand Radio Specialties, Inc., 2608 Leith St., Flint 6, Mich., 10 (NEDA)

**Grand Rapids**

Edwards-Lohse & Co., 221 Graceland N.E., Grand Rapids 5, Mich., 15, EMpire 3-0905, Branch: Cleveland, Ohio

Radio Electronic Supply Co., 505 Jefferson Ave., S.E., Grand Rapids 3, Mich., 10 (NEDA)

Shalco, Inc., 700 Rosewood Ave., S.E., Grand Rapids, Mich., 15, CHerry 5-8762, Branch: Ferndale, Mich.

**Highland Park**

Morrow Sales, Jim, 13149 Hamilton Ave., Highland Park 3, Mich., 15, TO 5-7600

**Airflyte:** Slip rings. **Bradley Semiconductor:** Rectifiers. **Burnell:** Toroids & filters. **Cambridge Thermionic:** Terminals. **Control Switch Div.:** Switches & ind. lites. **John E. Fast:** Capacitors. **Hitemp:** Teflon wire. **Mepco:** Precision resistors. **Price:** Relays. **Technology Instrument:** Potentiometers.

**Jackson**

Ellington Radio, Inc., 825 S. Gallatin St., Jackson, Mich., 10 (NEDA)

Fulton Radio Supply Co., 1208 Greenwood Ave., Jackson, Mich., 10 (NEDA)

**Kalamazoo**

Warren Radio Co., 1710 S. Westnedge Ave., Kalamazoo, Mich., 10 (NEDA)

**Lansing**

Electric Products Sales Co., 427 E. Michigan Ave., Lansing 29, Mich., 10 (NEDA)

Fulton Radio Supply Co. of Lansing, Inc., 2710 Alpha St., Lansing, Mich., 10 (NEDA)

Offenhauer, Co., 5019 W. Saginaw St., Lansing 17, Mich., 10 (NEDA)

**Mount Clemens**

F.G.S. Electronics Supply Co., Inc., 1142 S. Gratiot, Mount Clemens, Mich., 10 (NEDA)

**Muskegon**

Western Electrical Supply Co., 1781 5th St., Muskegon, Mich., 10 (NEDA)

**Niles**

Niles Radio Supply, 933 N. 5th St., Niles, Mich., 10 (NEDA)

**Pontiac**

Electronic Supply Co. of Pontiac, Inc., 248 E. Pike St., Pontiac 16, Mich., 10 (NEDA)

**Saginaw**

Orem Distributing Co., 401 S. Franklin St., Saginaw, Mich., 10 (NEDA)

Radio Parts Co., 813 S. Washington, P.O. Box 808, Saginaw, Mich., 10 (NEDA)

**Warren**

Electro-Mation Associates, 4012 E. Nine Mile Rd., Warren, Mich., 15, JEfferson 9-1420

**Associated Research:** Hypots, ground testers. **Barber Colman:** Motors & relays. **F. W. Bell:** Gaussmeters. **Coleman Electronics:** Digitizer systems. **Electro Prods. Labs.:** Transducers, dynamic micrometers & sonometers. **Emerson & Cuming:** Plastics. **Int'l Tel. & Tel.:** Closed circuit TV. **Int'l. Research & Development:** Balancing & vibration checking equip. **Lear:** Positioning controls, magnetic clutches, linear actuators, air pumps. **Librascope Div.:** X-Y plotters. **Lumen:** Magnetic amplifiers. **Oakland Development:** Magnetic checkers, speed sentinels, noise detectors. **Radiation Electronics:** Infrared detectors & no-contact electronic thermometers. **Scope:** 3" portable oscilloscopes. **H. H. Scott:** Sound measuring instruments. **Standard Instrument:** Print-out recorders, pre-determined electronic counters, photo-cells. **Stantron:** Housing systems.

## MINNESOTA

**Duluth**

Northwest Radio, 123 E. First St., Duluth 2, Minn., 10 (NEDA)



# Distributional Functions



**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

**Minneapolis**

Anderson & Associates, 3825 York Ave., N., Minneapolis 22, Minn., 15, JU 8-2523

**Air-Marine:** Motors, fans, blowers. **Atohm:** Multi-turn trimmer pots. **Beede:** Meters. **Chassis-Trak:** Slides. **Gorn:** Connectors & pressure switches. **Miniature Electronic Components:** Pots. **Pennsylvania Fluorocarbon Co.:** Teflon tubing & rod. **Sealectro:** Teflon terminals. **Telex:** Electro-acoustical accessories. **United Fabricators & Electronics:** Molding. **Vitramon:** Capacitors. **Zero:** Aluminum work.

Bartleson Co., Bill, 330 Oak Grove, Minneapolis 3, Minn., 15, FEderal 3-6709

**Analogue Controls:** Auto. control systems & components, potentiometers. **Beamco Assoc.:** Master cell battery & charger. **Key Resistor:** Precision deposited carbon film resistors. **Malco:** Solder lugs, terminals, connectors, printed circuits. **Mandex:** Terminal strips, anode connectors. **Sarkes Tarzian:** TV tuners.

Bauman Co., 3033-35 Lyndale, Ave., S., Minneapolis 8, Minn., 10 (NEDA)

Clothier Co., Inc., Stan, 12 W. 58th St., Minneapolis, Minn., 15, TAylor 5-1234

**Babcock:** Relays. **Columbia Wire & Supply:** Wire. **G.C. Electronics. Lerco:** Terminals. **San Fernando:** Capacitors. **Viking:** Printed circuit connectors.

Electronic Center, Inc., 107 Third Ave., N., Minneapolis 1, Minn., 10 (NEDA)

Foster Co., Mel., 2402 Hennepin Ave., Minneapolis 5, Minn., 15, FRanklin 4-2612 (ERA)

Franklin Co., Merrill, 338 E. Franklin Ave., Minneapolis 4, Minn., 15, FEderal 6-2315 (ERA)

Gibb Co., Clark R., 2400 Hennepin, Minneapolis 5, Minn., 15, FRanklin 7-1200

**Amperex:** Tubes & semiconductors. **Atlas Sound:** Loudspeakers. **Bud:** Sheet metal goods. **IT&T Components:** Silicon & selenium products. **Kooltronic:** Fans. **J. W. Miller:** Coils. **Milwaukee Resistor:** Wire wound resistors. **Herman H. Smith:** Components. **Triad:** Transformers. **Utah Radio:** Loudspeakers. **Waldom:** Components.

Hagestad & Assoc., E. O., 4513 Laguna Dr., Minneapolis 24, Min., 15, WA 2-2034

**Baumker:** TV hardware. **Hugh H. Eby:** OEM components, tube sockets, connectors. **Electronic Chemical:** Chemicals. **Industrial Electronic Hardware:** OEM components, tube sockets, connectors. **Jontz:** TV towers. **Microtran:** Microminiature transformers. **Tenna:** Antennas.

Hamilton & Bayle Associates, Inc., 3359 Republic Ave., Minneapolis 26, Minn., 15, WEst 9-7891

**Ace Electronics:** Precision potentiometers. **Brand-Rex Div.:** Wire & cable. **Couch Ordnance:** Relays. **Kurz-Kasch:** Molded plastics. **Lavelle Rubber:** Molded rubber prod. **Mepco:** Precision resistors. **Mucon:** Sub-Min. ceramic capacitors. **New England Laminates:** Copper clad laminates. **Ohmite:** Relays. **Oxford:** Speakers. **Pyramid Electric:** Capacitors. **Rotron:** Fans & blowers.

Hammond Co., The, 3324 Hiawatha Ave., Minneapolis 6, Minn., 15, PArkway 1-5074 (ERA)

Heyda Co., Bonament, 6101 Auto Club Rd., Minneapolis 20, Minn., 15, FR 7-3239 (ERA)

Hill & Co., Fred B., 6110 Excelsior Blvd., Minneapolis 16, Minn., 15, WEst 9-6727 (ERA)

Kirkeby Co., Marvin H., 204 Sunnyside Lane, Minneapolis 22, Minn., 15, FR 7-3239 (ERA)

Northern States Sales Co., 1400 Park Ave., Minneapolis 4, Minn., 15, FEderal 6-4808

**Birnbach:** Wire, cable, tubing, switches, hardware. **British Industries:** Amplifiers, cabinet components, solder, speakers, test equipment, tubes. **Gen. Prods.:** Terminal boards & connectors. **Littelfuse:** Fuses. **Pomona:** Sockets, connectors, patch cords, test sockets. **Turner Co.:** Microphones. **Wheelock:** Relays, signaling devices.

Northwest Radio & Supply Co., 52 S. 12th St., Minneapolis, Minn., 10 (NEDA)

Oszman Co., E. W., 12 E. 25th St., Minneapolis 4, Minn., 15, FEderal 9-0891

**Blonder-Tongue:** TV antenna systems, closed-circuit TV. **Rohn Mfg.:** Amateur, broadcast & communication towers.

Richardson & Co., Inc., H. M., 9 E. 22nd St., Minneapolis 4, Minn., 15, FEderal 6-4078 (ERA)

Ripley & Associates, Ray, 7222 James Ave., S., Minneapolis 23, Minn., 15, UN 6-8682

**Continental-Wirt:** Resistors, slide switches. **El-Rad:** Coils, pulse transformers & delay lines. **Electronic Instr.:** Test equipment, hi-fi & ham equipment. **Illinois Condenser:** Condensers. **J-B:** Power, plate & filament transformers. **Phaostron:** Panel meters. **Ungar:** Solder irons. **Walsco:** Chemicals, tools & hardware. **Western Transistor:** PNP transistors.

Stark Electronics Supply Co., 112 3rd Ave., N., Minneapolis 1, Minn., 10 (NEDA)

Stemm, Inc., R. Edward, 123 S. 3rd. St., Minneapolis 1, Minn., 15, FEderal 5-7172, Branch: Chicago, Ill.

Warner Co., A. J., 5022 29th Ave., S., Minneapolis 17, Minn., 15, PArkway 9-7371 (ERA)

**Rochester**

Elliott & Hanson Co., 119 First Ave., N.W., Rochester, Minn., 10 (NEDA)

**St. Paul**

Anderson & Associates, Inc., Burt, 500 N. Prior Ave., St. Paul 4, Minn., 15, MIdway 5-8104, Branch: Chicago, Ill.

Crossley Associates, Inc., 842 Raymond Ave., St., Paul 14, Minn., 15, MIdway 6-7881, Branch: Chicago, Ill.

Electronic Distributing Co., 891 Vandalia St., St. Paul 14, Minn., 10 (NEDA)

Michigan
Minnesota
Mississippi
Missouri

Ener-Electron Co., Wilkens, [illegible] Ave., St. Paul 18, Minn., 15, CA 2-2[illegible]

Argos: [illegible] Hammarlund: [illegible] Hy-Gain: [illegible] James: [illegible] Perma-Power: [illegible] Planet: [illegible] Rye Sound: [illegible] Terado: [illegible]

North-east Engineering Inc., 1[illegible] Ave., St. Paul 4, Minn., 15, MIdway 6-2427 (ERA)

## MISSISSIPPI

**Greenwood**

Massey Co., I. E., P.O. Box 724, 304 E. Jefferson, Greenwood, Miss., 15, OLdstone 3-3025 (ERA)

Parham Electronics Co., 5 & 7 Carrollton Ave., Greenwood, Miss., 10 (NEDA)

**Gulfport**

Helwick Radio & TV Supply, E. A., 2832 13th St., Gulfport, Miss., 10 (NEDA)

**Jackson**

May & Jackson Distributing Co., Inc., 930 Bailey Ave., Jackson, Miss., 10 (NEDA)

Swan Distributing Co., Inc., 342 N. Gallatin St., P.O. Box 2698, Jackson 7, Miss., 10 (NEDA)

**Tupelo**

Pate Electronics, Inc., Highway 45 S., P.O. Box 201, Tupelo, Miss., 10 (NEDA)

## MISSOURI

**Berkeley**

Ellinger Sales Corp., 6427 Evergreen St., Berkeley 21, Mo., 15, JAckson 4-1110, Branch: Chicago, Ill.

**Bridgeton**

Clemenson-Larrabee Co., 2725 Beloit Dr., Bridgeton, Mo., 15, PErshing 1-6857, Branch: Kansas City, Mo.

**Cape Girardeau**

Suedekum Electronic Supply Co., 2215 Broadway, P.O. Box 221, Cape Girardeau, Mo., 10 (NEDA)

**Clayton**

Inland Associates, 25 S. Bemiston Ave., Clayton 5, Mo., 15, PArkview 1-4435, Branch: Mission, Kans.

Kay Sales Co., 7003 Forsyth, Room 214, Clayton 5, Mo., 2[illegible], Branch: Kansas City, Mo.

Maynard Co., L. W., 130 N. Central Ave., Clayton 5, Mo., 15, PA 5-3723

**Newcomb Audio Prods.:** P.A. amplifiers, rack & panel equip., tape recorders. **Pickering:** Magnetic cartridges & components. **Webcor:** Record changers, tape decks, language labs. AM-FM stereo tuners & components.

**Florissant**

McCune, Co., John N., P.O. Box 216, Florissant, Mo., 15, TEmple 7-3188 (ERA)

**Jefferson City**

Central Missouri Distributing Co., 324 E. Capitol Ave., Jefferson City, Mo., 10 (NEDA)

Vignola Assoc., Carmine A., P.O. Box 569, Jefferson City, Mo., 15, JEfferson City 5-1023

**Anchor Electr. Prods.:** CRT Brighteners, test equipment. **Crosby:** Madison Fielding amplifiers. **Electronic Devices:** Selenium & silicon rectifiers. **Ferrodynamics:** Magnetic recording tape. **IE Mfg.:** Antenna hardware. **Illinois Condenser:** Capacitors. **International Elec.:** Mullard tubes. **Kimberley International:** Uher tape recorders. **Kurman:** Relays. **Mercury Elec.:** Test equipment. **Oryx:** Soldering irons. **Peerless Prod.:** Antennas. **Rayline:** Solder. **Robins Industries:** Audio accessories. **Rye Sound:** Earphones, Hirschmann products. **Sonotone:** Cartridges, batteries, tubes, speakers, microphones. **United Int'l. Dynamics:** Switches.

**Joplin**

Brotherson Co., Inc., M., 515 N. Byers Ave., P.O. Box 3, Joplin, Mo., 10 (NEDA)

Four-State Radio & Supply Co., Inc., 402 Wall, Joplin, Mo., 10 (NEDA)

**Kansas City**

Associated Electronics, 5423 Troost Ave., Kansas City 10, Mo., 10 (NEDA)

Bettis Co., Maury E., 406 W. 34th St., Kansas City 11, Mo., 15, LOgan 1-0772, (ERA)

Burstein-Applebee Co., 1012 McGee St., Kansas City 6, Mo., 10 (NEDA)

Clemenson-Larrabee Co., 436 E. 79th St., Kansas City 31, Mo., 15, JAckson 3-3005

**Continental-Wirt:** Resistors, slide switches, wire wound controls. **Finney:** Diodes. **Pomona:** Patch cords, sockets, socket adaptors. **Trimm:** Headsets, plugs, jacks.

Collins-Havercamp Associates, Inc., 6825 N. Baltimore, Kansas City 18, Mo., 15, GLadstone 3-4497

**Allied Wood Prods.:** Baffles & enclosures. **Antenna Designs:** Antennas. **Campro Prods.:** Metal & plastic cabinets. **Chemtronics:** Electronic chemicals. **Dutrex:** Tubes. **Erie Resistor:** Diodes, condensers & Resistors. **Fanon Electronic Sales:** Intercoms, Amplifiers. **General Instrument:** Selenium & Silicon rectifiers, diodes. **I-H Mfg.:** Brighteners, sockets, plugs. **International Wire & Cable:** Wire, ground rods. **Jersey Specialty Co.:** Twin lead, rotor cable. **Micamold:** Condensers. **Oaktron Inds.:** Loudspeakers. **Service Instr. Corp.:** Test equipment. **Vaco Prods.:** Hand tools & solderless terms.

Elliott Co., Arthur K., 211 Westport Rd., Kansas City 11, Mo., 15

**Acro Prods.:** Transformers, amplifiers. **Bennett Lab.:** Intercom equip. **Electro Sonic Lab.:** Phono arms & cartridges. **Fisher-Berkeley:** Intercoms. **Kaar Engrg.:** Mobile & marine radio equip. **Superscope:** Tape recorders.

Farris Co., Inc., R. W., 406 W. 34th St., Kansas City 11, Mo., 15, PLaza 3-5350

Electronic Components, test equip., & hi-fi components.

Florence Co., L. F., 406 W. 34th St., Kansas City 11, Mo., 15, LOgan 1-7282, (ERA)

Forristal-Young Sales Co., 4053 Broadway, Kansas City 11, Mo., 10, 15, VAlintine 1-5330, Branch: St. Louis, Mo.

Fry & Co., Inc., W. E., 406 W. 34th St., Kansas City 11, Mo., 15, JE 1-5236

**Airtron:** Microwave accessories. **Wm. Brand—Rex Div.:** Wire & cable. **Clevite:** Transistors. **Collins Radio:** Mechanical Filters. **Fenwal:** Thermistors. **G-V Controls:** Thermo relays. **Grigsby:** Switches. **Gudeman:** Condensers. **Iron Fireman:** Relays & gyros. **Kings Electronics:** RF connectors. **Littelfuse:** Fuses. **Marion Instrument:** Meters. **Rotron:** Blowers. **Tru-Ohm:** Resistors. **Winchester:** Multi-pin connectors.

Henshaw Radio Supply, 3617-19, Troost, Kansas City 9, Mo., 10 (NEDA)

Jones Electronic Sales, Inc., 3627 S. Main St., Kansas City 11, Mo., 10 (NEDA)

Kay Sales Co., 2600 Grand Ave., Kansas City 8, Mo., 15, 20, BA 1-3800 (ERA)

Kelly-Schmitz-Winkeler Associates, 407 W. 74 Terr., P.O. Box 8456, Kansas City 14, Mo., 15, EMerson 1-5651

**Chicago Electronic Engr.:** Transformers. **Columbia Wire & Supply:** Wire. **James:** Choppers. **Jensen:** Speakers. **Lumen:** Magnetic amplifiers. **Millen:** Electro-mechanical components. **Pyramid Electric:** Capacitors. **Sarkes Tarzian:** Rectifiers.

Koenig-Myers Associates, 4538 Main, Kansas City 11, Mo., 15, JE 1-7221

Amateur equip., Capacitors, Connectors, Controls, Rheostats, Hi-fi equip., Inter-com equip., Jacks, Metal Boxes & chassis, Name plates, Plugs, Power supplies, Relays, Sockets, Speakers & accessories, Springs.

Leemark Associates, Inc., P.O. Box 8467, Kansas City, 15, Mo., 15, NI 2-3313

**Beckman/Berkeley:** Counters. **Brush Instruments:** Recorders. **Electro Pulse:** Pulse eqt. **Millivac:** Meters. **NJE:** Power supplies.

Lowell Co., Theodore B., P.O. Box 4772, Station E, Kansas City, Mo., 15, VAlintine 1-8104, Branch: St. Louis, Mo.

Manhattan Radio & Equipment, Inc., 2538 Grand Ave., Kansas City 8, Mo., 10 (NEDA)

McDowell-Redlingshafer Sales Co., Jewell Bldg., 1103 E. Armour, Kansas City 9, Mo., 15, WEstport 1-5622, Branch: St. Louis, Mo.

Roes & Co., H. A., 2601 Cherry, Kansas City 8, Mo., 15, BAltimore 1-0866

**Amphenol-Borg:** Connectors, sockets, coaxial cable. **Electrosolids:** Solid state Electronic Devices. **J-B-T:** Frequency meters, elapsed time meters, switches. **E. F. Johnson:** Transmitting amateur equip., variable capacitors, inductors, pilotlights, plugs & jacks. **Leach:** Relays. **Ohmite:** Resistors, rheostats, diodes, tap switches, relays, tantalum capacitors, variable transformers. **Sonotone:** Nickel-Cadmium batteries. **Triad:** Transformers. **Triplett:** Testers & Panel meters.

Scholz Co., Paul G., P.O. Box 21, Kansas City 34, Mo., 15, SOuth 1-6757 (ERA)

Schryver, Clyde H., 8720 Norwood Dr., Kansas City 15, Mo., 15 (ERA)

Sebright & Co., Russ D., 2601 Cherry, Kansas City 8, Mo., 15, BA 1-0866, Branch: St. Louis, Mo.

Somers & Co., F. C., Davidson Bldg., Suite 500, 17th & Main Sts., Kansas City 8, Mo., 15, GRand 1-1355 (ERA)

Terwilliger Sales Co., 9304 High Dr., Kansas City 15, Mo., 10, 15, MI 9-0188

**Devon Tape:** Electrical tape. **Easy UP:** TV accessories. **Molectronics:** Test equip. **P&H:** Amateur equip. **Rauland:** Picture tubes.

Thibau Co., A. R., 210 W. 8th St., Kansas City, Mo., 15, VIctor 2-7057 (ERA)

Walter's Radio Supply, Inc., 3635 Main, Kansas City 11, Mo., 10 (NEDA)

**Kirkwood**

Kelly Sales Co., Jack, 972 N. Geyer Rd., Kirkwood 22, Mo., 15, TAylor 2-1791 (ERA)

**Poplar Bluff**

Tri-State Electronics, Inc., P.O. Box 218, 536 E. Pine Blvd., Poplar Bluff, Mo, 10 (NEDA)

**St. Joseph**

Acme Radio Supply, Inc., 829 S. 10th St., St. Joseph, Mo., 10 (NEDA)

St. Joseph Radio & Supply Co., 720 S. 9th St., St. Joseph 54, Mo., 10 (NEDA)

**St. Louis**

Ashe Radio Co., Walter, 1125 Pine, St. Louis 1, Mo., 10 (NEDA)

Brown Radio Co., Tom, 3920-24 Washington Blvd., St. Louis 8, Mo., 10 (NEDA)

Crown Electronic Distributors, 2300 Union Blvd., St. Louis 13, Mo., 10 (NEDA)

Deltronics Distributing Co., 822 Hodiamont Ave., St. Louis 12, Mo., 10 (NEDA)

Ebinger Electronics, Inc., 2501 S. Jefferson Ave., St. Louis 4, Mo., 10 (NEDA)

Farris Co., Inc., R. W., 7811 Carondelet, St. Louis 5, Mo., 15, PArkview 6-4770, Branch: Kansas City, Mo.

Fixman Engineering Co., Gordon, 8160 Stanford Ave., St. Louis 30, Mo., 10, PArkview 5-5219

Components & instruments.

Forristal-Young Sales Co., 8147 Delmar St. Louis 30, Mo., 10, 15, PArkview 5-7701

**Allied Control:** Relays, switches. **Ferroxcube:** Ferrites. **Fusite:** Glass to metal seals. **Giannini Control:** Precision potentiometers, servo motors. **Pic Design:** Instrument components. **Resistance Prods.:** Precision wirewound resistors.

Fry & Co., Inc., W. E., 6616 W. Florissant Ave., St Louis 20, Mo., 15, EVergreen 2-3500, Branch: Kansas City, Mo.

Interstate Supply Co., 4445 Gustine Ave., St. Louis 16, Mo., 10 (NEDA)

Kathrinus & Co., Norman W., 4356 Duncan Ave., St. Louis 10, Mo., 15, OLive 2-7005

**Amco Eng.:** Modular enclosures. **Am. Electrical Heater:** Soldering irons. **Blonder Tongue:** TV cameras. **Cramer Controls:** Timers, motors. **Daven:** Resistors, switches, instruments. **Keil Eng. Prod.:** Printed Circuit boards. **Photoswitch Div.:** P.E. Controls. **Simpson:** Instruments. **Systron:** Instruments. **Technical Appliance:** Antennas.

Kelly-Schmitz-Winkeler Associates, 3938 Lindell Blvd., St. Louis 8, Mo., 15, OLive 2-6455, Branch: Kansas City, Mo.

Koenig-Myers Associates, 3649 Dunnica, St. Louis 16, Mo., 15, MOhawk 4-3096, Branch: Kansas City, Mo.

Leemark Associates, Inc., 2001 Big Bend Blvd., St. Louis 17, Mo., 15, MIssion 7-1470, Branch: Kansas City, Mo.

Lowell Co., Theodore B., P.O. Box 26, Creve Coeur Branch, St. Louis 41, Mo., 15, MIssion 7-1111

**Centralab Div., Consolidated Wire, GC Electronics, Lowell Mfg., Miratel, Precision Metal Prods., Wen Prods.**

McDowell-Redlingshafer Sales Co., 3615 Olive St., St. Louis 8, Mo., 10, 15, JEfferson 3-3277

**Advance:** Relays, **Air Shields:** Humidity chambers & dust hoods. **Bourns:** Trimming potentiometers. **Controls Co. America:** Solenoids, switches. **Cornell-Dubilier:** Capacitors. **Ohio Semiconductor:** Hall-effect devices. **Precision Apparatus:** Test equipment, basic meters. **Herman H. Smith:** Hardware. **Sola:** CV Transformers & power supplies. **Valor:** Instruments, delay lines, pulse transformers.

Radonics, 5040 Easton Ave., St. Louis 13, Mo., 10 (NEDA)

Roes & Co., H. A., 7120 W. Florissant Ave., St. Louis 20, Mo., 15, CO 1-0055, Branch: Kansas City, Mo.

Sebright & Co., Russ D., 7120 W. Florissant Ave., St. Louis 20, Mo., 15, CO 1-0055

**Acromag:** Magnetic amplifiers. **Barber-Colman, Ohmite, Telex Electro-Acoustic Div.**

Shaw Co., Robert, 7800 Kenridge Lane, St. Louis 19, Mo., 15, WOodland 2-4590

**Audiogersh:** Miracord record changers, loudspeakers, headphones. **R.T. Bozak:** Loudspeakers. **Brand Prods.:** Mag. recording tape. **Components Corp.:** Turntables. **Dynaco:** Amplifiers, transformers. **Fairchild Recording Eqpt.:** Cartridges, arms, turntables & professional recording equip. **Nortronics:** Tape heads & amplifiers. **H. H. Scott:** Amplifiers, tuners, sound level meters, decade amps, power amps for lab use, noise generators. **Tandberg of America:** Tape recorders.

Thomson Engineering Service, 8230 Forsyth Blvd., St. Louis 5, Mo., 15, PArkview 7-7705, Branch: Dallas, Tex.

Toler Radio Co., Ralph, 4855 Easton Ave., St. Louis 13, Mo., 10 (NEDA)

Van Sickle Radio Co., 1113 Pine St., St. Louis 1, Mo., 10 (NEDA)

**Sedalia**

Radio & Television Supply, Inc., 321 E. Main St., Sedalia, Mo., 10 (NEDA)

**Springfield**

Reed Radio & Supply Co., 805-809 Boonville St., Springfield, Mo., 10 (NEDA)

**University City**

Olive Electronic Supply Corp., 6662 Olive Blvd., University City 30, Mo., 10 (NEDA)

## MONTANA

**Billings**

Parts House, Inc., The, 106 11th St. W., Billings, Mont., 10 (NEDA)

**Great Falls**

Radio Electronic Supply, 110 Tenth St., S., Box 1376, Great Falls, Mont., 10 (NEDA)

## NEBRASKA

**Gering**

Corr & John's Radio TV Supply, 925 S St., Gering, Neb., 10 (NEDA)

**Hastings**

Central Radio Supply, Inc., 518 W. First St., Box 143, Hastings, Neb., 10 (NEDA)

**Lincoln**

General Radio & TV Co., 322 S. 12th St., Lincoln 8, Neb., 10 (NEDA)

Hicks Radio Co., 1422 O St., Lincoln 8, Neb., 10 (NEDA)



# Distributional Functions



**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Leuck Radio Supply, 243 S. 11th St., Lincoln 8, Neb., 10 (NEDA)

Scott Electronics, 2201 O St., Lincoln, Neb., 10 (NEDA)

**Omaha**

J-B Distributing Co., 1616 Cass St., Omaha 2, Neb., 10 (NEDA)

Omaha Electronics Co., 2222 Leavenworth St., Omaha 2, Neb., 10 (NEDA)

Radio Equipment Co., 2852 Douglas St., Omaha 31, Neb., 10 (NEDA)

Sidles Co., 7302 Pacific St., Omaha, Neb., 10 (NEDA)

## NEVADA

**Las Vegas**

Metcalf's, Inc., 25 E. California Ave., Las Vegas, Nev., 10 (NEDA)

**Reno**

Radio Supply Co., of Nevada, 720 Tahoe St., P.O. Box 2918, Reno, Nev., 10 (NEDA)

## NEW HAMPSHIRE

**Concord**

Evans Radio, Inc., Rt. 3A Bow Jct., P.O. Box 312, Concord, N.H., 10 (NEDA)

**New Durham**

Bahr Sales Co., Birch Hill Rd., New Durham, N.H., 15, TR 5-4539, Branch: Woodbridge, Conn.

## NEW JERSEY

**Asbury Park**

Robinson Co., The I.E., 905 Main St., Asbury Park, N.J., 15, KEllogg 1-3150, Branch: West Conshohocken, Pa.

**Atlantic City**

KEPCO, Inc., 300 N. Mississippi Ave., Atlantic City, N.J., 10 (NEDA)

**Berlin**

Midstate Radio Supply Co., 157 W. White Horse Pike, Berlin, N.J., 10 (NEDA)

**Bernardsville**

A & M Associates, Inc., 6 Sunnybrook Rd., Bernardsville, N.J., 15, BErnardsville 8-0699, Branch: Washington, D.C.

**Bloomfield**

Berger Electronics Supply, 237-241 Bloomfield Ave., Bloomfield, N.J., 10 (NEDA)

**Camden**

J-H Electronic Sales Co., P.O. Box 797, Camden, N.J., 15, WOodlawn 6-0303, Branch: Towson, Md.

Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey

Brand-Rex Div., W
Cable Ind
Davis A. Hemphill
Forbes & Wagner
Foster
Metal Etching
Microtechnic
P.C.L. Mfg.

Radio Electric Service Co. of N.J., 523 Cooper St., Camden, N.J., 10 (NEDA)

Clifton

Eastern Radio Corp., 221 Allen Ave., Clifton, N.J., 10 (NEDA)

Collingswood

Bancroft & Co., H. S., 209 Cooper St., Westmont, Collingswood 7, N.J., 15, ULysses 4-8000 (ERA)

See ad on this page

**Matronics:** Ferrites, ferrite rods, diode holders, molded cases. **Polymer Corp. of Pa.:** Teflon tubing. **Semco Sales & Service:** Potting compound mixers & applicators. **P. M. Steward:** Ceramics, ferrites. **Taurus:** Teflon terminals, punched card sensors. **Uniform Tubes:** Precision drawn metal tubing.

**Columbia**

Columbia Distributors, Inc., Columbia Heights, Columbia, N.J., 10 (NEDA)

**East Orange**

International Distributing Co., 185 Central Ave., East Orange, N.J., 10, OR 5-7291 (NEDA), Wholesale Distribution.

**Elizabeth**

Leader Electronic Supply Corp., 72 Prince St., Elizabeth, N.J., 10 (NEDA)

**Englewood**

Central Associates, 44 N. Dean St., Englewood, N.J., 15, LOwell 8-0898

**Alfred:** TWT amplifiers, microwave sweep generators. **A. Jeveleev, BWO TWT power supplies. Boonshaft & Fuchs:** Feedback Control systems. **Communication Measure-**

(list continued on page 736)

H. S. Bancroft & Co.
Sales Engineers
209 COOPER STREET
WESTMONT, COLLINGSWOOD 7,
NEW JERSEY
ULysses 4-8000
ELECTRONIC EQUIPMENT
COMPONENTS • PLASTICS
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**ments Labs.:** Electronic frequency generators. **Delta Design:** Portable temperature chambers. **Elasco:** Transistorized DC power supplies, AC & DC regulators. **Fleetwood Labs.:** Dry Circuit relay testers. **Franklin:** Digital voltmeters & multimeters, data reduction systems. **LEL:** Solid state receivers, mixer-preamplifiers, IF, RF & parametric amplifiers. **RLC:** Coaxial filters, attenuators, mixers, terminations. **Technical Appliance:** Taco antennas.

Fisher Co., D. J., 8 Depot Square, Englewood, N.J., 15, LOwell 9-0090

**Micro-Prod. Eng.:** Slip ring & brush block assemblies (molded), plated soldering tips. **Northfield Precision Instrument:** Microspin bearings, gears. **Pace Circuits:** Printed circuit boards. **Safeway:** Heating elements. **Timely Technical Prod.:** Teflon tubing.

Marconi Instruments Ltd., 111 Cedar Lane, Englewood, N.J., 5, LO 7-0607

**Automatic Telephone & Electric:** Oscillators. **Eddystone:** Receivers. **Rank Cintel. Servomex:** Function Generators.

RMC Associates, 391 Grand Ave., Englewood, N.J., 15, LOwell 7-3933, Branch: New York, N.Y.

**Erlton**

Dickison Sales Co., Inc., 302 Marlton Pike, Erlton, N.J., 10, 15, HA 8-4086

**Airtron:** Microwave components. **Hill:** Crystal ovens, packaged frequency sources. **Keystone Products:** Small transformers, toroids. **Walter Kidde:** Solid state relays, frequency changers, thermistors.

Nelson-Platt Sales, 300 Marlton Pike, Erlton, N.J., 10, 15, HAzel 9-4095

**Clevite-Brush:** Headphones, **Cornell-Dubilier:** Capacitors. **G.C. Electronics:** Chemicals, resistors, tools, antennas, knobs, hardware. **Polaris Elect:** Photo cells. **Poly-Tronic Lab:** C B transceivers, ham equipment.

**Snyder Co., Inc., V. A., P.O. Box 63, Erlton, N.J., 15, Branch: Union, N.J.**
See ad on page 739

**Fair Lawn**

Schwartz Co., Mel, 34-16 Tierney Pl., Fair Lawn, N.J., 15, SWarthmore 7-3435

**American Molded Prod.:** Nylon Bobbins. **Electronic Devices:** Selenium Rectifiers. **Ferroxcube:** Ferrites. **Lectron Labs:** Capacitors. **Mohawk Wire & Cable:** Plastic Wire. **Paramount Paper Tube:** Precision paper tubes. **Thermal Wire of America:** Teflon Wire.

**Glen Rock**

Ringer Co., R. L., P.O. Box 114, Glen Rock, N.J., 15, GIlbert 4-1434

**Chassis Trak:** Chassis slides. **Curtiss-Wright, Princeton Div.:** Recorders, volt ref., electrometers. **Ebert:** Mercury Power Relays. **Electro-Mechano:** Tachometers. **Gould-National:** Nickel cadmium batteries. **Polychem:** Solid dry film lubricant. **Sunshine Scientific Instrument:** Industrial & Lab. equipment. **Western Devices:** Cabinets, blowers, dollys.

**Hackensack**

Nidisco, 55 State St., Hackensack, N.J., 10, HUbbard 9-2000, Branch: Jersey City, N.J.

**Haddonfield**

Braddock, Edward, P.O. Box 305, Haddonfield, N.J., 15, HAzel 9-0087

**Arco:** Capacitors. **Austin-Craft:** Dry cell holders. **Columbia Prods.:** Mobile Communication whip antennas. **Dow-Key:** Coaxial relays. **Kingston:** RF/AF analyzers. **Kupfrian:** Transistor Power supplies. **Nt'l. Radio:** Components & receivers. **Quaker:** Field strength meters. **Tapetone:** UHF/VHF converters & receivers. **Wind Turbine:** Masts & towers.

Churchill, Floyd W., 50 Upland Way, Haddonfield, N.J., 15, HA 9-7871

**Muter:** Capacitors, resistors, switches, R.F. & I.F. coils. **Rola:** Loudspeakers, audio transformers & chokes, TV deflection components.

Keefe Electronic Sales Co., 228 E. Kings Hwy., Haddonfield, N.J., 15, HAzel 9-4650

**Chester Cable:** Insulated wire & cable. **Dytronics:** Stamped printed circuits. **Eldema:** Miniature indicator light assemblies. **Lamtex:** Fiberglass epoxy tubing & moldings. **Pierce-Roberts Rubber:** Soft rubber parts. **Sun Electric:** Meters. **Viking:** Connectors & plugs. **Underwriters Safety Device:** Elec'l wiring devices.

Moyer Co., Harold A., P.O. Box 14, Haddonfield, N.J., 15, HAzel 9-7792

**Becker:** Speakers. **Bud Radio:** Sheet metal ware, "ham" gear. **Finney Co.:** TV & FM antennas, semiconductors. **Grado Labs.:** Cartridges & tone arms. **Marantz:** Amplifiers & pre-amplifiers. **Sargent-Rayment:** Amplifiers & tuners. **Superscope:** Sony tape recorders, wireless & condenser microphones. **Thorens:** Turntables & changers.

White Co., Inc., Harry J., 121 Covered Bridge Rd., Barclay Farms, Haddonfield, N.J., 15, HAzel 8-2304

**ESC:** Delay lines. **Ideal Precision:** Meters. **Joseph Pollak:** Relays. **Saratoga Industries:** Transformers.

**Hillside**

Sherwood Distributors Inc., 1255 Liberty Ave., Hillside, N.J., 10 (NEDA)

**Hoboken**

Simberkoff Sales Co., 68 Hudson St., Hoboken, N.J., 15, OLdfield 6-5211

**Aerovox:** Capacitors, Deposited carbon resistors. **Cinema Eng.:** Wire wound resistors & switches. **Collins Electronic:** DC/AC choppers & hi-frequency vibrators. **GOE Engineering:** Turret type terminals. **Illumitronic Eng.:** Air wound coils. **Magnecraft:** Relays. **National Radio:** Knobs, hardware, components. **Penn-Tran Corp.:** Deflection yokes & flybacks. **Sarkes Tarzian:** Silicon & selenium recitifiers. **Shure Brothers:** Microphones, cartridges, heads. **SNC Mfg.:** Transformers. **Waterman:** Oscillosocopes & cathode ray tubes. **Waters:** Precision potentiometers.

**Jersey City**

Hallmark Electronic Corp., 85 Monticello Ave., Jersey City, N.J., 10 (NEDA)

Nidisco-Jersey City, Inc., 713 Newark Ave., Jersey City 6, N.J., 10, OLdfield 3-2360

**Cinch-Jones:** Connectors. **Cornell-Dubilier:** Capacitors. **G.E.:** Tubes, parts, semiconductors. **Jensen:** Speakers. **Mallory:** Capacitors, switches, controls. **Ohmite:** Resistors, relays. **R.C.A.:** Tubes, parts, test equip., semiconductors, batteries. **Simpson:** Panel meters, test equip. **Shure Bros.:** Microphones. **Stancor:** Transformers. **Standard Electrical Prods.:** Variable Transformers. **Thordarson:** Transformers. **University:** Speakers.

Schwartz Co., Adolph, 15 Exchange Pl., Jersey City 2, N.J., 15, DElaware 4-2424 (ERA)

Shulan & Co., Wally, 880 Bergen Ave., Rm., 701, Jersey City 6, N.J., 15, WOrth 2-0365 (ERA)

Steinberg Co., H. A., 880 Bergen Ave., Jersey City 6, N.J., 15, SWarthmore 5-2255 (ERA)

**Manasquan**

Budd Cato Assoc., 235 Parker Ave., Manasquan, N.J., 15 (ERA)

**Maple Shade**

Wetterhahn Co., A., 538 Buena Vista Ave., Maple Shade, N.J., 15, NOrmandy 2-1611

**Automation Components:** Ceramic Discs & trimmer capacitors, wire wound resistors. **Coil Specialty:** I.F. & R.F. coils, transformers, chokes. **Continental-Wirt:** Slide switches, wire wound resistors, potentiometers. **Electri-Cord:** Cord sets & audio cables with molded plugs. **Electro-Circuits:** Printed circuit boards. **Electro-Networks:** Toroidal coils, transformers, electric wave filters. **Electronic Plastics:** Terminal boards, fabrications. **Magnetic Core:** Powdered iron & ferrite parts. **Nucleonic Prods.:** Semiconductors. **Oxford:** Speakers. **Supreme:** Power, input & output transformers & chokes.

**Margate**

Williams & Assoc., Victor W., 5 Circle Dr., Margate, N.J., 15, COllingswood 5-6332 (ERA)

**Merchantville**

Trinkle Sales Co., Manor Bldg.,—W., 7675 Maple Ave., Merchantville, N.J., 15, NOrmandy 3-0303 (ERA)

**Montclair**

Brennan Co., F. X., 180 Glenridge Ave., Montclair, N.J., 15, PIlgrim 6-4640 (ERA)

Fields & Simon Sales Co., 109 Valley Rd., Montclair, N.J., 10, 15, 20, PIlgrim 6-6717

**Advanced Acoustics:** Hi-fi loudspeakers. **Audiogersh:** Miracord record changers, cartridges. **B&K:** Radio-TV service test equipment. **Barker Prod:** Hi-fi audio cables-adaptors. **Component Mfg. Service Co.:** Connectors. **Nortronics:** Magnetic tape heads. **Oryx:** Miniature soldering instruments. **R.K. Mfg.:** Transformers. **H. H. Scott:** Stereo amplifiers, tuners.

Freeman & Associates, Lawrence C., 24 Stephen St., Montclair, N.J., 15, PIlgrim 4-4775

**Advance Components Ltd.:** VTVM's, "Q" Meters, Signal Generators, Calibrators. **Electronic Tube:** Oscilloscopes, Cathode Ray Tubes, Recording Cameras. **General RF Fittings,** RF Connectors, TNC & TM types. **Erik A. Lindgren:** Shielded Rooms & accessories. **New London Instrument:** Amplifiers, Attenuators, Frequency Standards, Signal Generators, Monitors, Analyzers. **Nlforge:** Castings. **Waltham Electronics:** Signal Generating & Measuring Equip.

**Moorestown**

Foley Associates, Andrew A., P.O. Box 155, Moorestown, N.J., 15, NOrmandy 3-4545

**Elgin:** Advance Relays. **Glenco:** Ceramic Capacitors, Ni-cad Batteries, Thermistors. **Gulton:** Ceramic Coatings. **Langevin Div.:** Specialty Xformers. **Resistance Products:** Precision Resistors. **Rohn Mfg.:** TV & Comm. Towers. **San Fernando:** Capacitors. **Tru-Ohm:** Power Resistors & Rheostats. **Underwood Elec.:** Trimmer caps. **Winegard:** TV Antennas.

Stemler Associates & Co., Moorestown, N.J., 15, NO 2-1313, Branch: Baltimore Md.

**Mountainside**

Federated Purchaser, Inc., 1021 U.S. Rt. 22, Mountainside, N.J., 10 (NEDA)

**Newark**

Cerf & Co., Art, 744 Broad St., Newark 2, N.J., 15, MItchell 2-6734 (ERA)

**Chemtronics:** Electronic Chemicals. **Electro Products Labs.:** D.C. Power Supplies. **Electro-Voice:** Microphones, Speakers, Cartridges, Amplifiers, Cabinets. **Jensen Industries:** Needles & Cartridges. **JFD:** TV Antennas. **Lowell Mfg.:** Aluminum Baffles & Grilles. **Premier Metal Products:** Metal Cabinets, Racks & Housings. **Pyramid Electric:** Paper Electrolytic Capacitors, Selenium





# Distributional Functions



Rectifiers. **Thordarson-Meissner:** Transformers & Coils. **Utah Radio:** Speakers, Baffles, Rear Deck Kits. **Vitramon:** Vitreous Capacitors. **Vocaline:** Wireless Intercoms, Transceivers. **Weller:** Soldering Equipment.

Emerson Radio Associates, 985 Broad St., Newark 2, N.J., 10 (NEDA)

Krich-New Jesey, Inc., 428 Elizabeth Ave., Newark 8, N.J., 10 (NEDA)

Lafayette Radio Electronics Corp., 24 Central Ave., Newark 2, N.J., 5, 10, MA 2-1661, Branch: Jamaica, N.Y.

Lippman & Co., Aaron, 99-107 Newark St., Newark 3, N.J., 10 (NEDA)

**New Brunswick**

Bay Electronic Distributing Co., Inc., 226 Talmadge St., New Brunswick, N.J., 10 (NEDA)

William Radio Supply Co., 265 Woodbridge Ave., New Brunswick, N.J., 10 (NEDA)

**Nutley**

Galasso, David P., 382 Franklin Ave., Nutley 10, N.J., 10, 15, NOrth 1-1300

**Centralab:** Variable resistors, switches, ceramic products, capacitors, packaged electronic circuits.

**Passaic**

Nidisco, 294 Passic St., Passaic, N.J., 10, PRescott 9-4962, Branch: Jersey City, N.J.

**Paterson**

Jersey Electronic Distributing Co., 524 21st Ave., Paterson 3, N.J., 10 (NEDA)

**Pennsauken**

Boenecke Associates, 5505 Westfield Ave., Pennsauken, N.J., 15, NOrmandy 2-8650 (ERA)

**Perth Amboy**

Houser Associates, 188 Water St., Perth Amboy, N.J., 15, HIllcrest 2-3159

**Accurate Instrument:** AF Generators & Standards, Transistor Circuitry. **Ad-Yu:** Delay Lines, Phase Analysis Equip. **Ansley:** Printed Circuits. **Clough-Brengle:** Test Equip. **Cascade Research:** Ferrite Devices, Antennas, Waveguide Components. **Deltime:** Magnetostrictive Delay Lines, Tachometers. **Electro-Tec:** Slip Rings, Relays, Data Sampling Switches. **Electronic Specialty-Technicraft:** Microwave Components.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

**Mid-Eastern:** Transistorized Power Supplies. **TT Electronics:** Band Pass Filters. **Technical Appliance:** Antennas. **Times Wire & Cable:** Wire & Coax Cable. **Voak Engineering:** Precision Pots.

**Phillipsburg**

Williams Co., Carl B., 154 S. Main St., Phillipsburg, N.J., 10 (NEDA)

**Pine Brook**

Richardt Co., John W., Rt 46, Pine Brook, N.J., 15, CApital 8-0600

**Advance:** Magnetic relays. **Acromag:** Magnetic amplifiers. **Carter Parts:** Jacks, switches. **G.E.:** Switchettes. **G-V Controls:** Thermal relays. **Harco:** Thermocouples. **Monitor Products:** Quartz crystals & ovens. **Servonic Inst.:** Pressure transducers.

**Plainfield**

Lafayette Radio Electronics Corp., 139 W. 2nd St Plainfield, N.J., 5, 10, PL 6-4718, Branch: Jamaica, N.Y.

Leary, Betty, 1236 Denmark Rd., Plainfield, N.J., 10 (NEDA)

Union Television Parts Co., 800 South Ave., Plainfield, N.J., 10 (NEDA)

**Red Bank**

Astronetics, Inc., P.O. Box 450, Red Bank, N.J., 10, ATlantic Highlands 1-2700

**Elmac:** Special Purpose Tubes. **Raytheon:** Semiconductors & Special Purpose Tubes. **Westinghouse:** Semiconductors & Special Purpose Tubes.

Miller Electronics, Inc., 27 Mechanic St., Red Bank, N.J., 15, SHadyside 1-9300 (ERA)

**Ridgefield**

Barker Sales Co., 339 S. Broad Ave., Ridgefield, N.J., 5, WHitney 3-2477

**Automatic Telephone & Electric, Best Products, Connolly's, W. T. Glover, Whiteley Electric.** Wire & cable, vacuum thermocouples.


*Specialists in electronic test and measurement equipment from Metropolitan New York through Virginia.*

*Representing:*

Analab Instrument Corporation
Ballantine Laboratories, Inc.
Berkeley Div., Beckman Inst.
CBS Laboratories, Inc.
E-H Research Labs.
Industrial Instruments, Inc.
Francis L. Moseley
Offner Electronics
Owen Laboratories, Inc.
Perkin Engineering Corp.
Precision Instrument Co.
Scientific-Atlanta, Inc.
Sierra Electronics Corp.
Technical Products Company
United Electronics Co.
Waters Mfg. Co.
Wiancko Engineering Company

BRANCH OFFICE
135 Glenside Ave.
Wyncote, Pa.
WAverly 7-1820

GENERAL OFFICES
178 Eagle Rock Ave., Roseland, N.J.
Phones: CApital 6-4545-6-7
DIgby 4-2997

BRANCH OFFICE
8732 Flower Ave.
Silver Spring, Md.
JUniper 5-7550

GAWLER-KNOOP CO.

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**New Jersey**

Nidisco, 484 Pecton Blvd., Ridgefield, N.J., 10, Whitney 3-0570, Branch: Jersey City, N.J.

**Ridgewood**

Engel & Assoc., Inc., G. Curtis, 210 S. Broad St., P.O. Box 509, Ridgewood, N.J., 15, GIlbert 4-1400 (ERA), Calibration Service

See ad on this page

Abtronics: High Speed Framing Cameras
Baldwin-Lima-Hamilton: Strain Gages, Load Cells, Strain and Load Recording and Indicating Instruments
Bruel & Kjaer: Frequency Response Analyzer; Recorder, Accelerometers and Microphone Calibrators, True RMS Voltmeters, Artificial Ear and Voice
Boesch: Toroidal & Bobbin Winders
Computer Measurements: Electronic Counters and Digital Printers, Solid State
Edgerton, Germeshausen & Grier: Oscilloscopes, Hydrogen Thratrons
Electronic Associates: X-Y Plotter, Solid State Digital Voltmeters
John Fluke Mfg. Company: Differential Voltmeters, Power Supplies, Calibrators
Gertsch Products, Inc.: Ratio-transformers, UHF Frequency Meters, Complex Ratio Bridge, Variable Phase Stand and, Synchro Simulator
Harrison Laboratories, Inc.: Super Regulated Power Supplies, Solid State
Rantec Corporation: Micro wave Ferrite Devices, Telemetry, Antennas
Sanborn Company: Direct-writing Recording Oscillographs, Amplifiers, Transducers
Technibilt Corporation: Instrument Carriers (Dedlfiel)
Weinschel Engineering Corporation: Precision Attenuators, Insertion Loss Measuring Instruments
Vidar Corporation: Frequency to Voltage, Voltage to Frequency Converters

Finlay Co., Robert, 307 Lincoln Bldg., Ridgewood, N.J., 15, OLiver 2-0088 (ERA)


*G. Curtis Engel* and Associates

● Representing

Abtronics
High Speed Framing Camera

Baldwin-Lima-Hamilton
Strain Gages, Load Cells, Strain and Load Recording and Indicating Instruments

Bruel and Kjaer
Frequency Response Analyzer; Recorder, Accelerometers and Microphone Calibrators, True RMS Voltmeters, Artificial Ear and Voice

Boesch Mfg Company
Toroidal and Bobbin Winders

Computer Measurements Company
Electronic Counters and Digital Printers, Solid State

Edgerton, Germeshausen and Grier, Inc.
5000 mc Oscilloscopes, Hydrogen Thratrons

Electronic Associates, Inc.
X-Y Plotter, Solid State Digital Voltmeters

John Fluke Mfg. Company, Inc.
Differential Voltmeters, Power Supplies, Calibrators

Gertsch Products, Inc.
Ratio-transformers, UHF Frequency Meters, Complex Ratio Bridge, Variable Phase Stand and, Synchro Simulator

Harrison Laboratories, Inc.
Super Regulated Power Supplies, Solid State

Rantec Corporation
Micro wave Ferrite Devices, Telemetry, Antennas

Sanborn Company
Direct-writing Recording Oscillographs, Amplifiers, Transducers

Technibilt Corporation
Instrument Carriers (Dedlfiel)

Weinschel Engineering Corporation
Precision Attenuators, Insertion Loss Measuring Instruments

Vidar Corporation
Frequency to Voltage, Voltage to Frequency Converters

● Serving

Metropolitan New York ..... Rector 2-6001
New Jersey ..... Gilbert 4-1400
Eastern Pennsylvania ..... Walnut 2-3270

Main Office
210 South Broad Street
Ridgewood, New Jersey

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"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 135-240.

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Sales Representatives for Manufacturers of Electronic Equipment and Components

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**Roseland**

Gawler-Knoop Co., 178 Eagle Rock Ave., Roseland, N.J., 15, CApital 6-4545

See ad on page 737

**Analab Instrument:** Test equip. **Ballantine Labs.:** Voltmeters. **Beckman/Berkeley:** Counters. **CBS Labs.:** Test equip. **E-H Research Labs.:** Pulse Generators. **Industrial Instruments:** Bridges. **F. L. Moseley:** X-Y Plotters. **Offner:** Oscillographs. **Owen Labs.:** Transistor Test Sets. **Perkin Engineering:** Power Supplies. **Precision Instrument:** Tape Recorders. **Scientific-Atlanta:** Antenna Range Equip. **Sierra Electronics:** VHF/UHF Equip. **Tech Products:** Wave Analyzers. **United Electronics:** Transmitting Tubes. **Waters:** Precision Potentiometers. **Wiancko Engineering:** Test Equip.

**Rutherford**

Banfield Associates, Carroll S., P.O. Box 292, Rutherford, N.J., 15, WEbster 9-6784

**Apelco:** Marine Equipt., radiotelephones, electronic pilots, Depth Sounders, direction finders. **Engelhard:** Capac System for elimination of corrosion on underwater boat fittings. **Seatronics:** Marine chargers & inverters.

Holliday-Hathaway Co., Inc., 9 Lincoln Ave., Rutherford, N.J., 15, MUrray Hill 8-5858 (N.Y.C.)

**Burnell:** Audio & crystal filters, toroids & inductors. **Bush Transformer:** Transformers. **Filtron:** RF filters, specialty capacitors, pulse networks, delay lines. **General Electro-Mech.:** Hysteresis clutches & brakes. **Gorn Div.:** Connectors. **Mepco:** Precision resistors and networks. **Pesco Prods. Div.:** Axial flow fans & cooling units. **Sperry Semiconductor:** Silicon transistors & diodes. **Taber Instrument:** Transistorized amplifiers. **Technology Instrument:** Precision potentiometers. **Technology Inst. California:** Transducers & accelerometers. **Techron:** Printed circuits. **Tru-Ohm:** Rheostats & resistors. **Victory Engineering:** Thermistors & varistors. **Vitramon:** Capacitors. **Washington Machine & Tool Works:** Gearheads.

**Saddle Brook**

L & M Associates, 511 Victor St., Saddle Brook, N.J., 15, DIamond 3-3070

See ad on this page

**Alford:** Coaxial Instruments & components. **Baird-Atomic:** Transistor & semiconductor test sets, Dekatron, Digitron. **Christie:** Low voltage, high current power supplies. **DeMornay-Bonardi:** Complete microwave equipment. **Gray Instrument:** Resistance & potentiometer measuring instruments. **Marconi Inst.:** Signal generators, RF bridges, spectrum analyzers, communication receivers, modulation monitors. **Quan-Tech:** Power supplies, AC microammeters, decade & isolation amplifiers, distortion analyzer. **Radio Frequency Labs.:** Instrument calibration standards, magnet charging & treating equip., crystal impedance sets, 400 cycle converters. **Scopes Co.:** Wide-band portable oscilloscopes.

**Summit**

Land-C-Air Sales Co., 328 Springfield Ave., Summit, N.J., 15, CRestview 7-0440, Branch: Tuckahoe, N.Y.

**Teaneck**

Fields & Simon Sales Co., 571 Sunderland Rd., Teaneck, N.J., 10, 15, 20, TEaneck 6-6594, Branch: Montclair, N.J.

**Tenafly**

Border, Barrett, 121 Oak St., Tenafly, N.J., 15, LO 8-2354

**Arthur Ansley:** Printed circuits. **Connect-Tron:** Removable contact connectors. **Di-Electric Insulation:** Tubing. **Foster:** Power, pulse & audio transformers, chokes. **J.F.D.:** Variable piston capacitors, LC tuners, delay lines, fixed & variable inductors, antennas.

Franklin & Andrews Sales Corp., 43 Kent Rd., Tenafly, N.J., 15, LOwell 9-0007, Branch: Syracuse, N.Y.

Gray Associates, Harold, 8-10 Highwood Ave., Tenafly, N.J., 15, LOwell 7-3585 (ERA)

See ad on this page

**Allies' Prods.:** Precision deposited carbon resistors. **Collins Radio:** Mechanical filters, precision ferrites, tube shields. **Communication Accessories:** Toroids, filters, delay lines, saturable reactors, magnetic amplifiers, aircraft & missile & transistorized power supplies. **Dage Electric:** Connectors, subminiature terminators, crystal holders, coaxial connectors, hermetic seals. **Jan Hardware:** Metal shields, bezels, couplings, shaft locks, shock testing machine. **Sherold:** Quartz crystals, crystal ovens, filters. **Silicon Transistor:** Transistors & diodes.


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| Baird Atomic, Inc. | Hughes Aircraft |
| Christie Electric Corp. | Marconi Instruments |
| DeMornay-Bonardi | Quan Tech Labs. |
| | Radio Frequency Labs. |
| | The Scopes Company |

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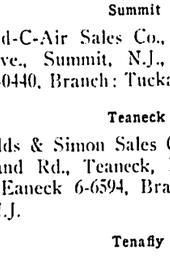
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# Distributional Functions



**Teterboro**

Smith-Meeker Engineering Co., Teterboro Airport, Teterboro, N.J., 15, Branch: New York, N.Y.

**Trenton**

Allen & Hurley, 23 S. Warren St., Trenton 10, N.J., 15, EX 3-0386

**Aerovox:** Condensers. **Astatic:** Cartridges, Microphones. **Centralab:** Switches. **Electro-Voice:** Microphones. **Hallicrafters:** Receivers & Transmitters. **IRC:** Resistors. **E. F. Johnson:** Transmitters & Parts. **Masco:** Amplifiers & Inter-Com's. **National:** Receivers & Parts. **Ohmite:** Resistors. **RCA:** Tubes, Batteries, Diodes, Test Equip. **Stancor:** Transformers. **Telrex:** Antennas. **UTC:** Transformers. **Vocaline:** Inter-Com's & Transmitters.

Nidisco, 985 Princeton Ave., Trenton 8, N.J., 10, EXport 6-3505, Branch: Jersey City, N.J.

**Union**

Beemer Engineering Co., 1865 Morris Ave., Union, N.J., 10, 15, 20, Branch: Philadelphia, Pa.

Snyder Co., Inc., V. A., P.O. Box 184, 2165 Morris Ave., Union, N.J., 15, MUrdock 8-6100

See ad on this page

**American Machine & Foundry:** Centrifuges, Spin Testers, Wind Tunnels. **Avco Corp., R & AD Div.:** Shock Machines, Noise Generators, Acoustical Testing Systems. **B & K Instruments:** Acoustical & Mech. Measuring Sys'ts., Wave Analyzers, Oscillators, Voltmeters, Deviation Bridges, Level Recorders. **Columbia Res. Labs.:** Accelerometers, Cathode Followers. **Exactel Instrument:** Servomanometers, Pressure Recording Systems. **Hughes Products:** Memo-scope Oscilloscope. **MB Electronics, Div. Textron:** Vibration Meters, Isolators, Exciters, Calibrators, Random Motion Test, Velocity Pickups, Hydraulic Shakers. **Murphy & Miller:** Environmental Test Chambers.

**Union City**

Bressler Associates, 4808 Bergenline Ave., Union City, N.J., 15, UNion 4-9577 (ERA)

See ad on this page

**Antenna Specialists:** Mobile Ant. **Chicago Miniature Lamp Works:** Aircraft & panel lamps. **Erie Resistor:** Ceramic condensers. **James Electronics** Vibrators, miniature transformers, choppers. **Littelfuse:** Fuses. **Merit Coil & Transformer:** TV replacements, audio, chokes & power transformers. **Metal Textile:** R. F. Shielding. **Perfection Mica:** Magnetic Shields. **Regency & Monitoradio:** Police & fire [illegible] Citizen band transceivers. **Syntronic Instruments:** Deflection [illegible] **Subminiature Instruments:** [illegible] & trimmers. **Viking:** Relay [illegible] nectors.

Dealer's Electronics Co., Inc., 827 [illegible] St., Union City, N.J., 10, UNion [illegible]

Hughes Co., Inc., Kenneth E., 4808 Bergenline Ave., Union City, N.J., 15, UNion 7-3204 (ERA)

See ad on page 738

**Acton Labs, Barnes Development, Beattie-Coleman, Coleman Electronics, Consolidated Electrodynamics, Elgin Metalformers, Engineered Electronics Co., Harowe Precision, Hermes, Hickok, Key Resistor, Leach Corp (Special Products Div.), Mark Line Electronic Products, McLean Engineering Labs, Ovenaire, Peerless Elec. Products (Div. Altec-Lansing), Shockley Transistor.**

**Upper Montclair**

Hinck Sales Co., Edwin B., 270 N Mountain Ave., Upper Montclair, N.J., 15, PIlgrim 6-2625

**Allegheny Plastics:** Machined Teflon parts. **Cimco Wire and Cable:** Teflon coated hook up wires, cables. **Spaulding Prods.:** Towers. **Winegard:** Television antennas.

**West Orange**

Garten & Associates, Louis A., 645 Eagle Rock Ave., West Orange, N.J., 15, REdwood 1-1800

**Airborne Instruments Lab.:** Microwave Test, Antenna Pattern, Recording Systems. **Carol Campbell, Inc.:** Subminiature Elapsed Time Meters. **Cubic Corp.:** Digital Instruments & Syst's., Lab. Insts. **Electronic Research Assoc.:** Transistorized Power Supplies, Inverters, Converters, Frequency Changers, Transistor Test Equip. **Epsco:** Transistor Digital Circuits, Magnetic Shift Registers. **ITT Industrial Products Div.:** Lab. Insts., Carrier Frequency Measuring Equip., Oscilloscopes. **Lavoie:** Lab. Insts., Robotesters, Crystal Ovens. **Rohde & Schwarz:** Lab. Insts., Communications Equip. **Rutherford:** Pulse Generators, Time Delay Generators. **Sanders Assoc.:** Servo Valves, Flexible Printed Cables, Microwave Tri-Plate, Miniature Blowers. **Spencer-Ken-**

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

New Jersey
New Mexico

[illegible]
Crowder Div. [illegible] Sparta Mfg.
[illegible] Weidmann

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Albuquerque

[illegible]
Alfred
Beattie Coast Co.
[illegible] Boston Radio
AM-FM
Hausen & Grier [illegible] Electron Germes
[illegible] EH Research Lab.
John Fluke: [illegible]
[illegible] Narda Microwave
[illegible] Other
[illegible] Radiation
Instrument Development Lab.
[illegible]
[illegible] Trans-Sonics
tive Research: [illegible] Sensi-
[illegible] Weinschel: [illegible]
[illegible]

Gates Co., F. Y., 122 Harvard Dr. S.E., Albuquerque, N.M., 15, (Hagerstown, Md. Branch: Salt Lake City, Utah)

Hyde Electronics Co., 5200 Constitution Ave., N.E., Albuquerque, N.M., 15, (Milwaukee, Wis. Branch: Denver, Colo.)




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| SOUTHERN NEW JERSEY: | P.O. Box 63, Erlton, New Jersey |
| PHILA. & EASTERN PENNSYLVANIA: | 1424 Race Street, Philadelphia, Pa. |

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"Distribution" listings are arranged alphabetically by states and by cities within each state. For names and addresses of manufacturing firms, see Alphabetical Directory, pages 135-240.

Miller, Jr. Co., Edward G., 210 Cagua Dr., N.E., P.O. Box 8306, Albuquerque, N.M., 15, ALpine 6-1585

**Aetna:** Servo analyzers. **Allied Control:** Relays, miniature switches. **Applied Research:** RF amplifiers, bandpass filters, UHF converters, RF multiplexers, attenuators, terminations, spectrum analyzers, multicouplers. **Chemalloy:** Calorimeters, microwave water loads. **Crown Engineering:** Circuit analyzers. **General Applied Science Labs:** Pulse generators, radar simulators, sonic spectrum analyzers. **Hoffman Electron Tube:** Special tubes, oscilloscopes, stroboscopes, nuclear instruments, analogue & digital magnetic heads, tape decks, magnetic drums, analogue computers. **James:** Choppers, relays, transformers, vibrators. **Rosso Instrs.:** Aircraft electrical system analyzers. **Superior Mfg. & Instr.:** Gears, servomechanisms. **Transistor Specialties:** Counter-Timers, decades.

Neely Enterprises, 6501 Lomas Blvd., N.E., Albuquerque, N.M., 15, ALpine 5-5586, Branch: North Hollywood, Calif.

Roberts & Associates, Inc., 112C Tulane Dr., Albuquerque, N.M., 15, AL 5-7304, Branch: Los Angeles, Calif.

Rupp Co., V. T., 1437 San Mateo Blvd., N.E., Albuquerque, N.M., 15, ALpine 6-0798, Branch: Los Angeles, Calif.

Williams & Associates, Inc., 3221 Silver Ave., S.E., Albuquerque, N.M., 15, ALpine 5-9632, Branch: Denver, Colo.

**Farmington**

Valley Engineering, Inc., 804 E. Main, Farmington, N.M., 10, DAvis 5-6521, Branch: Los Alamos, N.M.

**Las Cruces**

Neely Enterprises, 114 S. Water St., Las Cruces, N.M., 15, JAckson 6-2486, Branch: North Hollywood, Calif.

**Los Alamos**

Valley Engineering, Inc., 601 Cedar St., Los Alamos, N.M., 10, Tel: 2-3310 (NEDA)

**Santa Fe**

Valley Engineering, Inc., 241 W. Alameda, Santa Fe, N.M., 10, YUcca 2-1621, Branch: Los Alamos, N.M.

**Alpha Wire, Audio Devices, Burgess, Centralab, Cornell-Dubilier, Electro-Voice, General Electric, Hallicrafters, Jensen, J. W. Miller, Mueller, Sarkes Tarzian, Triad, Webster.**

## NEW YORK

**Albany**

Carse Electric Corp., 1044 Broadway, P.O. Box 4127, Albany 4, N.Y., 15, HObart 2-5364

**Fenwal:** Thermistors. **Greibach:** Microammeters, millivoltmeters, AC thermocouple meters, volt-ammeters, megohmmeters, differential meters. **W. L. Maxson:** Accelerometers, acceleration switches. **Parko:** Time delay relays. **Photoswitch Div.:** Photoelectric & Liquid level controls. **Potter & Brumfield:** Relays. **Voltron:** Expanded scale meters. **Wood Electric:** Circuit breakers, miniature.

Fort Orange Radio Dist. Co., 904 Broadway, Albany 7, N.Y., 10 (NEDA)

Reagan Co., Inc., J. A., 45 N. Lake Ave., Albany 3, N.Y., 15, HEmlock 6-9649

**Alfred:** Traveling Wave Tube Amplifiers, Power Supplies, Microwave Oscillators. **Burroughs Electronic Tube Div.:** Counters, Nixie & Beam Switching Tubes, Pulse Control Equip. **Daystrom-Pacific:** Potentiometers & Trimmers. **DeMornay-Bonardi:** Microwave Instruments. **Eldema:** Indicator Lights. **Franklin:** Digital Voltmeters, Multimeters, Amplifiers. **Greibach:** DC & AC Portable & Panel Meters. **Gulton:** Glennite Accelerometers, Transducers. **Lavoie:** Spectrum Analyzers, Pulse Generators, Scopes, Frequency Meters, Crystal Ovens, Automatic Test Equip. **LEL, Inc.:** IF, RF Amplifiers, Parametric Amplifiers. **Trio Labs.:** Panel Mounting VTVM's. **Trygon:** Transistorized Power Supplies.

Taylor Co., Inc., E. E., 465 Central Ave., Albany 6, N.Y., 10 (NEDA)

**Amsterdam**

Adirondack Radio Supply, 185-191 W. Main St., Amsterdam, N.Y., 10 (NEDA)

LeRoy & McGuire, Inc., R.D. 4, Amsterdam, N.Y., 15, VIctor 2-5979, Branch: Phelps, N.Y.

**Baldwin**

Taylor Corp., B. B., 2270 Grand Ave., Baldwin, N.Y., 15, BAldwin 3-8000

**Duncan:** Precision potentiometers. **Filtors:** Miniature relays. **Hyperion:** Power supplies. **IERC:** Tube shields & transistor heat dissipators. **North Atlantic Industries:** Phase angle vacuum tube voltmeters. **Servo Dynamics:** Servo motors & motor generators. **Shallcross:** Precision resistors, switches, laboratory test equip. **Solid State Products:** PNPN Controlled switches, trigistors, rectifiers. **Theta:** Phase generators, dial assemblies, synchro test sets, angular dividers, synchro & resolver bridges. **Trio Labs:** VTVM's.

**Bayside**

Scientific Systems Sales Corp., P.O. Box 3, Bayside 61, N.Y., 10, 15, BA 5-0929

**Anton:** Nuclear detectors & insts. **Blackstone:** Ultrasonic cleaners. **Controls for Radiation:** Solid state radiation detectors. **Land-Air:** Portable tritium survey meters, alpha counters, photospectrometers. **Radiation Inst. Development Lab.:** Multi-channel analyzers, scalers, pulse count integrators, nuclear detectors.

Tylinski Co., Frank, 73-63 Bell Blvd., Bayside 64, N.Y., 15, HOllis 4-8927

**Artisan:** Solenoids & relays. **Fibre Fabricators:** Stamped Electrical Insulating specialties. **Grayhill:** Switches, hardware. **Hill:** Quartz crystals, oscillators, filters. **J. B. Electronic Transformer:** Power, miniature, toroidal reactors. **W. L. Kidde:** Thermistors, solid state relays, contactors, converters, power supplies. **National Resistance:** Wire Wound resistors. **Ohio Semiconductors:** Hall effect devices. **TT Electronics:** R.C. filter networks. **Texas Capacitors:** Mylar & teflon. **Underwriters Safety Devices:** Terminal blocks.

**Binghamton**

Holliday-Hathaway Co., Inc., 94 Henry St., Binghamton, N.Y., 15, RAymond 3-5177, Branch: Rutherford, N.J.

Reagan Co., Inc., J. A., 52 B Crestmont Rd., Binghamton, N.Y., 15, RAymond 3-9661, Branch: Albany, N.Y.

Stack Electronics, 25 State St., Binghamton, N.Y., 10 (NEDA)

**Brightwaters**

Aironic Accessory Co., Inc., 161 Orinoco Dr., Brightwaters, N.Y., 15, MOhawk 6-6510

**R. C. Allen:** Turn & Bank Indicators, Miniature Rate Gyros. **California Technical Ind.:** Automatic programmed test equip. **Con-Elco:** Trimming Potentiometers. **Electronic Specialty:** Timing devices, sensing, static inverters & power supplies, airborne receivers & RF components. **Eicor:** Dynamotors, 400 cycle motors, DC motors & inverters. **Missile Systems:** Multi-conductor cables, cable assemblies. **U.S. Relay:** Relays, Time Delay, Control Boxes.

**Brooklyn**

AMA Electronic Corp., 1625 Bedford Ave., Brooklyn 25, N.Y., 10 (NEDA)

Bay Electronic Distributors, 3480 Nostrand Ave., Brooklyn 29, N.Y., 10 (NEDA)

Benray Electronics Corp., 485 Coney Island Ave., Brooklyn 18, N.Y. 10 (NEDA)

Brown Co., Inc., Irv., 1500 Carroll St., Brooklyn 13, N.Y., 15, HYacinth 3-1379

**Atlas Sound:** Outdoor & paging speakers, microphone stands & accessories. **Cletron:** Loudspeakers. **Wm. A. Holmin Corp.:** Portable megaphone. **International Rectifier:** Selenium & silicon rectifiers, silicon & zener diodes, selenium & silicon photo cells. **Workman TV Prods.:** Fused & globar resistors, contact cleaner & lubricant.

Buchman Wholesale Electronic Suppliers, Sam, 860 Atlantic Ave., Brooklyn 38, N.Y., 10 (NEDA)

Fisher Sales Co., 800 Greenwood Ave., Brooklyn 18, N.Y., 15 (ERA)

Green Tele-Radio Dist., Inc., 472 Sutter Ave., Brooklyn 7, N.Y., 10 (NEDA)

Hy-Grade Electronics, Inc., 9216 Church Ave., Brooklyn 36, N.Y., 10 (NEDA)

Laco Electronics Co., Inc., 4924 4th Ave., Brooklyn 20, N.Y., 10 (NEDA)

National Radio Parts Distributing Co., 572 Albany Ave., Brooklyn 3, N.Y., 10 (NEDA)

Quad Electronics, Inc., 1511 Coney Island Ave., Brooklyn 30, N.Y., 10 (NEDA)

Siclari, Vincent, 979 40th St., Brooklyn, N.Y., 10, GE 6-4567

Biophysical-medical-scientific field, instrumentation.

TV Parts, Inc., 1910 Coney Island Ave., Brooklyn 30, N.Y., 10 (NEDA)

**Buffalo**

Allen, Inc., Leonard D., 1043 Walden Ave., Buffalo, N.Y., 10, 15, Ellmore 6915, Branch: Syracuse, N.Y.

Dymac, Inc., 2329 Main St., Buffalo 14, N.Y., 10 (NEDA)

Farber Associates Inc., Maury, 70 W. Chippewa St., Buffalo 2, N.Y., 15, MOhawk 3543

**American Microphone:** General purpose microphones. **B & K Mfg.:** Test equip. **Centron:** Thyratron & rectifier tubes. **Dale:** Precision resistors, T-pots, hysteresis motors, printed circuitry. **Glennite:** Rechargeable batteries. **LMB:** Box chassis.

Genesee Radio & Parts Co., Inc., 2550 Delaware Ave., Buffalo 16, N.Y., 10 (NEDA)

Huron Electronic Supply Co., Inc., 324 N. Oak St., Buffalo 3, N.Y., 10 (NEDA)

Jackson Co., Robert W., 4446 Main St., Buffalo 26, N.Y., 15, CIrcle 2094

**Accurate Spring, Wallace E. Connolly & Co., Electric Mfg., Forbes & Wagner, Garitt Wire, Hoffman Semiconductor, Jeffers, Magnecraft, New England Instrument, Speer Resistor Div., Wirecraft Products.**

Jacobson Co., Inc., Leo, 1366 Kenmore Ave., Buffalo 23, N.Y., 15, TR 3-0442

**Audio Devices:** Computing & recording tape. **Electron Products:** Capacitors. **Gore Assoc.:** Nylon wire, ribbon cable. **Kurman:** Relays. **PSP Engineering:** Solenoids, synchros. **U.S. Semiconductor Prod.:** Zener diodes, Tantalum capacitors, silicon rectifiers, reference elements.



# Distributional Functions



Lamb Co., The Robert F., 3407 Delaware Ave., Buffalo 17, N.Y., 15, BE 3757

**AGA Div.:** Time Delay Relays. **Autotron:** Photoelectric. **Daystrom Transicoil:** Servo. **Esterline Angus:** Instruments. **Fenwal:** Thermoswitches. **Magnetics, Inc.:** Magamps. **Marion Instrument:** Instruments. **Pic Automation Div.:** Counters. **Potter & Brumfield:** Relays. **Pyrometer Inst.:** Pyros. **Sensitive Research:** Instruments.

Radio Electric Products, Inc., 186 E. Genesee St., Buffalo, N.Y., 10 (NEDA)

Radio Equipment Corp., 147 Genesee St., Buffalo 3, N.Y., 10 (NEDA)

Scheller Electronics Corp., 929 Kensington Ave., Buffalo 15, N.Y., 10 (NEDA)

Standard Electronics, Inc., 1501 Main St., Buffalo 9, N.Y., 10 (NEDA)

Summit Distributors, Inc., 916 Main St., Buffalo 2, N.Y., 10 (NEDA)

Wehle Electronics, Inc., 475 Ellicott St., Buffalo 3, N.Y., 10, (NEDA)

**Camillus**

Callahan Co., W. J., 107 Greenhedge Dr., Camillus, N.Y., 10, HUnter 8-5518

**Argos Prod.:** Baffles. **International Rectifier:** Rectifiers. **Milwaukee Resistor:** Resistors. **Sangamo:** Capacitors. **Service Instruments:** Test equip. **Switchcraft:** Switches, plugs, cord assemblies, language labs. **Trio:** Antennas.

**Corona**

Mannfred Electronics Corp., 102-09 Northern Blvd., Corona 68, N.Y., 10 (NEDA)

**Dobbs Ferry**

**Snyder Co., Inc., V. A., P.O. Box 126, Dobbs Ferry, N.Y., 15, Branch: Union, N.J.**

See ad on page 739

**Elmont**

Director Associates, Murray, 115-62 237th St., Elmont, N.Y., 15, CUrtis 5-6823

**Chicago Industrial Instrument:** Meters, instruments. **Dutrex East:** Dumont Picture Tubes. **Finney:** TV & FM Antennas, Germanium diodes. **Sightmaster:** Fuses. **U.X.L. Corp.:** Extension cables, antenna couplers, picture tube brighteners, speaker systems. **United Electronic Mfg.:** Electrolytics.

**Fairport**

Jackson Co., Robert W., P.O. Box 72, Fairport, N.Y., 15, Branch: Buffalo, N.Y.

**Farmingdale**

Drexler Co., Chester, 3 Lee Dr., Farmingdale, N.Y., 15, CHapel 9-8206

**Alpar:** Aluminum towers. **Alto:** Aluminum plates. **Continental Elect. & Sound:** S.W.R. meters. **Cosmos Inds.:** SSB transceivers. **Cushcraft:** Beams & vertical antennas. **Dow-Key:** Coaxial relays. **Electronic Prod.:** Carbon PTT mikes. **Gam:** Mobile gain antennas. **Herb Kreckman:** Antennas. **P&H Elect.:** Linears, amateur equip. **Pan:** Crystals. **Pennwood Numechron:** Digital computers, 12 & 24 Hr. clocks. **Pipestone Sales:** Steel crank-up towers. **Polytronics Lab.:** Citizen band transceiver. **Western Int.:** Coaxial fittings.

**Fayetteville**

**Hughes Co., Inc., Kenneth E., P.O. Box 54, Fayetteville, N.Y., 15, NEptune 7-9531, Branch: Union City, N.J.**

See ad on page 738

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Jackson Co., Robert W., P.O. Box 52, Fayetteville, N.Y., 15, NEptune 7-3851, Branch: Buffalo, N.Y.

Kennedy Co., Inc., R. P., P.O. Box 54, Fayetteville, N.Y., 15, 20, NEptune 7-9531, Branch: Rochester, N.Y.

**Flushing**

Bettan Sales, Marty, 77-15 164th St., Flushing 66, N.Y., 10, 15, OLympia 7-6659

**Central Electronics:** Single side-band transmitters. **Gonset Div.:** Citizens band equip. & FM tuners. **Hy Gain:** Citizen band antennas. **JFD:** TV antennas & components. **Magnecord:** Professional tape recorders. **Telectrosonic:** Tape decks. **Ward Prods.:** Communication antennas.

Harris, Inc., Arthur M., 42-34 195th St., Flushing 58, N.Y., 15, FLushing 7-7350 (ERA)

Heller Associates, Joseph L., 139-30 34th Rd., Flushing 54, N.Y., 15, FL 3-8900

**American Elite:** Telefunken receiving, voltage regulating & special purpose tubes. **Electra:** Precision film resistors, ceramic disc capacitors. **Gen. Meters:** Panel meters. **Jefferson:** Hook-up wire, coaxial & audio cables, multiconductor, intercom. **Nat'l. Tel-Tronics:** Hardware, phone plugs, connectors, terminals, terminal boards. **Tech-Ohm:** Wire wound power resistors. **Variflex:** Insulation sleeving & tubing.

**L & M Associates, 38-25 149th Place, Flushing 54, L.I., N.Y., 15, HIckory 5-0103, Branch: Saddle Brook, N.J.**

See ad on page 738

Weiland Co., Geo. H., 76-49 168th St., Flushing 66, N.Y., 15, OLympia 8-4061

**Central Transformer:** All. **Columbia Technical:** Delay lines. **Polyphase Instrument:** All.

Wolfe, Mike, 136-52 71st Rd., Flushing 67, L.I., N.Y., 15 (ERA)

**Forest Hills**

Baum Co., Sydney H., 70-15 Fleet St., Forest Hills 75, N.Y., 15, BOulevard 3-8101

**Aerovox:** Capacitors, filters, pulse forming networks. **Cinema Eng. Div.:** Precision wire wound resistors, rotary switches, audio equip., attenuators, potentiometers, equalizers, jacks, plugs, patch cords, power supplies, amplifiers, transformers, toroidal coils, filters. **Hi-Q Div.:** Ceramic capacitors, resistors. **Littelfuse:** Fuses, holders, clips, circuit breakers.

Miller Co., Jack, 1 Continental Ave., Forest Hills 75, N.Y., 15, BO 3-4446

**Condenser Prods.:** Plastic-dielectric capacitors. **E-T-A Prods.:** Miniature circuit breakers. **Farmer Electric:** Timers, photoelectric scanners & relays. **Philamon:** Tuning fork resonators, frequency generators. **WacLine:** Panel meters.

**Glen Cove**

Scott Co., George G., 6 Stuart Dr. W., Glen Cove, N.Y., 15, ORiole 6-2488

**Elbert:** Mercury plunger relays. **National:** Wire & cable. **Technical Wire Products:** RFI gaskets.

**New Mexico**
**New York**

**Gloversville**

Fulton County Distributors, Inc., 26 Bleecker St., Gloversville, N.Y., 20, Gloversville 5-2515

**Great Neck**

Ellis-Haber Corp., The, 11 Northern Blvd., Great Neck, N.Y., 15, HUnter 7-5745

**Control Technology:** Magnetic test equipment. **Edcliff Instruments:** Precision transformers & inductors. **Electric Regulator:** V-Belt drives. **Electro-Mechanical Specialties:** Audio & servo relays. **Gray & Kuhn:** Delay lines, pulse transformers, toroids & swinging chokes. **IMC Magnetics:** Precision transformers, toroid cores, D.C. motors, tachometers, servo motors & generators, servo & control systems. **Kendick:** Precision potentiometers. **Kemtron Electron Prods.:** Delay lines. **Pollak:** Relays.

Joseph Assoc., Ben, 45 S. Middle Neck Rd., Great Neck, L.I., N.Y., 15, HUnter 7-9595 (ERA)

Pacent Engineering Corp., 300 Northern Blvd., Great Neck, N.Y., 15, HUnter 2-4678

**Aetna Steel Prods.:** Shielded enclosures. **Dallons Labs.:** Semiconductors. **Federal-Pacific:** Meters, Switches, Balances. **Fugle-Miller:** Filters, Delay Lines, Toroids, RF Coils, Magamps. **Inso:** Teflon Wire, Cable, Tubing. **Moloney Electric:** Pulse transformers, Unit rectifiers, Reactors, Cores.

Rutt, William, 123 Middle Neck Rd., Great Neck, L.I., N.Y., 15, HUnter 2-8160 (ERA)

Travco Associates, Inc., 45 N. Station Plaza, Great Neck, N.Y., 15, HUnter 7-9040

**Acoustica:** Ultrasonic Liquid Level Sensing Systems. **Arizona Instruments:** Non-destructive Hi Pot Tester, Hi Speed Strobe Lamps. **Arnoux:** Temp. Measuring Equip., Transpots, Airborne Power Supplies. **DI An:** Digital Analog Systems & Components. **Georator:** 400 cycle No-Brush Generators. **Magnetic Systems:** Toroids, Filters, Magnetic Amplifiers, Power Supplies. **Magtrol:** Magnetic Clutches, Brakes, Actuators, Torquers, Dynamometers. **E. V. Naybor Labs.:** Time Delay & Special Relays, Solenoids. **Royal Industries:** Hydraulic Vibrators, Flight Tables, Timers, Electro Hydraulic Systems. **Space Components:** Flux Lock Sealed Switches.

**Hartsdale**

Components Sales Corp., 218 E. Hartsdale Ave., Hartsdale, N.Y., 15, SC 5-1050

**Accurate Instrument:** Frequency standards, dividers, inverters. **American Measurement & Control:** Torque motors, flow meters, hydraulic valves. **Computer Instruments:** Film potentiometers, pressure transducers. **Digitronics:** Punch tape readers, clutches. **Dressen-Barnes:** Modular & laboratory power supplies. **Dynamics Instrumentation:** Amplifiers, microvoltmeters, filters. **ESC:** Delay lines. **Globe:** Miniature AC & DC motors. **Precision Mechanisms:** Multi turn stops. **Schaevitz:** Transducers, recorders, indicators, G test machines.

Zlowe Co., Leonard, 15 N. Central Ave., Hartsdale, N.Y., 10, 15, 20, OWens 3-2922

**E-Z Way:** Towers. **De Wald:** Amplifiers, tuners, citizen band transceivers. **Dyna:** Amplifiers, preamplifiers, FM tuners, cartridges, audio output transformers. **Northeastern Tele Communications:** Ham equipment.

**Hempstead**

Davis Electronics Corp., 204 Main St., Hempstead, N.Y., 10 (NEDA)

Kubrick & Yurman, 475 S. Franklin St., Hempstead, L.I., N.Y., 15, IVanhoe 3-7230

**Atlantic Wire & Cable:** Coax cables, intercom, PA, audio. **Fibreglass-Evercoat:** Epoxy resins, paints. **Lectroloid:** Cord sets. **S&A:** Antennas. **Wen:** Soldering guns.

R & S Electronic Sales Corp., P.O. Box 217, Hempstead, N.Y., 15, PRimrose 5-7852

**MacDonald:** "Little Joe" Sleeving Cutters. "Jiffy" Holders. **Technical Devices:** Wire Cutter & Stripper, Component Lead Former, Lead Extractors, Circuit Board Holding Fixture.

**Snyder Co., Inc., V. A., P.O. Box 223, Hempstead, L.I., N.Y., 15, Branch: Union, N.J.**

See ad on page 739

Standard Parts Corp., 277 N. Franklin St., Hempstead, L.I., N.Y., 10 (NEDA)

**Hewlett**

Kirshbaum Co., Jerry, 1533 Peninsula Blvd., Hewlett, N.Y., 15, FR 4-0111

**Astatic:** Cartridges, microphones. **Consolidated Wire:** Wire. **Micamold:** Capacitors. **Osborn:** Transceivers. **Radio Receptor:** Rectifiers. **Waldom:** Panel meters. **Xcelite:** Tools.

Levison Sales Co., Inc., 1465 Peninsula Blvd., Hewlett, N.Y., 15, FRanklin 4-4064, Branch: Jamaica, N.Y.

**Hicksville**

Hunter & Salisbury, Inc., 87 Broadway, Hicksville, N.Y., 15, WEIls 8-1080

**Allard Instrument:** Panel Indicators, Motors. **Babcock:** Relays. **Electro Development:** Slip Rings, Rotary Switches. **Giannini:** Potentiometers, Stepping Motors. **Industrial Transformer:** Transformers. **Microwave Development Labs.:** Waveguide Components, Ferrite Devices, Signal Generators, Spectrometers. **Unimax Switch Div.:** Snap-Action Switches.

**Jackson Heights**

Associated Television Service Corp., 8606 37th Ave., Jackson Heights 72, N.Y., 20, HLinois 8-8800

**Jamaica**

Friedman & Assoc., A., 188-16 Jamaica Ave., Jamaica 23, N.Y., 15, SPruce 6-4800 (ERA)

Harrison Radio Corp., 144-24 Hillside Ave., Jamaica, N.Y., 5, 10, 20, REpublic 9-4102, Branch: New York, N.Y.

Lafayette Radio Electronics Corp., 165-08 Liberty Ave., Jamaica 33, N.Y., 5, 10, AXtel 1-7000

Levison Sales Co., Inc., 172-15 Hillside Ave., Jamaica 32, N.Y., 15, AXtel 1-5610

**Adjust-a-volt Sales:** Variable Transformers. **Bel Fuse:** Glass & chem. fuses, delay lines. **Chicago Dial:** Tempered glass. **Lansky Die Cutting:** Embossing. **Renco:** Coils. **Standard Elec. Products:** Transformers, aircraft switches. **Staver:** Tube Shields, stampings, lead castings.

Norman Radio Distributors, Inc., 94-29 Merrick Rd., Jamaica 33, N.Y., 10 (NEDA)

Peerless Radio Distributors, Inc., 92-32 Merrick Rd., Jamaica 33, N.Y., 10 (NEDA)

S-J Sales Engineering Co., 148-05 Archer Ave., Jamaica, N.Y., 15, AXtel 1-3232

**Diamond Coils:** Coils, RF Osc. **Hugh H. Eby:** Sockets, binding posts. **Greibach:** Meters. **Licon:** Switches. **Merkle Korff Gear:** Motors. **Quality Trans. Co.:** Transformers. **Reon Resistor:** Prec. resistors & pots. **Trolex Div.:** Rotary Switches.

**Jericho**

Miller Associates, Gilbert E., 47 Birchwood Park Dr., Jericho, N.Y., 10, 15, OVerbrook 1-6335

**Distributors Group:** Chemicals. **Frazier:** Loudspeakers. **Sargent-Rayment:** Stereo tuners & amplifiers. **Tandberg of America:** Tape recorders. **Tape-Athon:** Commercial tape decks.

**Kingston**

Arace Electronic Distributors, 16 Van Dusen St., Kingston, N.Y., 10 (NEDA)

**Little Neck**

Miller Co., Ben, P.O. Box 72, Little Neck 63, N.Y., 10, 15, BAyside 9-4673

**IMC Magnetics:** Motors, servos, tachometers, heat exchangers, blowers. **United Transformer Corp.:** Transformers, reactors, toroids, magamps, audio filters.

**Liverpool**

NACO Electronics Corp., 119 Luther Ave., Liverpool, N.Y., 15, GR 4-7481

**Airborne Instruments Lab.:** Noise figure equip. **Analab:** Oscilloscopes, cameras. **Baird-Atomic:** Transistor Test. Equip. **Bogart:** Microwave components. **Communication Measurements Lab.:** Variable frequency generators. **Cubic:** Digital voltmeters & systems. **Frequency Standards:** Microwave filters & wavemeters. **Industrial Products:** Large screen oscilloscopes. **Kepco:** DC power supplies. **Microwave Electronics:** Traveling wave tubes. **Polarad:** Microwave test equip. **Rutherford:** Pulse generators.

Reagan Co., Inc., J. A., 6 E. Bayberry Circle, Liverpool, N.Y., 15, HOward 3-8301, Branch: Albany, N.Y.

Wadsworth Mfg. Assoc., 509 Balsam St., Liverpool, N.Y., 15, OLdfield 2-7043 (ERA)

**Long Island City**

Dalis, Inc., H. L., 35-35 24th St., Long Island City 6, N.Y., 10, EMpire 1-1100

**Astron, Atlee, Centralab, Cinch-Jones, Clarostat, Dumont, Potter-Brumfield, Premier Metal, Raytheon, Sangamo, Simpson, Sylvania, Superior Electric, Transitron, United Transformer, Vector.**

Electronic Supply Corp., 41-08 Greenpoint Ave., Long Island City 4, N.Y., 10 (NEDA)

**Mamaroneck**

Rye Sound Corp., 145 Elm St., Mamaroneck, N.Y., 5, 15, OW 8-0080

**Amplivox, Ltd., London:** Microphones, headsets. **Danavox A/S, Copenhagen:** Earphones, headsets, throat mikes. **Richard Hirschmann Radiotecnisches Werk:** Plugs, connectors, terminals. **Koito Electronics, Tokyo:** Earphones.

Wimpie Assoc., Inc., S., 510 W. Boston Post Rd., Mamaroneck, N.Y., 15, OWens 8-7100

**American Electronics:** AC & DC blowers & motors, servo synchro & stepper motors, resolvers. **Arco:** High stability capacitors. **Hermetic Seal Transformer:** Transformers & power supplies. **Hurst Mfg.:** Synchronous motors. **International Instruments:** Panel meters & rotary switches. **Patwin:** Readout indicators. **Potter & Brumfield:** Relays. **Tape Cable:** Flat multiconductor cable.

**Manhasset**

Holliday-Hathaway Co., Inc., 390 Plandome Rd., Manhasset, L.I., N.Y., 15, MAnhasset 7-7300, Branch: Rutherford, N.J.

Kaelber & Mack, 1 Park Ave., Manhasset, N.Y., 15, MAnhasset 7-0620

**Carling:** Switches. **Conant Labs:** Rectifiers (instrument). **Dale:** Resistors, trimmer potentiometers, networks. **Pace:** Test, panel meters. **Phalo:** Wire, cable, cords. **Thomas & Skinner:** Magnets, laminations, cores. **Vector:** Turrets, adaptors, structures for circuitry.

Spellman, Fred, 200 Plandome Rd., Manhasset, L.I., N.Y., 15, MAnhasset 7-3399 (ERA)

**Mineola**

**Adelphi Electronics, Inc., 142 Mineola Blvd., Mineola, L.I., N.Y., 10, 15, PIoneer 7-5195 (NEDA)**

See ads on pages 537, 565

**Bogue Semiconductor, Borg Micropots & Dials, Bradley Semiconductor, Bud, Controls Co. of America, Cornell-Dubilier, General Products, Mallory, Plastic Capacitors, Precision Soldering Iron, Simpson, UTC.**


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Arrow Electronics, Inc., 525 Jericho Turnpike, Mineola, L.I., N.Y., 5, 10, 20, PIoneer 6-8686 (NEDA)

**General Electric, RCA, Raytheon, Sylvania:** Tubes.

**Schweber Electronics, 60 Herricks Rd., Mineola, L.I., N.Y., 15, PIoneer 6-6520**

See ads on pages 395, 407, 517, 521, 541

**Allen-Bradley:** Resistors & Potentiometers. **Amphenol:** Connectors & Coaxial Teflon Cables. **Automatic:** Coaxial Connectors. **Bourns:** Trimpots. **Cannon:** Plugs. **Dakota:** Clamps. **Daystrom-Pacific:** Potentiometers. **Elgin:** Advance Relays. **Fairchild:** Semiconductors, Diodes. **General Electric:** Tantalum Capacitors, Micro-miniature Relays. **Ohmite:** Resistors & Rheostats. **Vitramon:** Glass Type Capacitors. **Westinghouse:** Rectifiers, Semiconductors.

**Mount Kisco**

Electronicraft, Inc., Mount Kisco, N.Y., 25, MOunt Kisco 6-5212

Test equipment, waveguide components.

**Mount Vernon**

**Burlingame Associates, 510 S. Fulton Ave., Mount Vernon, N.Y., 15, MOunt Vernon 4-7530**

See ads on pages 245, 247, 257, 273, 274, 283, 288, 293, 294, 305, 311, 313, 327, 354, 365, 417, 439, 465, 475, 481, 489, 491, 569, 583

**Allison Labs:** Passive network audio filters. **Brush Instruments:** Oscillographs, Recorders. **Convair Instruments:** Microvoltmeters, Liquid Gas Detectors. **Donner Scientific:** Analog Computers, Oscillators, Wave Analyzers. **Electro Pulse:** Pulse & Time Delay Generators, Glow Tube Counters. **Empire Devices:** Noise, Field Intensity, Microwave Test, Attenuators, Variable Freq. Power Supplies. **Holt Instrument:** Voltage Standard, Audio Oscillators, Travelling Wave Tubes. **Huggins Labs:** Backward-Wave Oscillators. **Levinthal:** Transmitters, Modulators, RF & Microwave Equip., Pulse Transformers. **Menlo Park:** TWT Amplifiers, Solenoids & Power Supplies, Swept B-W Oscillators. **Metrolog:** Servo Analyzers, Power Supplies, Gyro Drift Recorder. **Narda Microwave:** Waveguide & Coax Test Equip., VSWR Amplifiers, Bolometer Amplifiers, Detectors. **NJE Corp.:** Power Supplies. **Smith-Florence:** Micro-Voltmeters, Cable Fault Finders. **Systron-Donner Corp.:** Data Handling & Control Systems, Strip-chart Recorders, Time Interval & Freq. Counters. **Wayne Kerr:** Bridges, Audio & Video Test Instruments, Microwave Wattmeters.

Distributing Co., Inc., 630 S. Columbus Ave., Mount Vernon, N.Y., 10 (NEDA)

Kopple Associates, John J., 9 W. Prospect Ave., Mount Vernon, N.Y., 15, MO 4-5577

**Atlantic Transformer:** Transformers. **Dumont Airplane & Marine Instrument:** Capacitors & Electrolytics. **Hordis Bros.:** Glass. **James International:** Motors. **Lectroloid Corp.:** Anodes, Cord Sets, Harnesses. **Magnadyne:** Relays, Pulse Transformers, Controls. **Geo. J. Mayer Co.:** Name Plates, Etching. **Ohio Carbon:** Resistors, Suppressors. **Wisor-Smith:** Metal Products.

Radelco, Inc., 246 W. First St., Mount Vernon, N.Y., 10 (NEDA)

Sonkin Associates, David, 10 Fiske Pl., Mount Vernon, N.Y., 15, MOunt Vernon 8-9809

**Alto Scientific:** Telemetering Receivers, Time Delay Devices. **Augat Brothers:** Hardware, Tube Clamps, Component Clips. **Electro-Mechanical Instrument:** Meters. **James Knights:** Quartz Crystals, Oscillators, Filters, Frequency Standards. Plastic **Capacitors:** Capacitors, Pulse [illegible] works, Power Supplies, Premier Metal **Products:** Cabinets, Racks, Panels. **Slip Ring Co. America:** Slip Rings, Brushes. Stable Platform Assemblies. Walkitt: Binary Counters & Packaging.

**New Hartford**

Holliday-Hathaway Co., Inc., P.O. Box 296, Utica, New Hartford, N.Y., 15, REdwood 2-1602, Branch: Rutherford, N.J.

**New Hyde Park**

Diehl Co., John F., P.O. Box 13, Hillside Manor, New Hyde Park, N.Y., 15, FLoral Park 4-3234, Branch: New York, N.Y.

Reed & Riddett Co., The, 1100 Jericho Turnpike, New Hyde Park, L.I., N.Y., 15, FLoral Park 4-6719 (ERA)

**New Rochelle**

Gates Co., Claude A., 27 Locust Ave., New Rochelle, N.Y., 15, 20, NE 2-1465

**Blue M:** Lab ovens, furnaces, baths, humidity cabinets. **Claude S. Gordon:** Pyrometer accessories, thermocouples, extension wire. **Lindberg:** Lab & pilot plant furnaces. **Pereny Equipment:** Pilot plant furnaces, kilns. **Pyrometer Instrument:** Pyrometers. **Radiation Electronics:** Radiation pyrometer systems. **Wheelco Instruments Div.:** Pyrometers.

**New York City—Manhattan & Bronx**

Ad. Auriema, Inc., 85 Broad St., New York 4, N.Y., 5, BOwling Green 9-7750

**Aerovox:** Capacitors, Resistors. **Allegheny Ludlum:** Steel laminations, Alloys. **Alpha Wire:** Hook-up wire, Cable, Zippered & plastic tubing. **Beattie-Coleman:** Oscilloscope cameras, Programmers. **Billey:** Quartz crystals, crystal ovens, filter networks, ultrasonic delay lines. **Branson Instruments:** Ultrasonic test instruments & gages. **Branson Ultrasonic:** [illegible]

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20. Sales & service
25. Surplus dealers

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Environmental Equipment Co.:
[illegible] John Fluke:
[illegible] General Instrument:
[illegible] General Radio:
[illegible] General Resistance:
[illegible] Indiana Steel:
[illegible] Knight Electron:
[illegible] Littelfuse:
[illegible] Microtran:
[illegible] National Co:
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[illegible] Phaostron:
[illegible] Radiart:
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[illegible] Turner Co.:
[illegible] Ward Leonard:
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Adelman Co., Leon L., 25 Chittenden Ave., New York 33, N.Y., 15, SWinburne 5-1145; 141 Broadway, Room 1801, New York 7, N.Y., 15, WOrth 2-5308

See ad on this page

**Austin-Craft:** Battery Holders. **Clarostat:** Resistors, Controls. **Conrac:** TV Chassis, Monitors. **Elec. Systems Eng.:** Sound Systems. **General Phones:** Headphones. **Kingdom Prods.:** Speakers. **Lenk:** Soldering Irons. **Lowell:** Baffles. **Metalworks:** Racks, Consoles, Cabinets. **Pickering:** Cartridges. **Radion:** Indoor TV Antennas. **Standard Coil Products:** TV Tuners. **Technical Applicance:** Antennas.


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Adson Radio & Electronics Co., 189 Greenwich St., New York 7, N.Y., 10 (NEDA)

Advance Electronics, 6 W. Broadway, New York 7, N.Y., 25, REctor 2-0270

American Advancement Corp., 50 Church St., New York 7, N.Y., 5, 15, BA 7-3960

American Laubscher Corp., 250 W. 57th St., New York 19, N.Y., 5, JUdson 6-7474

Arrow Electronics, Inc., 65 Cortlandt St., New York, N.Y., 5, 10, 20, DIgby 9-3790, Branch: Mineola, L.I., N.Y.

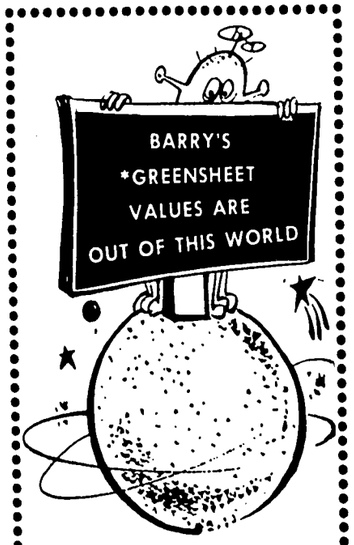
Atlas Electronics Corp., 1317 First Ave., New York 21, N.Y., 10 (NEDA)

Bach Sales Co., 1 E. 42nd St., New York, N.Y., 15, MUrray Hill 7-1240, Branch: Old Bethpage, L.I., N.Y.

**Barry Electronics Corp., Dept. REI, 512 Broadway, New York 12, N.Y., 5, 10, 15, 20, 25, WAlker 5-7000 (NEDA)**
**See ad on this page**

**Adjust-A-Volt:** Variable Xfmrs. **B&W, Drake, Geloso, General Electronics, Glas-Line, Hammarlund, Hexacon, E. F. Johnson, National Co., National Electronics, Penta, Staco, Technical Materiel, Vocaline, Westinghouse:** Selenium & Silicon Rectifiers, Transformers & Chokes, Industrial Power Supplies.

Becker Co., Irving, 635 E. 14th St., New York 9, N.Y., 15, PLaza 7-6454


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**Antronic:** Boosters, brighteners, couplers, CRT testers. **Arnhold Ceramics:** High fidelity speakers. **Chemical-Elect. Eng.:** Chemicals. **I E. Mfg:** TV hardware. **Radec:** Recording tape. **David Riemer:** Mikes, arms, meters. **Rye Sound:** Headsets, plugs, jacks, connectors. **Shell:** Tube testers, tuners. **Technical Tape:** Pressure sensitive tapes.

Beemer Engineering Co., Chanin Bldg., New York 17, N.Y., 10, 15, 20, Branch: Philadelphia, Pa.

Boro Electronics, Inc., 69-18 Roosevelt Ave., New York 77, N.Y., 10 (NEDA)

**Bressler Associates, 15, OXford 5-0255, Branch: Union City, N.J.**
**See ad on page 739**

Breuer Co., Inc., R. E., 10 Columbus Circle, New York 19, N.Y., 15, CO 5-0440

**Advance Ross:** Deflection yokes & horizontal output transformers. **Aeronautical Electric:** Pilot light assemblies, terminal boards. **Allcraft Screw & Hardware:** Fasteners. **B & C Insulation Products:** Sleevings & tubings. **Combined Electronics:** Printed circuit boards. **Cutler Metal Prod:** Sheet metal fabrications. **Electrical Windings:** Transformers, solenoids, coils. **Quam-Nichols:** Speakers, ion traps, magnetic devices. **Syncro:** Electrolytic capacitors.

Bronx Wholesale Radio, 472 E. Fordham Rd., New York 58, N.Y., 10 (NEDA)

CBS International, 46 E. 52nd St., New York 22, N.Y., 5 (Export only)

**Adler:** TV translators, Microwave equipt. **Standard Electronics:** TV, FM, AM Transmitting equipt.

Calvert Electronics Inc., 536 Broadway, New York 12, N.Y., 5, 10, 15, 20, CAnal 6-7400

**Amperex:** Tubes. **Audio Development:** Telephone Jacks, Plugs. **Bogen-Presto:** Recording Equipment. **Brimar:** Tubes. **Clevite:** Headsets. **Continental Carbon:** Resistors. **Dumont:** Tubes. **Eitel-McCullough:** Electron Tubes. **General Electric:** Tubes. **Hardwick, Hindle:** Resistors. **E. F. Johnson:** Sockets, Insulators. **Marshall:** Tubes. **Pye:** Megaphones. **R.C.A.:** Tubes. **Recoton:** Styli. **Sangamo:** Capacitors, Inverters. **Westinghouse:** Tubes. **Yokogawa Electric Works:** Instruments.

Camber Co., Marty, 1700 York Ave., New York 28, N.Y., 15, ENdicott 9-4222

**Micamold:** Capacitors. **Woodward Schumacher:** Solenoid Transformers.

Center Industrial Electronics, Inc., 74 Cortlandt St., New York 7, N.Y., 10 (NEDA)

Central Associates, New York, N.Y., PYramid 6-0577, Branch: Englewood, N.J.

Cooper, Simon & Cooper, Inc., 400 E. 79th St., New York 21, N.Y., 15, LEhigh 5-2900

**Aemco:** Relays, timers, flashers. **Chester Cable:** Wire, cable, coax, multiconductor. **Marion Inst. Div.:** Meters, aircraft mechanisms. **New England Inst:** Potentiometers, wirewound & conductive plastic. **Resistance Products:** Precision resistors & networks.

Coronet Electronics, Inc., 120 Liberty St., New York, N.Y., 10, CO 7-3760

**Augat:** Clips, Clamps, relay sockets. **General Motors:** Delco Transistors & Rectifiers. **Sealectro:** Terminals & Connectors. **U. S. Components:** Connectors. **Winchester:** Connectors & Terminals.

Crane & Egert Corp., 97 Reade St., New York 13, N.Y., 15, WOrth 4-0996

**Autotron:** Photoelectric controls. **Flow Corp.:** Random signal measure equipment, hot wire anemometers. **Heinz Mueller:** Motors, generators. **Philbrick Researches:** Computing equip. **H. H. Scott:** Audio test equip.

Dale Electronics Co., 319 W. 14th St., New York 11, N.Y., 10 (NEDA)

Delsam Radio-TV, 2665 Grand Concourse, New York 68, N.Y., 20, CYpress 8-3657

General radio & electronic equipment.

Diehl Co., John F., 60 E. 42nd St., New York 17, N.Y., 15, MUrray Hill 2-1720

**Amrum Metal Industries:** Metal Stampings. **Atlas Pattern & Model Wrks.:** Non-Ferrous Castings. **Charles E. Crofoot Gear:** Precision Gears. **Peerless Eng.:** Screw machine products. **Pioneer Steel Ball:** Ball Bearings. **Stella Prods.:** Zinc Die Castings. **Thomaston Mfg.:** Screw Machine Products.

Dietrich Co., Earl, 110 E. End Ave., Apt. 8-K, New York 28, N.Y., 15, LEhigh 5-6590 (ERA)

Eby Sales Co., 130 Lafayette St., New York 13, N.Y., 10, 15, WO 2-7766

Sockets, hardware, TV Couplers, adapters, harnesses, wired cables.

Electro-Tech Equipment Co., 308 Canal St., New York 13, N.Y., 10 (NEDA)

Electronic Surplus Brokers, 148 Chambers St., New York 7, N.Y., 25, REctor 2-1591

Resistors, capacitors, tubes, diodes, transistors, shields for scope tubes, dynamotors, plugs & jacks, connectors.

Electronic Tube Sales, Inc., 74 Cortlandt St., New York 7, N.Y., 5, 10, 20, BArclay 7-4140

**CBS:** Tubes & Semiconductors. **General Electric:** Tubes & Semiconductors.

Electronics Center, Inc., 211 W. 19th St., New York 11, N.Y., 10 (NEDA)

Emeltone Electronics Co., 71 W. Broadway, New York 7, N.Y., 5, 10, 25, RE 2-1696

Electron tubes, test equipment.

Empire Electronics Co., 74 Cortlandt St., New York 7, N.Y., 25, WOrth 2-5272

**Engel & Associates, Inc., G. Curtis, 15, REctor 2-0001, Branch: Ridgewood, N.J.**
**See ad on page 737**

**Ercona Corp., Dept P-8, 16 W. 46th St., New York 36, N.Y., 5, CIrcle 5-3840**
**See ad on page 411**

**Belling & Lee, Ltd.**

Fay-Bill Distributing Co., 418 Broome St., New York 13, N.Y., 25

Tubes & parts.

Fields & Simon Sales Co., New York, N.Y., 10, 15, 20, WOrth 2-3318, Branch: Montclair, N.J.

Filnor Products, Inc., 156 5th Ave., New York 10, N.Y., 5, WI 7-8744

Tape recorders.

Fordham Radio Supply Co., 265 E. 149th St., New York 51, N.Y., 10 (NEDA)



# Distributional Functions



Forrest Co., Bernard J., 102 Warren St., New York 7, N.Y., 15, COrtlandt 7-1711 (ERA)

Franklin Insulation & Plastics Div., 129 Lafayette, New York 13, N.Y., 10, CAnal 6-4376

**Niagara Plastics, Permacel, Visking Division.**

Freed & Co., Leo, 420 Lexington Ave., New York 17, N.Y., 15, LExington 2-4771

**Electronic Components:** Transformers. **John E. Fast:** Capacitors & chokes. **Forbes & Wagner:** Delay lines, toroid coils. **Gavitt:** Wire & cable, printed circuits, loop antennas. **Quincy Speaker Mfg.:** Loudspeakers. **Solar Mfg.:** Ceramic capacitors, barium titanate transducers. **United Tool & Stamping:** Stampings. **Wirecraft:** Teflon wire.

Galasso, David P., New York, N.Y., 10, 15, DIgby 4-1763, Branch: Nutley, N.J.

Gancher Co., Louis, 468-72 W. Broadway, New York 12, N.Y., 25, GRamercy 7-4755

Screws, nuts, bolts, washers, tee nuts, lockwashers, spacers, springs, grommets, knobs, shock mounts, eyelets, rivets, solder lugs, screw & solder terminal boards, insulation sleeving, cable clamps, all electro-mechanical component parts.

Garten & Associates, Louis A., New York, N.Y., 15, BOwling Green 9-4339, Branch: West Orange, N.J.

**Gawler-Knoop Co., 15, DIgby 4-2997, Branch: Roseland, N.J.**
**See ad on page 737**

Glass Assoc., Ed, 250 W. 57th St., New York 19, N.Y., 15 (ERA)

Goldberg Associates, Max G., 270 Lafayette St., New York 12, N.Y., 15, CAnal 6-7468

**Amplifone:** Flybacks. **Micarta Fabricators:** Laminate phenol assemblies. **Mid West Coil & Transformer:.** Transformers, chokes. **Servwel:** Screw machine products.

**Gray Associates, Harold, 15, BRyant 9-3766, Branch: Tenafly, N.J.**
**See ad on page 738**

Graybar Electric Co., Inc., 420 Lexington Ave., New York 17, N.Y., 10

**W. H. Brady:** Pressure sensitive tape marking, aluminum name plates. **Camblock:** Terminal blocks. **General Electric:** Mobile radio, microwave equip., electron tubes, semiconductors, lamps, power transformers, voltage regulators, phono accessories, motors, motor controls & insulating materials. **Lansing Sound:** Loudspeakers & audio amplifiers. **Leviton:** Switches & controls. **Lynch Communication Systems:** Telephone & telegraph carrier (terminal & repeater) equipment, wave filters, & supervisory remote control telemetering equipment. **Machlett:** Electron tubes. **Minnesota Mining:** Insulating products & magnetic recording tape. **Raytheon:** Electron tubes & DC power supplies. **Thomas & Betts:** Wire terminals & connectors. **Victory Eng.:** Thermistors, varistors & choppers.

Greenberg Associates, Jerry, 16 Hudson St., New York 13, N.Y., 15, WOrth 4-7150

**Audiotex:** Tape & phono accessories. **Federal Electronics:** Components, tools. **G-C Electrocraft:** Plugs & jacks. **G-C Electronics:** Knobs. **G-C Telco:** Hardware. **General Cement:** Tools, chemicals, hardware. **JBL International:** Fleetwood television. **Lansing Sound:** Dynamic loudspeakers & enclosures. **Superscope:** Tape recorders. **Transistronics:** Amplifiers. **Webcor:** Tuners, recorders.

**105. Distribution.**
5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Greenwich Sales Co., 84 Cortlandt St., New York 7, N.Y., 20, 25, CO 7-4646

Lab. test equipment, Govt. surplus components & equipment.

Greylock Electronic Supply Co., Inc., 550 W. 168th St., New York 32, N.Y., 10 (NEDA)

Haas Electronics Co., 862 Southern Blvd., New York 59, N.Y., 10 (NEDA)

Harrison Radio Corp., 225 Greenwich St., New York 7, N.Y., 5, 10, 20, BArclay 7-7777

**Aerovox:** Capacitors. **Akro-Mils:** Cabinets. **Alpha:** Wire. **American Beauty:** Soldering irons. **Amperite:** Ballast tubes, relays. **Amphenol:** Sockets, connectors, plugs, cable. **Arrow-Hart & Hegeman:** Switches. **Astatic:** Microphones. **Atlas Sound:** Stands. **Audio Devices:** Recording tape. **APM:** Hex seals, screws. **Barker Williamson:** Amateur transmitters, components. **Belden:** Wire. **Birnbach:** Wire, jacks, plugs & sockets. **Bliley:** Crystals. **Bogen:** Hi-fi & PA systems. **Bourns:** Trimpots. **Bud:** Cabinets, capacitors. **Bussman:** Fuses. **Burgess:** Batteries. **Centralab:** Capacitors, switches, controls. **Chicago Standard:** Transformers. **Cinch-Jones:** Terminal strips, sockets, plugs. **Clarostat:** Controls, resistors. **Collins:** Amateur equip. **Cornell-Dubilier:** Capacitors. **Cutler-Hammer:** Switches. **Dale:** Resistors. **Dialco-Signico:** Pilot light assemblies. **Dow-Key:** Relays. **Drake:** Soldering irons. **Eby:** Plugs, sockets. **EICO:** Kits. **Elmac:** Tubes. **Elco:** Shields, sockets. **Electrovert:** Cradle-clips. **Electro-Voice:** Microphones. **Equipto:** Cabinets. **Erie:** Capacitors, trimmers. **G.E.:** Tubes, semi-conductors, transformers. **Gonset:** Amateur equip. **Grayhill:** Switches, clips, posts. **Hallicrafters:** Amateur equip. **Hammarlund:** Capacitors, receivers. **Hickok:** Test equip. **I.R.C.:** Switches, controls, resistors. **Ideal:** Strippers, thermotips, foot switches. **Industro:** Semi-conductors. **J-B-T:** Switches, meters. **E. F. Johnson:** Sockets, dials. **M. C. Jones:** Test equip. **Kester:** Solder. **Keystone Electronics:** Battery clips. **Krylon:** Spray paint. **Kurz-Kasch:** Knobs. **Lerco:** Lugs, terminals. **Littelfuse:** Fuse clips, fuses. **Mallory:** Cap. switches, controls, tantalum capacitors. **Microdot:** Connectors. **Microtran:** Transformers. **Millen:** Terminal strips, plugs, sockets, shield. **Miller, J. W.:** RF-IF-coils. **Minnesota Mining:** Recording & electrical tape. **Mosley:** Amateur antennas. **Multicore:** Solder. **Nt'l. Co.:** Amateur equip., coils, knobs, capacitors. **North Hills:** Coils. **Ohmite:** Resistors, capacitors, rheostats. **Oryx:** Soldering irons. **Par Metal:** Cabinets, panels. **Penta:** Tubes. **Pioneer:** Punches. Potter & **Brumfield:** Relays. **Precision Apparatus:** Test equip. **Premier Metal:** Cabinets. **R.C.A.:** Tubes, semiconductors, test equip. **Sangamo:** Capacitors. **Sarkes Tarzian:** Rectifiers. **Shure:** Microphones. **Simpson:** Meters, panels, test equip. **Smith, H. H.:** Plugs, sockets, terminal strips. **Sprague:** Tantalum capacitors. **Standard Electric:** Variable transformers. **Stancor:** Transformers. **Superior Powerstats. Switchcraft:** Plugs, switches, cable assemblies. **Telrex:** Amateur antennas. **Thordarson-Meissner:** Transformers. **Transitron:** Semiconductors, diodes, transistors, rec-

Harvey Radio Co., Inc., 103 W. 43rd St., New York 36, N.Y., 15, NEDA

Hughes Co., Inc., Kenneth E., 15, OXford 5-0982, Branch: Union City, N.J.
See ad on page 738

Instrumentation Associates, Inc., 17 W. 60th St., New York 23, N.Y., 5, 15, 20, CIrcle 5-5550

Research & clinical instruments, I.P. gauges & specialties, supplies, test apparatus & other measuring equip.

Interstate Electronics, Inc., 227 Fulton St., New York 7, N.Y., 10, 25, BEekman 3-8780
See ad on page 392

Cable, Capacitors (**Corning, Erie, Pyramid, Sangamo**), Connectors, Fuses, Indicator Lights, Jacks, Meters, Rectifiers, Relays, Resistors, Semiconductors, Sockets.

Jacobson Co., Inc., Leo, 501 E. 21st St., New York 10, N.Y., 15, ORegon 4-8800, Branch: Buffalo, N.Y.

Jayso Electronics, 819 E. 181th St., New York, N.Y., 10 (NEDA)

Kahant Associates, 11 Park Pl., New York 7, N.Y., 15, COrtlandt 7-5326

**Associated Research:** Megohmmeters & high voltage test sets. **Columbus Electric:** Snap-action switches. **Fairfield Engrg.:** Magnetic rectifiers & thyratron controls. **Federal-Pacific:** Electrical measuring instruments & circuit breakers. **Hartman Electric:** Contactors & reverse current cutouts. **H. R. Kirkland:** Push buttons & indicating lamps. **Northwestern Electric:** Motors & generators. **Pittsburgh Coil:** Control transformers. **States:** Meter testing equip. **Struthers-Dunn:** Relays & timers. **R. E. Uptegraff:** Power, distribution & instrument transformers.

Kahgan Sales Corp., 1261 Broadway, New York 1, N.Y., 10, 15, MUrray Hill 4-7772

**Amperex:** Special tubes, transistors & diodes. **Bamford:** Miniature potentiometers. **Control Dynamics:** Miniature hi-shock relays. **Glenco:** Subminiature ceramic capacitors. **Hopkins Engrg.:** Capacitors. **International Electronic Inds.:** Capacitors. **Radio Receptor:** Selenium rectifiers. **Raytheon:** Voltage stabilizers & mechanical components. **Rotating Components:** Motors & blowers. **Stanley Transformer:** Audio & power transformers. **Thermistor Corp:** Thermistors.

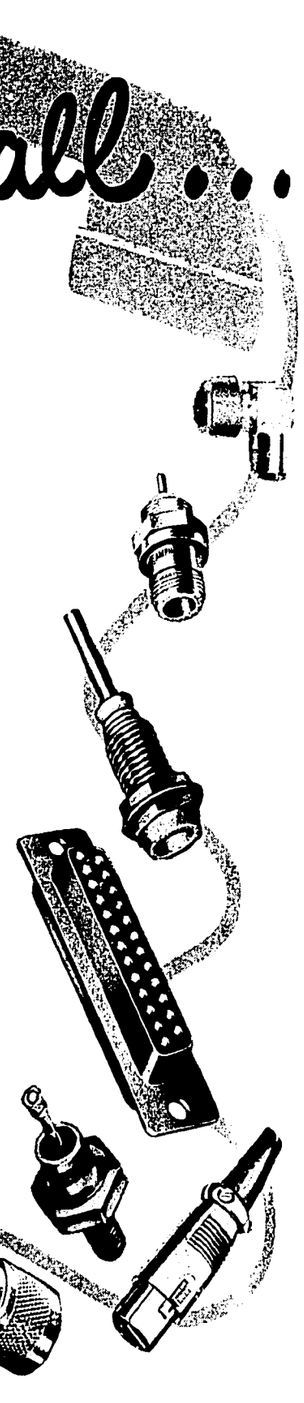
Knickerbocker Annunciator Co., 73 Murray St., New York 7, N.Y., 10, BArclay 7-5306

**American Steel & Wire:** Annunciator Wire. **Anaconda Wire & Cable:** Magnet Wire. **Belden:** Lead, Magnet, Hook-Up, RG/U Wire, Copper Braid & Strand, Cord Sets, Telephone & Plastic Cables.

Lafayette Radio Electronics Corp., 100 6th Ave., New York 13, N.Y., 5, 10, WO 6-5300, Branch: Jamaica, N.Y.

Lafayette Radio Electronics Corp., 542 E. Fordham Rd., New York 58, N.Y., 5, 10, FO 7-8813, Branch: Jamaica, N.Y.

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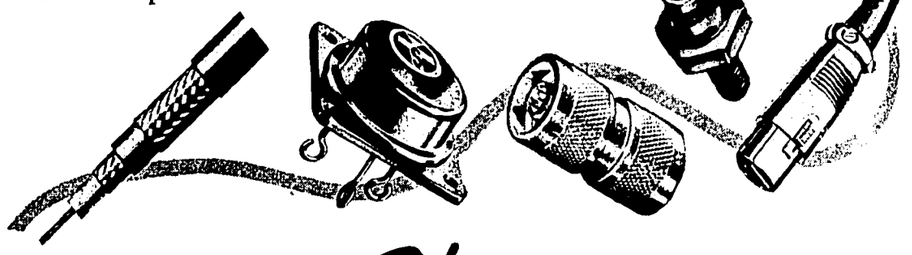
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# Distributional Functions



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15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Landes Electronic Fasteners, 510 W. Broadway, New York 12, N.Y., 10, AL 4-4593

Screws, nuts, washers, rivets, terminals, grommets, eyelets, spacers, spade bolts, lugs, springs, extruded tubing, shockmounts, wire, clamps.

Landis & Gyr, Inc., 45 W. 45th St., New York 36, N.Y., 5, 15, JU 6-4644

**Landis & Gyr S. A., Zug, Switzerland; Roulements Miniatures S.A., Bienne, Switzerland; Sodeco, Geneva, Switzerland.**

Leonard Radio, Inc., 69 Cortlandt St., New York 7, N.Y., 10 (NEDA)

Levison Sales Co., Inc., 545 Fifth Ave., New York 17, N.Y., 15, MUrray Hill 2-2995 (ERA)

Magnet Wire Inc., 25 Walker St., New York 13, N.Y., 10, 25, CAnal 6-0900

**Bridgeport Insulated Wire:** Silk-nylon, rayon covered magnet wire & litz wire. **Cable Designs:** Teflon insulated magnet wire. **W. B. Driver:** Resistance wires. **Gen. Electric:** Covered magnet wire. **Spargo Wire:** Bare & tinned copper wire.

Marcy Assoc., Robert J., 1776 Broadway, New York 19, N.Y., 15, CIrcle 5-3880

**Borg-Warner Controls:** Transducers, data systems, R.F. & nuclear instruments, miniature magnetic tape recorders. **Dynex:** Gear heads & speed changers. **Franke Gear Works:** Fine pitch gears. **G. W. Galloway:** Miniature coaxial connectors. **Gotham Audio:** Neuman & Beyer microphones. **Harcast:** Precision investment castings. **Keystone Products:** Transformers. **Langevin:** Audio & video amplifiers, power supplies, rotary switches, faders & mixers, equalizers, filters. **Power Instruments:** Inverters & converters.

**Metropolitan Supply Corp., Dept. ER-11, 1133 Broadway, New York 10, N.Y., 5, CHelsea 3-1105**


See ad on page 575


Electron Tubes, Transistors, Diodes, Rectifiers—**Amperex, Bendix, Bomac, CBS, Dumont, Eimac, General Electric, ITT, Machlett, Metrotube, National Union, RCA, Raytheon, Sperry, Sylvania, Tung-Sol, Varian, Westinghouse.**

Micro Specialties, 1896 Walton Ave., New York 53, N.Y., 10, CY 4-1525

Limit Switches.

Milgray Electronics, Inc., 136 Liberty St., New York 6, N.Y., 10 (NEDA)

Milo Electronics Corp., 530 Canal St., New York 13, N.Y., 10, BEekman 3-2980

**Alpha, Allen-Bradley, Amperex, Amphenol, Arrow-Hart & Hegeman, Astron, Belden, Birnbach, Bourns, Bud, Bussman, Cannon, CBS-Hytron, Centralab, Chatham—Tung-Sol, Chic. Telephone, Chicago Transformer, Cinch-Jones, Circuit Instruments, Clarostat, Cornell-Dubilier, Controls Corp., Dale, Daven, Dialight, Eimac, Elco, Electrons, Erie-Corning, Eveready, GE, Hetherington, I.R.C., J.B.T., J.F.D., E. F. Johnson, Kurman, Littelfuse, Mallory, Nat'l Electronics, Nt'l Union, Ohmite, Phaostron, Plastic Capacitors, Potter & Brumfield, RCA, Raytheon, Sangamo, Simpson, Sola, Spectrol, Sprague, Stancor, Superior, Sylvania, Telectro, Transitron, Triplett, United Transformer, Westinghouse, Weston.**

Mitchell-Rand Corp., 51 Murray St., New York 7, N.Y., 10, CO 7-9264

**Connecticut Hard Rubber:** Cohrlastic Tapes. **General Electric:** Insulating products & Laminates. **Hess Goldsmith, H. Linton Div.:** Fiberglas Tapes. **Ludlow Mfg.:** Tapes. **Macallen:** Mica products. **National Vulcanized Fiber:** Fiber products & Laminates. **Owens-Corning:** Fiberglas Cords. **Permacel:** Pressure Sensitive Tapes. **Plymouth Rubber:** Friction & Rubber Tapes. **Rogers Paper:** Insulating Papers. **U.S. Rubber:** Asbestos Products.

**Mogull Co., A., 17 Warren St., New York 7, N.Y., 10, WOrth 4-0865**


See ad on this page


**Allen-Bradley:** Potentiometers. **Cinch-Jones:** Connectors, strips. **Ohmite:** Rheostats, resistors. **Amphenol, Bendix, Cannon, Continental, USC, Winchester:** Connectors. Also all makes capacitors, mica capacitors, wirewound resistors, switches, etc.

Morse Sales, Irv., 150 Broadway, New York 38, N.Y., 10, 15, COrtland 7-2913

**Automatic Coil:** Coils. **FBC Instrument:** Panel meters. **Judd:** Wire. **M & M Metal Prod.:** Chassis. **W & M Mfg.:** Term. strips, phono plugs & jacks.

National Radio Distributors Corp., 1165 Southern Blvd., New York 59, N.Y., 10 (NEDA)

National Radio Distributors-Manhattan, Inc., 1799 First Ave., New York 28, N.Y., 10 (NEDA)

New Yorker Electronics Co., Inc., 40 E. 21st St., New York 10, N.Y., 10, OREgon 4-5120

**Mullard:** Tubes. **Nat'l. Union:** Tubes. **Sprague:** Capacitors. **Tung-Sol:** Transistors, tubes.

Newhope Corp., The, 6 E. 39th St., New York 16, N.Y., 15, Lexington 2-7372

**American Television & Radio:** Vibrators, DC-AC inverters, battery eliminators. **Centralab:** Controls, capacitors, switches, ceramics, packaged electronic circuits. **Duotone:** Phonograph needles & accessories. **Electric Soldering Iron:** Soldering guns. **Krylon:** Protective coatings-aerosols. **North American Philips:** Speakers, record changers, tape recorders.

Progress Electronics Co., Inc., 107 Franklin St., New York 13, N.Y., 5, 10, 15, 20, CAnal 6-5611


See ad on page 746


**Cannon:** MS Connectors, All Components. **Dage Electric:** Connectors. **Gremar:** Connectors. **Hoffman Semiconductor:** Diodes & Transistors. **Industrial Products:** Coaxial Connectors & Switches. **Int. Tel. & Tel.:** Semiconductors. **Silicon Transistor:** Semiconductors. **Times Wire & Cable:** Coaxial Cables.

RMC Associates, 236 E. 75th St., New York 21, N.Y., 15, TR 9-2023

**Burroughs:** Beam switching & indicator tubes, unitized pulse systems. **Dymec:** Instrumentation systems. **Hewlett-Packard:** Complete electronic instrumentation. **Kin Tel:** Absolute DC supplies, AC-DC amplifiers, TV systems, chopper stabilized instruments, meters. **Larson:** Time recorders, contact meters. **Massa:** Direct recording oscillographs, transducers. **Sorensen:** Regulators, DC sources, high voltage supplies. **Varian:** Klystrons, recorders, vacuum gauges, microwave components & equip.

Radio Merchandise Sales, Inc., 2015 Flatbush Ave., New York 12, N.Y., 10

[illegible]

Radio Research Instrument Co., 550 Fifth Ave., New York 36, N.Y., 10, 25, JUdson 6-3604

Radio & [illegible]

Rochelson Corp., 569 Madison Ave., New York 22, N.Y., 5

**Ad-Yu:** Instruments & Supplies. **Boonton Radio:** Instruments. **DuMont Labs:** Instruments & tubes. **General Radio:** Instruments. **R.F.L.:** Instruments. **Sprague Electric:** Capacitors. **Stevens-Arnold:** Coil parts. **Weston:** Instruments. [illegible] export only.

Reese, Inc., J. Ramsey, 71 Murray St., New York 7, N.Y., 15

**AAA Mfg.:** Springs. **Arrow Mfg.:** Springs. **Harjon Mfg.:** Screw machine parts. **Joma:** Lens rim stampings. **J. H. Rosenbeck:** Washers. **Trebor:** Sheet rim stampings. **Woodworth Specialties:** Wire forms.

Resistor Wholesalers Corp., 71 Murray St., New York 7, N.Y., 10, WOrth 2-7862

**Allen-Bradley:** Insulated carbon resistors.


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Rocke International Corp., 13 E. 40th St., New York 16, N.Y., 5, 10, MU 9-0200

**Amperex Electronics:** Tubes. **Browning Labs.:** Receivers. **Gates Radio:** Transmitters, etc. **Hammarlund Mfg.:** Receivers. **Stainless:** Pal-towers.

Ross Associates Inc., Milton, 550 Fifth Ave., New York, N.Y., 15, JUdson 6-0653

**American Radionic:** Paper & mylar capacitors. **Automatic Metal Prod.:** Co-ax switches & relays, type UG connectors, RF connectors. **Better Coil & Transformer:** Audio & power transformers. **General Wire Prod.:** Hook-up wire & co-ax cable. **Superior Resistor & Electronics:** Wire wound resistors.

Saftler Associates, Inc., P., 157 W. 57th St., New York 19, N.Y., 15, CIrcle 7-3857

**All Star Prod.:** Variable capacitors. **Astatic:** Microphones & Pickups. **Britton Elect.:** Selenium & silicon rectifiers. **General Ind.:** Fractional & Phono motors. **McGregor Elect. Ind.:** Speakers & transformers. **Richco Plastics:** Plastic clamps. **Standard Winding:** RF & IF coils. **Wells Elect.:** Miniaturized Coils.

Schwartz Co., Mel, New York, N.Y., 15, LOngacre 4-4724, Branch: Fair Lawn, N.J.

Simberkoff Sales Co., New York, N.Y., 15, WHitehall 3-7023, Branch: Hoboken, N.J.

Slate & Co., 3960 Merritt Ave., New York 66, N.Y., 10 (NEDA)

Smith Co., Howard F., 259 W. 14th St., New York 11, N.Y., 15, CHelsea 2-2398 (ERA)

Smith-Meeker Engineering Co., 157 Chambers St., New York 7, N.Y., 15, WOrth 4-5510

Aircraft navigation & communication equip.: **ARC, Bendix, Collins Radio, RCA, Sperry. G.E.:** Marine radio tel. **Lavoie:** Radar. **Northern Radio:** HF marine tel.

Sprung Associates, Joseph, 254 W. 31st St., New York 1, N.Y., 15, LO 5-1820

**Essex Electronics:** Chokes, delay lines. **General Products:** Terminal boards. **ITT Components:** Semiconductors. **National Fabricated Products:** Tube sockets. **Stackpole Carbon:** Resistors, switches, ferrites. **Victoreen Instrument:** Resistors, volt reg. tubes.

**State Laboratories, Inc., 215 Park Ave. South, New York 3, N.Y., 15, ORegon 7-8400**

**See ad on page 581**

**L.M. Ericsson:** Longlife tubes.


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- DYNAMOTORS
- HEAD SETS & ELEMENTS
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**Sun Radio & Electronics Co., Inc., 650 Sixth Ave., New York 11, N.Y., 10, 15, ORegon 5-8600**

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**Aerovox:** Capacitors. **Amphenol:** Connectors. **Arrow, Hart & Hegeman:** Switches. **Bourns:** Trimpots. **Bud:** Steel & aluminum. **Centralab:** Switches & capacitors. **G.E.:** Semiconductors. **Gen. Instrument:** Semiconductors. **Ohmite:** Relays, resistors & controls. **Potter & Brumfield:** Relays. **R.C.A.:** Tubes, semiconductors, testers, batteries. **Raytheon:** Semiconductors, tubes, voltage regulators, mech. components. **Simpson:** Test equip. & panel meters. **Superior Electric:** Voltage Regulators. **U.T.C.:** Transformers.

Sylvan-Wellington Co., 269 Canal St., New York 13, N.Y., 10 (NEDA)

**Technical Apparatus Builders ("TAB"), 111 Liberty St., New York 6, N.Y., 10, 25, REctor 2-6248**

**See ad on page 492**

Amplifiers, automatic control equip., battery chargers, blowers, cabinets, fixed capacitors, coils, converters, electronic photo flash, fuses, general test equip., infrared equip., magnets, meters, power supplies, rectifiers, relays, resistors, semiconductors, special purpose tubes, thermostats, transformers, volt. regs.

**Telectrad, 148 Chambers St., New York 7, N.Y., 5, 25, REctor 2-1591**

**See ad on this page**

Transmitters, receivers, power supplies, dynamotors, headsets, handsets, microphones, relays, cords, telephone equipt., switchboards, plugs, jacks, rheostats, potentiometers, capacitors, resistors, switches, fuses. Export Gov. Surplus.

Terminal Electronics, Inc., 236 W. 17th St., New York 11, N.Y., 10, CHelsea 3-5200

**General Elec.:** Semiconductors. **General Transistor:** Semiconductors. **Hughes:** Semiconductors. **PSI:** Semiconductors. **Philco:** Semiconductors. **RCA:** Semiconductors. **Raytheon:** Semiconductors. **Sarkes-Tarzian:** Semiconductors. **Sylvania:** Semiconductors. **Eitel-McCullough:** Special purpose tubes. **GE:** Special purpose tubes. **RCA:** Special purpose tubes. **Sylvania, Tung-Sol, Victoreen, Waterman:** Special purpose tubes. **Aerovox, B & K, Cornell-Dubilier, Elco, Hickok, JBT, RCA, Simpson, Triplett, Waterman, Weston:** Test Equipt. **Aerovox, Astron, Centralab, Cornell-Dubilier, Elmenco, Erie, Mallory, Ohmite, Sangamo, Sprague, Vitramon:** Capacitors, Etc.

Tobias & Co., Inc., D. F., 30 Church St., New York 7, N.Y., 15, COrtlandt 7-4349 (ERA)

**Transitube, Inc., 129 Fifth Ave., New York 3, N.Y., 10, LF 3-5580**

**See ad on page 577**

**Amperex, Anton, Bendix, Bomac, Burroughs, CBS, Chatham, Continental, Delco, DuMont, Eitel-McCullough, Electrons, Fairchild, General Electric, Hughes, ITT (Federal Tel. & Kuthe), Litton, Machlett, Microwave Assoc., Motorola, Nat. Electronics, Pacific Semiconductor, Penta, RCA, Raytheon, Sperry, Sylvania, Texas, Transitron, Tung Sol, Utd. Electronics, Varian, Victoreen, Western Electric, Westinghouse:** Tubes & Semiconductors.

Tri-Par Distributing Co., 1558 White Plains Rd., New York 62, N.Y., 10 (NEDA)

United Electronic Supply Co., 1991 Broadway, New York 23, N.Y., 10 (NEDA)

**Universal Relay Corp., 42 White St., New York 13, N.Y., 10, WAlker 5-9257**

**See ad on page 520**

Circuit breakers—low voltage, high current types. Rectifiers—selenium, full wave bridge types. Relays—all types, most makes.



# Distributional Functions



Weber Assoc., Jack, 63 E. 9th St., New York 3, N.Y., 15, GRamercy 3-7813 (ERA)

Wescon Electronics, Inc., 580 E. Fordham Rd., New York, N.Y., 10 (NEDA)

Western International Co., 45 Vesey St., New York 7, N.Y., 10, DIgby 9-2275

**Belden Mfg. Co., Plastoid Corp., Royal Electric Co., Tensolite Insulated Wire.**

Wilco Radio Distributors, 383 E. 138th St., New York 54, N.Y., 10 (NEDA)

Wilgreen Industries, Inc., 100 Warren St., New York 7, N.Y., 10, 25, WOrth 4-2490

**Amphenol, Bendix, H. H. Buggie, Cannon, Cinch-Jones, Continental, Dage, DeJur, Diamond, IPC, Kings, Winchester:** Connectors.

**North Syracuse**

Richter Corp., William, 107 Dolores Terrace South, North Syracuse, N.Y., 15, GLenview 4-1051, Branch: Rochester, N.Y.

**Old Bethpage**

Bach Sales Co., 26 Mahan Rd., Old Bethpage, L.I., N.Y., 15, CHapel 9-1324

**Fairchild Recording Equip:** Cartridges, arms, turntables, professional recording equip. **Koss:** Stereophones & accessories. **Precision Electronics:** Tuners & amplifiers. **Scope Electronics:** EMI audio products, amplifiers, speakers. **Stephens Trusonic:** Loudspeakers.

**Onondaga**

Wolf Co., O. C., Box 32, Onondaga, N.Y., 15, HOward 9-0649 (ERA)

**Pelham**

Masin Co., O. F., One Wolf's Lane, Pelham, N.Y., 15, PElham 8-4510

**Ace Electronics Assoc.:** Precision pots. **Cannon:** Plugs, co-ax connectors, DC solenoids. **Curtis Development & Mfg.:** Terminal blocks. **Felsenthal:** Edge-lighted panels, knobs. **Raychem:** Thermofit tubing, co-ax cable, hook-up wire. **Sigma:** Relays. **Switchcraft:** Jacks, plugs, switches. **Tru-Ohm:** Resistors, rheostats. **Victory Engrg.:** Thermistors, varistors.

**Penfield**

Freed & Co., Leo, 1967 Five Mile Line Rd., Penfield, N.Y., 15, LUdlow 6-8848, Branch: New York, N.Y.

**Phelps**

Le Roy & McGuire, Inc., R.D. 1, Phelps, N.Y., 15, KIngswood 8-4891

**Bogen-Presto:** Sound Equip, turntables, sound consoles. **Conant Instrument Labs.:** Instrument rectifiers. **Electro-Voice:** Phono cartridges, microphones, loudspeakers, handie talkies, receiving equip.

**Port Washington**

Aaron Associates, Paul D., Professional Bldg., Port Washington, N.Y., 15, Port Washington 7-8480

**American-Monarch:** Relays, push-button switches. **Coilcraft:** R.F., I.F. Coils. **Detroit Controls:** Snap action switches. **Good-All:** Capacitors, foil wound inductances. **Lectrohm:** Wire-wound resistors. **Mucon:** Sub-miniature ceramic capacitors. **Torotel:** Toroids, filters. **Wells:** Precision potentiometers. **Wright:** Quartz crystals.

Carduner Sales Corp., 80 Shore Rd., Port Washington, L.I., N.Y., 15, Port Washington 7-7700 (ERA)

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & Service
25. Surplus dealers

Di Blasi Associates, Inc., John, 90 Main St., Port Washington, L.I., N.Y., 15, PO 7-0470

**Airpax, Electric Design & Mfg. Corp., James Millen Mfg., Scientific Radio Products Inc., Tru-Connector, Unison Products, Universal Condenser.**

River Edge Sales Corp., 80 Shore Rd., Port Washington, L.I., N.Y., 5, PO 7-7700

Wooden Cabinets.

**Poughkeepsie**

Yewell Associates, Inc., 806 Main St., Poughkeepsie, N.Y., 15, GRover 1-3456, Branch: Burlington, Mass.

**Rochester**

Amer Electronic Supply, Inc., 480 St. Paul St., Rochester 5, N.Y., 10 (NEDA)

Brown Associates, Jack, 157 Rawlinson Rd., Rochester, N.Y., 15, Branch: Yonkers, N.Y.

Case Electronic Supply Co., Inc., 82 St. Paul St., Rochester 4, N.Y., 10 (NEDA)

Hi-C Electronics, Inc., 109 State St., Rochester 14, N.Y., 10 (NEDA)

Holliday-Hathaway Co., Inc., P.O. Box 1081, Rochester 3, N.Y., 15, GReenfield 3-1270, Branch: Rutherford, N.J.

Kennedy Co., Inc., R. P., 182 Mayflower Dr., Rochester 18, N.Y., 15, 20, BRowning 1-6322

**A.P.M. Sales:** Rotary shaft seals. **Atlee:** Component holders, transistor heat sinks, clips. **Consolidated Electrodynamics:** Removable pin connectors. **Cunningham Sons:** Crossbar switches, scanners, actuators. **Electric Indicator:** Fractional horsepower motors, selsyns. **Engineered Electronics:** Digital plug-in components, modules transistorized. **Ferranti:** Tape readers, delay lines. **Precision Metal Products:** Terminals, boards, hardware. **Precision Paper Tube:** Paper tubes, hobbins, mylar-wrapped tubes. **Robinson Technical:** Shock mounts. **Schutter Microwave:** Waveguide components.

Kopple Associates, John J., 2815 Monroe, Rochester, N.Y., 15, Hillside 5-0450, Branch: Mount Vernon, N.Y.

Marsey Sales Co., The, 529 Merchants Rd., Rochester 9, N.Y., 15, HUbbard 2-4133

**Alpha:** Wire. **Bud Radio:** Electronic sheet metal prods. **GC Electrocraft:** Plugs, jacks. **GC Electronics:** Hardware. **Gefco Mfg.:** Speakers. **Ken-Tron: (formerly Waltham Horological):** Connectors. **Merit Coil:** Transformers. **Pace Electrical Instruments:** Meters. **Precision Apparatus:** Instruments (test equipment). **Turner Co.:** Microphones.

Masline Electronics, Inc., 511 Clinton Ave., S., Rochester, N.Y., 10 (NEDA)

Naco Electronics Corp., 74 Park Ave., Rochester 7, N.Y., 15, GReenfield 3-4169, Branch: Liverpool, N.Y.

**New York**

Ossmann & Associates, Edward A., 820 Linden Ave., Rochester 25, N.Y., 10, 15, LIlac 4-4440

Amperex, Anton-Lima-Hamilton: Bald-[illegible] Breeze [illegible] Hoounton Radio: [illegible] Dymec: [illegible] Electro Prods. Labs: [illegible] Heltpot: [illegible] Hewlett-Packard: [illegible] Industrial Electronic Engineers: [illegible] Industrial Instruments: [illegible] Kaiser: [illegible] F. L. Moseley: [illegible] Pulse Engrg.: [illegible] Sanborn: [illegible] Syntron: [illegible] Technical Prods.: [illegible] Telecomputing: [illegible]

Richter Corp., William, 790 Linden Ave., Rochester 10, N.Y., 15, LUdlow 6-6464

**Richard D. Brew:** Delay lines, pulse transformers. **Central Transformer:** Transformers. **Chassis-Trak:** Chassis slides & hardware. **Constanta Co. Canada:** Miniature carbon film resistors. **Eastman Kodak:** Photosensitive resistors. **General RF Fittings:** Coaxial connectors. **International Electronic Inds.:** Electrolytic capacitors. **International Instruments:** Miniature meters. **Mamco:** F.H.P. Motors. **Security Devices Lab.:** Reed relays & battery holders. **Tape Cable:** Cable in tape form. **Walkirt:** Digital systems modules.

Rochester Radio Supply Co., Inc., 400 E. Main St., Rochester 5, N.Y., 10 (NEDA)

S.B.M. Associates, Inc., 900 Clinton Ave., S., Rochester 20, N.Y., 15, Greenfield 3-6506 (ERA)

Saftler Associates, Inc., P., 1000 East Ave., Rochester 10, N.Y., 15, BRowning 1-5858, Branch: New York, N.Y.

Simberkoff Sales Co., 5 Sandhurst Dr., Scottsville, Rochester, N.Y., 15, MUrray 8-2463, Branch: Hoboken, N.J.

**Rockville Centre**

Rywel Sales, Inc., 100 N. Village Ave., Rockville Centre, N.Y., 15, RO 4-2000

**Harry Davies Molding:** Plastic knobs, cases. **Hymeg Resistance:** Carbon ribbon type resistors, high voltage, high power & high frequency resistors. **Industrial Condenser:** Long life capacitors, interference filters. **QVS, Inc.:** Meters, panel portable types. AC/DC logarithmic. **Transformers:** Magnetic amplifiers, AC voltage calibrators, bridges. **Welwyn International:** Precision carbon film resistors, metal oxides

Willgold Electronic Sales Corp., 100 N. Village Ave., Rockville Centre, L.I., N.Y., 15, ROckville Centre 4-4022 (ERA)

**Rome**

Fishner, Stanley, 120 Colonel Dr., P.O. Box 1012, Rome, N.Y., 15, FF 7-0070

Radar, Microwave Instrumentation, Check out equipment.

Rome Electronics, Inc., 108 Spring St., Rome, N.Y., 10 (NEDA)

**Roslyn**

Aaron, Bertram D., P.O. Box 186, Roslyn, L.I., N.Y., 10, 15, MA 1-0630

**Bomac Labs.:** Gas switch tubes, cavities, reference, stalo, frog meter, silicon mixer, crystal diodes, klystrons, magnetrons, microminiature triodes, duplexers, microwave assemblies, high power simulators, pressurizing windows. **Microwave Engineering Laboratories:** Ferrite isolators, circulators, switches, mixers, filters, amplifiers, video receivers, signal sweepers, choppers, masers, parametric amplifiers.

Hicks, W. M., 4 Spruce Dr., Roslyn, N.Y., 15, Manhasset 7-6150

**Connect-Tron:** Connectors. **Gibson:** Silver alloy contacts. **Jeffers:** Molded coils, composition capacitors. **Mandex Mfg.:** Terminal strips, tube sockets. **National Rivet & Mfg.:** Tubular & solid rivets. **Reeves Instrument:** Transformers. **Speer Resistor Div.:** Composition resistors, coil forms.

Lichter Co., Wm., 26 Teakwood Lane, Roslyn, L.I., N.Y., 15, Mayfair 1-2636 (ERA)

**Schenectady**

Aeroconomy Agency, 1079 Lexington Ave., Schenectady 9, N.Y., 15, 20, Franklin 2-8426

Electric City Radio Supply, 2469 Albany St., Schenectady 8, N.Y., 10 (NEDA)

Grimmers Electronics Parts Supply, 41 N. Brandywine Ave., Schenectady, N.Y., 10 (NEDA)

Schenectady Electronic Distributors Corp., 1708 Altamont Ave., Schnectady 3, N.Y., 10 (NEDA)

Winick Co., Charles A., 926 Riverview Rd., Schenectady 9, N.Y., 15, STate 5-8133

**Electronic Associates:** Plotters, transistorized digital voltmeters. **Electronic Measurements:** Voltage & current power supplies. **Electro-Precision:** Analog, digital & servo bldg. blocks. **Jerrold:** RF measurement equip., sweep generators, attenuators, high speed coaxial switches, detectors. **Lab. for Electronics:** Microwave test equip., stalos, frequency & pulse jitter testers. **Lumatron:** Millimicrosecond test equip. **Millivac:** Vaccum tubes, transistorized voltmeters, amplifiers, resistance measuring equip. **Optimized Devices:** Circuit & component testers, scanners. **Radar Measurements:** Components, couplers, attenuators, wattmeters. **Rust Industrial:** Strip chart recorders. **Theta Instr.:** Test equip., bridges, phase shifters, precision dials.

**Scotia**

Jacobson Co., Inc., Leo, 420 Mohawk Ave., Scotia 2, N.Y., 15, FRanklin 7-9030, Branch: Buffalo, N.Y.

**South Farmingdale**

Drexler Co., Chester, 3 Lee Dr., South Farmingdale, L.I., N.Y., 15, CHapel 9-8206 (ERA)

**Staten Island**

B & D Distributing Co., 639 Tompkins Ave., Staten Island 5, N.Y., 10 (NEDA)

**Syracuse**

Allen, Inc., Leonard D., 115 Luther Ave., P.O. Box 32, Salina Station, Syracuse 8, N.Y., 10, 15, GRanite 1-3108

**Allied Control:** Relays, contactors, switches, valves. **Antenna Specialists:** Communication antennas & citizen band. **Beamco Associates:** Rechargeable batteries. **Campbell Industries:** Precision deposited carbon resistors. **Carbonneau Industries:** Speakers. **Clarostat:** Controls, decade boxes, dividers, potentiometers, resistors, assemblies, rheostats, switches. **Communication Accessories:** Filters, magnetic amplifiers, reactors. **Controls Co. of America:** Synchronous motors, snapac switches, solenoids, timers. **Elco:** Connectors, molded parts, sockets, binding posts, cable assemblies. **Electro Laminates:** Grip-tip test probe products. **Electro Mechanical Instrument:** Meters, relays. **Good-All:** Capacitors, encapsulated circuits, foil wound coils, filters. **Kulka:** Adapters, blocks, boards, hardware. **Resistance Prods.:** Precision wire wound, hi-frequency, high megohm resistors. **Rohn Mfg.:** Masts & towers. **Rotating Components:** Blowers, generators, motors. **Royal Sound:** Speaker baffles. **Sonotone:** Phonograph cartridges, microphones, speakers, vacuum tubes, rechargeable batteries. **Space Communications:** Ling closed-circuit TV. **Technical Appliance:** Antennas. **Ungar:** Soldering tools. **Utd. Scientific Labs.:** Citizens band transceiver. **Worner Electric Devices:** Photoelectric equip. **Xcelite:** Pliers, wrenches.

**Burlingame Associates, 514 University Bldg., Syracuse, N.Y., 15, GRanite 4-7409, Branch: Mount Vernon, N.Y.**

**See ads on pages 245, 247, 257, 273, 274, 283, 288, 293, 294, 305, 311, 313, 327, 354, 365, 417, 439, 465, 475, 481, 489, 491, 569, 583**

Carse Electric Corp., Syracuse, N.Y., 15, Branch: Albany, N.Y.

D-B Associates, Inc., 3310 Erie Blvd., East DeWitt, Syracuse, N.Y., 15, GIbson 6-0220 (ERA)

Franklin & Andrews Sales Corp., 2 Standish Ter., Syracuse 3, N.Y., 15, GI 6-1120

**Bridgeport Insulated Wire:** Magnet wire. **Columbus Electronics:** Semiconductors, silicon rectifiers. **Continental-Wirt:** Resistors, slide switches. **Electralab Printed Electronics:** Printed circuit boards. **Glaser Steers:** Record changers. **National Moldite:** Powdered iron, ferrites. **National Union Electric:** Special tubes. **Pyramid Electric:** Capacitors. **Victor Electric Wire & Cable:** Cord sets, hook-up wire.

Land-C-Air Sales Co., State Tower Bldg., Room 317, Syracuse, N.Y., 15, HArrison 2-4811, Branch: Tuckahoe, N.Y.

Lanzendorf Co., Oren G., 513 Cumberland Ave., Syracuse 10, N.Y., 15, GRanite 2-4195

**American Electric Cable:** Harnesses & Assemblies. **Balco:** Capacitors. **Fairbanks Wire:** Magnet Wire. **Hampden Mfg.:** Fibre & plastic fabricated parts & terminal boards. **Mohawk Mfg.:** Threaded Metal stampings. **U.S. Sonics:** Transducers.

Lightstone Engineering, J. B., 515 Comstock Ave., Syracuse 10, N.Y. 15, GRanite 5-6704

**Aircom:** Microwave equip., components. **American Electronic Labs:** Microwave components & equip. **Applied Research:** RF filters, pads, amplifiers, strain gage input equip. **Eldorado:** Pulse data & particle accelerator instrumentation. **Gruenberg Elec.:** Ovens, furnaces, test chambers. **Hamner:** X-Ray & nucleonics. **Pitlog:** Stalos, stalo testers. **Power Designs:** Transistorized power supplies. **Presin:** Counters, photoelectric. **Vacuum Instrument:** Argon leak detectors & vacuum components.

Ossmann & Associates, Edward A., 2363 James St., Syracuse, N.Y., 10, 15, HEmpstead 7-8446, Branch: Rochester, N.Y.

Paston-Hunter Co., P.O. Box 123, De-Witt Station, Syracuse 14, N.Y., 15, GIbson 6-2180

**Amperex:** Tubes, semiconductors. **Astatic:** Microphones. **Fannon:** Intercom equip., PA & telephone equip. **Jerrold:** TV distribution systems. **E. F. Johnson:** Pilot lights, connectors, etc. **Krylon:** Aerosol Coatings. **Sprague:** Capacitors & resistors. **Triad:** Transformers. **Walsco:** Hardware, chemicals.

Roberts & O'Brien, Inc., 839 Hiawatha Blvd. W., Syracuse 1, N.Y., 10 (NEDA)

Ryerson Assoc., Inc., J. D., P. O. Box 1400, Syracuse 1, N.Y., 15, GIbson 6-1771

**Bomac, Computer Measurement, Edgerton, Germeshausen & Grier, FXR, John Fluke, Gertsch Products, Kin Tel, Marconi Instruments, Massa, Sorensen, Varian Assoc., Weinschel Engineering.**

Swank, Inc., Wally B., 2310 Bellevue Ave., Syracuse 4, N.Y., 15, GRanite 8-2141 (ERA)

Tesco Associates, 114 Miles Ave., Syracuse 10, N.Y., 15, HOward 3-4533

**Amco:** Modular instrument enclosures. **Consolidated Avionics:** Transistorized power supplies & data processing equip. **Lieco:** Waveguide components. **Probescope:** Spectrum analyzers. **Statham Development:** Temperature test chambers. **Telonic Industries:** Sweep & signal generators. **Universal Mfg.:** Toroidal coil winders.

Wilbur Co., D. L., 572 Oakwood Ave., Syracuse 5, N.Y., 15, GRanite 6-2706

**Anchor Alloys:** High purity metals. **Anchor Metal:** Solders, brazing alloys. **Escon:** Hermetic & Plastic connectors, glass diode cases. **Fair-Rite Prod.:** Ferrite threaded cores, antennas, rods, choke forms. **Glass-Tite Ind.:** Glass-metal to ceramic-metal seals. **Hobson Bros.:** Grid caps, terminals & terminal boards.

Winick Co., Charles A., Syracuse, N.Y., 15, GRanite 1-8270, Branch: Schenectady, N.Y.

Zimmerman, Inc., Wilson H., 112 DeWitt St., Syracuse 3, N.Y., 15, GRanite 4-4889

**Centralab:** Ceramic capacitors, switches, controls, packaged circuits, technical ceramics. **A. W. Haydon:** Timing devices. **N.Y. Transformer:** Inductive components. **Vickers:** Semiconductors.

**Tonawanda**

Aironic Accessory Co., Inc., 1590 Niagara Falls Blvd., Tonawanda, N.Y., 15, ATwater 4740, Branch: Brightwaters, N.Y.

**Troy**

Trojan Electronic Supply Co., 15 Middleburg St., Troy, N.Y., 10 (NEDA)

Troy Television, 85 5th Ave., Troy, N.Y., 10 (NEDA)

**Tuckahoe**

Land-C-Air Sales Co., 76 Main St., Tuckahoe, N.Y., 15, Woodbine 1-4700

**Blonder Tongue:** Master antennas. **Calcon Mfg.:** Wire. **Christman Industries:** Chassis slides. **El-Rad:** Delay lines, pulse transformers. **General Applied Science:** Pulse & square wave generators. **Glaser Steers:** Record changers. **Kellogg Switchboard:** Relays. **Monroe Calculating:** Magnetic drums. **Oxford:** Speakers. **Reeves Soundcraft:** Recording tape & discs. **Rek-O-Kut:** Turntables & pick-up arms. **Sherwood:** Amplifiers & tuners. **Solitron Devices:** Silicon rectifiers. **Talk-A-Phone:** Inter-coms. **Vibration Research Labs.:** Power supplies.

Stang Sales Corp., 271 Columbus Ave., Tuckahoe, N.Y., 10, 15, SPencer 9-6868

**Audio Empire:** Cartridges, arms, turntables. **EICO:** Test Equip., HiFi, Ham Gear, kits. **Ferro Dynamics:** Rec. tape. **Harman-Kardon:** Tuners & amps. **Quam-Nichols:** Rept. speakers. **Recoton:** Phono. needles & acc. **Robins:** Phono. & tape accessories.

**Utica**

Naco Electronics Corp., 261 Genesee St., Utica, N.Y., 15, REdwood 2-3151, Branch: Liverpool, N.Y.

Sturdy Co., Inc., R.H., Niagara-Mohawk Bldg., Utica, N.Y., 15, RE 5-4206, Branch: Newton, Mass.



# Distributional Functions



Valley Electronic Laboratories, Inc., 1415 Oriskany St., W., Utica 4, N.Y., 10 (NEDA)

**Valley Stream**

Bittan Co., D. R., 104 S. Central Ave., Valley Stream, L.I., N.Y., 15, LOcust 1-2444

**American Microphone:** Microphones. **Bourns:** Sub. miniature prec. potentiometers. **Barco:** Subminiature electrolytic capacitors. **Bramco:** Reed relays. **Ecco Electronics:** R.F. connectors. **Keystone Carbon:** Thermistors. **Kurman:** Relays. **Spectrol:** Precision rotary potentiometers. **Standard Rectifier Co.:** Silicon rectifiers. **Telex:** Acoustic devices, headphones. **U.S. Wire & Cable:** Co-ax cable. **Ungar:** Soldering irons.

Woolf Assoc., Irving W., 104 S. Central Ave., Valley Stream, L.I., N.Y., 15, LOcust 1-0122 (ERA)

**Vestal**

Allen, Inc., Leonard D., 1905 Vestal Rd., Vestal, N.Y., 10, 15, STillwell 5-5979, Branch: Syracuse, N.Y.

Federal Electronics, Inc., Vestal Parkway East, Vestal, N.Y., 10 (NEDA)

Ossmann & Associates, Edward A., 149 Front St., Vestal, N.Y., 10, 15, STillwell 5-0296, Branch: Rochester, N.Y.

**West Nyack**

Brown Associates, Jack, 67 Forward Rd., West Nyack, N.Y., 15, Branch: Yonkers, N.Y.

**Westbury**

Avnet Electronics Corp., 70 State St., Westbury, N.Y., 10, EDgewood 3-5800, Branch: Los Angeles, Calif.

Hoffman & Co., Inc., H. L., 35 Old Country Rd., Westbury, N.Y., 5, 15, EDgewood 4-5600

**ACDC Electronics, Audio Instrument, Don-Lan Electronics, EMI Electronics Ltd., Instruments for Industry, Telonic Industries, Valor Instruments, Westport Electric.**

**White Plains**

Smith-Meeker Engineering Co., Westchester County Airport, White Plains, N.Y., 15, Branch: New York, N.Y.

**Sun Radio & Electronics Co., Inc., 10, 15, WHite Plains 9-7715, Branch: New York, N.Y.**

**See ad on page 748**

Westchester Electronic Supply Co., Inc., 602-610 Mamaroneck Ave., White Plains, N.Y., 10 (NEDA)

**Williamsville**

Reagan Co., Inc., J. A., 145 Millbrook Dr., Williamsville 21, N.Y., 15, PLaza 2727, Branch: Albany, N.Y.

**Yonkers**

**Be-Esco Sales Corp. (Formerly Blair Sales Co., Inc.), 45 S. Broadway, Yonkers, N.Y., 15, YOnkers 3-0150 (ERA)**

**See ad on this page**

**Alpha Wire:** Wire, Zipper Tubing, Lacing Cord, Harnesses. **Bogen-Presto:** Amplifiers, Tuners, Receivers, Intercoms, Recording Equipment. **Con Elco:** Precision miniature pots. **Electronic Enterprises:** Rectifier Tubes. **Electrophono & Parts Co.:** Lesa Recording Equipment. **Jerrold Electronics:** Master Home Antenna Systems, Amplifiers, Field Strength Meters. **Kimberly International:** UHER Tape Recorders. **Triad Transformer:** Transformers of all kinds. **University Loudspeakers:** Speakers and Accessories. **Utrad Corp.:** Transformers.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Brown Associates, Jack, 207 Rosedale Rd., Yonkers, N.Y., 15, SPencer 9-7330

**Amer. Elite:** Telefunken Tubes. **Columbia Wire & Supply:** Wire items. **Electric Solvents:** Chemicals. **H. H. Smith:** Electronic Accessories. **Telrad:** Diodes, Transistors. **Video Industries:** Antennas.

Electronic Wholesalers, 356 S. Broadway, Yonkers, N.Y., 10 (NEDA)

**L & M Associates, P.O. Box 51, Centuck Station, Yonkers, N.Y., 15, WOodbine 1-5566, Branch: Saddle Brook, N.J.**

**See ad on page 738**

Shaw Co., Inc., S. A., 361 Central Park Ave., Yonkers, N.Y., 15, YOnkers 3-5700

**Alliance:** Motors. **Hamilton Hall:** Resistors. **ITT-Components Div.:** Distributors only. **Illinois Condenser:** Capacitors, electrolytic. **Industro:** Transistors. **Quality Components:** Cores, forms. **Sarkes Tarzian:** Tuners. **Sonotone:** Tubes, pickups, heads, mikes.

Yonkers Electronic Supply, Inc., 541 Nepperhan Ave., Yonkers, N.Y., 10 (NEDA)

## NORTH CAROLINA

**Asheville**

Freck Radio & Supply Co., Inc., 38 Baltimore Ave., Asheville, N.C., 10 (NEDA)

Long's Distributing Co., Inc., 260 Baltimore Ave., Asheville, N.C., 10 (NEDA)

**Burlington**

Hayden Associates, Paul, 423 W. 5th St., Burlington, N.C., 15, CA 7-3479, Branch: East Point, Ga.

**Charlotte**

Cartwright & Bean, 625 Harwyn Dr., Charlotte, N.C., 15, FRanklin 6-8648, Branch: Memphis, Tenn.

Fanning-Duckett Sales Co., P.O. Box 11402, Charlotte 9, N.C., 15 (ERA)

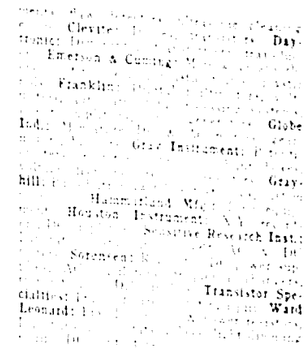
Henry Associates, Bill, P.O. Box 6073, Charlotte 7, N.C., 15, FRanklin 5-8958

**Automatic Metal Products:** R.F. Components, coaxial relays & switches. **Boston Insulated Wire & Cable:** Coaxial. **Coil Winders:** Transformers, reactors, coils. **De Jur-Amsco:** Potentiometers, meters, connectors. **Jonathan:** Chassis slides & hardware. **H & M Research & Development:** Mylar capacitors. **Solid State Products:** PNPN Switches, trigistors, etc.

Highsmith & Co., James L., 3733 Monroe Rd., Charlotte 5, N.C., 15, FR 7-2546

**Airpax:** Tachometers, circuit breakers, choppers, magnetic amplifiers, aircraft test sets. **Boonton Electronics:** Null detectors, inductance bridges, capacitance bridges, distortion meters, RF voltmeters, VHF grid dip meters. **Branson Inst.:** Thickness testing instru-

New York
North Carolina




Hoffman, North & Seitz, 1857 Oakmore Dr., Charlotte, N.C., 15, FA 3-2[illegible], Branch: Atlanta, Ga.

Lone Engineering Co., 110 S. Torrence St., Charlotte, N.C., 15, EDison 4-5511, Branch: Winston-Salem, N.C.

Millar Associates, James, 4923 Arbor-way, Charlotte, N.C., 15, EMerson 6-2661, Branch: Atlanta, Ga.

Murphy & Cota, 221 Latta Arcade, Charlotte 2, N.C., 15, FR 5-2317, Branch: Atlanta, Ga.

Radiotronic Distributors, Inc., 1015 N. Seigle Ave., Charlotte 5, N.C., 10 (NEDA)

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Smith Co., Maitland K., 920 W. Hill St., P.O. Box 8401, Charlotte 8, N.C., 15, FRanklin 6-5950, Branch: Atlanta, Ga.

Taylor Co., Morris F., 1224 Dresden Dr. W., Charlotte 5, N.C., 15, KEystone 7-4878, Branch: Silver Spring, Md.

Wallace Associates, Inc., Stanley K., P.O. Box 11377, Charlotte, N.C., 15, Branch: Lutz, Fla.

**Concord**

Mac-Victor Electronic Supply, Inc., Box 3236 Wilmar Branch, Hghwy. 29 and Florence Ave., Concord, N.C., 10 (NEDA)

**Durham**

Maguire & Co., J. A., 1707 Avondale Dr., Durham, N.C., 15, DUrham 2-8717, Branch: Camden, N.J.

**Gastonia**

Diethert Co., Russ, P.O. Box 510, Gastonia, N.C., 15, UNiversity 5-3771, Branch: Chicago, Ill.

**Greensboro**

Atcheson & Adams, 601 N. Elm St., Greensboro, N.C., 15, BRoadway 2-6838

**Colman Electronic Products:** Radio-TV knobs. **Eby Sales:** Sockets, radio-TV accessories. **Erie Resistor:** Ceramic capacitors. **Industrial Products:** Coax cable connectors, switches. **International Rectifier:** Selenium, silicon rectifiers, diodes, solar cells. **Lectrohm:** WW resistors. **Perma-Power:** TV tube brighteners. **Phalo Plastics:** Wires, cables. **Planet Sales:** Electrolytic capacitors. **Premier Metal Products:** Racks, panels. **Standard Coil Products:** TV tuners. **Technical Appliance:** Antennas. **Utah Radio:** Speakers.

Brown & Co., P.O. Box 1791, Greensboro, N.C., 15, BRoadway 3-5973 (ERA)

Chapman & Co., Cary, 1009 S. Elm St., Greensboro, N.C., 15, BRoadway 3-9473, Branch: Atlanta, Ga.

Johannesen Electric Co., Inc., Box C1, 312-314 N. Eugene St., Greensboro, N.C., 10 (NEDA)

Schiffer & Co., G. F., P.O. Box 6365, Summit Station, Greensboro, N.C., 15, BRoadway 3-5578

**Electrovert:** Cable harnessing & marking systems. **Hardwick, Hindle:** Resistors & Rheostats. **Illinois Condenser:** Capacitors. **Kinematix:** P.A. systems. **Kings Electronics:** R.F. Connectors & Cable assemblies. **L.J.K. Industries:** Knobs. **South River Metal Products:** Antenna mounting hardware. **Winegard:** Antennas & Distribution systems. **Workman TV:** Replacement TV & Radio parts.

**Hickory**

Victor Radio-TV Supply Co., Inc., 1058 3rd Ave. Dr., N.W., Hickory, N.C., 10 (NEDA)

**Raleigh**

Southeastern Radio Supply Co., 414 Hillsboro St., Raleigh, N.C., 10 (NEDA)

**Wilmington**

Buthan, Inc., 4924 Oleander Dr., Wilmington, N.C., 15, ROger 2-5749 (ERA)

**Winston-Salem**

Dalton-Hege Radio Supply Co., Inc., 924 W. 4th St., P.O. Box 1008, Winston-Salem, N.C., 10 (NEDA)

Electronic Distributors, Inc., 823 S. Marshall St., Winston-Salem, N.C., 10 (NEDA)

Hilker Co., The, P.O. Box 5211, Winston-Salem, N.C., 15, PArk 5-8588 (ERA)

Lee Associates, Inc., S. S., P.O. Box 906, Winston-Salem, N.C., 15, Branch: Orlando, Fla.

Long Engineering Co., 961 Burke St., Winston-Salem, N.C., 15, PArk 5-2306

**Altec Lansing:** Amplifiers, Microphones, Speakers. **Belden:** Cable. **Dage Television:** Closed Circuit TV. **DuKane:** Microphones, Amplifiers, Speakers, Intercoms. **Electro-Voice:** Microphones, Speakers. **Webster Electric:** Amplifiers & Intercoms.

Murphy & Cota, 1106 Burke St., Winston-Salem, N.C., 10, 15, PK 4-0750, Branch: Atlanta, Ga.

Scientific Sales Engineering Co., Whippoorwill Dr., Winston-Salem, N.C., 15, WAbash 4-2182, Branch: Atlanta, Ga.

## NORTH DAKOTA

**Fargo**

Bristol Distributing Co., 1345 Main Ave., Fargo, N.D., 10 (NEDA)

Radio Equipment Co., 1418 1st Ave., N., Fargo, N.D., 10 (NEDA)

## OHIO

**Akron**

Akron Electronic Supply Co., 107 S. Arlington St., Akron 6, Ohio, 10 (NEDA)

Clancy & Co., Inc., Joe, 789 Orlando Ave., Akron 20, Ohio, 15, UNiversity 4-0848, Branch: Angola, Ind.

Olson Radio Corp., 260 S. Forge St., Akron 8, Ohio, 10 (NEDA)

Sun Radio Co., 110 E. Market St., Akron 8, Ohio, 10 (NEDA)

Warren Radio Co., 71 S. Broadway, Akron 9, Ohio, 10 (NEDA)

**Ashtabula**

Morrison's Radio Supply, 331 Center St., Ashtabula, Ohio, 10 (NEDA)

**Batavia**

Anderson & Associates, Inc., Burt, Monterey R.R. #3, Batavia, Ohio, 15, REgent 4-6353, Branch: Chicago, Ill.

**Brecksville**

Deunk & Associates, Robert K., 10005 Chippewa Rd., Brecksville, Ohio, 15, JAckson 6-4317

**Barber-Colman:** Motors, relays. **Bircher:** Heat sinks, tube clamps, transistor clips. **Bud:** Chassis, hardware. **Marion Instrument Div.:** Meters, aircraft instruments. **Zero:** Instrument cases, enclosures.

Nace Co., Inc., Allen, 7601 Parkview Rd., P.O. Box 146, Brecksville, Ohio, 15, Jackson 6-4323

**Allied Control:** Relays, miniature toggle switches. **Augat:** Component cradles, tube clamps. **Centralab:** Controls, ceramic capacitors, rotary switches, packaged circuits, steatite and high alumina parts. **Daven Co.:** Attenuators, precision resistors, rotary switches, transistor power supplies. **Dearborn:** Plastic film capacitors. **Inso:** Thin-wall teflon wire. **Phaostron:** Meters. **Stevens Arnold:** Choppers, Millisec relays, vibrating capacitors. **Superior Resistor & Electronics:** Vitreous wire-wound resistors. **Tepro Electric:** Miniature precision power resistors. **Thomas & Skinner:** Alnico magnets, transformer laminations, wound cores. **Transformer Technicians:** Transformers, power and audio.

**Canton**

Burroughs Radio, Inc., 2705 Fulton Rd. N.W., Canton 8, Ohio, 10 (NEDA)

**Centerville**

Dolfuss Jr. & Co., Charles H., 9106 Mary Haynes Dr., P.O. Box 572, Centerville, Ohio, 15, Tel: 7-2930, Branch: Cleveland, Ohio

**Cincinnati**

Aironic Accessory Co., Inc., 4 Eswin St., Greenhills, Cincinnati 18, Ohio, 15, WEbster 1-0930, Branch: Brightwaters, N.Y.

Baehr, Greenleaf & Associates, Inc., 7960 Mitchell Farm Lane, Cincinnati 42, Ohio, 15, TWeed 1-3827, Branch: Cleveland, Ohio

Brauer & Associates, Inc., Walter J., 5235 N. Bend Rd., Cincinnati 39, Ohio, 15, HUmboldt 1-3782, Branch: Cleveland, Ohio

Engineering Specialties, 8115 Camargo Rd., Cincinnati 43, Ohio, 15, LOcust 1-6803

**Advanced Instruments:** Flame photometers, chemical lab. instruments. **Associated Research:** High potential testing equip., AC & DC. **John Chatillon:** Weight, force & torque measuring equip. **Dynamic Gear:** Gears, clutches, differentials, breadboard parts. **Radiation Counter Labs.:** Nuclear measuring equip., multiple channel pulse height analyzers. **West Instrument:** Temperature control & measuring equip., thermocouples, strip chart recorders.

Herrlinger Distributing Co., 112 E. Liberty St., Cincinnati 10, Ohio, 10 (NEDA)

Holub & Hogg Co., 1400 Sycamore St., Cincinnati 10, Ohio, 10 (NEDA)

Murray Co., James W., P.O. Box 28, Cincinnati 11, Ohio, 15, HUmboldt 1-9726

**ADC:** Transformers, plugs, jacks, panel boards. **Autotron:** Photoelectric controls & light sources. **Computer Instruments:** Precision carbon film potentiometers. **JFD:** Miniature glass trimmer capacitors, delay lines & LC tuners. **PIC Automation:** Controls, electric & mechanical counting devices. **Quality Name Plate:** Panels. **Sigma:** Sensitive relays. **Technical Wire Products:** RF Shielding materials.

Mytronic Co., The, 2145 Florence Ave., Cincinnati 6, Ohio, 10 (NEDA)

Olsen Co., John O., 4016 Diehl Ave., Cincinnati 36, Ohio, 15, SYcamore 1-1297, Branch: Cleveland, Ohio

Rockford Controls Co., 5643 Maple Ridge Dr., Cincinnati 27, Ohio, 15, LO 1-4429, Branch: Glen Ellyn, Ill.

Sheridan Associates, Inc., Roselawn Center Bldg., Cincinnati 37, Ohio, 15, MElrose 1-2460

**Bowmar:** Gear trains & counting devices, servo pkgs. **Burnell:** Toroids, filters, equalizers. **Electric Regulator:** Voltage regulators, monitors, governors. **Filtors:** Military relays. **Helipot Div.:** Precision potentiometers, expanded scale meters, servomotors, MG's, servo breadboard. **James Knights:** Quartz crystals, component ovens, frequency standards. **Mepco:** Resistors & networks. **Miniature Precision Bearings:** Instrument bearings. **Shockley:** Semiconductors. **Tensolite:** Military hookup wire & cable, subminiature coax, airframe, magnet wire. **Vitramon:** Porcelain dielectric capacitors.

Steinberg's, Inc., 633 Walnut St., Cincinnati 2, Ohio, 10 (NEDA)

United Radio, Inc., 1314 Vine St., Cincinnati 10, Ohio, 10 (NEDA)

Warren Radio Co., 1669 Central Parkway, Cincinnati, Ohio, 10 (NEDA)





# Distributional Functions



Whitesell & Associates, Robert O., P.O. Box 2717, Cincinnati, Ohio, 15, MElrose 1-9210, Branch: Indianapolis, Ind.

**Cleveland**

Baehr, Greenleaf & Associates, Inc., 14700 Detroit Ave., Cleveland 7, Ohio, 15, ACademy 1-9030

**Acme Electric:** Transformers, power supplies, voltage stabilizers. **CTS:** Variable resistors. **Clare:** Relays, stepping switches. **Elco:** Tube sockets, connectors. **Good-All:** Capacitors. **International Resistance:** Resistors, displacement transducers, pressure transmitters, polystrip cable, precision potentiometers. **Quam-Nichols:** Speakers. **Raychem:** Shrinkable tubing, coaxial cable, hook-up wire. **Simpson:** Meters, test equip. **Ungar:** Soldering tools.

Baier Co., The Arthur H., 12417 Cedar Rd., Cleveland 6, Ohio, 15, FA 1-5644 (ERA)

Brauer & Associates, Inc., Walter J., 15631 Lakewood Heights Blvd., Cleveland 7, Ohio, 15, LAkewood 1-7268

**American Super-Temperature:** Teflon wire. **Berkshire Electric Cable:** Insulated wire. **Comar:** Relays & solenoids. **Curtiss-Wright:** Instruments & thermal relays. **Electrical Utilities:** Paper dielectric capacitors. **International Electronic Ind.:** Miniature electrolytics. **Molon Motor & Coil:** FHP motors. **Penn Resistor:** Precision film resistors. **Rae Co.:** Transformers. **Resistors:** Power resistors. **Sage Electronic:** Precision power resistors. **U.S. Components:** Connectors.

Daugherty Co., F. A., 6025 Mayfield Rd., Cleveland 24, Ohio, 15, HIllcrest 9-1122

**Centralab:** Ceramic capacitors, switches, controls & packaged circuits. **Fisher Radio:** Tuners, receivers, amplifiers, preamplifiers, speaker systems. **GC Electronics:** Hardware, chemicals, knobs, resistors. **Lansing Sound:** Loudspeakers. **Precision Apparatus:** Test equipment, electronic kits, panel meters. **Sarkes Tarzian:** Rectifiers, tuners, magnetic tape. **Utah Radio:** Loudspeakers, P.A. **Webcor:** Diskchanger, tape decks, AM-FM tuners. **Wen:** Soldering Guns.

Dolfuss Jr. & Co., Charles H., 2108 Payne Ave., The Film Bldg., Cleveland 14, Ohio, 15, PRospect 1-1270

**Aerovox:** Capacitors & resistors. **M. R. Conners:** Sleeving & tubing. **General Industries:** Phono motors. **J-B-T:** Freq., time elapse meters, toggle switches, pyrometers, relays, controls, tachometers & galvanometers. **Rider:** Books. **Sarkes Tarzian:** Selenium & silicon rectifiers. **Shaver:** Battery chargers, copper oxide rectifiers. **Shurite:** Meters. **Triplett:** Meters & testers.

Edwards-Lohse & Co., 2123 E. 9th St., Rm. 510, Cleveland 15, Ohio, 15, TOwer 1-5753

**Cinema Engineering:** Resistors, switches. **James:** Choppers, transformers. **Macdonald:** Sleeving cutter, holder. **Minelco:** Trimpots. **Molectronics:** Instruments. **Pomona:** Cords, plugs. **Sunshine Scientific:** Instruments. **Technical Devices:** Wire cutter & stripper, lead extractor. **Texas:** Crystals. **Twin Lock:** Plugs, boards. **U.S. Transistor:** Transistors.

Goory Sales Co., The, 19555 Henry Rd., Cleveland 26, Ohio, 15, EDison 1-1500

**Drake:** Jewel lights. **Eraser:** Wire-stripping machines. **Hudson:** Magnet wire. **Kapitol Magnetic:** Transformers.

Landfear Co., Inc., J. M., 12429 Cedar Rd., Cleveland 6, Ohio, 15, FAirmount 1-4533

**Columbia Wire & Supply, Dow-Key, Easy-Up, Hickok, I-H Mfg., North American Philips, T.V. Development, Winegard.**

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

Levin & Associates, Sid, 6252 Mayfield Rd., Cleveland 24, Ohio, 15, HIllcrest 2-8340

**Amperex:** Tubes. **Antenna Specialists:** Antennas. **Finney:** FM. multiplex & TV antennas. **Jackson Electrical:** TV test equip. **Kaar Eng.:** Two-way radios. **Rohn:** Towers. **Workman TV:** Wire-wound resistors.

Lowry Dietrich Co., 316 Marion Blvd., Cleveland 13, Ohio, 15, SUperior 1-1855, Branch: Pittsburgh, Pa.

Midwest Sales Co., 3219 W. 117th St., Cleveland 11, Ohio, 15, WInton 1-2700 (ERA)

Morrow Co., Les A., 3123 W. 117th St., Cleveland 11, Ohio, 15, CL 1-5700 (ERA)

Olsen Co., John O., 16201 Shaker Blvd., Cleveland 20, Ohio, 15, SKyline 2-5444

**American Television & Radio:** Vibrators & power supplies. **Cannon:** Disconnect plugs. **Clarostat:** Controls & Potentiometers. **Crest:** Transformers. **Malco:** Solder & solderless terminals. **Microtran:** Miniature transformers. **Premier Metal Products:** Metal housings. **Resistance Products:** Fixed resistors. **Silicon Transistor:** Diodes & transistors. **Technical Appliance:** Antennas.

Peters Co., Robert W., 350 E. 215th St., Cleveland 23, Ohio, 15, ANdrews 1-2330

**American Microphone, Anchor Products, Audio Empire, Dutrex, Milwaukee Resistor, New England Electronics Components, Sherwood, United Audio, Ward Products.**

Pioneer Electronic Supply Co., 2115 Prospect Ave., Cleveland 15, Ohio, 10 (NEDA)

Podolny Co., James H., 2138 Lee Rd., Rm. 18, Cleveland 18, Ohio, 15, YEllowstone 2-6105, Branch: Pittsburgh, Pa.

Radio & Electronic Parts Corp., 3235 Prospect Ave., Cleveland 15, Ohio, 10 (NEDA)

Rauer Co., Frank W., 4144 Marvin Ave., Cleveland 9, Ohio, 15, MElrose 1-8350 (ERA)

Rockford Controls Co., 2628 N. Glen Rd., Westlake, Cleveland, Ohio, 15, TR 1-4014, Branch: Glen Ellyn, Ill.

Roth Sales Co., Mike, 13947 Cedar Rd., Cleveland 18, Ohio, 15, YEllowstone 2-4262

**Astatic:** Phono xtals, microphones. **Kidco:** Precision resistors. **Kurman:** Relays. **J. W. Miller:** Coils. **Pyramid Electric:** Capacitors. **Solitron Devices:** Silicon rectifiers. **Sterling:** Indicating meters. **United Trans:** Transformers, inductors, toroids, filters, magnetic amplifiers.

Schroeder Sales Co., 2309 Prospect Ave., Cleveland 15, Ohio, 15, 20, MAin 1-5075

**Bozak:** Speakers & enclosures. **Grado Labs.:** Turntables. **Koss:** Headsets. **McIntosh Labs.:** Amplifiers, preamps, AM-FM receivers. **Thorens:** Turntables. **Viking:** Tape machines.

North Carolina
North Dakota
Ohio

Scott & Stevens, Inc., 1835 Euclid Ave., Cleveland 15, Ohio, 15, TOwer 1-2525 (ERA)

Stewart Electronic Sales Co., Inc., 1624 Carnegie Ave., Cleveland 3, Ohio, 10 (NEDA)

Sheridan Associates, 5835 York Rd., P.O. Box 24, Cleveland 30, Ohio, 15, HIllcrest 2-8080, Branch: Cincinnati, Ohio

Sterling Co., The, 5527 Mayfield Rd., Cleveland, Ohio, 15, 20, HIllcrest 2-8080, Branch: Detroit, Mich.

Tilo Co., The, 2245 Warrensville Center Rd., Cleveland 18, Ohio, 15, ERieview 1-5535

**B & F Instruments:** Square wave generators & decade boxes. **Beleville-Hexem:** E.H.R. meters. **California Tech Ind.:** Automatic circuit test instruments. **Donner Scientific:** Analog computers. **E-H Research Labs.:** Electronic chips & pulse generators. **Holt Instrument Labs.:** AC calibration sources. **McDowell Elect.:** Power AC amplifiers & microwave power supplies. **Scientific-Atlanta:** Microwave recorders, receivers, & antenna targets. **Systron:** Counters, timers, data systems. **Wayne Kerr Corp:** Electronic measuring instruments.

Warren Radio Co., 5080 Prospect St., Cleveland 3, Ohio, 10 (NEDA)

Whitesell & Associates, Robert O., P.O. Box 5, Cleveland, Ohio, 15, SUperior 1-1855, Branch: Indianapolis, Ind.

**Cleveland Heights**

Valentine, Inc., Forrest C., 12417 Cedar Rd., Cleveland Heights 6, Ohio, 15, FAirmount 1-0266, Branch: Fort Wayne, Ind.

**Columbus**

Buckeye Electronics Dist., Inc., 236-246 E. Long St., Columbus 15, Ohio, 10 (NEDA)

Electronic Supply Corp., 134 E. Long St., Columbus 15, Ohio, 10 (NEDA)

Hughes-Peters, Inc., 481 E. 11th Ave., Columbus 11, Ohio, 10 (NEDA)

Lehner Co., J. W., 367 Brynhild Rd., Columbus 2, Ohio, 15, AMherst 8-5260 (ERA)

McFadden Sales Co., 150 E. Broad St., Columbus 15, Ohio, 15

**Bliley:** Quartz crystals. **Bogen-Presto:** Amplifiers. **Chicago Standard:** Transformers. **Industrial Electronic:** Hardware. **Jensen:** Speakers. **E. F. Johnson:** Transmitting parts, amateur equip. **Lenz:** Wire. **Planet:** Electrolytic capacitors. **Sealectro:** Teflon terminals. **Shure:** Acoustic Devices. **U.S. Semcor:** Silicon Diodes.

Pugh Co., C. L., 2144 Riverside Dr., Columbus 21, Ohio, 15, HUdson 8-4855

**Electro-Voice, I.T. & T. Components Div., Jensen, Merit Coil & Transformer, Orr Industries, Howard W. Sams, Soundolier, Sprague, Tenatronics, Waldom.**

Roth Sales Co., Mike, 908 Grandon Ave., Columbus 9, Ohio, 15, BElmont 5-4253, Branch: Cleveland, Ohio



"Distribution" listings are arranged alphabetically by states and by cities within each state.
For names and addresses of manufacturing firms, see Alphabetical Directory, pages 135-240.

Seay Co., H. H., 3850 Fairlington Dr., Columbus 21, Ohio, 15, HUdson 8-9994 (ERA)

**Cleveland Electronics:** Loudspeakers. **Electrical Windings:** Transformers. **Electrocraft:** Plugs, connectors. **Hamilton-Hall:** Wire-wound resistors. **International Electronics:** Mullard tubes.

Whitehead Radio Co., 124 N. Grant, 124 E. Long, Columbus 15, Ohio, 10 (NEDA)

**Dayton**

Allied Supply Co., Inc., 1100 E. Monument Ave., Dayton 2, Ohio, 10 (NEDA)

Bear Corp., Neal, 2801 Far Hills Ave., Dayton 19, Ohio, 15, AXminster 9-3566, Branch: West Richfield, Ohio

Clancy & Co., Inc., Joe, 805 Rockhill Ave., Dayton 29, Ohio, 15, AXminster 8-3052, Branch: Angola, Ind.

Crossley Associates, Inc., 2801 Far Hills Ave., Dayton 19, Ohio, 15, AXminster 9-3594, Branch: Chicago, Ill.

Engineering Associates, 434 Patterson Rd., Dayton 19, Ohio, 25, AX 3-1662

Lowry Dietrich Co., 333 W. 1st St., Dayton 2, Ohio, 15, BAldwin 3-6042, Branch: Pittsburgh, Pa.

Nace Co., Inc., Allen, P.O., Box 93, Riverdale Station, Dayton 5, Ohio, 15, CRestview 7-8215, Branch: Brecksville, Ohio

Odell Co., M. P., 2676 Salem Ave., Dayton 6, Ohio, 15, CRestview 7-4441, Branch: Westlake, Ohio

Podolny Co., James H., P.O. Box 722, Dayton, Ohio, 15, BAldwin 4-7011, Branch: Pittsburgh, Pa.

Sheridan Associates, Inc., 4217 N. Main St., Dayton 5, Ohio, 15, CRestview 7-7212, Branch: Cincinnati, Ohio

Srepco, Inc., 314 Leo St., Dayton 4, Ohio, 10 (NEDA)

Sterling Co., S., 363 W. First St., Dayton 2, Ohio, 15, 20, BAldwin 8-8794, Branch: Detroit, Mich.

Stotts Friedman Co., The, 108 N. Jefferson St., Dayton 2, Ohio, 10 (NEDA)

Tiby Co., The, 645 Salem Ave., Dayton 6, Ohio, 15, CRestview 7-3822, Branch: Cleveland, Ohio

Whitesell & Associates, Robert O., 2600 Far Hills Bldg., Dayton, Ohio, 15, AXminster 8-4261, Branch: Indianapolis, Ind.

**Lima**

Lima Radio Parts Co., 600 N. Main St., Lima, Ohio, 10 (NEDA)

**Mansfield**

Burroughs Radio, Inc., 218 E. Second St., Mansfield, Ohio (NEDA)

**Marietta**

Marietta Radio & TV Supply, Inc., 1028 E. Greene St., Marietta, Ohio, 10 (NEDA)

**New Bremen**

Shelby & Co., Thomas, 319 S. Franklin, New Bremen 6, Ohio, 10, 20, Tel: 6511

**Alliance:** Rotors. **Campro Prods.:** Cabinets. **Chicago Miniature Lamp Works:** Pilot bulbs. **Hunter:** Tools. **Masco:** Intercoms. **Vidaire:** Antenna accessories.

**South Euclid**

Rosenwasser Sales, F. A., 13781 Cedar Rd., South Euclid 18, Ohio, 10, 15, FA 1-0463

**Advance Electronics:** Antennas. **Atlantic:** Wire & cable. **Barker Sales:** Cossor tubes. **Devon:** Electrical tapes. **Gray Mfg.:** Turntables, arms. **Gt. Eastern Mfg.:** Transistors & Diodes. **Illinois Condenser:** Capacitors. **Injectoral:** Chemicals. **M. A. Miller:** Needles. **Middlesex Wood Prods.:** Baffles. **Rye Sound:** Hardware & earphones. **Shell:** Testers & Hi-Fi transceivers.

**Springfield**

Rubin Co., Ben Z., 515 E. Grand, Springfield, Ohio, 15, FAirfax 2-5893, Branch: Detroit, Mich.

**Steubenville**

Hausfeld Electronics Supply Co., 116 N. 3rd St., Steubenville, Ohio, 10 (NEDA)

**Stow**

Blocki Associates, Bill, 2280 Liberty Rd., Stow, Ohio, 15, OVerdale 8-4277 (ERA)

Natalino Co., Augie, P.O. Box 644, Stow, Ohio, 15, OVerdale 8-3930 (ERA)

**Toledo**

Chilcote Sales Co., 636 Nesslewood, Toledo 10, Ohio, 15, CHerry 8-2356

**Alco:** Meters. **Boulevard:** Tuners, amplifiers. **Colman:** Knobs, antenna coils. **Haydon:** Steel tubing. **Hi-Par:** Citizens band & ham antennas. **Jersey Specialty:** Wire. **Middlesex Wood Prod.:** Baffles. **Moody Machine Prod.:** Tools. **Parker Metal Goods:** TV hardware. **Radio Merchandise Sales:** Antennas. **Rogers:** Flybacks, yokes, transformers. **Semi-Elements:** Diodes & semiconductors. **Superior Resistor & Elect.:** Resistors. **Transpace:** 2-way radiophone. **Webster:** Built-in radio inter-coms. **Wilder:** Speakers.

Howard's Electronic Supply, Inc., 131-135 17th St., Toledo 2, Ohio, 10 (NEDA)

Lifetime Electronics, 1501-1505 Adams St., Toledo 2, Ohio, 10 (NEDA)

Warren Radio Co., 1002 Adams St., Toledo 1, Ohio, 10, CHerry 8-3364

**American:** Relays. **Ampex:** Tape Recorders. **Amphenol:** Connectors. **Bell:** Sound. **Bud:** Chassis & Cabinets. **CD:** Condensers. **Cinch-Jones:** Connectors. **GE:** Tubes. **Guardian:** Relays. **Hickok:** Test Equip. **IRC:** Controls & Resistors. **Mallory:** Condensers, Controls, Resistors, Rectifiers, Vibrators. **Merit:** Transformers. **Ohmite:** Resistors & Industrial Controls. **Potter-Brumfield:** Relays. **Seco:** Test Equip. **Sencore:** Test Equip. **Simpson:** Meters & Test Equip. **Sprague:** Condensers. **Stromberg-Carlson:** Sound & Pagemaster. **Superior:** Powerstats. **Sylvania:** Receiving & Industrial Tubes. **Thordarson:** Transformers. **Triplett:** Meters & Test Equip. **Tung Sol:** Receiving Tubes. **Webcor:** Record Players & Recorders.

**Trotwood**

Atkind, Irving, 821 Burman Ave., Trotwood, Ohio, 15, TE 7-4750

**Astron:** Capacitors, noise filters. **Howard:** Crystal holders. **Rust:** Tape recording insts. **Van Norman:** Test equip.

**Warren**

Radio Specialties, 136 Pine Ave., S.E., Warren, Ohio, 10 (NEDA)

**West Richfield**

Bear Corp., Neal, 3435 Streetsboro Rd., West Richfield, Ohio, 15, OLiver 9-3331

**Advance:** Relays. **Alpha:** Wire & Cable, lacing cord. **Argos:** Baffles, enclosures. **Audio Devices:** Magnetic tape. **Bourns:** Wire-wound & carbon potentiometers. **Int. Rectifier:** Selenium & silicon rectifiers, semiconductors, solar cells. **Littelfuse:** Fuses. **Precision Metal Prds. Malden:** Terminals, hardware. **H. H. Smith:** Plugs, jacks, hardware. **Switchcraft:** Adaptors, connectors, jacks, plugs. **Welwyn:** Carbon deposited resistors.

**Westlake**

Odell Co., M. P., 26614 Center Ridge Rd., Westlake, Ohio, 15, TRinity 1-8000

**Amco Engrg.:** Enclosures. **Boesch:** Coil winders. **Dressen-Barnes:** Power supplies. **Dynamics Instrmtn.:** Amplifiers. **Engineered Electronics:** Digital modules. **Ferrotec:** Microwave components. **John Fluke:** Power supplies, differential voltmeters. **Microwave Development Labs.:** Microwave components. **Midwestern Instruments:** Recorders & servo-valves. **Narda Microwave:** Microwave test instrumentation. **Philbrick Res.:** Analog computer components. **Radio Frequency Labs.:** Instrument calibration. **Southwestern Industrial Electronics:** Test equipment. **Strand Labs:** Microwave generators. **Technibilt:** Scope carts. **Trio:** Vacuum Tube voltmeters. **Unitek:** Welders.

**Willoughby**

Seay Co., H. H., 5155 Nan Linn Dr., Willoughby, Ohio, 15, WHitehall 2-8370, Branch: Columbus, Ohio

**Worthington**

Weller-Rahe Co., P.O. Box 212, Worthington, Ohio, 15, TUxedo 5-7819

**Arco:** Condensers. **Birnbach:** Wire, hardware. **Blonder-Tongue:** RF signal dist. equip. **Electron Prods.:** Condensers. **Ideal Precision Meter:** Panel meters. **Mosley:** Ham beams. **Oxford:** Speakers, transformers. **Polytronics Labs.:** Transceivers. **So. River Metal Prods.:** Antenna mounts. **Sub-Miniature Inst.:** Precision pots. **Weller:** Soldering tools. **Winston:** Test equip.

**Youngstown**

Armie's Electronics, 320 W. Federal St., Youngstown 3, Ohio, 10 (NEDA)

Ronci Electronics, 3627 South Ave., Youngstown 2, Ohio, 10 (NEDA)

**Zanesville**

Thompson Radio Suppliers, 110 S. Sixth St., Zanesville, Ohio, 10 (NEDA)

**Zenia**

Baehr, Greenleaf & Associates, Inc., 3350 Maplewood Dr., Zenia, Ohio, 15, CHapel 4-5485, Branch: Cleveland, Ohio

## OKLAHOMA

**Oklahoma City**

Dulaney's, 100 N.W. 44th St., Oklahoma City, Okla., 10 (NEDA)

Electronic Supply Co., 212 N.W. Tenth St., Oklahoma City 3, Okla., 10 (NEDA)

Johnson Wholesale Electronics, 927 N.W. 1st St., P.O. Box 1866, Oklahoma City, 1, Okla., 10 (NEDA)

Trice Wholesale Electronics, Inc., 800 N. Hudson, Oklahoma City, Okla., 10 (NEDA)

**Tulsa**

Barnes Co., Arnold, P.O. Box 5417, Tulsa, Okla., 15, WE 6-7707, Branch: Dallas, Tex.

Gross-Daniels Co., P.O. Box 8511, Tulsa, Okla., 15, LUther 4-1142, Branch: Dallas, Tex.

Oil Capitol Electronics Corp., Admiral Station Box GG, 708 S. Sheridan, Tulsa, Okla., 10 (NEDA)



# Distributional Functions



## OREGON

**Eugene**

Hay & Carman, Inc., 768 Lincoln St., Eugene, Ore., 10 (NEDA)

**Medford**

Walker Co., Verl G., 205 W. Jackson, P.O. Box 1586, Medford, Ore., 10 (NEDA)

**Portland**

Arva, Inc., 1238 N.W. Glisan St., Portland 9, Ore., 15, CApital 2-7337, Branch: Seattle, Wash.

Burcham Co., Don H., P.O. Box 4098, Portland 8, Ore., 15, CA 6-4148

**Amphenol-Borg:** Connectors, cable. **Antenna Specialists:** Antennas. **Bud:** Sheet metal prods. **Chicago Standard:** Transformers. **Filtron:** Filters. **Gen. Precision Labs.:** TV camera. **Jerrold:** Community systems. **Mallory:** Batteries. **P. R. Mallory:** Components. **Raytheon:** Tubes. **Newcomb Audio:** Amplifiers, P.A. Systems. **Rohn:** Steel towers. **Simpson:** Instruments, meters. **University:** Speakers. **V-M:** Phonographs, tape recorders.

Central Distributors, 1331 N.W., Couch St., Portland 9, Ore., 10 (NEDA)

Eckersley, James W., 3150 S.W. Hamilton St., Portland 1, Ore., 15, CH 6-3183 (ERA)

James, Marshall B., 2941 N.W. Quimby, Portland 10, Ore., 15 (ERA)

Lee Co., Inc., Dave M., 3527 N.E. Union Ave., Portland 12, Ore., 15, ATlantic 8-5796 (ERA)

McMillan Electronics, 10111 S.W. 62nd Ave., Portland 19, Ore., 15, CHerry 4-7830

**Continental Electronics & Sound:** Ham gear. **Minneapolis Speaker:** Hi-fi & PM speakers. **S & A Electronics:** Antennas. **Trutone:** AM-FM tuners, amplifiers. **Vocaline:** C-B radio, wireless intercom, perma-plug.

Merritt Co., Ron, 1238 N.W. Glisan St., Portland 9, Ore., 15, CApital 2-7337, Branch: Seattle, Wash.

Minthorne Co., Roger M., 0673 S.W. Taylor's Ferry Rd., Portland 19, Ore., 15, CH 6-4556

**Akro-Mils:** Cabinets. **Arkay:** Radio speaker kits. **Birnbach:** Wire, hardware. **Continental-Wirt:** Resistors, switches. **Eby:** Hardware, harnesses. **Jersey Specialty:** Wire. **Moody Machine Prods:** Tools. **Robins Industries:** Tape/disc accessories. **Service Instruments:** Sencore timesavers. **Superex:** Earphones. **Tech Labs.:** Switches, potentiometers. **Vokar:** Vibrators. **Waldom:** Meters, hardware. **Wright Steel & Wire:** Steel wires.

Porter Co., Burt, 1937 N.E. Multnomah Ave., P.O. Box 7854, Portland 12, Ore., 15, ATlantic 4-1718, Branch: Seattle, Wash.

Portland Radio Supply Co., 1234 S.W. Stark St., Portland 5, Ore., 10 (NEDA)

Saelens Radio Co., Inc., 1605 N.W. Everett, Portland 9, Ore., 10 (NEDA)

Stroum Co., Inc., Samuel N., 6224 E. Burnside, Portland, Ore., 15, BElmont 2-7868, Branch: Seattle, Wash.

Television & Radio Supply Co., 1327 S.E. Grand Ave., Portland 14, Ore., 10 (NEDA)

Weber Co., Dale G., 8 S.E. Clay St., Portland, Ore., 15, BElmont 4-7671 (ERA)

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

**Salem**

Willamette Radio Supply, Inc., 2450 State St., Salem, Ore., 10 (NEDA)

## PENNSYLVANIA

**Abington**

Pearson Sales Co., R. T., 1125 York Rd., Abington, Pa., 15, TUrner 7-0186

**Ajax Condenser:** Mylar capacitors. **Artted Co.:** Coils. **Condenser Prods.:** Plasticon capacitors, power supplies, pulse forming networks. **Mel-Rain:** Sensitivity controls & circuit breakers. **Precision Line:** Precision potentiometers. **Quincy:** Speakers. **Victor Electric Wire & Cable:** Cord sets. **Woodward-Schumacher:** Transformers.

**Allentown**

Beil & Whitaker, Inc., 1303 N. Troxell St., Allentown, Pa., 15, HEmlock 4-5220, Branch: Reading, Pa.

Peters, Inc., A. A., 231 N. 7th St., Allentown, Pa., 10 (NEDA)

Radio Electric Service Co., 1313 Linden St., Allentown, Pa., 10 (NEDA)

**Altoona**

Altoona TV Supply, Inc., 1713 Union Ave., Altoona, Pa., 10 (NEDA)

**Ambler**

Pacent Engineering Corp., 119 E. Butler Ave., Ambler, Pa., 15, MItchell 6-0405, Branch: Great Neck, N.Y.

Quinlan Co., D. G., National Bank Bldg., Ambler, Pa., 15, MItchell 6-7250 (ERA)

**Ardmore**

Land-C-Air Sales Co., 32 Rittenhouse Rd., Ardmore, Pa., 15, GReenwood 7-2725, Branch: Tuckahoe, N.Y.

Rothenheber & Co., Inc., 53 Cricket Ave., Ardmore, Pa., 15, MIdway 2-6911

**Bristol Spring:** Stampings & wire forms. **Dearborn:** Film capacitors. **Hugh H. Eby:** Binding posts, plugs, connectors. **Electra:** Deposited carbon & metal film resistors. **Electric Regulator:** Voltage, current, speed regulators, dashpots. **Enfo:** Teflon bars, sheets. **Kato:** Generators, motor generator sets, control panels, converters. **New York Coil:** Transformers. **Quality Components:** Coil forms, cores, composition capacitors. **Skinner Electric Valve Div.:** Solenoid valves. **Stevens Mfg.:** Thermostatic controls. **Trans-Sil:** Silicon power rectifiers.

**Bala-Cynwyd**

Friedman & Assoc., Martin, 7 Heather Rd., Bala-Cynwyd, Pa., 15, TRinity 7-3450

**Ballastran:** Transformers. **Heffner:** Magnetic devices & speakers. **Industrial Electronic Hardware:** Sockets, connectors, terminal strips. **International Electronic Inds.:** Miniature electrolytic tantalum capacitors. **Nortronics Co.:** Recording heads. **Telex:** Acoustic devices.

Ohio
Oklahoma
Oregon
Pennsylvania

**Bethlehem**

Beil & Whitaker, Inc., 504 Hickory St., Bethlehem, Pa., 15, UNiversity 4-4424, Branch: Reading, Pa.

Buss Radio Electric Supply, 431 N. Broad St., Bethlehem, Pa., 10 (NEDA)

**Braddock**

Mark's Parts Co., 317 Braddock Ave., Braddock, Pa., 10 (NEDA)

**Bristol**

Powell Electronic Sales Co., 457 Mill St., Bristol, Pa., 10 (NEDA)

**Bryn Mawr**

Humes Sales, David, 124 Lee Circle, Bryn Mawr, Pa., 15, LAwrence 5-6460

**Deluxe:** Coils, chokes, miniature assemblies. **Glasseal:** Glass to metal seals & headers, hermetic connectors. **Komak:** Printed circuits, etched components. **Plastex:** Rigid plastic extrusions. **Peerless Molded Plastics:** Compression & injection molders. **Syracuse Electronics:** Timers & time delay relays.

**Butler**

Barron's Radio Supply, Inc., 368 E. Jefferson St., Butler, Pa., 10 (NEDA)

**Camp Hill**

Robinson Co., The I. E., 2120 Market St., Camp Hill, Pa., 15, REgent 7-6791, Branch: West Conshohocken, Pa.

**Carnegie**

Daugherty Co., F. A., 86 Pilgrim Rd., Rosslyn Farms, Carnegie, Pa., 15, BR 9-3869, Branch: Cleveland, Ohio

**Cheltenham**

Scholes Co., William R., P.O. Box 104, Cheltenham, Pa., 15, PIlgrim 5-2765

**Balco:** Capacitors. **General Resistance:** Precision wire wound resistors. **Haddam Mfg.:** Flexible heaters. **Magnetic Corp:** Clutches. **Modern Die Cutting:** Baffles. **Patwin:** Magneline indicators for inline display. **Photo Chemical Prod.:** Permanent markings on dials, panels, etc.

**Clifton Heights**

Delaware Valley Electronic Supply Corp., 224 W. Baltimore Pike, Clifton Heights, Pa., 10 (NEDA)

Holdsworth & Co., 426 S. Springfield Rd., Clifton Heights, Pa., 15, MAdison 6-8300

**Applied Research:** Broadband amplifiers, bandpass filters, multicouplers, multiplexers, attenuators, terminations. **Calibration Standards:** DC volt-amp meters, DC stability tester. **Electronic Measurements:** DC power supplies, line voltage regulators. **Erie-Pacific:** Counters & timers, digital frequency meters. **Jerrold:** Sweep frequency generators, Coaxial switches, attenuators. **Julie:** Voltage dividers & absolute voltage references, resistors. **Lab. for Electronics:** Microwave oscillators, pulse stability testers, MTI Radar test sets. **Lumatron:** Oscilloscopes, Millamicrosecond sampling units, synchronizing trigger units. **Millivac:** VTVM's DC & AC, low noise choppers. **Optimized Devices:** Voltage comparators, transistor & diode test sets, multiconductor cable test sets. **Rust:** Miniature recorders. **Servo Corp. Amer.:** Servo system analyzers, autopilot analyzer, servoboards, "Servolab" educational kits, infrared components.

**Devon**

Bell Co., P. F., 112 Hunters Lane, Devon, Pa., 15, MUrray 8-5011

**Donora**

Rosenwasser Sales, F. A., P.O. Box 576, Donora, Pa., 10, 15, Branch: South Euclid, Ohio

**Drexel Hill**

Kellar & Co., Hal, 653 Ferne Blvd., Drexel Hill., Pa., 15, CLearbrook 9-6758 (ERA)

Stobbart Co., Arthur J., 56-14 Revere Rd., Drexel Hill, Pa., 15, CLearbrook 9-3881 (ERA)

**Elkins Park**

A. G. Radio Parts Co., 939 Township Line, Elkins Park 17, Pa., 10 (NEDA)

**Erie**

Duncombe Co., J. V., 1011 W. Eighth St., Erie, Pa., 10 (NEDA)

Jordan Electronic Co., 1130 German St., Erie, Pa., 10 (NEDA)

Mace Electronics, 28 E. 24th St., Erie, Pa., 10 (NEDA)

Warren Radio Co., 1315 Peach St., Erie, Pa., 10 (NEDA)

**Gardenville**

Biggs & Co., Inc., J. Alan, Bucks County, Gardenville, Pa., 15, FI 8-9457 (ERA)

**Glenside**

Scarborough, George G., 315 Harrison Ave., Glenside, Pa., 15 (ERA)

Shelps Co., George A., P.O. Box 254, Glenside, Pa., 15, KIngsley 6-1066 (ERA)

Technical Representation, 220 S. Easton Rd., Glenside, Pa., 15, TUrner 7-1325

**ITT Components Div.:** Selenium & Silicon Rectifiers, Glass Seals, Miniature Capacitors. **Stackpole Carbon:** Carbon Resistors, Switches, Ferrite Cores, Ceramic Magnets, GA Capacitors. **Times Wire & Cable:** Coaxial Cable, Plastic Hook-up Wire. **Victory Engineering:** Thermistors, Varistors, Thermal Conductivity Cells, Combustion Analysers, Temperature Sensor Assemblies, Hypsometers, Compactrols.

Wilkinson, Inc., Robert L., P.O. Box 215, Glenside, Pa., 15, HAncock 4-8400, Branch; Towson, Md.

**Harrisburg**

D & H Distributing Co., Inc., 2525 N. 7th St., Harrisburg, Pa., 10 (NEDA)

Electronic Wholesalers, 1922 Paxton St., Harrisburg, Pa., 10 (NEDA)

Lowery, Inc., L. D., 1501 Allison St., Harrisburg, Pa., CEdar 3-0917, Branch: Wynnewood, Pa.

Radio Distributing Co., 915 S. 13th St., Harrisburg, Pa., 10 (NEDA)

**Havertown**

Fairbanks Co., H. J., Waybar Bldg. 1615 Darby Rd., Havertown, Pa., 15, GRanite 2-2467

**Carter Motor:** Fractional HP Motors, dynamotors, converters. **Michigan Magnetics:** Tape recording heads. **Pyramid Electric:** Capacitors. **Stanwyck:** Coils.

Kass Electronics Distributors, W. Chester Pike & Darby Rd., Havertown, Pa., 10 (NEDA)

Mustico Co., John, 312 Bewley Rd., Havertown, Pa., 15, HIlltop 6-1961

**Akro-Mils:** Cabinets. **James:** Vibrators. **Micamold:** Condensers. **Regdon:** Solenoids. **Resistor Wholesalers:** Resistors. **Schrack Electrical Sales:** Relays.

Satterthwaite, W. F., P.O. Box 664, Havertown, Pa., 15, SUnset 9-9600

**Amco:** Modular instrument enclosures. **Chicago Thrift-Etching:** Name plates, dials. **Consolidated Avionics:** Transistorized power supplies. **Diamonite Prods.:** Alumina Ceramics. **Hamlin:** Mercury & Dry reed switches. **Mutual Designers:** Printed circuit boards, assemblies. **Slip Ring Co. America:** Slip ring & commutator assemblies.

Stinson Co., John T., 2124 Darby Rd., Havertown, Pa., 15, SUnset 3-7111

**Ampex:** Instrumentation, computer & audio recording tapes. **Antenna Specialists:** Antennas. **Dutrex:** DuMont receiving & picture tubes. **Gramer:** Transformers. **Magnacord:** Professional tape recorders. **John F. Rider:** Books & manuals.

**Hellertown**

Taylor Co., Morris F., 534 Ellen St., Hellertown, Pa., 15, TErrace 8-8503, Branch: Silver Spring, Md.

**Homestead**

Leff Radio Parts Co., M., 247 West Eighth Ave., Homestead, Pa., 10 (NEDA)

**Jenkintown**

Garten & Associates, Louis A., 730 Washington Lane, Jenkintown, Pa., 15, Waverly 7-1200, Branch: West Orange, N.J.

Laird Equipment Co., P.O. Box 108, Jenkintown, Pa., 15, TUrner 4-8198

**New Hermes:** Engraving machines.

**Lansdowne**

Taylor Co., Morris F., 275 Bryn Mawr Ave., Lansdowne, Pa., 15, MAdison 2-0383, Branch: Silver Spring, Md.

**McKeesport**

Barno Radio Co., 927 Walnut St., McKeesport, Pa., 10 (NEDA)

McKeesport Electronics, Inc., 1661 Fifth Ave., McKeesport, Pa., 10 (NEDA)

**Monroeville**

Bear Corp., Neal, 1974 Gregory Ave., Monroeville, Pa., 15, VAlley 3-5117, Branch: West Richfield, Ohio

**Narberth**

Jeffries, Inc., Samuel A., 105 Forest Ave., Narberth, Pa., 15, MOhawk 4-8500 (ERA)

Massey Associates, 529 Brookhurst Ave., Narberth, Pa., 15, MOhawk 4-4200

**Atlee:** Tube holders, clips and shields. **Burnell:** Toroids, filters, related networks. **J-B-T:** Switches & timers, frequency meters. **Pennsylvania Fluorocarbon:** Tubings (teflon). **Shurite:** Meters. **Standard Electrical Prods.:** Adjust-A-volt transformers. **Tensolite:** Wire (teflon) & cables. **Triplett:** Panel instruments, signal generators.

**New Brighton**

Television Parts Co., Inc., 518 Fifth Ave., New Brighton, Pa., 10 (NEDA)

**Norristown**

Frederick Jr. Co., C. William, 800 W. Washington St., Norristown, Pa., 10, 15, BRoadway 9-7560

**Elco:** Sockets, connectors. **Merit:** Coils & transformers. **Parker Metal Goods:** Hardware. **Tenna:** Antennas & coax connectors. **Times Wire & Cable:** Multiconductor cable. **Turner Co.:** Microphones.

**Philadelphia**

A. C. Radio Supply Co., 1539 W. Passyunk Ave., Philadelphia 45, Pa., 10 (NEDA)

Allied Electric Appliance Parts, Inc., 1320 W. Erie Ave., Philadelphia 40, Pa., 10 (NEDA)

Almo Radio Co., 913 Arch St., Philadelphia 7, Pa., 10 (NEDA)

Andco Sales-Engineering, Inc., 5823 Greene St., Philadelphia 44, Pa., 15, VIctory 4-9100

**Ace Electronics:** Precision potentiometers. **Duramark:** Wire markers. **Emerson & Cuming.** Resins, dielectric materials, microwave absorber, radar lenses & reflectors, anechoic chambers. **Litton:** Hardware & terminal boards, printed circuits. **Lumen:** Magnetic amplifiers. **Royal Electric:** Wire & cable. **Wood Electric:** Circuit breakers, miniature RF connectors.

Barnett Bros. Radio Co., 622 Arch St., Philadelphia 6, Pa., 10 (NEDA)

Baron Associates, Presidential A-710, Philadelphia 31, Pa., 10, 15, TRinity 7-4605

Waveguide, microwave, power equip., electro-mechanical.

**Be-Esco Sales Corp., 1122 Cliveden St., Philadelphia, Pa., 15, LIvingston 9-1122, Branch: Yonkers, N.Y.**

**See ad on page 751**

Beemer Engineering Co., 401 N. Broad St., Philadelphia 8, Pa., 10, 15, 20, WAlnut 2-0900

**AeroDuct Works:** Flexible Ducting. **Chemical Micro Milling Corp.:** Panels, Nameplates, Switch Components. **Chrysler Corp., Amplex Div.:** Oilite Sintered Metal Products, Bearings, Filters, Flash Arrestors. **Halogen Insulator & Seal:** Molded & Machined Teflon Components. **Plastic & Rubber Products Corp.:** Molded Parts of Silicone, Natural, & Synthetic Rubber.

Blumenstein Co., 123 Cross Hill Rd., Philadelphia 50, Pa., 15, MIdway 9-9523 (ERA)

**Burlingame Associates, 15, SHerwood 7-9080, Branch: Mount Vernon, N.Y.**

**See ads on pages 245, 247, 257, 273, 274, 283, 288, 293, 294, 305, 311, 313, 327, 354, 365, 417, 439, 465, 475, 481, 489, 491, 569, 583**

Cerf & Co., Art, Philadelphia, Pa., 15, LOcust 4-0663, Branch: Newark, N.J.

Cordray Sales Co., 18 W. Chelten Ave., Philadelphia 44, Pa., 15, VIctor 8-0447 (ERA)

Crane & Egert Corp., Philadelphia, Pa., 15, PEnnypacker 5-3520, Branch: New York, N.Y.

Duncan & Associates, Inc., William I., 5452 Charles St., Philadelphia 24, Pa., 15, CUmberland 9-7840

**Cherry:** Snap action switches. **Daystrom-Pacific:** Potentiometers. **Hopkins Engineering:** Capacitors. **Iron Fireman:** Relays. **JFD:** Piston capacitors, LC tuners. **Vitramon:** Porcelain & micro-miniature ceramic capacitors.

**Engel & Associates, Inc., G. Curtis 15, WAlnut 2-3270, Branch: Ridgewood, N.J.**

**See ad on page 737**

Erdman Co., Kenneth B., 7908 High School Rd., Philadelphia 17, Pa., 15, CApitol 4-1833

**Cambridge Thermionic:** Terminals, coils, coil forms, handles, capacitors. **Conductorlab:** Custom printed circuit boards. **PIC Design:** Gears, breadboard, dials, differentials, clutches, couplings.

Estersohn, Harry, 5727 Wister St., Philadelphia 38, Pa., 15, VIctor 8-8484

**Acousti-Craft:** Cabinets. **Advanced Acoustics:** Bi-phonic coupler loudspeaker. **American Capacitor:** Ceramic disc capacitors. **American Concertone:** Tape recorders. **Bamford:** Sub-miniature trimming pots. **Chicago Miniature Lamp:** Miniature lamps. **Jerrold:** TV accessories. **H. H. Scott:** Audio equip. **United Audio Prods.:** Dual changers, speakers.



# Distributional Functions



Hautenschild Co., George, 949 E. Godfrey Ave., Philadelphia 24, Pa., 15, PIoneer 4-0847

**Barco:** Miniature electrolytic capacitors. **International Electronics:** Mullard Products, electronic tubes. **Kip:** Coincidence thyratrons, grid controlled indicator tubes. **Lerco:** Turret terminals, eyelets, terminal boards, control knobs. **U.S. Transistor:** PNP Junction types.

Herbach & Rademan, Inc., 1204 Arch St., Philadelphia 7, Pa., 10 (NEDA)

**Hughes Co., Inc., Kenneth E., 101 North 33rd St., Philadelphia 4, Pa., 15, EVergreen 6-3130, Branch: Union City, N.J.**

**See ad on page 738**

Jem Electronic Distributors, Inc., 1022 W. Girard Ave., Philadelphia, Pa., 10 (NEDA)

Keefe Electronic Sales Co., Philadelphia, Pa., 15, MArket 7-3454, Branch: Haddonfield, N.J.

**L & M Associates, 488 W. Clapier St., Philadelphia, Pa., 15, GErmantown 8-5666, Branch: Saddle Brook, N.J.**

**See ad on page 738**

Lazar Radio Co., Nat, 4231 Lancaster Ave., Philadelphia 4, Pa., 10 (NEDA)

Leban Assoc., Albert D., 218 Lloyd Lane, Philadelphia 31, Pa., 15, MIdway 2-9047, (ERA)

Lectronic Distributors, Inc., 727 Arch St., Philadelphia 6, Pa., 10 (NEDA)

Lectronic Research Labs., 715 Arch St., Philadelphia, Pa., 5, 10, 25, MArket 7-6771

Industrial electronic components

Lee Electronics, 3628 Rhawn St., Philadelphia 36, Pa., 10 (NEDA)

Lewis Co., Herman, 1622 68th Ave., Philadelphia 26, Pa., 15, Livingston 8-1281

**Consolidated Wire & Assoc.:** Ind. & military wire. **Dynavox:** Industrial phonographs. **Federal Electronics:** Capacitors, miniature jacks. **Great Eastern:** Transistors & diodes. **Lab-tronics:** Connectors, molded plugs & jacks. **Mercury:** Test equipment. **Saratoga Industries:** Semiconductors. **Sterling Prec.:** Differentials & electro-mech. clutches & brakes. **P. Wall:** Soldering irons.

MacDonald Inc., Samuel K., 1531 Spruce St., Philadelphia 2, Pa., 15

**Centralab:** Components. **Chicago Standard:** Transformers. **Cinch-Jones:** Connector devices. **E. F. Johnson:** Components. **Ohmite:** Resistors, rheostats. **Rayclad:** Heat shrinkable tubing. **Raychem:** Coax cable, wire. **Shure:** Audio devices. **Simpson:** Meters, testers. **Spectrol:** Precision pots.

Naudain-Bohaker & Co., 846 Suburban Station Bldg., Philadelphia 3, Pa., 15, LOcust 4-3194 (ERA)

Newson & Associates, Inc., C. H., 813 Bethlehem Pike, Philadelphia 18, Pa., 15, CHestnut Hill 8-3377

**Clevite Transistor Prods:** Diodes. **Delevan:** Coils, chokes. **Kellogg Switchboard:** Delays. **Kings:** UG, RF connectors. **L. Frank Markel:** Tubing, sleeving, lead wire. **Micamold:** Capacitors. **U.S. Components:** Panel & Rack connectors.

Nolan & Associates, John J., 314 W. Sparks St., Philadelphia 20, Pa., 15, WAverly 4-1595

**Algo:** Transformer cans. **Allies' Prods.:** Precision deposited carbon resistors. **Cosmo Plastics:** Nylon bobbins, bushings, washers. **Electrical Windings:** Coils & Transformers. **Mohawk:** Wires & cables. **Oryx:** Miniature soldering irons. **Sphere Co.:** Hermetic seal terminals.

**105. Distribution.**

5. Export & import
10. Jobbers & wholesalers
15. Manufacturers representatives
20. Sales & service
25. Surplus dealers

O'Hara Co., Brendan C., 5040 City Line Ave., Philadelphia 31, Pa., 15, GReenwood 3-3654 (ERA)

Paragon Sales Co., 111 S. 22nd St., Philadelphia 3, Pa., 15, LO 3-7040

**Amperex:** Tubes & semiconductors. **Gray & Kuhn:** Delay lines, band pass filters, RF & IF transformers & coils. **Hardwick-Hindle:** Wire wound resistors, rheostats. **IMC Magnetics:** Induction, servo, synchronous motors, blowers, fans. **PSP Engineering:** Linear & rotary solenoids, synchros, resolvers. **Phalo:** Insulated wire & cable, wiring harnesses.

Penn Electronic Parts Co., 5303 Frankfort Ave., Philadelphia 24, Pa., 10 (NEDA)

Powell Co., Harold H., 2102 Market St., Philadelphia 3, Pa., 10, 15, LO 4-1440

**Atlee:** Component Holders. **Bendix-Scintilla:** Connectors. **Bussmann:** Fuses. **Cannon:** Connectors. **Chicago Transformer:** Transformers. **Cinch-Jones:** Connectors. **Dage Electric:** RF Connectors. **Dialight:** Pilot Lights. **Elco:** Vari-Con & Printed Circuit Connectors. **Grayhill:** Switches. **Hollingsworth:** Solderless Terminals. **Kings:** RF Connectors. **Markel & Sons:** P.V.C. & Teflon Sleeving. **Plastic Capacitors:** Capacitors. **Pomona:** Test Leads. **Sealectro:** Teflon Terminals, Miniature RF Connectors. **Sloan Co.:** Color-Lite, Pilot Lights. **Switchcraft:** Plugs, Jacks, Switches. **Tensolite:** P.V.C. & Teflon Insulated Wire. **Useco-Litton:** Terminals, Knobs, Handles. **Vector:** Turret Sockets, Plug-Ins, Boards. **Winchester:** Connectors.

Radio Electric Service of Pennsylvania, Inc., 701 Arch St., Philadelphia 6, Pa., 10 (NEDA)

Radio Electric Shop, 631 S. 60th St., Philadelphia 43, Pa., 20, GR 6-8125

Receivers, photographic strobe lite units, electro-medical equip., fathometers, marine receivers, timers.

Randall Co., Ken, 121 N. Broad St., Philadelphia 7, Pa., 15, LOcust 4-2151

**Barry:** Shock mounts, vibration isolators. **Churchill:** Chassis, dust covers. **Hammarlund:** Variable capacitors. **Magnecraft:** Relays. **Marion Instrument Div.:** Meters, aircraft instruments. **Switchcraft:** Plugs, jacks, switches, cables. **Transformer Technicians:** Reactors.

Rosen & Co., Inc., Raymond, Parkside Ave. At 51st St., Philadelphia 31, Pa., 10 (NEDA)

Simberkoff Sales Co., 1021 Levick St., Philadelphia 11, Pa., 15, PIoneer 3-2512, Branch: Hoboken, N.J.

**Snyder Co., Inc., V. A., 1424 Race St., Philadelphia, Pa., 15, WAlnut 2-0634, Branch: Union, N.J.**

**See ad on page 739**

Steinberg & Co., Albert, 2520 N. Broad St., Philadelphia 32, Pa., 10 (NEDA)

**Pennsylvania**

Stratton Co., C. H., 314 E. Wadsworth St., Philadelphia 19, Pa., 10, 15, CHestnut Hill 7-7500

Campro: [illegible] JO-Line Tools: [illegible] Mamco: [illegible] Simmons: [illegible] Xcelite: [illegible]

Master Electronic Supply, Sidney, 4 52 N. 5th St., Philadelphia 40, Pa., 10 (NEDA)

**Pittsburgh**

Cameradio Co., 1121 Penn Ave., Pittsburgh 22, Pa., 19, EXpress 1-4000 (NEDA)

See ad on page 758

**Aerovox:** Capacitors. **Amphenol:** Connectors. **Arrow, Hart & Hegeman:** Switches. **Belden:** Wire. **Bourns:** Miniature pots & the stats. **Bud:** Cabinets, racks, chassis. **Cannon:** Connectors. **Collins Radio:** Amateur receivers & transmitters. **Cornell-Dubilier:** Capacitors. **Electro Products:** Power Supplies. **Electrons:** Industrial tubes. **Hallicrafters:** Amateur. **Hammarlund:** Amateur. **Hoffman:** Semiconductors. **Industrial Timer:** Timers. **Mallory:** Switches, power supplies, capacitors. **Millen:** Components. **Nat. Electronics:** Tubes. **Nat. Radio:** Amateur Receivers. **Ohmite:** Power rheostats, switches. **Potter & Brumfield:** Relays. **Production Inst.:** Counting devices. **RCA:** Tubes, semiconductors, test equip. **Raytheon:** Tubes, semiconductors. **Sola:** Volt. regs. **Struthers-Dunn:** Relays. **Superior:** Powerstats, var. transformers. **Thordarson:** Transformers, chokes. **Triad:** Transformers, chokes. **UTC:** Transformers, chokes. **Westinghouse:** Tubes, semiconductors.

Keps Electric Co., Electronic Div., 3000 Baum Blvd., Pittsburgh 13, Pa., 10 (NEDA)

Levine Co., Albert, 11 Jonquil Pl., Pittsburgh 34, Pa., 15, LOcust 1-7027

**Jersey Specialty:** TV transmission cable. **Parker Metal Goods:** TV antenna hardware, masts. **R & K Tuner & Mfg.:** TV tuner rebuilders. **Workman TV:** Globars, wire wound resistors, transistors, tube brighteners.

Lowry Dietrich Co., 703 Clairton Blvd., Pittsburgh 36, Pa., 15, TUxedo 1-2228

**American Machine & Foundry:** Centrifuges. **Consolidated Controls:** Pressure actuated switches. **International Radiant:** Environmental chambers. **MB Electronics:** Vibration analysis. **Plasmadyne:** Plasma arc generator, hyperthermal wind tunnel, spray equip. **Skiatron:** Storage oscilloscope, alphadyne character generators.

Lowry, William F., 1414 Swantek St., Pittsburgh 4, Pa., 15, WA 1-2959 (ERA)

Mac Donald Inc., Samuel K., 335 5th Ave., Pittsburgh, Pa., 15, ATlantic 1-2253, Branch: Philadelphia, Pa.

Mates, Hy, 5510 Hobart St., Pittsburgh 17, Pa., 15, HA 1-8998 (ERA)

Nace Co., Inc., Allen, 101 Investment Bldg., Pittsburgh 22, Pa., 15, ATlantic 1-6050, Branch: Brecksville, Ohio

Odell Co., M. P., 750 Penn Ave., Pittsburg 21, Pa., 15, Fremont 1-1231, Branch: Westlake, Ohio

Olsen Co., John O., 104 Elatan Dr., Pittsburgh 16, Pa., 15, BRowning 9-2550, Branch: Cleveland, Ohio

Podolny Co., James H., 5912 Penn Ave., Pittsburgh 6, Pa., 15, HIland 1-6800

**Astron:** Capacitors. **British Industries. Commercial Plastics:** Cable clamps. **Drake:** Pilot lamps. **Multicore:** Solder. **Peerless Elect. Prod. Div.:** Transformers. **Quam-Nichols:** Speakers. **P. Wall:** Solder irons.

Radio Parts Co., Inc., 6401 Penn Ave., Pittsburgh 6, Pa., 10 (NEDA)

Root & Co., 733 Vallevista Ave., Pittsburgh 34, Pa., 15, LOcust 1-4125

**Aerovox:** Capacitors, resistors. **General Products:** Terminal boards. **J-B-T & Shurite:** Toggle switches & meters. **John F. Rider:** Technical books. **Tenna:** Antennas. **Triad:** Transformers. **Triplett:** Test equip. & meters.

Shelby & Co., Thomas, 312 Spring Valley Rd., Pittsburgh 16, Pa., 10, 20, CAnal 1-4676, Branch: New Bremen, Ohio

Sterling Co., S., G. B. U. Bldg., 4232 Brownsville Rd., Pittsburgh 27, Pa., 15, 20, TUxedo 4-5515, Branch: Detroit, Mich.

Tanner Co., George O., 720 Gypsy Lane, Pittsburgh 34, Pa., 15, FIeldbrook 1-5263

**Antenna Designs:** Antennas. **Bliley:** Crystals. **Electrend:** Antenna loading coils. **Kefi:** Printed circuit boards. **Lenz:** Wire & cable. **Spaulding Products:** Towers. **Trimm:** Headphones, plugs, connectors. **Union Switch & Signal:** Relays & readout instruments. **United Scientific Labs.:** Citizen's Band transceivers.

Taylor Co., Morris F., 5436 Youngridge Dr., Pittsburgh 36, Pa., 15, OLympia 5-7712, Branch: Silver Spring, Md.

Tydings Co., 933 Liberty St., Pittsburgh 22, Pa., 10 (NEDA)

Yarussi Co., Frank, 312 Spring Valley Rd., Pittsburgh 28, Pa., 15, CAnal 1-4676 (ERA)

**Reading**

Barbey Co., Inc., The George D., 157 Penn St., Reading Pa., 10 (NEDA)

Beil & Whitaker, Inc., 3623 Jacksonwald Ave., Reading, Pa., 15, FRanklin 5-6837

**Alpha:** Hook up wire, multiconductor cable, lacing cord, tubing, zippertubing. **Amperex:** Industrial & special purpose tubes, semiconductors. **Ampex:** Audio, computer, instrumentation, video magnetic tapes. **Arco:** Micas, miniature micas, miniature bypass & trimmer capacitors. **Clarostat:** Wire wound & carbon controls, precision & wire wound resistors, rheostats. **Jerrold:** TV distribution equip. **JFD:** TV antennas & accessories. **Potter & Brumfield:** Relays. **Setchell-Carlson:** Television monitors & receivers.

**St. Marys**

B. & R. Electric Co., 20 Railroad St., St. Marys, Pa., 10 (NEDA)

**Scranton**

General Radio & Refrigeration Co., 1129 Wyoming Ave., Scranton 9, Pa., 10 (NEDA)

Graham Associates, Wilfrid, 227 N. Washington Ave., Scranton 3, Pa., 15, DI 3-1259, Branch: Wynnewood, Pa.

Pursell, Fred P., 1221 N. Washington Ave., Scranton 9, Pa., 10 (NEDA)

**Sharon**

Sharon Electronics Supply, 1336 E. State St., Sharon, Pa., 10 (NEDA)

**Southampton**

Park, E. L., 651 Paddock Rd., Southampton, Pa., 15, ELmwood 7-7805

**Eby Sales, Electro Prods., Mosley, Planet, R.M.S., Soundex, Superior Insulated Wire, TV Development.**

**State College**

Penn Industrial Electronics Co., P.O. Box 661, State College, Pa., 10, AD 7-2202

Industrial control equipment, temperature control of counting, recording, etc.

**Uniontown**

Zimmerman Wholsalers, 104 W. Peter St., Uniontown, Pa., 10 (NEDA)

**Upper Darby**

**Burlingame Associates, 222 Long Lane, Upper Darby, Pa., 15, SHerwood 7-9080, Branch: Mount Vernon, N.Y.**

**See ads on pages 245, 247, 257, 273, 274, 283, 288, 293, 294, 305, 311, 313, 327, 354, 365, 417, 439, 465, 475, 481, 489, 491, 569, 583**

Holliday-Hathaway Co., Inc., 8601 West Chester Pike, Upper Darby, Pa., 15, HIlltop 9-2000, Branch: Rutherford, N.J.

**West Conshohocken**

Robinson Co., The I. E., 144 Elizabeth St., West Conshohocken, Pa., 15, TAylor 8-1294

**Baldwin-Lima-Hamilton:** Strain Gages & Indicators. **Bomac:** Tubes & Microwave Components. **Dymec:** Instrumentation. **Hewlett-Packard:** Test Instruments. **Navcor:** Transistorized Pulse Program Equip. **Sanborn:** Industrial Recorders. **Schmit:** Printed Board Prod. Machinery. **Sensitive Research Instrument:** Indicating Instruments. **Sorensen-Raytheon:** AC Regulators & DC Power Supplies. **Varian:** Klystrons, Recorders, Vacuum Tubes.

**Wilkes Barre**

General Radio & Electronic Co., 396-402 S. Main St., Wilkes Barre, Pa., 10 (NEDA)

**Willow Grove**

Lewis Co., Herman, 210 Red Barn Rd., Willow Grove, Pa., 15, OLdfield 9-0704, Branch: Philadelphia, Pa.

**Wyncote**

**Gawler-Knoop Co., 835 Glenside Ave., Wyncote, Pa., 15, WAverly 7-1820, Branch: Roseland, N.J.**

**See ad on page 737**

Hardy Associates, Norman, 414 Gribbel Rd., Wyncote, Pa., 15, TUrner 7-3956

**Clairex:** Cadmium selenide & sulphide photoconductors. **Electric Regulator:** Voltage regulators. **Resistance Prods.:** Precision film, HV resistors.

**Wynnewood**

Graham Associates, Wilfrid, 610 Latham Dr., Wynnewood, Pa., 15, MIdway 9-3027

**Artizans of New England:** Cabinets. **Barker Sales:** Vacuo-junction tubes. **Electrophono & Parts Corp:** Volume controls & record changers. **Fairchild Recording Equip.:** Turntables, arms, cartridges. **Jersey Specialty:** 300 twin lead wire. **Shriro Trading:** Imported component parts, controls, microphones, switches, etc.

Lowery, Inc., L. D., 50 E. Wynnewood Rd., Wynnewood, Pa., 15, MI 2-9100

**Dialight:** Pilot lights, thermal time delays, pilot light socket assemblies. **Epoxy Prods.:** Epoxy encapsulating materials. **General Prods.:** Molded terminal boards, connectors. **A. W. Haydon:** Mechanical & electronic timing devices, automated test equipment. **Haydon Instrument:** Mechanical counters. **Haydon Switch:** Hermetic, plastic snap switches, pressure switches. **Industrial Condenser:** Electrolytic capacitors. **Millen:** Mu metal shields, hardware. **United Transformer:** Laminated iron core transformers, filters, toroids.


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# Distributional Functions



**York**

Newson & Associates, Inc., C. H., 1850 Church Rd., York, Pa., 15, Tel: 46-3261, Branch: Philadelphia, Pa.

## RHODE ISLAND

**Lincoln**

Adams-Mc Gregor Associates, 66 Lakeview Rd., Lincoln, R.I., 15, PAwtucket 6-1300

**Browning Labs:** Klystron power supplies, WWV receivers, SWR amplifiers. **Electro-Voice:** Communication receivers, citizen band transceivers. **J-B-T:** Toggle, rotary, lever switches, pyrometers, vibrating reed freq. & elapsed time meters. **Trimm:** Jacks, plugs, car phones, coaxial cables, plugs. **Triplett:** Panel meters, test equipment. **Schauer:** Instrument rectifiers, DC power supplies, chargers, battery eliminators. **Shurite:** Panel meters. **Whitso:** Molded Prods., stand-off insulators. **Worner Electronic Devices:** Photoelectric systems.

**Pawtucket**

Jabbour Electronic Suppliers, 20 Woodbine St., Pawtucket, R.I., 10 (NEDA)

## SOUTH CAROLINA

**Charleston**

Wholesale Radio Supply Co., E. Bay St., Charleston, S.C., 10 (NEDA)

**Columbia**

Dixie Radio Supply Co., Inc., 1900 Barnwell St., Columbia, S.C., 10 (NEDA)

Horlacher & Barrett, 1740 Blanding St., Columbia 1, S.C., 10 (NEDA)

**Florence**

Southern Electronics, Inc., 359 N. Irby St., P.O. Box 1440, Florence, S.C., 10 (NEDA)

**Greenwood**

Fausett & Co., Floyd, Stony Point, Greenwood, S.C., 15, GLenview 1-3637, Branch: Atlanta, Ga.

**Rock Hill**

Joyner & Associates, J. E., Route #2, P.O. Box 182A, Rock Hill, S.C., 15, Branch: Atlanta, Ga.

**Spartanburg**

Hemcor Radio Supply, 481 Union St., Spartanburg, S.C., 10 (NEDA)

## SOUTH DAKOTA

**Sioux Falls**

Mc Kenzie Distributors, Inc., 800 N. Main Ave., Sioux Falls, S.D., 10 NEDA)

**Watertown**

Burghardt Radio Supply, Inc., 621 Fourth St. S.E., Box 746, Watertown, S.D., 10 (NEDA)

## TENNESSEE

**Bristol**

Roden Electrical Supply Co., 104 E. State St., Bristol, Tenn., 10, (NEDA)

**Chattanooga**

Curle Radio Supply Co., Inc., 439 Broad St., Chattanooga 2, Tenn., 10 (NEDA)

Johnson Co., Jesse P., 413 Dome Bldg., Chattanooga 2, Tenn., 15, AMherst 6-1610

**Bloader-Tongue:** TV master Ant. systems, CCTV cameras, amplifiers. **Miratel:** Video monitors, voice actuated relays. **North American Philips:** Tape recorders, speakers, sound equipment.

**Columbia**

Randolph & Williams, 204 Carter St., Columbia, Tenn., 10, (NEDA)

**Cookeville**

Randolph & Parks, Inc., 2nd & Oak Sts., Cookeville, Tenn., 10 (NEDA)

**Dyersburg**

Warren Radio Co., Highway 51 North, Dyersburg, Tenn., 10 (NEDA)

**Jackson**

Rush Co., L. K., P.O. Box 1418, 425-29 N. Royal St., Jackson, Tenn., 10 (NEDA)

**Kingsport**

Radio Electric Supply Co., 961 E. Sullivan St., Kingsport, Tenn., 10 (NEDA)

**Knoxville**

Chemcity Radio & Electric Co., 2211 Dutch Valley Rd., P. O. Box 5026, Knoxville 18, Tenn., 10 (NEDA)

Roden Electrical Supply Co., 708 N. Central Ave., Knoxville 17, Tenn., 10 (NEDA)

Smith Electronic Supply Co., Inc., 301 E. Magnolia Ave., Knoxville 17, Tenn., 10 (NEDA,

**Memphis**

Bluff City Distributing Co., Inc., 234 East St., Memphis 4, Tenn., 10 (NEDA)

Cartwright & Bean, 560 S. Cooper St., Memphis 4, Tenn., 15, BR 6-4442

**Astatic:** Crystal cartridges & microphones. **Audio Devices:** Recording discs & tape. **Bell Sound:** P.A. & HiFi Amplifiers, tape decks. **Chicago-Standard:** Transformers & coils. **Cinch:** Plugs, sockets, terminal strips, hardware. **ITT-Components:** Selenium & silicon rectifiers. **Mosley Electronics:** Ham antennas & TV accessories. **Ohmite:** Resistors & rheostats. **Potter & Brumfield:** Relays. **Quam-Nichols:** Speakers **Sangamo:** Capacitors. **Simpson:** Test equipment & panel meters. **University:** Speakers & enclosures, PA trumpets, drivers.

Crockett Sales Co., 3752 Pattie Ann Dr., Memphis 16, Tenn., 15, EX 8-3598, Branch: Dallas, Texas

Electronic Supply, Inc., 1100 Union Ave., Memphis, Tenn., 10 (NEDA)

Engelman Co., Al, 3205 Crump Ave., Memphis 12, Tenn., 15, GLendale 8-6263 (ERA)

Texport Co., The, 585 Clower, Memphis 9, Tenn., 15, EXpress 8-3719, Branch: Dallas, Texas

Uffer & Co., Frank G., 1518 Madison Ave., Memphis 4, Tenn., 10 (NEDA)

**Nashville**

Atcheson & Adams, P.O. Box 157, Nashville, Tenn., 15, TUcker 3-2429, Branch: Greensboro, N.C.

Dixie Electronics Assoc., Inc., 1021 8th Ave. South, Nashville, Tenn., 15, ALpine 5-1344 (ERA)

Electra Distributing Co., 1914 W. End Ave., Nashville 5, Tenn., 10 (NEDA)

Randolph & Rice, 1213 McGavock St., Nashville 3, Tenn., 10 (NEDA)

Wallace Associates, Inc., Stanley K., 638 Rochelle Dr., Nashville, Tenn., 15, Branch: Lutz, Fla.

**Pennsylvania**
**Rhode Island**
**South Carolina**
**South Dakota**
**Tennessee**
**Texas**

**Tullahoma**

Randolph & Holt, Inc., 312 E. Coffee St., Tullahoma, Tenn., 10 (NEDA)

## TEXAS

**Abilene**

R & R Electronic Co., 1010 Pine St., Abilene, Texas, 10 (NEDA)

**Amarillo**

Alltronic Supply, Inc., 1401 W. Seventh Ave., P.O. Box 423, Amarillo, Texas 10 (NEDA)

R & R Electronic Co., 707 Adams, Amarillo 1, Texas, 10 (NEDA)

West Texas Electronics Co., Inc., 401 Adams St., P.O. Box 1969, Amarillo, Texas 10 (NEDA)

**Austin**

Electronic Headquarters, 310 Willow St., P.O. Box 343, Austin 1 & 62, Texas, 10 (NEDA)

Hargis-Austin, Inc., 410 Baylor St., P.O. Box 716, Austin 1, Texas, 10 (NEDA)

**Beaumont**

Montague Radio Distributing Co., 760 Laurel St., P.O. Box 3045, Beaumont 1, Texas, 10 (NEDA)

Sterling Radio of Beaumont, Inc., 1160 Laurel Station A, Beaumont, Texas, 10 (NEDA)

**Brownsville**

Electronic Equipment & Engineering Co., 1154 E. Madison St., Brownsville, Texas, 10, 15, LIberty 6-1611, Branch: Corpus Christi, Texas

**Corpus Christi**

Electronic Equipment & Engineering Co., 805 S. Staples St., Corpus Christi, Texas, 10, 15, TUlip 3-9271 (NEDA)

**Belden:** Wire. **Channel Master:** Antennas. **Chicago Standard:** Transformers. **Collins Radio:** Transmitters & Receivers. **P. R. Mallory:** Condensers. **Sprague Prods.:** Condensers. **Stromberg-Carlson:** Sound systems. **Sylvania:** Tubes. **Union Carbide Consumer Prods.:** Batteries. **Webster-Chicago:** Phonographs.

Leader Electronic Supply, Inc., 1701 Morgan Ave., Corpus Christi, Texas, 10 (NEDA)

Wicks Radio Equipment Co., 513-15 S. Staples St., Corpus Christi, Texas, 10 TUlip 4-8285 (NEDA)

**Amphenol:** Sockets & Connectors. **Astatic:** Cartridges & microphones. **Barker & Williamson:** Amateur. **Belden:** Wire & cable. **Bogen-Presto:** Amplifiers & inter-coms. **Centralab:** Controls, switches, ceramic capacitors. **Cornell-Dubilier:** Capacitors. **Eby:** Sockets. **Electro-Voice:** Microphones, cartridges, speakers. **Finco & Tenna:** TV antennas. **Garrard:** Changers. **General Cement:** Chemicals. **General Electric:** Receiving tubes, picture tubes, semi-cond. prods., cartridges. **Gonset:** Converters, receivers, transmitters. **Hallicrafters & Hammarlund:** Amateur receivers. **E. F. Johnson:** Amateur transmitters. **Merit & Triad:** Transformers. **J. W. Miller:** Coils. **Hickok, Precision Apparatus, Simpson:** Test equip. **Quam-Nichols & University:** Loudspeakers. **Shure:** Microphones. **Turner:** Microphones. **Union Carbide:** Batteries. **Viking:** Tape decks.

**Dallas**

Airep Engineering Co., P.O. Box 9555, Dallas 14, Texas, 15, TAylor 4-3800

**Alabama Automation:** Control system programmers, curve followers, arbitrary function generators. **Electronic Reseach Assoc.:** DC power supplies, transistorized high current supplies, static inverters, frequency changers, transistor test equipment. **Freq. Stds:** Microwave wavemeters. **Gray Instrument:** Laboratory standards—Resistance, wheatstone & mueller bridges, millivolt potentiometers, laboratory & portable instruments, standards calibration. **Holt Instrument Labs.:** AC Instrumentation, low distortion power amplifiers, audio oscillators, AC regulators. **Huggins:** Traveling wave tubes, backward wave oscillators. **Jerrold:** RF alignment instrumentation, wide band sweep generators, crystal controlled markers, variable attenuators. **Menlo Park:** Microwave instrumentation, swept oscillators, wide range amplifiers, power supplies, broadband power leveling systems, solenoids. **Smith-Florence:** Microvoltmeters, lab & nuclear power supplies, anticoincidence preamps, digital voltmeters, transistorized cable fault finders. **Technitrol:** Pulse Instrumentation. **Wayne Kerr:** Impedance measurement, universal & comparison bridge, inductance meter, waveform analyzer, micrometer, Vibration meter. **Weinschel:** Lab. standards.

All-State Electronics, Inc., 2411 Ross Ave., Dallas 1, Texas, 10 (NEDA)

Allied Components Inc., 2517 Converse St., Dallas 7, Texas, 15, RIverside 2-2830

**Acoustica:** Ultrasonic cleaners. **Advanced Vacuum Prods.:** Terminals & headers. **Collins Electronic:** AC-DC choppers. **Daystrom:** Servomotors, alternators. **Elcor:** Inverters, dynamotors, alternators. **Filtors:** Sub. min. & herm. sealed relays. **General Ceramics:** Ferrites, memory cores. **Indiana Steel:** Magnets. **Magnetic Metals:** Transformer laminations, tapewound cores. **Maxson:** Snap action switches. **Modine Mfg.:** Semiconductor coolers. **Perkin-Elmer:** Vernistat. **Plasteck:** Edgelighted panels & knobs. **Viking:** Miniature connectors, relay sockets.

Anderson Co., George E., 1901 Griffin Ave., Dallas 2, Texas, 15, RI 1-5931 (ERA)

Antle-Smith-Delzell Sales, 2721 Brookfield Ave., Dallas 35, Texas, 15, FLeetwood 7-7279

**Burton-Rogers:** Hoyt panel meters. **Clear Beam Antenna:** TV antennas. **Gramer-Halldorson:** Transformers & coils. **Hamilton-Hall:** Resistors. **National Radio, New England Inst., North American Philips, Philmore, Precise Development, Sightmaster, Universal Transistor Prods., Webster.**

Associated Electronics, Inc., 6115 Denton Dr., Dallas 35, Texas, 15, FLeetwood 2-3389 (ERA)

Aymond Co., Edward F., 4312 Maple Ave., Dallas 19, Texas, 15, LAkeside 6-5233

**Cannon:** Connectors. **Dale:** Resistors. **Globe Industries:** Motors. **Good-All:** Capacitors. **Industro:** Transistors. **North Electric:** Relays. **Sonotone:** Batteries. **Tensolite:** Teflon wire. **Victory Engr.:** Thermistors.

Barnes Co., Arnold, 3603 Lemmon Ave., Dallas 19, Texas, 15, LAkeside 6-8735

**Burroughs Electronic Tube Div.:** NIXIE & Magnetron Beam Switching Tubes, Pulse Control Equip., Decade Counters. **Chassis-Trak:** Chassis Slides, Heavy Duty Handles. **Digitran:** Switches with In-Line Readout, Electromechanical Counters. **Kepco:** Power Supplies, Transistorized & Vacuum Tube Types. **Kin Tel:** Voltmeters, DC Amplifiers, Calibrators, Power Supplies, Closed-Circuit TV. **Massa:** Multi-Channel Recorders, Plug-in DC & Carrier Amplifiers, Pen Motors. **Millivac:** VTVM's, Direct Reading Resistance Meters, Bridges. **Nacimco:** Transducers, AC to DC Converters, Tachometers. **Scopes:** Oscilloscopes. **Sensitive Research Instrument:** Measuring Instruments. **Statham Development:** Temperature Chambers. Transducer Test. **Systron:** Frequency Counters, Time Interval Meters, RDB Counters, Digital Tachometers, Analog-to-Digital Converters, Digital Data Processing. **Technibilt:** Instrument Carriers & Dollies. **Waugh:** Flow Meters, Pulse to DC Converters. **Western Devices:** Instrument Cabinets, Blowers.

Berthold Sales Co., 4411 Maple Ave., Dallas 19, Texas, 15, LAkeside 6-8329

**American Television & Radio:** Vibrators, battery eliminators & chargers. **Arco:** Elmenco capacitors. **Fanon:** Inter-com systems, amplifiers. **Fedtro:** Transistor radio earphones, soldering irons, dry batteries, balance controls. **GC Electrocraft:** plugs, jacks, test leads, switches. **GC Electronics:** Radio & TV knobs, resistors. **General Cement:** Chemicals, tools, hardware. **GC Telco:** TV Hardware, antennas, citizens radio accessories. **Osborne:** Portable 2-way citizens radio. **Perma-Power:** Automatic voltage regulators, remote controls, power supplies for transistor checking. **Quincy Prods.:** Bulk and Boxed speakers. **Setchell-Carlson:** TV monitors.

Branum Sales, Inc., 2334 Havenhurst, Dallas 34, Texas, 15, CHapel 7-7128

**Chicago Dynamics:** Switches. **Erie:** Resistors, capacitors, diodes, pulse transformers, ceramicons, trimmers. **Model Engineering:** Resistors. **Scherma:** Relays. **Standard Kollsman:** Television tuners. **Switchcraft:** Jacks, plugs, switches & cable assemblies. **Triad:** Transformers. **Tung-Sol:** Tubes, diodes, cathodes, transistors, lamps.

Campion Sales Co., 9002 Chancellor Row, Dallas 7, Texas, 15, FLeetwood 7-4095

**Air Marine:** Sub-fractional A/C motors. **Cornell-Dubilier:** Fixed capacitors. **Dialight:** Panel lights. **Jonathan:** Chassis slides. **Kings:** RF connectors. **Monitor Prod:** Freq-xtals. **Molectronics:** Test equip. **John F. Rider:** Publications. **Shure:** Microphones. **Sigma:** Sensitive & polar relays. **Vernitron:** Servos, syncros, resolvers. **Wells:** Precision pots & trimmers.

Central Electronics, 4117 Maple Ave., Dallas 19, Texas, 10 (NEDA)

Corry Co., Hal F., 6315 Hillcrest Ave., Dallas 5, Texas, 15, LAkeside 8-9172

**American Rectifier:** DC power supplies, voltage regulators, motor speed controls. **Knopp:** Phase sequence indicators, voltage testers, current transformers. **Meter Devices:** Meter test switches. **Mohawk:** AN wires. **Molecu-Wire:** Wire. **Radio Frequency:** Induction heaters. **Texas Capacitor:** Mylar & teflon capacitors. **U.S. Relay-Electronics:** Relays. **Westohm:** Precision resistors.

Crabtree's Wholesale Electronics, 2608 Ross Ave., Dallas 1, Texas, 10 (NEDA)

Crockett Sales Co., The, 2204 Griffin, Dallas 2, Texas, 15, RI 8-8209

**Alliance, Cornish Wire, Industrial Timer, Littelfuse, Merit Coil & Transformer, Sprague Products, Triplett.**

Dansby Co., Robert W., 2517 Cedar Springs Rd., Dallas 1, Texas, 15, RIverside 7-6543, (ERA)

Delzell-Maynard Sales Co., 2013 Cedar Springs, Dallas 1, Texas, 15, RI 2-2027 (ERA)

Equipment & Service Co., 7118 Envoy Court, Dallas 7, Texas, 10, 15, 20, FL 1-9947

Gross-Daniels Co., P.O. Box 1926, 10665 Harry Hines Blvd., Dallas 21, Texas, 15, FL 1-1837

**Antenna & Radome Research Assoc.:** Microwave components, variable attenuators. **Hermetic Pacific & Hermetic Seal:** Glass to metal components, AN connectors, multi-headers, terminals, plugs. **Lewis & Kaufman:** Special purpose tubes. **Moeller:** Isolated power supplies. **Pacific Relays:** Miniature relays. **Shepherd Inds.:** Digital tape systems, tape heads, airborne recorders, reproducers. **Sperry-Rand:** Selenium & silicon rectifiers, surge protectors. **Staver:** Subminiature tube shields, rare metal stampings, eyelet machine parts. **Vickers. Ward Antennas.**

Guenther, John B., 4533 N. Central Expressway, Dallas 5, Texas, 15, LAkeside 8-6286 (ERA)

Hays Co., W. R., 3416 Rosedale St., Dallas 5, Texas, 15, EMerson 3-2021 (ERA)

Kantenberger Co., The, 711 Reverchon Dr., Dallas, Texas, 15, WHitehall 8-9535

**Associated Research:** High voltage, insulation & ground testers. **Control:** Supervisory & remote controls, analog & digital telemetering, automatic regulated battery chargers. **Control Data:** Digital computers. **Delbert Blinn:** Transistor pads & mounting kits, heat sink dissipators, silicon-mica insulators. **Greibach:** Precision indicating volt, amp, ohmmeters. **Jordan:** Aircraft & missile power supplies, timers, programmers, sensors. **Mid-Eastern:** Lab. power supplies, ultra-high resistance measuring. **Ransom Research:** Electronic computer components. **Standard Inst.:** Photo-electric control & counting, time recording. **Superior Switchboard:** Outdoor inst. cabinets, test switches.

Koch Engineering & Sales Co., 309 Meadows Bldg., Dallas 6, Texas, 15, EMerson 1-1765

**Brevel:** Geared motors, motion devices, turntables. **Bristol Motors:** Synchronous timing motors, motor driven timing devices, clutch motors. **Climax Metal Prods.:** Nylon Gears & Bearings. **Communications Measurements Lab.:** Electronic Generators, strobes. **Control Parts:** Screw machine prods., precision machining. **Dormeyer:** Solenoids, coils, transformers. **Epsco:** Recorders. **Electrical Industries:** Hermetically sealed terminals, compression seals, multiple headers. **Form-it Prods:** Coil forms, hobbins. **G. B. Components:** Resistors, precision voltage & null references, networks. **General Industries:** DC & AC Motors. **Handley:** Precision potentiometers, custom winding. **Hydroforming Co.:** Hydroformed metal parts, prototype drawn parts. **IT&T:** Selenium & Silicon rectifiers, capacitors, power vacuum tubes, hydrogen thyratrons, hydrogen diodes. **Kurz-Kasch:** Instrument & control knobs, dials & assemblies, compression molding. **Leland:** Ledex rotary solenoids, stepper selectors, rectifiers, syncramental motors. **Measurements:** Signal generators, frequency meters, attenuators, capacitance bridges, test equipment. **Metron:** Speed reducers & changers, gear trains, direct reading tachometers. **Mid-South:** Wire harnesses. **Miniclutch:** Clutch couplings & Torque limiters. **Phaostron:** Meters, switches, relays. **Pix:** Stampings. **Process Gear:** Custom gears. **Revcor:** Blower wheels & Fans. **Simplatrol Prods.:** Electro-mechanical clutches, brakes & couplings. **Sterling Precision:** Gears. **E. H. Titchener:** Wire forms, welded wire assemblies. **Victory:** Power supplies. **Vol-Shan:** Time delay relays. **Harvey Vogel:** Stampings. **Winzeler:** Stamped gears. **Wolverine Plastics:** Molded plastics.

Lawrence Sales Co., P.O. Box 13026, Dallas, Texas, 10, FLeetwood 2-7484

**Cedar Eng.:** Instrument motors. **Electro-Tec:** Slip rings. **Emerson & Cuming:** Plastics. **Magnetics:** High permeability prods. **U. S. Semiconductor:** Silicon diodes & tantalum capacitors. **Waters:** Precision potentiometers.

Lieberman & Associates, Inc., Hank, 6170 Sherry Lane, Dallas 25, Texas, 15, EMerson 3-3452

**Aerovox:** Capacitors, resistors. **Columbia Wire & Supply:** Wire. **Electronic Devices:** Selenium rectifiers. **Precision—Paco Electronics:** Test equipment. **Silicon Transistor:** Transistors. **Herman H. Smith:** Components. **Solitron Devices:** Silicon rectifiers. **Twin Lock:** Barrier strips.

Lucas Sales Co., Charles, 2004 S. Beckley, Dallas 16, Texas, 15, WH 2-5938

**Barker:** "Molded on" audio cables. **Bozak Sales:** Loudspeakers. **Glaser-Steers:** Record changers. **Grado Labs.:** Cartridges, arms. **McIntosh Lab.:** Amplifiers. **Thorens:** Turntables. **Vega:** Wireless microphones. **Viking:** Tape decks.

McKinney Sales Co., Jack F., 1303 Chemical St., Dallas 7, Texas, 15, RIverside 1-1368 (ERA)



# Distributional Functions



Nesbitt Co., Robert E., 1925 Cedar Springs, Dallas 1, Texas, 15, RIverside 7-5824

**Bulova:** Frequency control prods., quartz crystals, ovens, oscillators, crystal filters. **Centralab:** Ceramic Capacitors, electronic circuits, controls & potentiometers, steatite & high alumina ceramic prods., rotary switches. **Chester Cable:** Insulated wire, coax cable. **Chicago Thrift-Etching:** Etched name plates, dials. **Cimco Wire & Cable:** Teflon. **Cinema Eng.:** Audio frequency amplifiers, equalizers, attenuators, precision resistors custom toroids, instrument switches. **Clare:** Transistors. **Cramer Controls:** Timing devices, sub-miniature DC & synchronous motors. **E. F. Johnson:** Pilot lights, jacks & plugs, inductors, nylon connectors, knobs, dials, tube sockets, air variable capacitors. **Milwaukee Resistor:** Power resistors. **Sola:** Constant voltage transformers, DC Power supplies. **Technical Devices:** Wire strippers.

Packard Associates, Love Field Terminal Bldg., Dallas 35, Texas, 15, FLeetwood 7-5713

**Atohm:** Miniature & sub-min. trimmer potentiometers. **Babcock:** Miniature & sub-min. relays. **Beede:** Panel meters. **Behlman:** AC power supplies. **Gremar:** R.F. connectors. **Instruments for Industry:** Amplifiers. **Illinois Condenser:** Electrolytic capacitors. **Malco:** Solder & solderless terminals. **National Union:** Special purpose tubes. **Penn Engineering:** Self-clinching fasteners. **Plastic Capacitors:** Plastic film capacitors. **Premier Metal Prods.:** Metal housings. **Resistance Prods.:** Precision resistors. **Slip Ring Co. America:** Slip rings. **U. S. Components:** Connectors.

Peck Co., The Gordon V., 130 Casa Linda Plaza, Dallas 18, Texas, 15, DAvis 1-6579

**Acme, Model Engineering:** Battery holders. **Amatom Electronic Hardware, CFI Corp.:** Ceramics. **Conhex:** Coaxial RF connectors. **Delitime:** Magnetostrictive delay lines. **Electronic Components:** Transformers. **John E. Fast:** Paper capacitors. **General Scientific:** Precision Potentiometers. **Glennite Batteries:** Rechargeable nickel cadmium. **John Hassall:** Special header parts, units. **Kerley Eng.:** Shock mounts. **Kulka:** Terminal blocks, toggle switches. **Mallory Battery:** Mercury & Zinc carbon. **Mallory Contact Div.:** Electrical contacts. **Mallory Metal Specialties:** Special alloys & sintered metals. **Mallory Welding Div.:** Electrodes & holders. **Mel-Rain:** Sensitivity controls & circuit breakers. **Milli-Switch:** Miniature toggle switches. **Moxness Prods.:** Silicone parts & tape. **Radio Materials:** Ceramic disc & feed-thru capacitors. **San Fernando:** Capacitors, filters & potentiometers. **Sargent:** Toggle switches. **Sealectro:** Standoff & feed-thru terminals. **Torotel:** Toroid coils, magnetic amplifiers. **Wall:** Soldering guns. **West-Cap:** Paper, mylar, polystyrene & teflon capacitors.

**Progress Electronics of the Southeast, 1363 Crampton St., Dallas, Texas, 5, 10, 15, 20, RIverside 1-1463, Branch: New York, N.Y.**

**See ad on page 746**

Schoonmaker Co., Inc., J. Y., 5328 Redfield Ave., P.O. Box 35266, Dallas 35, Texas 15, LAkeside 6-7238 (ERA)

Sinks Co., R. M., 210 Casa Linda Plaza, Dallas 18, Texas, 15, DA 7-9126, (ERA)

Smith Co., J. Earl, P.O. Box 35331, Airlawn Station, Dallas 35, Texas, 15, FLeetwood 7-1727 (ERA)

Southern Radio Supply, 3137 Ross Ave., Dallas 1, Texas, 10 (NEDA)

Southwest Electronic Industries, 273 Meadows Bldg., Dallas 6, Texas, 15, EMerson 3-1671

**Arnold Engrg.:** Magnetic materials. **Bourns:** Trimpots. **Bowmar:** Electromechanical assemblies, gear mechanisms. **Dage Electric:** RF connectors. **Dressen-Barnes:** Regulated DC power supplies. **Electronic Assoc.:** Analog computers & data processing Insts. **General Instrument:** Silicon & germanium rectifiers. **Micamold:** Capacitors. **Offner:** Oscillograph recorders. **Price:** Relays. **Victoreen:** G-M tubes, VR tubes, electrometer tubes, deposited carbon resistors, radiological & health physics instrumentation.

Spears Co., Mitchell, Dallas, Texas, 15, 20, ANdrew 2-6466, Branch: Fort Worth, Texas

Texport Co., The, 2147 Farrington St., Dallas 7, Texas, 15, RIverside 8-0458

**Alpha:** Wire & cable. **Audio Devices:** Magnetic recording tape. **Electra:** Metal film & deposited carbon resistors. **Electro Prods. Labs.:** DC power supplies. **Industrial Electronic Hardware:** Terminal strips & sockets. **Int'l Rectifier:** Silicon & selenium rectifiers & diodes. **J F D:** Trimmer capacitors. **Sonotone:** Cartridges & tubes. **Telex:** Headsets & miniaturized components.

Thomson Engineering Service, 2520 Oak Lawn, Dallas 19, Texas, 15, LAkeside 6-8741

**Aero-Tech:** Teflon wire, cable, sleeving. **Adams-Russell:** Antennas, RF components. **Control Prods.:** Switches. **Couch Ordnance:** Relays, rotary switches. **Crescent:** Transducers, indicators, converters. **Deeco:** Toroidal coils, filters, transformers. **Electro Engineering:** Transformers. **Electronic Transistors:** Germanium & Silicon. **Fairchild Controls:** Potentiometers, transducers, rate gyros. **Feedbac:** Analog computers, servo, magamps. **IERC Div.:** Tube shields, transistor heat dissipators. **Jettron:** Sockets, connectors. **Marstan:** Relays, capacitors, fuses, test equip. **McMillan:** Radomes, microwave absorbers, filters. **Norrich:** Screw machine products. **Ohm:** Wire & cable. **Pyrofilm:** Resistors. **Sealtron:** Glass to metal seals, glass sealed connectors. **Sphere:** Feed thrus, terminals. **Surf Chemical:** Teflon. **Ultronix:** Resistors, pots.

Wholesale Electronic Supply, 2809 Ross Ave., Dallas 1, Texas, 10 (NEDA)

Wilkinson Brothers Co., 2406 Ross, Dallas, Texas, 10 (NEDA)

Wilks Co., The Ernest L., 1212 Camp St., Dallas 2, Texas, 15, RIverside 7-2637

**Barker & Williamson:** Coils, toroids, transmitting condensers, transmitters, test equipment. **C-B-C:** Tube brighteners, automatic voltage regulators, multiple outlet boxes, hi-fi cables. **Campro:** Utility cabinets. **Chicago Miniature Lamp Wrks.:** Lamps. **Colman Electronic Prods.:** Coils, hardware, knobs, chemicals, CRT Conversion kits. **Component Specialists:** Diodes, transistors, silicon rectifiers. **Conant Labs.:** Copper oxide & selenium rectifiers. **Electronic Measurements:** Test equipment. **Gray:** Turntables, tone arms. **Jerrold:** TV Distribution systems. **Penn. Resistor:** Composition resistors, ceramic disc capacitors. **Premax Prod.:** Ground rods, mobile & marine antennas, antenna loading coils. **Quam-Nichols:** P.A. Speakers, ion traps, output transformers. **Resistors:** Wire wound resistors. **Sherwood:** Tuners, amplifiers, speakers. **Turner Co.:** Microphones, stands, accessories.

Wyborny Sales Co., 100 Merchandise Mart, Dallas 1, Texas, 15, RIverside 8-6139 (ERA)

**Clevite-Walco, Electrosonic Labs., Fourjay, Jensen, Kupfrian, Metalworks, Miratel, Movic, Vidaire, Waltham Precision Inst.:** Audio reproducing equip., transistorized DC & AC converters & inverters.

Yount Co., Jack, 1431 Pleasant Drive, P.O. Box 17270, Dallas 17, Texas, 15, EXpress 1-1631

**Electro-Voice:** Microphones, speakers, cartridges. **Hudson Lamp:** Miniature lamps.

**Texas**

**Jackson:** Test equipment. **Lowell:** Radios. **Millen:** Components & instruments. **Newcomb:** Audio visual photographic & P.A. amplifiers, tape recorders. **Oxford:** Replacement speakers. **Radio Mfg. Eng.:** Amateur radio equip. **H. H. Scott:** Amplifiers, tuners. **Supreme:** Transformers. **Texas Crystals:** Industrial & amateur crystals.

**Denison**

Denison Radio Supply, 310 W. Woodard, Denison, Texas, 10 (NEDA)

**Denton**

Cole Co., Lloyd C., P.O. Box 504, Denton, Texas, 15, DU 2-2017 (ERA)

**El Paso**

Mc Nicol, Inc., 811 N. Estrella, El Paso, Texas, 10 (NEDA)

R & R Supply Co., Inc., 2531 East Yandell, El Paso, Texas, 10 (NEDA)

**Fort Worth**

Ecklund Electronic Sales Co., P.O. Box 12151, Fort Worth, Texas, 15, PErshing 8-9773

Engineering & Equipment Co., P.O. Box 13311, Fort Worth 18, Texas, 15, 20, WA 3-7386

**Boonton Electronics:** calib. **Computer Engrg. Assoc.:** Power supplies, amplifiers. **Electric Regulator:** calib. **Electronic Measurements:** calib. **Electronic Tube:** calib. **Holtzer-Cabot:** Fractional hp motors. **M. Ten Bosch:** calib.

Scooter's Radio Supply Co., S. Freeway & E. Vickery, P.O. Box 1536, Fort Worth 2, Texas, 10 (NEDA)

Spears Co., Mitchell, 4944 James Ave., Fort Worth 15, Texas, 15, 20, WAlnut 3-4657

**Ballantine Labs.:** Voltmeters, AC-DC calibrators, capacitance meter, decade amplifier. **Brush Inst.:** Ink, electric, & thermal recording systems, amplifiers, operational monitors. **Colvin Labs.:** Displacement & pressure transducers, pressure switches. **Computer-Measurements:** Digital counters, printers, voltmeters. **De Mornay-Bonardi:** Microwave components. **Donner:** Analog computers & simulators. **Edgerton, Germeshausen & Grier:** Traveling wave oscilloscope, hydrogen thyratrons, high speed photographic instrumentation. **Empire Devices:** Power density meters, stub tuners, power dividers, RF noise & field intensity meters, modulation meters, crystal mixers & attenuators, variable frequency power supplies. **Lavoie:** Oscilloscopes, frequency standards, crystal ovens, spectrum analyzers, automatic testers, double pulse generators. **Non-Linear:** Digital voltmeters, ratiometers, ohmmeters, go-no-go voltage comparators, precision wire-wound resistors, digital readouts, data logging systems, scanners. **Radiation Counter Labs.:** Nuclear equip. **Shielding:** RF shielding, dust-free rooms. **Tally Register:** Plotting equip., logic switches, tape consoles, paper tape equip.

Swieco, Inc., 1518 E. Lancaster, P.O. Box 670, Fort Worth 3, Texas, 10 (NEDA)

**Harlingen**

Electronic Equipment & Engineering Co., 817 W. Tyler, Harlingen, Texas, 10, 15, GArza 3-5424, Branch: Corpus Christi, Texas

**Henderson**

Miller, Jr. Co., Edward G., 512 Waskom St., P.O. Box 929, Henderson, Texas, 15, Tel: 5049, Branch: Albuquerque, N.M.

**Houston**

Airep Engineering Co., 7050 Sharpcrest, Houston 36, Texas, 15, GY 4-4171, Branch: Dallas, Texas

Angie Radio & TV Supply Co., 2005 Crawford St., Houston 2, Texas, 10 (NEDA)
Aymond Co., Edward F., 5010 Carew, Houston, Texas, 15, MOhawk 7-2593, Branch: Dallas, Texas
Beyer & Co., A. R., 1318 Polk Ave., Houston 2, Texas, 10 (NEDA)
Corry Co., Hal F., 2305 Branard, Houston, Texas, 15, JAckson 9-2085, Branch: Dallas, Texas
Hall, Inc., R. C. & L. F., P.O. Box 2434, 1901 Chenevert, Houston 2, Texas, 10 (NEDA)
Kantenberger Co., The, 1811 Pierce St., Houston, Texas, 15, CApital 7-9693, Branch: Dallas, Texas
Klicpera Co., M. F., P.O. Box 3113, Houston, Texas, 15, JAckson 2-8459 (ERA)
Koch Engineering & Sales Co., 1607 Jefferson, Houston 2, Texas, 15, FAirfax 3-7051, Branch: Dallas, Texas
Lieberman & Associates, Inc., Hank, 5702 Creekbend, Houston 35, Texas, 15, GY 9-8797, Branch: Dallas, Texas
Nesbitt Co., Robert E., 4810 Hazard, Houston, Texas, 15, JAckson 8-3811, Branch: Dallas, Texas
Peck Co., The Gordon V., 4007 Bellaire Blvd., Houston, Texas, 15, MOhawk 4-1435, Branch: Dallas, Texas
Southwest Electronic Industries, 3815 Richmond Ave., Houston, Texas, 15, MAdison 3-5775, Branch: Dallas, Texas
Spears Co., Mitchell, Houston, Texas, 15, 20, MAdison 3-4112, Branch: Fort Worth, Texas
Sterling Electronics, Inc., 1616 Mc Kinney, P.O. Box 1229, Houston, Texas, 10 (NEDA)
Texport Co., The, 12910 Tosca Lane, Houston 24 Texas, 15, HOmestead 5-0734, Branch: Dallas, Texas
Wofford Electronics Co., 1423 Holman St., Houston 4, Texas, 10 (NEDA)

**Lubbock**

B & L Radio & TV Supply, Inc., 2424 Texas Ave., Lubbock, Texas, 10 (NEDA)
R & R Supply Co., Inc., 1607 Ave. G, P.O. Box 1360, Lubbock, Texas, 10 (NEDA)

**McAllen**

Rio Radio Supply Co., 608-10 S. Broadway, McAllen, Texas, 10 (NEDA)

**Port Arthur**

Diehl Radio & TV Supply, 2120 Seventh St., Port Arthur, Texas, 10 (NEDA)

**San Antonio**

Gross-Daniels Co., 4610 Lord Rd., San Antonio, Texas 15, MIdway 8-0755, Branch: Dallas, Texas
Kantenberger Co., The, 1502 W. Gramercy, San Antonio, Texas, 15, Pershing 2-2151, Branch: Dallas, Texas
Modern Electronics Co., 2000 Broadway, San Antonio, Texas, 10 (NEDA)
Radio & Television Parts Co., 1828 N. St. Mary's St., San Antonio 2, Texas, 10 (NEDA)
Sherman Electronics Supply, Inc., 720 San Pedro, San Antonio 12, Texas, 10 (NEDA)
South Texas Radio Supply Co., Inc., 647 S. Presa St., San Antonio 3, Texas, 10 (NEDA)

**Texarkana**

Mc Culloch Wholesale TV Supply Co., 1222 Main St., Texarkana, Texas, 10 (NEDA)

**Victoria**

Electronic Equipment & Engineering Co., 1007 N. William, Victoria, Texas, 10, 15, HIllcrest 3-6356, Branch: Corpus Christi, Texas

**Waco**

Best Electronics, 324 N. 18th St., Waco, Texas, 10 (NEDA)
Hargis Co., Inc., 1205 Washington Ave., Waco, Texas, 10 (NEDA)
L & M Sales Co., 1307 Austin Ave., Waco, Texas, 10 (NEDA)

**Wichita Falls**

Gose Radio Supply, 1003 Baylor, Wichita Falls, Texas, 10 (NEDA)

## UTAH

**Ogden**

Ballard Supply Co., 3109 Washington Blvd., Ogden, Utah, 10 (NEDA)
Tri-State Electronic Supply, 2783 Washington Blvd., Ogden, Utah, 10 (NEDA)

**Salt Lake City**

Bowen Co., Inc., R. G., 463 E. 3rd South, Salt Lake City, Utah, 15, EMpire 3-4528, Branch: Denver, Colo.
French Co., Gene, 138 South 2nd East, Salt Lake City, Utah, 15, EMpire 4-3057, Branch: Albuquerque, N.M.
Gates Co., F. Y., 200 S. Main St., Salt Lake City 1, Utah, 15, ELgin 9-1101
**Applied Dynamics:** Spectrum analyzers. **Daven:** Insts. **DuMont Inst. Div.:** Oscilloscopes. **Dynamics Instrumentation:** Chopper stabilizer amplifiers. **Measurements:** Pulse generators. **McIntosh:** Amplifiers, RF tuners. **Smith-Florence:** Amplifiers, power supplies. **Sterling Prec.:** Gyro instrumentation. **Technibilt:** Scope carts. **Triplett:** Test meters.
Hyde Electronics Co., 2803 Connor St., Salt Lake City 9, Utah, 15, INgersoll 7-5763, Branch: Denver, Colo.
Moss Electronics, Inc., Gordon, 1502 Preston St., Salt Lake City 8, Utah, 10, 15, Branch: Greeley, Colo.
O'Loughlin's Radio Supply, 113-115 East Third South St., Salt Lake City 11, Utah, 10 (NEDA)
Pearson & Co., Mel, 288 Canyon Rd., Salt Lake City 1, Utah, 15, EMpire 4-7524, Branch: Denver, Colo.
Standard Supply Co., 225 E. Sixth South St., Salt Lake City 10, Utah, 10 (NEDA)
Stevenson Co., Ralph S., P.O. Box 17495, Salt Lake City 17, Utah, 15, CRestwood 7-2515
**Bogen-Presto:** Amplifiers, alarm systems, professional tape & disc recorders, duplicators, turntables & arms. **Fourjay Ind.:** Baffles. **Glennite Battery:** Nickel cadmium "button cell" rechargeable batteries. **Industrial Electrical Works:** Retractable power-reels, electrical circuits. **Jerrold:** TV distrib. system. **New-Tronics:** Antennas. **Premier Metal Prods.:** Chassis, slides. **Shure:** Microphones. **University:** Speakers. **Wall:** Soldering tools.
Williams & Associates, Inc., 320 E. 4th South, Salt Lake City, Utah, 15, EMpire 4-6844, Branch: Denver, Colo.

## VERMONT

**Bennington**

North Radio Co., Hicks Ave., Bennington, Vt., 10 (NEDA)

## VIRGINIA

**Annandale**

Land-C-Air Sales Co., 201 Epsilon Pl., Annandale, Va., 15, JEfferson 3-7310, Branch: Tuckahoe, N.Y.

**Arlington**

Industry Services, Inc., Key Electronics Div., 122-126 S. Wayne St., Arlington 4, Va., 10 (NEDA)
Jay Co., The, 2420 Wilson Blvd., Arlington 1, Va., 15, JAckson 4-6767
**APC:** Antennas & towers. **Applied Research:** Broadband low noise RF amplifiers, bandpass filters, multicouplers, pads & terminations. **CSC:** Transistorized meters. **Electro-Pack:** Flexible chassis, chassis glide slides, consoles. **Electronic Measurements:** Programmable power supplies. **Jerrold:** Sweep generators, RF attenuators, detectors, comparison switches, crystal marker generators. **Lab. for Electronics:** Ultrastable microwave oscillators, microwave & pulse stability testers, MTI radar test sets. **Lumatron:** Scopes, pulse generators, rise time converters, diode recovery test. **Magnetic Research:** Solid state radar pulse modulators, control systems, telemetry, airborne power devices. **Optimized Devices:** Go-No-Go test equip., comparators, multiconductor test set, transistor test set. **Radiation Instrument Development Lab.:** Multichannel analyzers, scalers, detectors, shields, sample changers, nuclear data analysis systems. **Servo Corp. America:** Servoscope, autopilot analyzer, infra-red optics, I-R components and systems.
Rucker Electronic Products Co., Inc., 1213 Wilson Blvd., Arlington 9, Va., 10 (NEDA)
Simberkoff Sales Co., 724W Arlington Towers, Arlington, Va., 15, JAckson 5-5898, Branch: Hoboken, N.J.

**Charlottesville**

Virginia Radio Supply Co., Inc., 715 Henry Ave., Box 1189, Charlottesville, Va., 10, Tel: 2-4124 (NEDA)
**Amphenol-Borg:** Sockets, connectors, cables. **Belden:** Wire, cable. **Bud Radio:** Cabinets, panels, chassis. **Bussmann:** Fuses. **Chicago Standard:** Chokes & transformers. **Cinch-Jones:** Connectors & terminals. **Cornell-Dubilier:** Capacitors. **Erie Resistor:** Diodes. **General Electric:** Tubes, semiconductors, resistors. **Littelfuse:** Fuses. **P. R. Mallory:** Switches, controls. **Mueller:** Clips. **Ohmite:** Resistors, pots. **Potter & Brumfield:** Relays. **Sola:** Constant voltage transformers. **Triplett:** Instruments. **Tung-Sol:** Tubes, semiconductors. **Ungar:** Soldering tools. **United Transformer:** Transformers, filters.

**Danville**

Womack Radio Supply Co., Inc., 513 Wilson St., Danville, Va., 10 (NEDA)

**Falls Church**

Wilkinson, Inc., Robert L., P.O. Box 218, Falls Church, Va., 15, JEfferson 2-6076, Branch: Towson, Md.

**Norfolk**

Art's Distributing Co., 128 West Olney Rd., Norfolk 10, Va., 10 (NEDA)
Cain Electronics Co., Inc., 14th & Monticello Ave., Norfolk 10, Va., 10 (NEDA)
Priest Electronics, Inc., 6431 Tidewater Dr., Norfolk 9, Va., 10 (NEDA)
Radio Supply Co., Inc., 711 Granby St., Norfolk 10, Va., 10 (NEDA)





# Distributional Functions



**Richmond**

Banner Electronics, Inc., 2224 Chamberlayne Ave., Richmond 22, Va., 10 (NEDA)
Highsmith & Co., James L., P.O. Box 536, Richmond 4, Va., 15, EL 9-1411, Branch: Charlotte, N.C.
Holsten, Inc., E. A., 1420 East Main St., Richmond, Va., 10 (NEDA)
Industrial Electronics Tube Corp., 26 S. 12th St., Richmond 19, Va., 10 (NEDA)
Johnston-Gasser Co., Inc., 3023 W. Marshall St., Richmond 30, Va., 10 (NEDA)
Meridian Electronics, Inc., 1001 W. Broad St., Richmond 20, Va., 10 (NEDA)
Radio Supply Co., Inc., 3302 W. Broad St., Richmond 21, Va., 10 (NEDA)
Richmond Electronic Supply Co., 800 W. Cary St., Richmond 20, Va., 10 (NEDA)

**Roanoke**

Dixie Appliance Co., Shenandoah Valley Ave. & Forest Hill Ave., P.O. Box 601, Roanoke, Va., 10 (NEDA)
Mc Knight Electronics, Inc., 405 Shenandoah Ave., N.W., Roanoke, Va., 10, 15, DIamond 3-9338
**American Standard Tube Sales:** CRT's. **Channel Master:** Antennas. **IRC:** Resistors & controls. **Merit:** Transformers. **Precision Apparatus:** Test equip. **RCA:** Tubes, test equip. **Ram:** Transformers. **Sprague:** Capacitors. **Tung-Sol:** Tubes.
People's Radio & TV Supply Co., Inc., 1015 Moorman Rd. N.W., Roanoke, Va., 10 (NEDA)
Radio Supply Co., Inc., 2009 Williamson Rd., Roanoke, Va., 10 (NEDA)

## WASHINGTON

**Aberdeen**

Western Electronics Co., 213 W. Heron St., Aberdeen, Wash, 15, Lenox 2-5192, Branch: Seattle, Wash.

**Bellevue**

Hall Engineering Co., 1430 130th Ave. N.E., Bellevue, Wash., 15, GL 4-9511 (ERA)

**Ellensburg**

Geiger Radio, W. A., 1101 Columbia, P.O. Box 660, Ellensburg, Wash., 10 (NEDA)

**Everett**

Pringle Radio Wholesale Co., 2101 Colby, Everett, Wash., 10 (NEDA)

**Seattle**

Arva, Inc., 1320 Prospect St., Seattle 9, Wash., 15, MAin 2-0177
**Airtron:** Waveguide, ferrite devices. **Baldwin-Lima-Hamilton:** Strain gages, transducers & instrumentation. **Dage:** Coaxial connectors. **Daytronic:** Differential transformers, transducers. **Dymec:** Custom instruments & systems. **G-V Controls:** Thermal time delay relays. **Hewlett-Packard:** Electronic test instruments. **Int'l Resistance:** Potentiometers, transducers. **Kay Elec.:** Sweeping oscillators, pulse generators. **Kin Tel:** DC Amplifiers & Digital Voltmeters, industrial TV. **Marion Instrument Div.:** Panel meters. **F. L. Moseley:** X-Y & strip chart recorders. **Nems-Clarke:** Special purpose receivers. **Rust:** Strip chart recorders. **Sanborn:** Oscillographic recording systems. **Sensitive Research Instrument:** AC & DC meters. **Sierra Electronic:** Communication test equipment. **Sigma:** Sensitive relays. **Sorensen:** AC regulators, DC power supplies. **Stantron:** Metal Cabinets. **Varian:** Recorders, klystrons, vacuum products. **Victoreen:** Nuclear measuring equip.

Backer Co., Jas. J., 221 W. Galer St., Seattle 99, Wash., 15, AT 3-6470
**Babcock:** Relays. **Cannon:** Plugs. **Centralab:** Switches, controls. **General Instrument:** Diodes, rectifiers. **Hallicrafter:** Receivers. **J.B.T.:** Frequency meters. **Technical Appliance:** Antennas. **Triplett:** Testers, meters. **Tru Ohm:** Resistors. **Ungar:** Soldering Irons.

Burcham Co., Don H., 422 1st Ave. West, Seattle 99, Wash., 15, ATwater 4-7297, Branch: Portland, Ore.
Drake Assoc., Inc., Rush S., 1817 Norman St., Seattle 44, Wash., 15 (ERA)
Farwest Agencies & Farwest Trading Co., Inc., 209 1st Ave. South, Seattle 4, Wash., 10, 15, 20, MAin 4-5650
**Deutsch:** Fasteners. **Waters Mfg.:** Scopes, Pots, Torque Gages, Hardware.
Garretson Radio Supply, Inc., 2416 Second Ave., Seattle 1, Wash., 10 (NEDA)
Haight Co., Fred H., 3212 Eastlake Ave., Seattle 2, Wash., 15, EAst 2-1818
**Drake, International Electronic Industries, International Rectifiers, IT&T Industrial Prod. Div., National Ultrasonic, Pomona, Potter & Brumfield, Standard Electrical Prods.**
Johnston Co., Inc., Ray, 1011 E. 69th Seattle 15, Wash., 10, 15, LAkeview 4-5170
**Airborne Instru. Lab.:** Microwave test insts. **Burnell:** Toroids & filters. **Clevite:** Transistors & Diodes. **Allen B. DuMont:** CRT's and PMT's. **Electralab Printed Electronics:** Printed circuits. **Emerson & Cuming:** Potting compounds, anechoic rooms. **Grant Pulley:** Sliding devices. **HI-G:** Relays. **Hitemp:** Teflon wire. **Marco Industries:** Indicator lights. **Mepco:** Precision resistors. **Mica:** Epoxy glass printed board material. **Pacific Automation Prod.:** Cables & Harnessing. **Rotron:** Fans & blowers. **Vitramon:** Precision capacitors.
Lanphear Co., William R., 3215 Western Ave., Seattle 1, Wash., 15, ATwater 4-8150
**Electro-Voice:** Microphones, public address speakers, cartridges. **Hollingsworth:** Solderless lugs. **Master Mobile Mounts:** Coils, whips, crystals. **Sidco:** Soldering irons. **Sightmaster:** Fuses. **Herman H. Smith:** Plugs, jacks.
Levinson Co., Harry, 1117 Second Ave., Seattle 1, Wash., 15, MAin 2-5433 (ERA)
Marsh Agencies, Inc., 2601 First Ave., Seattle 1, Wash., 15, MAin 2-8761 (ERA)
Merritt Co., Ron, 1320 Prospect St., Seattle 9, Wash., 15, MUtual 2-7337
**Acousti-Craft:** Hi-Fi equipment. **American Geloso:** Stenotape recorder. **Audio-Empire:** Hi-Fi. **B & K Mfg.:** Tube testers, TV circuit analyzers. **Electronic Importers:** Turntables. **Electronic Instrument:** Kits & wired electronic test equip. **Entron:** Closed circuit TV equip. **International Resistance:** Resistors, potentiometers. **Kraeuter:** Hand tools. **Marantz:** Amplifiers & preamplifiers. **Mosley:** TV accessories & amateur antenna. **Plastoid:** TV & industrial wire. **Reeves Soundcraft:** Magnetic Recording tape & discs. **Seco:** Test equip. **Sherwood:** Amplifiers & tuners. **Standard Coil Prods.:** TV tuners & replacement parts. **Stephens-Trusonic:** Hi-Fi speakers. **Superscope:** Tape recorders. **Switchcraft:** Jacks, plugs, connectors, audio accessories. **Telex Labs.:** Head sets. **Tung-Sol:** Radio, TV & industrial Tubes, semiconductors.

**Texas**
**Utah**
**Vermont**
**Virginia**
**Washington**

Northwest Instrument Co., Inc., 1403 W. 45th St., Seattle 7, Wash., 10, 15, 20, SUnset 4-8444
**Applied Electronics:** Radiotelephony, radar, detection finders. **Edo:** Sonar. **Ericsson, L. M.:** Private telephone & intercommunication systems. **Lavoie Labs:** Radar. **Morrow Radio:** Radiotelephones. **North Electric:** Private telephone systems. **Radio Corp. of America:** Marine radar, radiotelephones. **Triton Master:** Loran, radar, automatic radio. **Webster:** Antennas.
Northwestern Agencies, Inc., 4130 1st Ave. South, Seattle 4, Wash., 15, MAin 3-8882
**Atlas Sound Equip.:** Sound projectors, microphone stands. **David Bogen:** Amplifiers, intercom equip., baffles, coupling transformers. **Calvideo:** Television picture tubes. **Carter Motor:** Small rotary power supplies & converters. **Cornell-Dubilier:** Capacitors, vibrators, vibrator power supplies, antenna tuners. **Heinemann:** Magnetic circuit breakers. **Oxford:** Speaker line. **Paco:** Test equip in kit form. **Precision Apparatus:** Radio & TV test equip. **Presto Recording:** Disc & tape recording & playback equip., recording supplies. **Pyramid Instrument:** Tape type ammeters & voltmeters. **Royal Electric:** Radio & electrical cords & cables, fuses. **Shure:** Acoustic devices, microphones, pick-up cartridges. **Sola:** Constant voltage transformers. **United Transformer:** Transformers. **Vega:** TV picture tubes. **Ward Leonard:** Resistors & rheostats, wire-wound, relays. **Weller:** Soldering guns.
Northwestern Sales Co., 2216 11th Ave. West, Seattle 99, Wash., 15 (ERA)
Pacific Electronics Sales Co., 1200 First Ave., Seattle 1, Wash., 10 (NEDA)
Paratech (Paramount Technical Agencies), 9210 28th Ave. N. W., Seattle 7, Wash., 15, SUnset 4-6447
**Benco TV Assoc.:** Amplifiers, antenna systems. **Chicago Dynamic:** Switches, counters, indicators. **Foto-Video:** Cameras, Monitors, TV studio equipment, instruments. **LEL:** Amplifiers, receivers, telemeter preamps. **Lab. for Elec.:** Microwave stability testers, pulse jitter tester, oscillators, memory storage devices. **Lumatron:** Millimicrosecond sampling oscilloscope, pulse generator, diode tester, sampling converter. **Melabs:** Microwave filters, BWO signal generators, receivers, solid state components. **Metronix:** Transistor test set, panel mounted voltmeters. **Microwave Assoc.:** Waveguide components, magnetrons, computer diodes, ferrite devices, varactors & diodes. **Penta:** Switches, Tubes. **Power Sources:** Solid state power supplies.
Parsons & Co., C. B., 3028 First Ave., Seattle 1, Wash., 15, MUtual 2-6780
**Acro Div. Robertshaw-Fulton Controls Co., Adams & Westlake, Autotron, Cambridge Thermionic, C. P. Clare & Co., C. P. Clare Transistor Corp., Curtis Dev. & Mfg., Detroit Coil, Industrial Timer, Industrial Coil, International Instruments, Line Electric, Patwin Div. Pateat Button, PIC Automation, Shallcross Mfg., Simplatrol.**
Peninsula Associates, 3215 Western Ave., Seattle, Wash., 15, Zenith 9501, Branch: Redwood City, Calif.
Porter Co., Burt C., 1209 Poplar Pl., Seattle 44, Wash., 15, EAst 3-8330 (ERA)
**Aero Research Inst.:** Flow-sensing devices, thermocouples. **Bourns:** Trimpots. **Libra scope:** X-Y plotters, analog to digital converters, computer components. **Massa-Cohu:** Direct writing recording systems. **Non-Linear:** Digital voltmeters, ohmmeters, readouts, input scanning devices. **Raychem:** Heat shrinking tubing, wire, cable, coax. **Stackpole:** Fixed composition resistors. **Westinghouse:** Power, receiving, & cathode ray tubes.

Schultz Co., N. R., 4227 Airport Way, Seattle 8, Wash., 15, MAin 4-8650 (ERA)

Seatronics, Inc., 1817 Norman St., Seattle 44, Wash., 15, EAst 3-8545

**AGA Div. ESNA:** Time Delay Relays. **APM:** Hexseals. **Fenwal:** Thermistors. **General Resistance:** Resistors. **Genistron:** Filters. **B. F. Goodrich, Sponge Products Div.:** Absorbers. **Iron Fireman:** Relays. **Lerco:** Hardware. **Mechatrol Div., Servomechanisms:** Motors. **Ohio Semiconductors:** Hall Effect Items. **Sage Electronics:** Power Resistors. **Sartron:** Transformers. **Spectrol:** Potentiometers. **Standard Controls:** Pressure Transducers. **Voltron Products:** Expanded Scale Meters. **Warren Wire:** Teflon & Mil-Spec Wire.

Seattle Radio Supply, Inc., 2117 Second Ave., Seattle 1, Wash., 10, (NEDA)

Smith Sales Co., Don, 2320 N. 45th St., Seattle 3, Wash., 15, MElrose 3-3160 (ERA)

Stroum Co., Inc., Samuel N., 621 Michigan St., Seattle 4, Wash., 15, PArkway 3-7310

**Alpha Wire, Astron, Christie Electric, Clarostat, Elco, Elgin Nat'l Watch, Gen. Transistor, Globe Industries, Helipot, ITT-Components Div., Jensen, Master Specialties, Nat'l Radio, Vaco, Zero.**

Western Electronics Co., 717 Dexter Ave,. Seattle 9, Wash., 10, ATwater 4-0200

**Ampex:** Tape Recorders. **Belden:** Wire. **Bud:** Metal Goods. **Burgess:** Batteries. **Channel-Master:** Antennae, Radios. **Cornell-Dubilier:** Capacitors. **Electro-Voice:** Speakers, Mikes, Cartridges. **P. R. Mallory:** Resistors, Controls, Switches. **Minnesota Mining:** Tape. **Ohmite:** Resistors. **Raytheon:** Tubes, Semiconductors, Hardware. **Simpson:** Meters, Test Equip. **Superior:** Voltage Regulators. **Texas Instruments:** Semiconductors. **Useco-Litton:** Terminals. **United Transformer:** Transformers. **Ward Leonard:** Resistors.

Widdekind Co., M. K., 222 First Ave. N., Seattle 9, Wash., 15, AT 4-8020

**Altec Lansing:** Audio systems. **Aemco:** Relays. **Atlee:** Component holders. **Autotronics:** Clutches, brakes. **Blonder-Tongue:** Closed circuit TV systems. **Douglas Microwave:** Waveguide components. **Freed:** Transformers, instruments, toroids. **Millivac:** Laboratory instruments. **Oak Mfg.:** Switches. **Potter:** Capacitors. **Sarkes Tarzian:** Rectifiers, silicon, selenium. **Scientific Radio:** Quartz crystals. **Tensolite:** Wire & cable.

**Spokane**

Alltronic Distributors, Inc., East 204 Augusta Ave., Box 1077, Spokane 10, Wash., 10 (NEDA)

Arva, Inc., East 127 August Ave., Spokane 10, Wash., 15, Fairfax 5-2557, Branch: Seattle, Wash.

Columbia Electric, E. 3420 Ferry Ave., Spokane 10, Wash., 10 (NEDA)

Merritt Co., Ron, East 127 Augusta Ave., Spokane 10, Wash., 15, FAirfax 5-2557, Branch: Seattle, Wash.

Northwest Electronics, Inc., E. 730 First Ave., Spokane 3, Wash., 10 (NEDA)

Tel-Electric Distributors, N. 734 Division St., Spokane 2, Wash., 10 (NEDA)

**Tacoma**

C & G Electronics Co., 2502 Jefferson Ave., Tacoma 2, Wash., 10 (NEDA)

Wible Radio Supply, Inc., 2360 S. Fawcett Ave., Box 1163, Tacoma 1, Wash., 10 (NEDA)

**Vancouver**

Palmer, Inc., M. V., 4108 N.W. Fruit Valley Rd., Vancouver, Wash., 5, 10, 15, 20, OXford 3-0590

**Palmer Electric Mfg. Co.**

**Wenatchee**

Mid-State Radio Supply, Box 490, 611½ N. Wenatchee Ave., Wenatchee, Wash., 10 (NEDA)

## WEST VIRGINIA

**Bluefield**

Meyers Electronics, Inc., 924 Bland St., P.O. Box 1300, Bluefield, W.Va., 10 (NEDA)

**Charleston**

Chemcity Radio & Electric Co., 1637 Fourth Ave., Charleston 27, W.Va., 10 (NEDA)

Mountain Electronics, Inc., 708 Bigley Ave., P.O. Box 106, Charleston 21, W.Va., 10 (NEDA)

**Huntington**

Electronic Supply, Inc., 422 Eleventh St., Huntington 8, W.Va., 10 (NEDA)

**Wheeling**

General Electronics Distr., Inc., 735 Main St., Wheeling, W.Va., 10 (NEDA)

## WISCONSIN

**Appleton**

Valley Radio Distributors, 518 N. Appleton St., Box 975, Appleton, Wis., 10 (NEDA)

**Brookfield**

Petitt Co., Inc., George, 1105 Forest Lane, Brookfield, Wis., 15, SUnset 2-6026, Branch: River Forest, Ill.

**Chippewa Falls**

Bushland Radio Specialties, 9 W. Spring St., Chippewa Falls, Wis., 10 (NEDA)

**Fond du Lac**

Fond du Lac Distributing Co., 152 S. Macy St., Fond du Lac, Wis., 10 (NEDA)

Harris Radio Corp., 289 N. Main St., Fond du Lac, Wis., 10 (NEDA)

**Green Bay**

NESLO, Inc., 715 14th Ave., Green Bay, Wis., 10 (NEDA)

Northern Radio & Television Co., 1585 Main St., Green Bay, Wis., 10 (NEDA)

**La Crosse**

Stark Electronics Supply Co., 131 S. 6th St., La Crosse, Wis., 10 (NEDA)

**Madison**

Radio Distributors, 418 Oak St., Madison 4, Wis., 10 (NEDA)

Satterfield Electronics, Inc., 1900 S. Park St., Madison, Wis., 10 (NEDA)

**Menomonie**

Miller's Electronic Supply, 1329 N. Broadway, Menomonie, Wis., 10 (NEDA)

**Milwaukee**

Ackermann Radio Supply, 3861 N. 35th St., Milwaukee, Wis., 10 (NEDA)

**Allied Radio of Wisconsin, Inc., 2461 W. Center Ave., Milwaukee, Wis., 5, 10, HIlltop 4-8320, Branch: Chicago, Ill.**

**See ad on page 162**

Central Radio Parts Co., 1723 W. Fond du Lac Ave., Milwaukee 5, Wis., 10 (NEDA)

Cumming & Associates, Inc., Bruce, 4852 N. 24th St., Milwaukee 9, Wis., 15, UPtown 3-1381, Branch; Chicago, Ill.

Dickinson & Associates, E. A., 4117 N. Green Bay Ave., Milwaukee 9, Wis., 15, COncord 4-1080

**Bradley Labs.:** Rectifiers. **Electra Mfg.:** Film resistors. **Gulton:** Special devices. **Heinemann:** Circuit breakers. **Ledex:** Rotary solenoids & switches. **Ohio Semiconductor:** Hall effect devices. **Potter & Brumfield:** Relays. **Simpson:** Meters. **Tru-Ohm:** Wire resistors. **Unimax:** Snap switches.

Diethert Co., Russ, 1324 W. Wisconsin Ave., Milwaukee, Wis., 15, DIvision 2-7484, Branch: Chicago, Ill.

Radio Parts Co., Inc., 1314 N. 7th St., Milwaukee 5, Wis., 10 (NEDA)

Taylor Electric Co., 4080 N. Port Washington Rd., Milwaukee 12, Wis., 10 (NEDA)

**Racine**

Darnold, D. Hale, 914 Kentucky St., Racine, Wis., 15, MElrose 2-9644

**Anchor Metal:** Solder, microforms. **Columbia Products:** TV accessories. **Luxo:** Lamps. **Oxford Electric:** Speakers. **Talk-A-Phone:** Intercommunication systems. **Workman TV:** Resistors, condensers, globars, contact cleaner.

Standard Radio Parts Co., 1244 State St., Racine, Wis., 10 (NEDA)

**West Allis**

Marsh Radio Supply Co., 6047 W. Beloit Rd., West Allis 19, Wis., 10 (NEDA)

## CANADA

**Alberta: Edmonton**

Gould Sales Co. Ltd., E. S., 10860 McQueen Rd., Edmonton, Alberta 15, Branch: Montreal, Quebec

**British Columbia: North Vancouver**

Thompson Ltd., Charles L., 3115 Lonsdale Ave., North Vancouver, B.C., 15, YUkon 7-9388

**Aerovox:** Capacitors, resistors, tape degaussers. **Astatic:** Microphones, cartridges, stands, pickups. **Am, TV & Radio:** Vibrators & inverters, battery chargers, tube savers. **Balfour-Guthrie:** Guy wire. **Belden:** Wire & cable. **Bogen:** Amplifiers, tuners, public address amplifiers & systems, portable transcription equip., intercom & school sound systems, internal telephone intercom systems. **Cerl-Dale:** Wire wound resistors, knobs, electro-mechanical assemblies. **Chicago Telephone:** Volume controls. **Daiwa:** Tape recorders. **English Telephone:** Telephone intercom systems. **Hammarlund:** Communication receivers, variable capacitors. **Hurst Tool:** Timing motors (synchronous). **Katolight:** Generators, converters, frequency & phase changers. **Potter & Brumfield:** Relays. **Raytheon Canada:** Industrial tubes, transistors. **Tenatronics:** Communication antennas, twin lead & co-axial cable. **Tri-Ex:** Steel towers. **University Loudspeakers:** Horns, enclosures. **White Radio:** Air trimmers.

**British Columbia: Vancouver**

Arva, Inc., G-7 Marine Bldg., 355 Burrard St., Vancouver 1, B.C., 15, MUtual 2-4323, Branch: Seattle, Wash.



# Distributional Functions



Atlas Instrument Corp., Ltd., 106-525 Seymour St., Vancouver, B.C., 15, MUtual 3-5848, Branch: Toronto, Ont.

Gould Sales Co. Ltd., E. S., 2150 W. 4th St., Vancouver, B.C., 15, YU 7-5565, Branch: Montreal, Quebec

Mc Lennan Ltd., D. Eldon, 1624-W. 3rd Ave., Vancouver 9, B.C., 15, REgent 6-9251

**Bell Sound Div.:** Amplifiers, tape decks, tape recorders. **Centralab:** Volume controls, switches, ceramic capacitors, printed circuits, ceramics. **Clevite:** Brush headsets, recording heads. **Clevite Walco:** Phonograph needles & accessories. **EV of Canada:** Microphones, DA horns, components. **Fisher Berkeley:** Intercommunication systems. **GC Electronics:** Tools, hardware, chemicals. **Globe Electrical:** Relays. **Highland:** Baffles. **Quam-Nichols:** Speakers. **RME Div.:** Communications equip. **Sangamo:** Electrolytic capacitors. **Soundoller:** Loudspeaker enclosures. **Triad:** Transformers, coils, toroids. **Utrad:** Transistor invertops. **Westcom:** Intercommunication telephones.

Merritt Co., Ron, G-7 Marine Bldg., 355 Burrard St., Vancouver 1, B.C., 15, MUtual 2-4323, Branch: Seattle, Wash.

**Manitoba: Winnipeg**

Thompson Ltd., Charles L., 1440 Erin St., Winnipeg 3, Manitoba, 15, SUnset 3-0848, Branch: North Vancouver, B.C.

**Ontario: Ajax**

Bayly Engineering Ltd., Hunt St., Ajax, Ont., 15, EMpire 2-3741 (Toronto)

**Arnold Engineering:** Magnetic materials. **Ballantine Labs:** Electronic voltmeters. **Boesch:** Toroidal winding machines. **Boonton Radio:** Signal generators, Q meters, Q comparators. **Brush Inst.:** Recording systems. **DeMornay-Bonardi:** Microwave equip. **Du-Mont Labs.:** Electronic test equip. & oscilloscope record cameras, industrial cathode-ray tubes, multiplier phototubes. **Sorensen:** Power supplies, high voltage regulators, frequency changers. **Technibilt:** Industrial handling equip.

Stark Electronic Sales Co., Stark Bldg., Ajax, Ont., 10, 15, WHitehall 2-2120

**Ontario: Ottawa**

Atlas Instrument Corp., Ltd., 77 Danforth Ave., Ottawa, Ont., 15, PArkway 2-7668, Branch: Toronto, Ont.

Bayly Engineering Ltd., 48 Sparks St., Ottawa, Ont., 15, CEntral 2-9821, Branch: Ajax, Ont.

Computing Devices of Canada Ltd., P.O. Box 508, Ottawa 4, Ont., 15, 20, TAlbott 8-2711

**All American Tool & Mfg., American Research Corp., Bell & Howell, Bendix Cincinnati, Bendix Computer, Bendix Pacific, Bendix Radio, Bendix Red Bank, Benson-Lehner, Clary, Dekko Cameras, Dynatron, Ekco, Epsco, Epsylon Industries, Flight Research Inc., Friden Calculating Machine, Hermes Electronics, Huber Industries, New Electronic Products, Nistri OMI Corp., Northeastern Engineering, Offner, Reeves Instrument, Vanguard Instruments.**

Electrodesign, 534 Brittany Dr., Ottawa 2, Ont., 10, 15, SH 9-6837, Branch: Montreal, Quebec

**Ontario: Rexdale**

Pointon Ltd., Charles W., 66 Racine Rd., Rexdale, Ont., 15, CHerry 7-8777

**Astron Sales:** Capacitors. **Carter Motor:** Dynamotors, genemotors, converters. **Cerl-Dale Ltd.:** Miniature precision power resistors, deposited carbon resistors, vitreous-enamel resistors. **C. T. Chapman:** Audio amplifiers, timers. **Don Bosco Electronics:** Transistorized signal injector. **Garrard Engineering & Mfg. Co. Ltd.:** Automatic record changers, transcription motors. **GC Electronics:** Radio hardware, chemicals, TV hardware, antennas. **General Industries:** Electric phonograph motors, recording motors. **Multicore Solders Ltd.:** Ersin & Arax multicore solder wire, tape solder. **Pickering:** Audio components. **RJ Audio Prods.:** Speaker enclosures. **Rola Celestion:** Loudspeakers. **Sterling Precision:** Servo components. **Thordarson-Meissner:** Transformers, coils. **Trimm:** Headsets, plugs, jacks. **Xcelite:** Hand tools.

**Ontario: Toronto**

Active Radio & TV, Ltd., 58 Spadina Ave., Toronto 2, Ont., 15, EM 4-2256 (ERA)

Armstrong Ltd., A. T. R., 700 Weston Rd., Toronto 9, Ont., 15, ROger 2-7535

**APM:** Seals & plugs. **Akro-Mils:** Storage units. **Dormeyer:** Solenoids. **Essex of Canada:** Coils, delay lines. **Good-All:** Capacitors. **Gordos:** Mercury switches. **Olympic Prods.:** Hardware. **Potter & Brumfield:** Relays. **Reeves Soundcraft:** Magnetic tapes. **Sarkes Tarzian:** Rectifiers. **Tru-Ohm:** Resistors & rheostats.

Atlas Instrument Corp., Ltd., 50 Wingold Ave., Toronto 19, Ont., 15, RUssell 1-6174

**Dymec:** Electronic instrumentation systems. **Electro Products.:** Magnetic pickups & proximity controls. **Gertsch Prod.:** Frequency measuring equip. & ratio transformers. **Hewlett-Packard:** Comprehensive line of electronic test equip. **Kin Tel:** DC instrumentation & closed circuit television. **Lindgren:** RF screen rooms. **Massa:** High speed recording system. **Skydyne:** Transit cases. **Sierra Electronic:** Transmission line test equip. **Tel-Instrument:** Voltage regulators & vibration calibrators, TV test equip.

Atlas Radio Corp., Ltd., 50 Wingold Ave., Toronto 19, Ont., 15, RUssell 1-6174

**Amperite:** Relays, ballasts, voltage regulators. **Atlas Sound:** Horns, paging units, microphone stands. **Audiotex:** Hi-Fi Accessories. **B&K Mfg.:** Cathode rejuvenator. **Borg Corp.:** Precision potentiometers & motors. **Consolidated Wire & Assoc.:** Wire & Cable. **Continental Connector:** Connectors. **DeJur-Amsco:** Precision potentiometers. **Drake Mfg.:** Pilot light assemblies, jewels. **Elco:** Sockets & varicons. **Electrical Inds.:** Fused terminals & headers. **Elac:** Automatic record changers & players, variable reluctance cartridges. **Electro Prods. Labs:** Power supplies. **E.M.I. Sales:** Speakers, baffles, battery operated record players. **Federal Electronic Sales:** TV interference filters & couplers. **Gabriel Co.:** Directional antennas. **I. E. Mfg.:** TV accessories. **Industrial Electronic Hardware:** Wafer sockets & terminal strips. **Jerrold Electronics:** Multiple antenna systems, field strength meters. **Lowell Mfg.:** Baffles. **J. W. Miller:** Coils & chokes. **Oak Mfg.:** Rotary switches, vibrators. **Orr Inds.:** "Irish" magnetic tape. **Oxford Components:** Radio, TV, outdoor & hi-fi speakers. **Pace Electrical Instruments:** Meters. **Paco Electronics:** Test equip. & high fidelity kits. **Pilot Radio:** Hi-fi amplifiers & tuners. **Precision Apparatus:** Signal generators, VTVM's, scopes. **Pyramid Instrument:** Clamp-on voltammeters. **Rek-O-Kut:** Hi-fi turntables. **Sargent Electric:** Switches. **Herman H. Smith:** Radio & TV hardware. **Sonotone:** Ceramic cartridges & microphones. **Staver Mfg.:** Tube shields & clips. **Stuzzi Radiotechnisher Betrieb (Vienna):** Transistorized battery operated portable tape recorder. **Switchcraft:** Microphone plugs, jacks, stack switches, connectors. **Telex Labs.:** Earsets, headsets, miniature plug-in & transistor transformers. **Terado:** Converters. **Vaco Prods.:** Screw drivers & pliers, solderless terminals. **Walsco Electronics Mfg.:** TV & radio hardware, chemicals, TV antennas. **Ward Prods.:** Antennas.

Canadian Research Institute, 46 St. George St., Toronto 5, Ont., 5, 10, 15, 20, WAlnut 3-2455

**Baird-Atomic:** Lab. Instruments. **Buckley's (Uvral) Ltd.:** High Tension Test. **Emel Establishments:** Movie Cameras. **Fisher Research Lab.:** Geophysical Instruments. **P. Gossen & Co.:** Meters & Instruments. **Hathaway Instrument:** Recording Oscillographs. **Hitachi:** Insulation Testers. **Isopad Ltd.:** Electric Heating Mantles. **Mico Instrument:** Pantograph Engravers. **Microsprings:** Instrument & Watch Springs. **Photovolt:** Photo-electric Instruments. **Pisberg & Co.:** Wire. **Precision Radiation Instruments:** Radiation Counting Equip., Scintillators, Geiger. **Precision Tubing Co.:** Tubing. **Staub & Co.:** Recording Meters.

Computing Devices of Canada Ltd., 164 Eglington Ave., East Toronto, Ont., 15, 20, HUdson 8-2452, Branch: Ottawa, Ont.

Electro Sonic Supply Co., Ltd., 543 Yonge St., Toronto 5, Ontario, 10 (NEDA)

Electrodesign, 35 Mulholland St., Toronto 19, Ont., 10, 15, RU 7-0691, Branch: Montreal, Que.

Engineered Sound Systems Ltd., 169 Kipling Ave. South, Toronto 18, Ont., 5, 10, 15, 20

**Bogen:** Amplifiers. **Centrum:** Intercoms. **Electro-Voice:** Speakers, Mikes, Mike Stands. **Etelco:** Telephones. **Fisher:** Tuners, Amplifiers. **General Electric:** Cartridges, Speakers, Cabinets, etc. **Hackbusch Electronics:** Amplifiers, Speakers. **Northern Electric:** Sound Equipment, Wire. **Tandberg:** Tape Recorders, Speakers. **Webster:** Intercoms, Amplifiers.

Gould Sales Co. Ltd., E. S., 4 Little Rock Dr., Toronto, Ont., 15, WA 4-0561, Branch: Montreal, Quebec

Precision Electronic Components Ltd., 50 Wingold Ave., Toronto 19, Ont., 15

See Atlas Radio Corp., Toronto.

Radio Components Ltd., 50 Wingold Ave., Toronto 19, Ont., 15, RUssell 1-6174

See Atlas Radio Corp., Toronto.

**Quebec: Montreal**

Armstrong Ltd., A. T. R., 1434 St. Catherine's St., Montreal 25, Quebec, 15, UNiversity 1-6676, Branch: Toronto, Ont.

Atlas Instrument Corp., Ltd., 333 Cavendish Blvd., Room 390, Montreal, P.Q., 15, HUnter 9-8495, Branch: Toronto, Ont.

Electrodesign, 9124 St. Lawrence Blvd., Montreal 11, P.Q., 10, 15, DU Pont 9-5914

**Allison Labs., American Rectifier, Atronic Prod., Beam Echo, Branson Instruments, Bogart Mfg., California Technical Inds., Chassis-Trak, Ersa—Ernst Sachs, Farmer Electric Prod., Franklin Electronics, Gilson Medical Electronics, Gedart-Mijnhardt, C. P. Goerz Electro AG, Hamlin, Industrial Test Equip., Instruments for Industry, Kulite-Bytrex, Manson Labs., Metrawatt AG, Nagard, Nuclear Electronics, Systron, Telecomputing, Trygon Electronics, Versadyne, Waters.**

Gould Sales Co. Ltd., E. S., 19 Le Royer St. West, Suite 102, Montreal 1, Quebec, 15, AVenue 8-5225

**Augat Bros.:** Tube clamps. **Hiram Jones:** Teflon hardware. **Kemode Mfg.:** Cartridge heated soldering irons. **Microtran:** Sub-

*(listing continued on page 766)*

miniature transformers. **San Fernando Mfg.:** Capacitors & potentiometers. **Slip Ring Corp. of Amer.:** Slip rings & brushes. **U. S. Semiconductor Corp.:** Semiconductor products.

Gysan Associates, Montreal, Que., 15, UNiversity 6-9581, Branch: Hamilton, Mass.

## MEXICO

Consultores Tecnicos S. A., (COTESA) Apartado 2250, Mexico D.F. 1, Mexico, 15, Tel: 46-44-18

**Alcon Metal Prods.:** Tube sockets. **Bendix Int'l.:** Airborne radar. **CBS Int'l.:** Vacuum tubes. **Fenwal:** Temperature controls. **Gen. Magnetic Corp.:** Magnets. **Good-All Mfg.:** Condensers. **National Moldite:** Ferrites **Nelson Elec. Mfg.:** Power controls. **Shure Bros.:** Microphones, phono pickups. **Stevens, G. S.:** Coil winders. **Tektronix:** Oscilloscopes.

Consultores Tecnicos S. A., (COTESA) Apartado 1681, Monterrey N.L., Mexico, 15, Tel: 2-73-50, Branch: Mexico City, Mexico

Ingenieria Internacional de Mexico S. A., Alvaro Obregon #189, Mexico 1 D.F., Mexico, 5, 10, Tel: 25-50-24, Branch: Rocke International, New York City

Oskam Representaciones, W. P., Apartado 20699, Mexico 6 D.F., Mexico, 15, Tel: 461050

**Allen-Bradley:** Resistors & precision potentiometers, ferrite prod. **Alliance Mfg.:** Phonomotors. **Astatic:** Phonographs, cartridges, pickups, microphones. **Capehart:** Components for audio equip. **Centralab:** Printed electronic circuits, miniature amplifiers, switches, capacitors, trimmers, ceramic parts, potentiometers. **Cinch:** Connectors, sockets. **Columbus Electronics:** Silicon rectifiers. **Electro Motive:** Mica capacitors. **FairRite Prods.:** Ferrite parts. **Magnetic Core:** Powdered metal cores for high frequency use. **M. A. Miller Mfg.:** Phonograph needles. **Joseph Plasencia:** Transistors & other miniature components. **United-Carr Fastener:** Fasteners. **Vokar:** Vibrators.

## GREAT BRITAIN

Systems Engineering Labs., Inc., 34 Bloomsbury St., London, W.C. 1, England, 5, 10, LANgham 5654, Branch: Rocke International, New York City

## FRANCE

Bureau de Liaison, 113 Rue de l'Université, Paris 17, France, 5, 10, INValides 9920, Branch: Rocke International, New York City

Radiophon Corp., 148 Ave. Malakoff, Paris 16, France, 5, Branch: New York, N.Y.

## GERMANY

Telco G. m. b. H., Eichhoernchenstrasse 172, Postfach 9, Baldham-Muenchen, Germany, 5, 10, Tel: 08106, Branch: Rocke International, New York City

## JAPAN

Technical Factors, Ltd., C.P.O. Box 1288, Tokyo, Japan, 5, 15, Tel: 441-1742

**American Silver Co.:** Foils. **Ampere Inds.:** Infra-red heaters. **Analogue Controls:** Precision potentiometers. **Anchor Metal Co.:** Alloys, solders. **Combustion Instruments:** Plastic analyzers. **Courter Prods.:** Digital converters. **Derivation & Tabulation Assoc.:** Data list. **Electronic Control Corp.:** Electric controls. **Emerson & Cuming, Inc.:** Plastics for elect. **Gremar Mfg. Co.:** Coaxial connectors. **Kinevox:** Tape & film recorders. **Mesa Plastics Corp.:** Diallyl phthalate. **Racal Communications:** Receivers. **Racal Instruments:** Digital counters. **Radiation Research Corp.:** Krypton battery. **Ram Chemicals:** Mold release. **Remanco:** Microwave target simulator. **Semi-Elements Inc.:** Single crystals. **Technical Wire Prods.:** Woven wire gaskets. **Techniques Associates:** Pyrometer testing devices. **Telectro Ind.:** Tape recorders for FM/AM. **United Hydraulics, Inc.:** Hydraulic-electronic systems.

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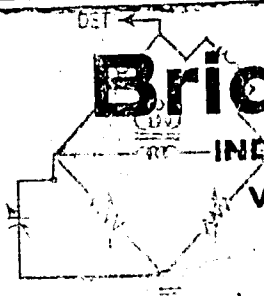
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| 1605-AS2 Impedance Comparator $925 | 100 c, 1 kc<br>10 kc, 100 kc | Z: 20Ω to 20 MΩ<br>ΔZ: ±0.003% to ±3%<br>Δθ: ±0.00003 to ±0.03 radian | ±0.003% | self contained | self contained | For precise measurements — has 3-to-1 increase in sensitivity over the 1605-A. |
| 1613-A Capacitance Bridge $2175 | 400 c | C: 5 μμf to 11,000 μμf<br>D: 0 to 0.11 | ±0.1%<br>(±0.8% at 5 μμf)<br>±2% | self contained | self contained | Designed primarily as a calibrator for capacitive type aircraft fuel-gage testers. |
| 716-C Capacitance Bridge $655 (rack model, $625) | 1 kc<br>0.1, 10, 100 kc<br>0.1, 1, 10, 100 kc<br>0.1, 1, 10, 100 kc | C: 100 μμf to 1.15 μf<br>C: 100 μμf to 1150 μμf<br>C: 0.1 μμf to 1050 μμf<br>D: 0.00002 to 0.56 | ±0.1% ±(1 μμf x C multiplier setting)<br>±0.2% (substitution)<br>±2% | 1302-A | either 1231-B or 1212-A with appropriate filters | For capacitance standardization, precision measurements, dielectric tests and studies. |
| 716-CS1 Capacitance Bridge $600 (rack model, $575) | 0.5 to 3 Mc | C: 0.1 to 1150 μμf<br>D: 0.00002 to 0.56 | ±0.2%<br>±0.2% | 1214-M for 1 Mc 1211-B for other frequencies | 1212-A | High-frequency model of 716 C. |
| 916-AL Radio-Frequency Bridge $670 | 50 kc to 5 Mc | X: ±11,000 Ω at 100 kc<br>R: 0 to 1000 Ω (X-range varies inversely as frequency) | ±2%<br>±1% | 1211-B or 1330-A | communications receiver | Measures impedances of antennas, transmission lines; measures low impedances simply directly at radio frequencies. |
| 1606-A Radio-Frequency Bridge $660 | 400 kc to 60 Mc | X: ±5,000 Ω at 1 Mc<br>R: 0 to 1000 Ω | ±2%<br>±1% | 1211-B, 1215-B, or 1330-A | communications receiver | Improved model — same use as 916-AL but for higher frequencies. |
| 1601-A V-H-F Bridge $575 | 10 to 165 Mc | X: ±200 Ω at 100 Mc<br>R: 0 to 200 Ω | ±5%<br>±2% | 1208-B, 1215-B, or 1330-A | receiver, DNT-1, DNT-2 | For measurements of either lumped or coaxial circuits. |
| 1661-A Vacuum-Tube Bridge $1100 (also measures transistor low-frequency parameters) $1100 | 270 c, 400 c, 1 kc | μ: 0.001 to 10,000<br>rp: 50 Ω to 20 MΩ<br>gm: 0.02 to 50,000 μmho<br>also measures hi, hr, hf, and ho of transistors | ±2%<br>±2%<br>±2%<br>at mid ranges | 1214-E | 1212-A with 1951-E Filter | Adaptors furnished with instrument for measuring characteristics of receiving and transistors. |

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